

## Sustainable Recycling Practices to Reduce Health Hazards of Municipal Solid Waste in Patna, India

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**Abstract :** Though Municipal Solid Waste (MSW) is a worldwide problem, yet its implications are enormous in developing countries, as they are unable to provide proper Municipal Solid Waste Management (MSWM) for the large volume of MSW. As a result, the collected wastes are dumped in open dumping at landfilling sites while the uncollected wastes remain strewn on the roadside, many-a-time clogging drainage. Such unsafe and inadequate management of MSW causes various public health hazards. For example, MSW directly on contact or by leachate contaminate the soil, surface water, and ground water; open burning causes air pollution; anaerobic digestion between the piles of MSW enhance the greenhouse gases i.e., carbon dioxide and methane (CO<sub>2</sub> and CH<sub>4</sub>) into the atmosphere. Moreover, open dumping can cause spread of vector borne disease like cholera, typhoid, dysentery, and so on. Patna, the capital city of Bihar, one of the most underdeveloped provinces in India, is a unique representation of this situation. Patna has been identified as the 'garbage city'. Over the last decade there has been an exponential increase in the quantity of MSW generation in Patna. Though a large proportion of such MSW is recyclable in nature, only a negligible portion is recycled. Plastic constitutes the major chunk of the recyclable waste. The chemical composition of plastic is versatile consisting of toxic compounds, such as, plasticizers, like adipates and phthalates. Pigmented plastic is highly toxic and it contains harmful metals such as copper, lead, chromium, cobalt, selenium, and cadmium. Human population becomes vulnerable to an array of health problems as they are exposed to these toxic chemicals multiple times a day through air, water, dust, and food. Based on analysis of health data it can be emphasized that in Patna there has been an increase in the incidence of specific diseases, such as, diarrhoea, dysentery, acute respiratory infection (ARI), asthma, and other chronic respiratory diseases (CRD). This trend can be attributed to improper MSWM. The results were reiterated through a survey (N=127) conducted during 2014-15 in selected areas of Patna. Random sampling method of data collection was used to better understand the relationship between different variables affecting public health due to exposure to MSW and lack of MSWM. The results derived through bivariate and logistic regression analysis of the survey data indicate that segregation of wastes at source, segregation behavior, collection bins in the area, distance of collection bins from residential area, and transportation of MSW are the major determinants of public health issues. Sustainable recycling is a robust method for MSWM with its pioneer concerns being environment, society, and economy. It thus ensures minimal threat to environment and ecology consequently improving public health conditions. Hence, this paper concludes that sustainable recycling would be the most viable approach to manage MSW in Patna and would eventually reduce public health hazards.

**Keywords :** municipal solid waste, Patna, public health, sustainable recycling

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