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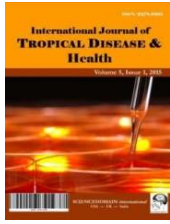
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High Disease Burden among Sanitation Workers of Shimla Municipality in Himachal Pradesh, India - A Leading Cause of Adult Mortality

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Authors' contributions

Principal author conceptualized the paper. Author VS collected the references and data. Author AP helped in writing the paper and author Mr. VK provided the guidance and photos. All authors read and approved the final manuscript.

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ABSTRACT

The aim of this paper was to explore the work practices, injuries, illnesses, working conditions and other hazards faced by Shimla city municipal solid waste collectors and sanitary workers in the course of discharging their duties. The sample for the study comprised three hundred and eighty (380) solid waste collectors, drainage cleaners and septic tank cleaners selected through convenient sampling technique, through open interviews. Their supervisors also formed part of the sample.

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From July 27, 2012 to Nov 27, 2014 (28 Months), a total of 16 sanitary workers, including two women, died of various ailments, which means death of one worker every two months. Majorities were in their mid forties and suffered cardiovascular ailments like heart attacks. A total of 33 sanitary workers died within 2 years of their retirement that is before reaching the age of 61 years most of them due to heart attack.

There is a strong need for periodic health surveillance of sanitary workers to detect early signs of non-communicable diseases like high blood pressure and diabetes etc. among them and educate them regarding balanced diet and risk of excessive alcohol, non-veg food and smoking. There are facilities nearby to treat communicable diseases. However, now the trend of suffering of sanitary workers is shifting from communicable to non communicable diseases that are not taken care of at early stage and hence compound the problems for them.

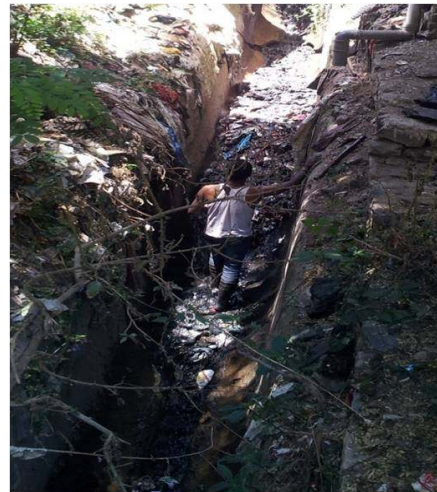
Keywords: Municipality workers; garbage collectors; health and sanitation; septage management; jaundice outbreak; health education.

1. INTRODUCTION

Himachal Pradesh is primarily a rural state. Though the share of urban population to the total population is consistently rising over the years, the state has only one Municipal Corporation. There are 29 Municipal Councils and 20 Nagar Panchayats, constituting approximately 10% of the state population. Shimla, the erstwhile summer capital of the British, is the state capital having 0.1 million as floating tourist population. The local city population is 0.16 million as per 2011 census. The urban growth is not limited to the municipal limits of the towns and cities in the state. It is the peri-urban population that puts load on the existing sanitation infrastructure of urban populace. The floating population within the city and high tourist influx require city managers to make cleanliness and sanitation related arrangements within limited available resources. Any failure in discharging this obligatory function of the municipality may result in adverse public health outcomes, especially jaundice outbreaks.

Shimla city does not have regulations and mechanisms for managing septage, which results in groundwater quality contamination issues. Manual scavenging practices involved in informal septage management are controlled significantly after adoption of related Act. The percentage of urban households practicing open defecation in the city is 3.0%. Repeated Jaundice outbreaks [1] (Hepatitis-A) in the city of Shimla and other towns in last decade due to mixing of sewage with drinking water sources from the rivers is a serious cause of concern. The recent jaundice outbreak (Hepatitis-E) in Shimla (2016) has affected more than 1000 persons, causing some deaths, especially of pregnant women. Various attempts have been made in this regard

from time to time but such outbreaks are pointer towards poor sanitation and poor water quality that need to be addressed completely in specific pockets of the city. The absence of scientific treatment and landfilling for municipal solid waste is another cause of concern for the city managers. Coverage of households in terms of door to door garbage collection services is inadequate and segregation of waste is not practiced. The hilly terrain of Shimla makes it tough for the municipality workers to provide civic amenities like lifting of garbage, street sweeping, septage management, cleaning of clogged drains / nullahs (Picture 1), sewer maintenance, lack of Honey Suckers for emptying of septic tanks and other related public utilities to every household in the city.



Picture 1. Sanitary workers working bare foot/hands to clean a big dirty drain in the city

Sanitation being the state subject, Municipal Corporation Shimla (MCS) is entrusted with the

job to keep the city clean and livable. To discharge this obligatory function, municipal workers have many categories, namely garbage collector, drainage cleaner and sewerage/septic tank cleaners. The city government has procured the advanced machines and tools from time to time to facilitate the municipal workers. The use of such machines and tools are limited to certain parts of the city only, which are accessible through roads. Absence of roads in the hilly terrain leads to intense physical labour, leading to back aches and other health ailments among sanitary workers. This also increases the risk of their direct exposure to the filth, as machinery and equipments can not be used in such terrains. The Municipal workers are at particular risk for all injuries due to a wide variety of high-risk activities and locations. Such Work related accidents and occupational hazards cause substantial human and economic cost to the urban local bodies.

Garbage collectors in this study area manually lift and dump gunny sacks/containers filled with garbage into the operational trucks (Picture 2). Garbage collection is laden with health hazards. They are exposed to foul odours, dust, ants, flies and their clothing is spoiled easily, though they may be wearing protective clothing. As no segregation of waste takes place and all household garbage is mixed by the residents or by the garbage collectors, they are prone to other health hazards, including chemical burns, injuries from disposable needles, broken glasses, falling objects from overloaded containers and the diseases that are caused by mixed solid waste. The garbage collectors are often seen sitting without any protection on the garbage dumps in moving trucks, with waste overflowing. Complaints about poor design, storage and transport of tools and equipment are also reported from time to time. The sanitation department within the municipal corporation reports problems in recruiting and retaining the new employees. The average sick leave rate of employees in this sanitation specific sector is higher than employees doing other jobs in urban local bodies. Various studies [2,3] have reported that low back injuries among sanitation workers cause more absence from work than any other injury or disease. Studies have also reported increased risks of sanitary workers using pain killers and getting their organs damaged [4]. One worker in our municipality died of kidney failure as he was chronically taking pain killers for back ache for the last 10 years. Medicines are generally taken for their routine ailments, but

painkillers are taken indiscriminately by the sanitary workers for pains, almost daily.

The hilly state also does not have regulations and mechanisms for managing septage, which results in groundwater quality contamination issues. Manual scavenging practices involved in informal septage management are curtailed significantly after adoption of the related Act. The percentage of urban households practicing open defecation in the state of Himachal Pradesh is 6.88%. Una district tops the list in Himachal with 22.79% households going for open defecation, followed by Kangra (14.71%) and Chamba (9.26%) districts.



Picture 2. Garbage truck with overflowing garbage and unprotective sanitary workers

1.1 Literature Review

Kanitz et al. [5] have studied Hepatitis-B (HBV) infection in solid waste collectors in Genoa. The results revealed a higher prevalence of Hepatitis-B (HbsAg) and Hepatitis-C (anti-HCB) than in the general population. Available data reveal an alarming and extremely high rate of work related deaths and injuries among solid waste collectors in the developed as well as developing nations. Work related injuries among municipal workers cause an estimated number of 3,400,000 disabling injuries globally. Each week day, a fatal injury occurs every 2 hrs and a disabling injury every 8hrs among municipal workers [6,7]. The International Labor Organization (ILO) estimates that each year, around 2.3 million workers die as a result of occupational accidents. The work-related diseases and fatal occupational accidents are about 0.35 million every year and fatal work-related diseases are around 1.95 million per year [8,9,10].

Occupational health risk studies on waste pickers across India present a dismal picture. Tuberculosis, bronchitis, asthma, pneumonia, dysentery, parasitosis and malnutrition are the most commonly experienced diseases among waste pickers based on health studies conducted on them in Bangalore [11]. About 180 waste pickers at the Calcutta open dumps were studied [12] in 1995. During the course of one year, 40% had chronic cough, and 37% had jaundice. The average quarterly incidence of diarrhea was 85%, of fever was 72%, of coughs and colds was 63%. Eye soreness or redness in 15% and skin ulcers in 29%. A comparative study of waste pickers [13] working at Calcutta's Dhapa dump and nearby farmers, who use organic solid waste as fertilizer, showed that pickers reported higher prevalence of respiratory diseases (pickers: 71% vs. farmers: 34%), diarrhea (pickers: 55% vs. farmers: 28%) and protozoal and helminth infestation (32% vs. 12%). As per survey by Kannoth et al, 95 solid waste workers were examined at the Mumbai open dumpsites [14]. 80% had eye problems, 73% had respiratory ailments, 51% had gastrointestinal ailments, 40% had skin infections or allergies, and 22% had orthopedic ailments. Based on clinical examination, 90% had decreased visual acuity. Most workers complained of eye burning, diminished vision, redness, itching, watering from eyes. Clinical examination showed 27% had skin lesions, of which 30% were determined to be directly occupation related.

World Bank (2006) compilation [15] based on above studies of waste pickers conducted in various parts of the country reported that 38% of women pickers have lost one child and 10% have lost 3 or more. According to these women, the main causes of their infant deaths were diarrhea, tetanus, smallpox, bronchitis and virus infections.

The aim of this paper was to determine the high disease burden among sanitation workers in line with the above facts. An attempt has been made to explore the work practices, injuries, illnesses, working conditions and other health hazards faced by Shimla city municipal solid waste collectors in the course of discharging their duties.

2. MATERIALS AND METHODS

We interviewed the health workers and later we checked their health status through organisation

of health camps that verified high non communicable disease burden in sanitary workers. All municipal workers (380) who face occupational hazard were taken as study participants. Data were collected by face to face interview, using pre-tested standard questionnaire which was developed based on the related published studies with certain modification. The questionnaire marked responses related to physical fitness, stress management, psychological and mental health issues, nutrition and dietary related issues and alcohol and tobacco dependency and their liking for veg/non veg food. Two health camps were organised to assess the health situation of these municipal workers with the support of Department of Health, Government of Himachal Pradesh.

3. RESULTS

3.1 Mortality Trends

Not much data is available for direct relationship of sanitary work and mortality / morbidity; however, a small observation made by Municipal Corporation Health Officer MC Shimla during his tenure of 28 months is as follows:

Sectioned Strength of Sanitation Workers -	380
Sanitation workers presently deployed -	380
No. of deaths reported in last 28 Months -	16

(On an average 1 death of a sanitary worker occurs in less than two months during service that calls for serious health related interventions).

Majority of deaths were sudden due to heart attack. The others reasons were Alcoholic hepatitis, accidents, brain hemorrhage due to high blood pressure, kidney failure and cancer. From July 27, 2012 to Nov 27, 2014 a total of 16 sanitary workers, including two women, died that is one worker every two months. Majority were in their mid forties and suffered cardiovascular ailments like heart attacks, brain haemorrhage etc.

A total of 33 sanitary workers died within 2 years of their retirement that is before reaching the age of 61 years, most of them due to heart attack.

3.2 Disease Burden

Alarmed at high mortality in adult age groups a health check up camp was organised. Out of 180

sanitary workers screened at the camp for cardiovascular risks like blood pressure and blood sugar, 33 (18.5%) were found to have blood pressure more than the prescribed limit of 140/90 and one was found to have random sugar level more than 200 mg%, though majority had a diabetic tendency and higher blood sugar levels. In 2013, a total of 23 sanitary workers were persuaded to get their sputum examined and two were found to be positive for Tuberculosis, a rate of 8.7%. None of the workers was taking any medicines for these ailments, despite indication to that effect.

In another project, two out of six (33%) sanitary workers were found to have rabies antibodies in their blood without any vaccination as they were carrying the dead bodied of animals for burial. Incidentally, six animals reported dead to municipality during this period were tested for rabies antigen [16] and all were found to be carrying the rabies virus in their brains as tested with FAT at CRI lab in Kasauli, proving that rabies antigen in dead animals may have triggered antibody response among workers handling animal dead bodies.

Despite repeated reminders, many sanitary workers did not turn up for medical examination or tests for TB and rabies antibodies or anti-rabies vaccination. Even for free compulsory medical insurance camp of Rashtriya Swasthya Bima Yojana (RSBY), only 200 turned up. For sanitation related trainings to teach them hand washing and safe garbage handling, only half of them turned up.

3.3 Availability of Personal Protective Equipments (PPEs)

PPEs like masks, gloves, hard shoes, dark goggles, Jackets and rain sheeters for door to door collection of garbage in rainy seasons etc. are essential to protect the health of the garbage collectors. Vaccination against Hepatitis-B, tetanus and rabies are essential for them apart from screening for Tuberculosis and other lung diseases. The tools for sweeping and digging of drains need to be appropriate to avoid injuries or working bare hands.

Questionnaire responses were analyzed using descriptive statistics of frequency counts, percentages and tables. Results revealed that out of the total three hundred and eighty (380) respondents, 30% agreed that their protective equipments were of the right quality and suitable

to the task, 11% were undecided while 59% disagreed. This implied that their protective equipments were not of the right quality and were not suitable to the tasks. Qualitative data revealed that not all the workers were given the protective equipments. Physical observation of the waste components revealed broken glasses and bottles, empty tins with serrated edges, broken plates, hypodermic needles and other sharp objects amidst several other forms of wastes. Two hundred and thirteen respondents representing 76.3% of the total population agreed that they had sustained injuries from sharp objects in the course of packing refuse with bare hands. The hazards they experienced ranged from injuries of all kinds, musculoskeletal and hearing disorders to respiratory and gastro intestinal tract infections. One of them even reported to have his back burnt due to acid put in the garbage by some household. One of the lady garbage collector had to get her right little finger amputated due to gangrene that developed due to fungal infection in her hand after injury.

4. CONCLUSION AND RECOMMENDATION

The burden of communicable diseases is high among the sanitation workers, but is managed by medicine availability in nearby government health institutions and absence from the work. The shifting of pattern of disease from communicable to non-communicable ones is an emerging trend. So, there is need to take care of them by organising repeated health check up camps to detect early warning signs like high blood pressure or high blood sugar levels among them. This will save many sanitary workers from the "sudden death phenomenon". Compulsory medical examination and individual health card should be made mandatory for them to go for sanitation work. Many of them can be found cleaning clogged sewer lines with bare hands and without masks. Health promotion activities and health workers' knowledge and personal protective practices must therefore be improved and they should be provided with proper PPE compulsorily. By focusing on employee welfare programmes, the city government can ultimately save money on workers' compensation claims. We recommend that documentation of health status and illness of each health worker should be done to estimate the disease burden and save the worker's lives with early intervention, especially by persuading them to undergo regular health checkups and take regular medicines. Health education activities on their

dietary habits are need of the hour as they tend to eat more non vegetarian fatty foods, thinking it to be protective and healthy for raising immunity. Awareness programmes on harms of excessive smoking and drinking should be carried out regularly.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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