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## Prevalence of Health Hazards Associated with Solid Waste Disposal- A Case Study of Kolkata, India

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### Abstract

Multiple factors like population density with high degree of commercialization and rapid urbanization has resulted in problems of solid waste disposal which produce 120,000 tones of solid waste per day in India (2014) and its detrimental consequences. But separate studies on the health hazards associated with waste disposal in the localities of Kolkata are scanty. The aim of this study is to explore the adverse health effects prevalent in the community associated with the solid waste disposal system in a specific locality (i.e. Garia) of Kolkata. A garbage disposable area of Kolkata was selected in Garia and the nearby households (within 500 m from the waste disposable land) were randomly selected and case study was done by interview on the effect of garbage disposal on the health of the adjacent residents with two self structured questionnaires, taking note of perception and awareness about garbage disposal practices. Their recommendation was also sought for eradication of menace. The study clearly indicates failure of the existing facilities, high volume of waste generation, inadequate collection space, and the presence of open-dump sites which generates serious health risks. Information of various types of waste materials like polythene bags, construction wastes, regular solid wastes from households were obtained. It was observed that the people living in this area have poor health like allergy, asthma, skin irritation and other gastro intestinal diseases. The public perception indicated that most people lack knowledge of the harmful effects of waste heaps including that they are breeding grounds for flies, cockroaches, and mosquitoes, rodents etc which are responsible for transmission of germs and zoonotic infections to the people living nearby. The findings of the study will help the stakeholders to take necessary steps to eradicate the problem and to grow a healthier environment.

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## 1.0 Introduction

Increasing population levels, booming economy, rapid urbanization and the rise in community living standards have greatly accelerated the municipal solid waste generation rate in developing countries (Minghua et.al. 2009). Rapid industrialization and population explosion in India has led to the large scale migration of people from villages to cities which generate thousands of tons M.S.W daily. The M.S.W amount is expected to increase significantly in the near future as the country strives to attain an Industrialized nation status by the year 2020 (Sharma and Shah, 2005; Central Pollution Control Board, 2004; Shekdar et.al. 1992). Improper handling of waste disposal causes an adverse impact on all components of the environment and human health (Rathi et.al. 2006; Sharholly 2007; Ray et.al. 2005; Jha et.al. 2003; Kansal 2002; Kansal 1998; Singh and Singh 1998; Gupta et.al. 2007). Different kinds of human activities generate huge quantity of waste. More complex and heterogeneous wastes are produced daily because of the change in the living standards and food habits. The solid waste problem is much more severe in urban environments (Anjaneyula 2005).

The major urban environmental concerns – municipal solid waste management, sanitation and associated adverse health impacts, the increased urbanization with large population density can further intensify these concerns, unless we take urgent effective steps to improve sanitation and solid waste management. Landfilling is the simplest and normally cheapest method for disposing of waste (Taylor et.al., 2003). In most low-to medium-income developing nations, almost all generated solid waste goes to landfill. Research findings have shown that these landfilling sites are the breeding ground for pathogenic microorganisms and vectors of disease, and cause a public nuisance due to unsightliness and bad smell. It can cause contamination of surrounding soil, groundwater and surface water, and it can also create fire hazards, physical hazards and have poisoning effects. Current global MSW generation levels are approximately 1.3 billion tonnes per year, and are expected to increase to approximately 2.2 billion tonnes per year by 2025. This represents a significant increase in per capita waste generation rates, from 1.2 to 1.42 kg per person per day in the next fifteen years. However, global averages are broad estimates only as rates vary considerably by region, country, city, and even within cities (Hoorweg 2005). According to the Central Pollution Control Board (CPCB), the average Indian generates about 490 grams of waste per day. Although the per capita waste is low compared to western countries, the volume is huge. The generation of solid waste in Indian cities has been estimated to grow with 1.3 percent annually. The expected generation of waste in 2025 will therefore be around 700 grams per capita per day. Considering that the urban population of India is expected to grow to 45 percent from the prevailing 28 percent, the magnitude of the problem is likely to grow even larger unless immediate steps are taken (Draft report for the 12th Finance Commission Management of Solid Waste in Indian Cities, Government of India). Earlier studies have shown that the unscientific disposal of solid waste created lots of environmental problem in some area.

More than 2920 ton/d of solid waste are generated in the Kolkata Municipal Corporation (KMC) area. Major deficiencies were found in all elements of SWM. The collection process is deficient in terms of manpower and vehicle availability. Bin capacity provided is adequate but locations were found to be inappropriate, thus contributing to the inefficiency of the system. At this time, no treatment is provided to the waste and waste is dumped on open land at Dhapa after collection. Lack of suitable facilities (equipment and infrastructure) and underestimates of waste generation rates, inadequate management and technical skills, improper bin collection, and route planning are responsible for poor collection and transportation of municipal solid wastes (Hazra and Goel 2009).

With an area of 187.33 km<sup>2</sup> and a population of about 10 million (including a floating population of about 6 million), the city generates about 3500 Metric Ton (MT) of solid waste per day. Currently, Kolkata Municipal Corporation (KMC) disposes its waste at Dhapa (21.47 ha), where the disposal rate exceeds 3000 MT/day, and at Garden Reach (3.52 ha), where the disposal rate is 100 MT/day. Considering the exhaustion of Dhapa land space, city planners are urgently searching for an alternate disposal ground. National Environmental Engineering Research Institute (NEERI), under the sponsorship of Central Pollution Control Board (CPCB), has brought out literature developing the site selection criteria for municipal solid waste disposal ground to suit Indian conditions. The developed criteria encompass environmental conditions, accessibility, geological and hydro geological conditions, and ecological and societal effects (Paulet.al. 2009).

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