

# Socio-Economic Impact of Improper Hospital Waste Management on Waste Disposal Employees

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## Abstract

**Background:** Improper disposal of hospital waste results in spread of disease to the community and its handlers.

**Objectives:** To study the socio-economic impact of inappropriate disposal of hospital waste on the health of the waste disposal staff.

**Materials and Methods:** Interviews were conducted from 50 hospital waste collectors of Lahore and using a pre-structured questionnaire, the information was filled. The data were statistically analyzed for frequencies, and cross tabulation.

**Results:** The improper disposal of hospital waste lead to disease in 45 hospital waste collectors. Eighteen waste collectors were infected with respiratory diseases, 14 with skin infection, 7 with tuberculosis and 6 with hepatitis. Only 8 workers were provided with special clothes by the hospital management. The chances of getting infection was high in those who were not provided with special clothes like, gowns, gloves and shoes as compared to those who were provided with these. The total cost of recovery for these diseases also varied with an amount of Rs. 68,340 for the treatment of hepatitis, Rs. 3,150 for tuberculosis, Rs. 1,500 for respiratory diseases and Rs. 1,000 for skin infection. Only 12 workers were given a small remuneration ranging from Rs. 100-400 per month as compensation from the hospital administration.

**Conclusions:** Use of protective clothing by the hospital waste disposal collectors can significantly reduce their exposure to the diseases.

**Policy message:** Provision of clothing and gloves to the waste disposal collectors, would help significantly in reducing diseases like tuberculosis, hepatitis, respiratory diseases and skin infection.

**Key words:** Socio-economic, hospital waste management, waste disposal employees.

## Introduction

An efficient and effective disposal of hospital waste is a challenge all around the globe. According to a report from USA, hospital waste produced each year is about 1% of the municipal waste<sup>1</sup>. Out of this 1% of the hospital waste, 85% is the commercial waste containing food, paper and plastics whereas, remaining 15% is composed of body tissues, materials contaminated with blood, body fluids or cultures which is potentially infectious and dangerous for animal and human health.

The situation of hospital waste management is worse in developing countries and Pakistan is no exception. Pakistan has environmental protection agency (EPA) in Islamabad along with four environmental protection departments (EPD) in each province. Pakistan environmental protection act (PEPA) was implemented in 1997. EPA also made legislations on Hospital Waste Management Rules in 2005<sup>2</sup> which are empowered by PEPA but are implemented with partial success. The EPD

Punjab has taken steps in protection against hospital waste disposal<sup>3</sup> but overall the hospital waste management in the country is still in its infancy.

Some research on hospital waste management has been done by EPD, Punjab but little work<sup>4</sup> is done on social benefits and cost analysis of hospital waste disposal which, may highlight its socio-economic impact on the civil society.

The assignment of economic value to the gains and losses in environmental context has gained considerable importance in the recent past. In current era of global warming, a good social benefit cost analysis before installation of a project can be beneficial for prevention of further deterioration because, it provides exact amount of benefits and costs of a project to be installed. That is why it is mostly used as tool by experts and policy makers to evaluate the socio-economic impact on the society resulting from an individual's or an organizational activity. A comprehensive socio-economic benefit cost analysis would improve the estimate of project's development impact as well as provide information about benefits associated with environmental investments. It has been widely applied to sort out benefits and costs of different types of solid waste in studies undertaken by Pearce<sup>5</sup>, Dobbs<sup>6</sup>, Eshet<sup>7</sup>, Hamilton<sup>8</sup>, Palmer<sup>9</sup> and Oke and

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Awofeso<sup>10</sup>. This study focuses on the economic evaluation of impact of current hospital waste disposal practices in Lahore on waste disposal employees and the diseases they catch during handling of hospital waste, estimate the socio-economic impact of improper disposal on scavengers/disposal staff, monetize the cost in terms of premature mortality and morbidity of these employees and estimate the compensation given by hospitals to the employees for treatment.

### Materials and Methods

The study was conducted over six months (January 2008 to June 2008). The primary data were collected by taking interviews from hospital waste collectors of few major hospitals of Lahore. The hospitals included Shalimar Hospital, Mayo Hospital, Jinnah Hospital, Services Hospital and Children Hospital. The responses were gathered by interview and through a questionnaire. The hospital managers were interviewed while 50 persons dealing with the waste disposal were served questionnaires which, were filled by the researchers. The sample size of hospital waste collectors was calculated on the basis of total number of beds in the hospitals i.e 37,500. As on an average each collector serves 5 beds so the number of data collectors come to be 7500. By incorporating this number in the following formula.

$SS = [z^2 * p(1-p)] / c^2$  a sample size of 50 collectors was calculated

The hospital administrators included superintendents and deputy superintendents of public hospitals and Director Environment of Shalimar Hospital. Interviews were conducted in person while the questionnaire was specially designed, pretested and was filled by the researchers for the waste collectors after posing questions.

The secondary data about the disposal of hospital waste was collected through literature search from the libraries, websites and books<sup>11</sup> (Amjad Chaudhry Library Lahore School of Economics, Lahore and Allama Iqbal Medical College Lahore). The books helpful for the basic understanding of the hospital waste management were specially reviewed. The data were computed in tabular form using Microsoft Excel Software while the benefits and costs were separately tabulated in Microsoft Word.

Data were statistically analyzed to display frequency tables, cross tabs. From the tables net benefits and costs were calculated.

### Results

Ten interviews were conducted with the aim to collect and analyze the current situation of waste collection, health of the collector and any precautionary measures taken. Administrations of the hospitals claimed

that special training was given to the waste collectors and special clothes were provided to them but, when sites were visited and sweepers were interviewed, only 8 out of 50 were equipped with these clothes.

**Table 1: Number of cases of different diseases calculated from frequencies of infected employees.**

| Types of diseases    | Number of cases    |
|----------------------|--------------------|
| Tuberculosis         | (7/50)*7500=1050   |
| Hepatitis            | (6/50)*7500=900    |
| Respiratory diseases | (18/50)*7500=2,700 |
| Skin infections      | (14/50)*7500=2,100 |

Forty five waste collectors had diseases like hepatitis (6), tuberculosis (7), respiratory infections (18) and skin diseases (14). The number of cases suffering from different diseases is calculated from frequencies of infected employees and is shown in Table-1. The cost analysis of these diseases is shown in Table-2.

**Table 2: Cost of recovery calculated per patient and total cost.**

| Types of diseases       | Tuber-culosis         | Hepatitis              | Respi-ratory diseases | Skin infections       |
|-------------------------|-----------------------|------------------------|-----------------------|-----------------------|
| Cost per patient in Rs. | 3,150                 | 68,340                 | 1,500                 | 1,000                 |
| Total cost in Rs.       | 3,150*1050 =3,307,500 | 68,340*900 =61,506,000 | 1,500*2700 =4,050,000 | 1,000*2100 =2,100,000 |

**Table 3: Expenditure by employees on cure of diseases per month and per annum.**

| Number of employees  | Monthly cost in Rs. | Per annum in Rs. |
|----------------------|---------------------|------------------|
| 19/50* 7,500 = 2,850 | 150                 | 1800             |
| 15/50*7,500 = 2,250  | 250                 | 3000             |
| 16/50*7,500 = 2,400  | 350                 | 4200             |

The cost for recovery of each disease was estimated by consulting the community medicine departments of hospitals. The cost of recovery from tuberculosis was Rs. 3,150 per patient and from hepatitis Rs. 68,340 per patient. The most expensive part of recovery is that from hepatitis due to high cost of interferon. Recovery from skin diseases was relatively cheap, costing about Rs.1,500 per patient. The estimated cost of recovery from respiratory diseases was around Rs. 1,000 per patient. However, the expenditure incurred by employees on the cure of these diseases per month and per annum was calculated from number of cases of different diseases as seen in Table-3. About 2,850 employees spend about Rs. 150 per month or Rs.1800 per annum on treatment of diseases. About 2,250 spend Rs. 250 per month and Rs. 3,000 per annum and 2,400 employees spend Rs. 350 per month and Rs. 4,200 per annum (Table-3).

## Discussion

The present study shows the cost analysis of treatment of hospital waste handlers who get infected with chronic diseases during their job.

The results of the present study are compared with a previous study<sup>4</sup> in Table-1 and it shows the change in socio-economic situation of waste collectors in the hospitals of Lahore. In both surveys majority of waste collectors opted for this job for want of money and unemployment. The comparison indicates a positive change where salaries have increased from 38% to 58% while that of unemployment has gone down from 82% to 48%. The highest salary in 2004 survey was Rs. 3,000 which was paid to few supervisors but in the present study, 32% were in the highest salary bracket (> Rs. 5,000). Majority of employees (42%), still lie in the lowest income bracket (Rs. 3,000-4,000). Majority of waste collectors were performing this job randomly without any family trends and no significant change in this trend was seen over the last four years: 56.4% in 2004 and 60% in 2008. The percentage of waste collectors with more than 5 year service has increased from 32.7 to 42% which reflects the trend of continuation of the jobs. The trend in those working for less than 5 year has undergone down from 67.3 to 58%, indicating that less number of people are opting for the job.

The waste collectors when enquired about the awareness for harmful nature of their job showed 100 % awareness as against 85.5% seen in 2004. Though majority of the waste collectors are taking precautions at personal level to protect themselves from infections and this trend has improved in four years significantly: increase in awareness from 29% in 2004 to 64% in 2008 and drop in non-aware people from 71 to 36%. This positive trend indicates that the hospital administration must have given some training to the employees but personal protective measures like provision of special clothes and shoes by the administration was not reflected in the responses of the collectors (84% in 2008 said no against 82% in 2004 while 16 in 2008 said yes against 18% in 2004). The present study showed a significant impact of non-supplying of special clothes for handling hazardous waste while only 5% get infected when provided with protective clothes

Over 90% the waste collectors caught diseases due to improper handling of hospital waste. No case of HIV was reported and none had dual infections. The frequency of illness showed that 32% employees did not fell ill, 54% fell ill once a month (normal trend) and 14% fell ill more than thrice a month which is alarming because this population has high immunity due to frequent exposures but as they are infected with multi drug resistant bacteria and viruses, therefore once they fall sick, they are difficult to treat.

Cost appears to be a major reason for these persons to not to get themselves tested for diseases as 84% said that they would not get themselves tested and 56%

quoted cost as the barrier for testing and said that hospital authorities should take appropriate measures for the prevention of infection to waste handlers. About 38% of the waste handlers said that their monthly expenditure on treatment ranges between Rs. 100-200, 30% were spending between Rs. 200 to Rs. 300 and 32% were spending more than Rs. 300, indicating that a major chunk of their salaries goes in the treatment. Majority of the waste collectors do not spend their money on treatment and rely on either treatment from the hospital or they avoid treatment till they are very sick. Only 24% of the collectors were compensated by the hospital administration and the study clearly showed that compensation by hospital administration helped the employees in treatment of their diseases. Social costs can also serve as a social benefit if they are provided by the government or by hospital administration to the scavengers.

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