

“A Study of the Health Impacts on Workers at Solid Waste Management sites – Case study of Chhatrapati Sambhajnagar City”

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Abstract

Municipal solid waste management is an important service that ensures cleanliness and reduces the spread of diseases in urban areas. However, workers involved in waste collection, transportation and disposal often face serious health risks. This study investigates health problems faced by sanitation workers during waste management. It is found that sanitation workers face significant difficulties at their workplaces such as injuries, respiratory diseases, eye and skin illness, musculoskeletal disorder. Following recommendations are suggested: Regular health check-ups, mental health support, lifestyle interventions, and accessible medical services are essential to prevent and manage health deterioration in sanitation workers. Improving occupational safety through good policies, provision of personal protective equipment, regular health check-ups and public recognition of their role are essential to safeguard the well-being of MSW workers.

Keywords: Municipal Solid Waste, Sanitation Workers, Occupational Health, Environmental Exposure.

1. Introduction

Municipal solid waste (MSW) is the waste generated daily from households, markets, offices and institutions. As cities grow, the amount of waste generated also increases. Managing this waste is a major task for local governments. In many parts of the world, especially in developing countries and India, solid waste management involves the manual collection, sorting, transportation and disposal of waste. The people who do this work – often referred to as garbage workers or sanitation workers – play a vital role in keeping cities clean and preventing the spread of disease.

Despite the importance of their work, MSW workers often face unsafe working conditions, low wages and a lack of social recognition. Many work without proper protective equipment and some receive no formal training in safe waste handling. As a result, they are regularly exposed to harmful substances such as chemicals, dust, sharp objects and disease-causing bacteria. Their work puts them at increased risk of various health problems, including injuries, infections, respiratory problems, and mental health problems (Ahsan, 2019; Wilson et al., 2006).

Furthermore, the nature of their work places them in close contact with potentially infectious waste, especially in settings where waste is not segregated at source. This exposure puts them at high risk of contracting diseases such as hepatitis, respiratory infections, and gastrointestinal diseases (Cointreau, 2006). Their situation is further exacerbated by the lack of access to clean water, medical care, and sanitation facilities.

2. Health Impacts Faced By Waste Workers

One of the most commonly reported health problems among garbage workers is musculoskeletal pain, particularly in the lower back and knees. This is caused by the lifting and bending of heavy objects in their daily work. A study by Athanassiou et al. (2010) found that many Greek municipal garbage workers reported physical strain due to repetitive movements and incorrect lifting techniques.

Respiratory diseases are another common problem. Workers often inhale harmful dust, decaying waste gases (such as methane and ammonia), and smoke from burning waste. According to Jayakrishnan et al. (2013), Indian garbage workers had a high incidence of chronic cough and shortness of breath. This was linked to prolonged exposure to landfill gases and poor air quality in dumping areas. Noise pollution from garbage collection vehicles and machinery also contributes to hearing problems and stress among workers (Bogle and Kumi, 2010).

Direct contact with mixed waste, which includes food, chemicals, and sharp objects, causes skin diseases and wounds. Cuts, rashes, and allergic reactions are common, especially among those who do not wear gloves or boots. In Ethiopia, Bogale and Kumi (2010) reported that more than half of the waste workers surveyed had skin problems. Gastrointestinal diseases are also a major concern. Waste often contains spoiled food, animal remains, and other organic matter that harbors bacteria. In Bangladesh, Alam and Ahmede (2013) reported a high incidence of stomach infections and diarrhea among waste handlers, which is mainly due to poor hygiene and consumption of contaminated food or water.

Many waste workers are at risk of infectious diseases, especially when handling biomedical or sanitary waste. Items such as used needles, diapers, and sanitary napkins can contain viruses such as HIV, hepatitis B and C, and other dangerous pathogens (Cointreau, 2006; Patwari et al., 2011). In particular, when sorting electronic waste or industrial waste, there is also exposure to toxic chemicals such as heavy metals, lead, mercury, and pesticides. These substances can enter the body through the skin, inhalation, or accidental ingestion and can cause long-term health effects such as organ damage, neurological disorders, and even cancer (Zolnikov and Ramirez-Andriota, 2020).

Waste workers often face social discrimination, as their work is seen as dirty or inferior. This stigma can result in emotional distress and a loss of dignity. A study by Pinto (2008) in Brazil showed that many informal waste pickers experienced low self-esteem, social exclusion, and depression due to how society

perceived their work. In addition, the uncertainty of informal employment, low wages, and lack of job security add to workers' mental stress. For female waste workers, the risks are even greater, as they may face gender-based discrimination and lack access to health care and maternity protection (ILO, 2017).

3. Methodology

A standard questionnaire was developed to assess the health status of workers, focusing on occupational diseases (e.g. respiratory problems, musculoskeletal disorders) and overall health status of waste workers. Semi-structured interviews were conducted with a purposive sample of workers to gather in-depth insights into their experiences of health problems and financial burdens. Demographic information (age, gender) and job-related details (type of work, exposure to hazards) were collected.

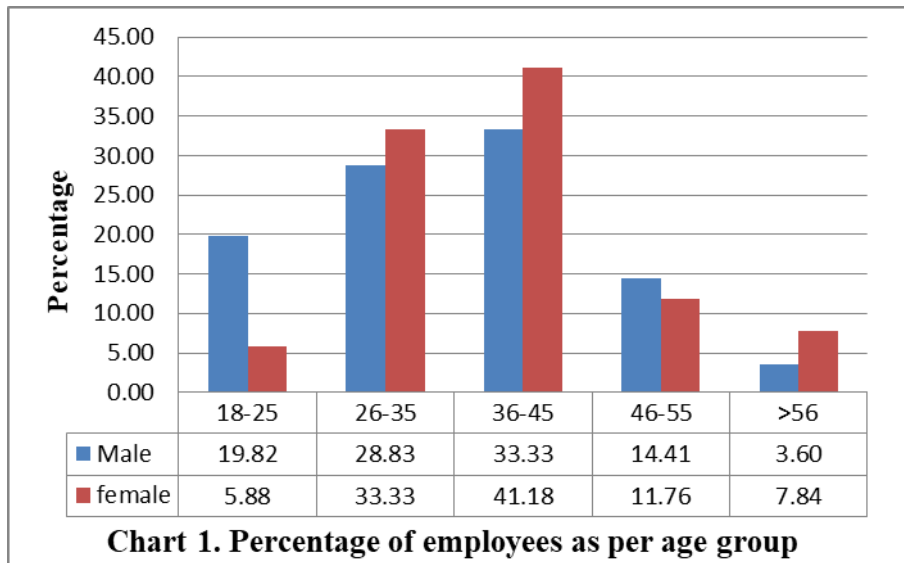
4. Results and Discussions

4.1 Number of sanitation workers involved in the research

324 sanitation workers were selected randomly and were interviewed in person and filled out questionnaires. Out of the 324 randomly selected sanitation workers, 68.52% are male and 31.48% are female. Out of 68.52 % male employees, 54.95% male employees are permanent employees of the Municipal Corporation and 45.05% male employees are contractual employees. Also, out of 31.48% female employees, 47.06% female employees are permanent employees of the Municipal Corporation and 52.96% female employees are contractual employees.

4.2 Distribution of sanitation workers by age group and gender:

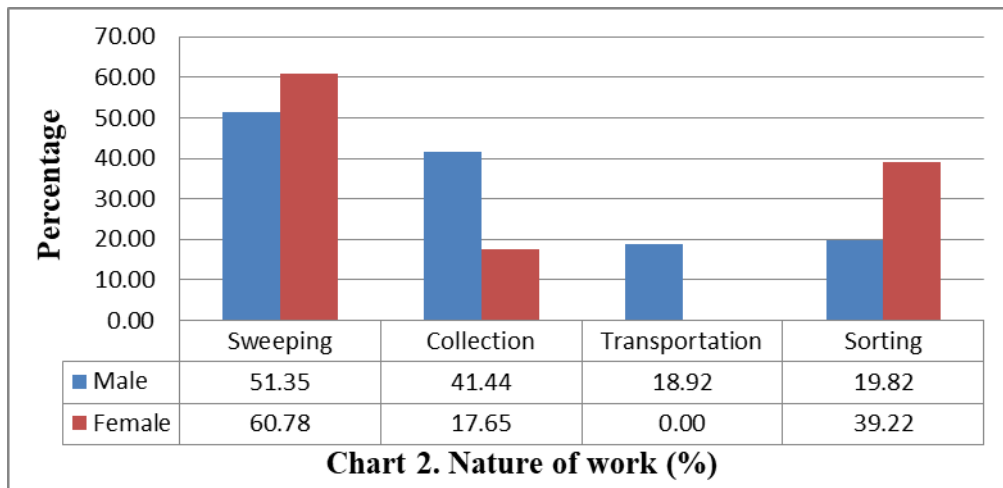
When the sanitation workers were divided according to age group and gender, it was found that in the age group 36 to 45, the number of female and male workers was found to be 41.18% and 33.33% respectively, followed by the age group 26 to 35, the number of female and male workers was found to be 33.33% and 28.33% respectively. In the age group 18 to 25, the number of female and male workers was found to be 5.88% and 19.82% respectively, in the age group 46 to 55, the number of female and male workers was found to be 11.76% and 14.41% and in the final age group of 56 years or more, the number of female and male workers was found to be 7.84% and 3.60%. From the above division, it is evident that the number of female and male workers is significant in the age groups 36 to 45 and 26 to 35, while the number of female workers is less in the age groups 18 to 25 and 56 and above compared to other age groups.



The smaller representation of male and female workers in the oldest age group could reflect the physically demanding nature of sanitation work, leading to a decline in workforce participation with age.

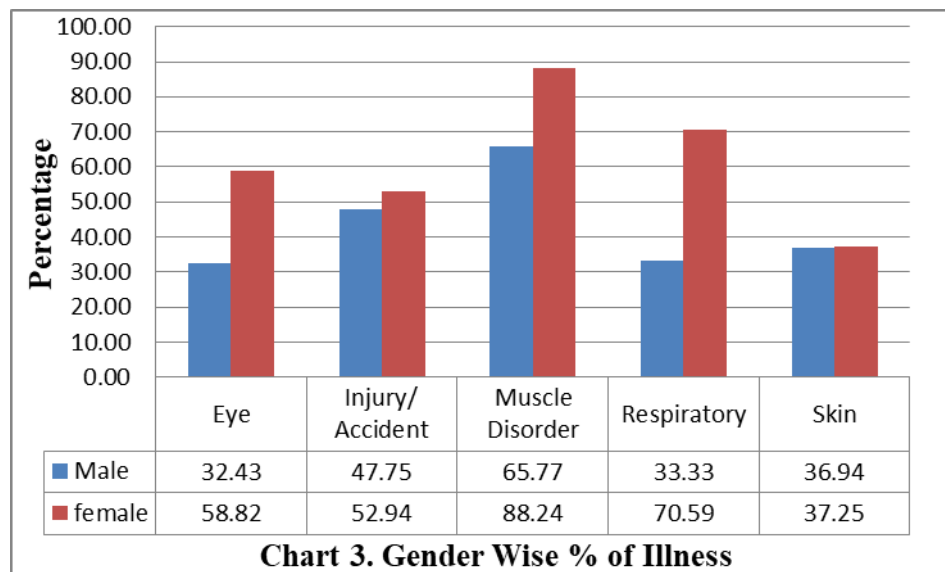
4.3 Nature of work of sanitation workers

51.35 percent male workers and 60.78 percent female workers are engaged in street sweeping. 41.44 percent male workers and 17.65 percent female workers are engaged in garbage collection. 18.95 percent male workers are engaged in transportation of collected garbage. 19.82 percent male workers and 39.22 percent female workers are engaged in sorting the garbage received at the processing center.



4.4 Health Issues

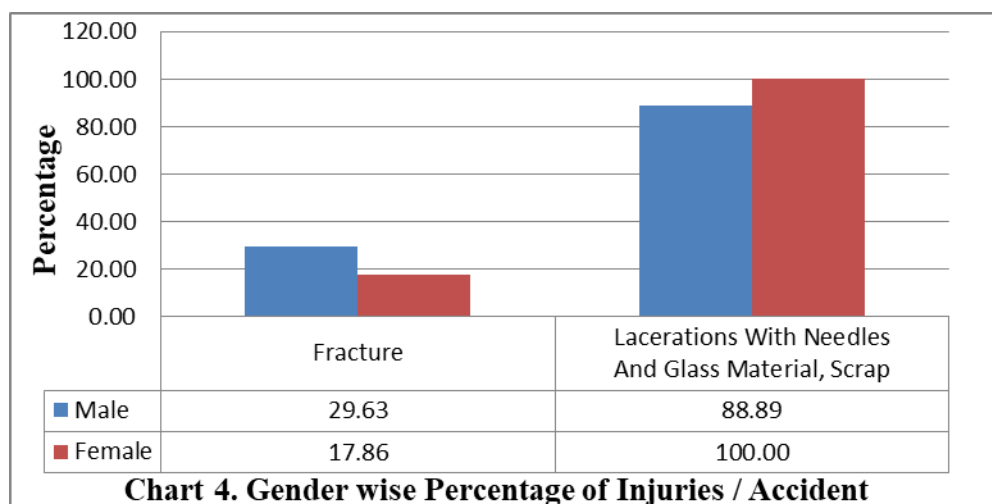
It was found that 32.43% of male workers and 58.82% of female workers were found to have eye problems. 47.75% of male workers and 52.94% of female workers were found to have injuries and accidents. 65.67% of male workers and 88.24% of female workers were found to have problems related to muscle disorders. 33.33% of male workers and 70.69% of female workers were found to have respiratory problems and 36.94% of male workers and 37.25% of female workers were found to have skin problems.



The analysis of health-related issues among sanitation workers reveals that every worker experiences one or more health problems, reflecting the physically demanding and hazardous nature of their work. Eye problems, injuries, muscle disorders, respiratory issues, and skin diseases are common among both male and female workers. Notably, female workers report a higher prevalence of eye problems, muscle disorders, and respiratory diseases compared to their male counterparts, indicating greater vulnerability to certain occupational health risks.

4.4.1 Injuries and Accidents

29.63% of male employees and 17.86% of female employees said that they had suffered fractures or similar injuries. Similarly, 88.89% of male employees and 100% of female employees said that they had suffered injuries while handling needles and glass materials, sharp iron materials and other types of scrap materials. These injuries were sometimes major and sometimes minor.

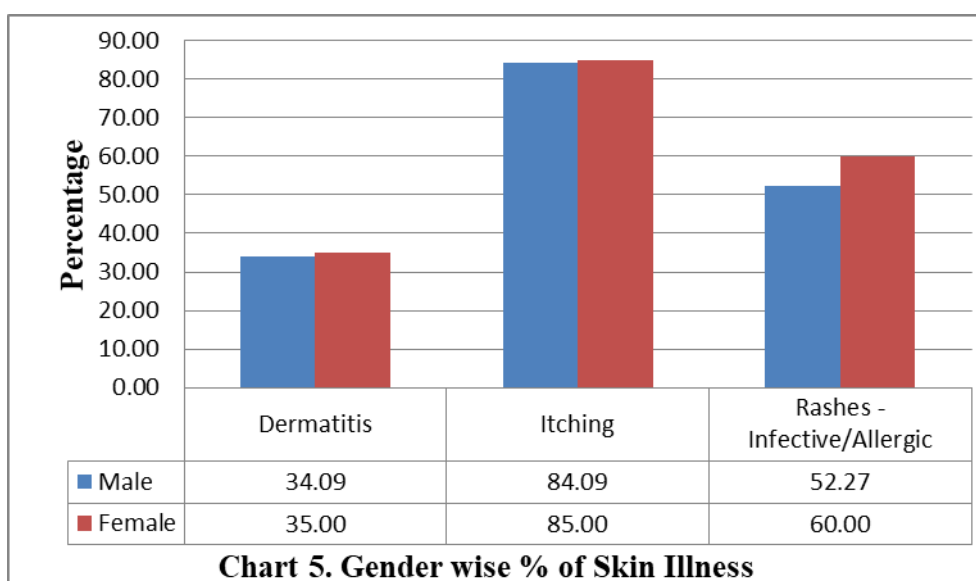


The analysis of injuries and accidents among sanitation workers indicates a significant number of incidents, with many workers experiencing minor or major injuries. While some reported fractures or similar injuries, a considerable proportion faced injuries caused by handling hazardous materials like

needles, glass, sharp iron objects, and other scrap materials. Notably, all female workers and most male workers encountered such injuries.

4.4.2 Skin Illness

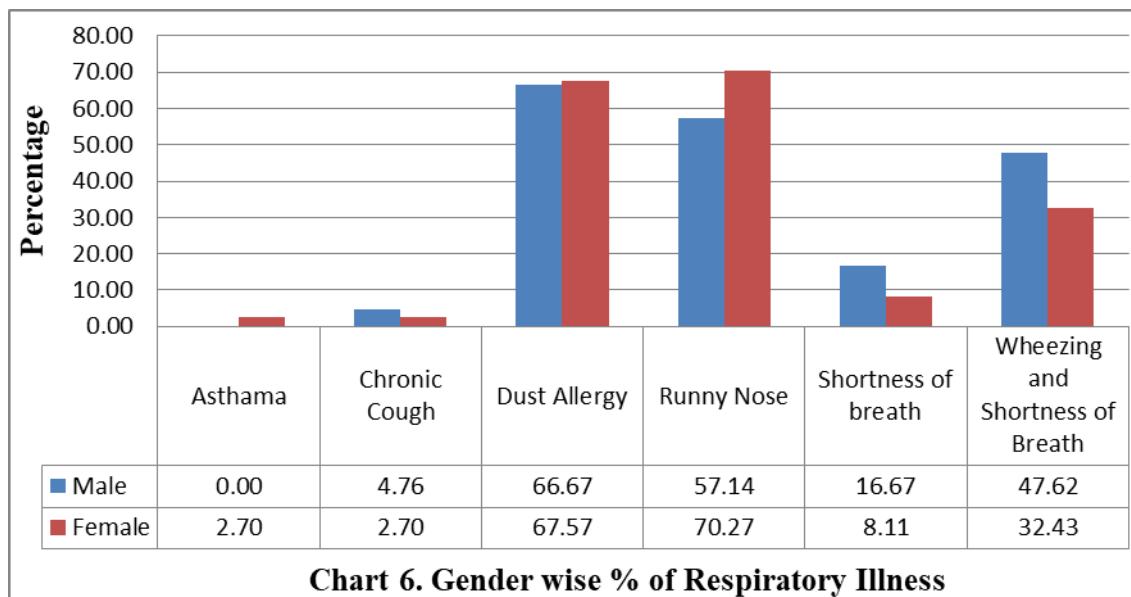
34.09% male sanitation workers and 35.00% female sanitation workers are facing dermatitis illness. 84.09% male sanitation workers and 85.00% female sanitation workers face itching problem and 52.27% male sanitation workers and 60.00% female sanitation workers facing Rashes-Infective / Allergic problem.



The analysis of skin-related problems among sanitation workers shows that the significant numbers of workers have experienced such issues. Many reported symptoms like itching, infectious rashes, and dermatitis. While a considerable proportion of both male and female workers reported dermatitis, the majority faced itching problems, followed by rashes of infectious or allergic origin. However, a larger number of workers did not experience any skin-related issues.

4.4.3 Respiratory Illness

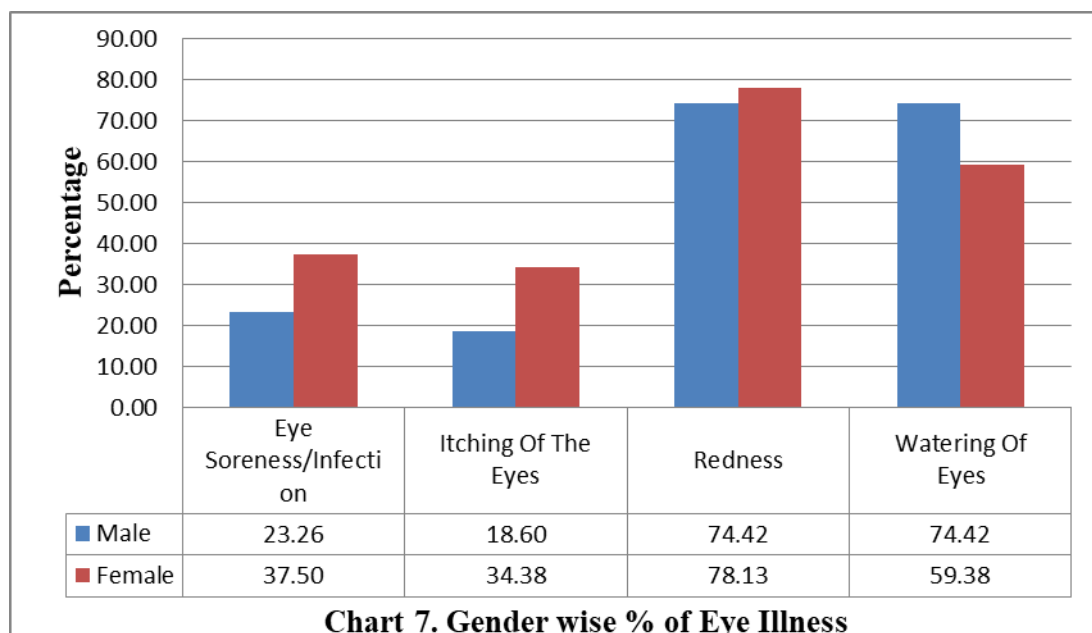
66.67% male sanitation workers and 67.57% female sanitation workers have dust allergy. 57.14% male sanitation workers and 70.27% female sanitation workers are faced runny nose issue. 47.62% male sanitation workers and 32.43% female sanitation workers have Wheezing and shortness of breath illness while 16.67% male worker and 8.11% female workers facing shortness of breath. Workers who are facing chronic cough illness are 4.76 % male and 2.70 % female workers. 2.70% female workers facing asthma no one male worker is facing asthmas.



The analysis of respiratory illnesses among sanitation workers reveals a significant prevalence of respiratory issues, with a notable number of both male and female workers reporting such problems. Dust allergy emerged as the most common issue, followed by runny nose symptoms. While a considerable proportion of both genders experienced wheezing and shortness of breath, fewer workers reported chronic cough, and only female workers were found to suffer from asthma.

4.4.4 Eye Illness

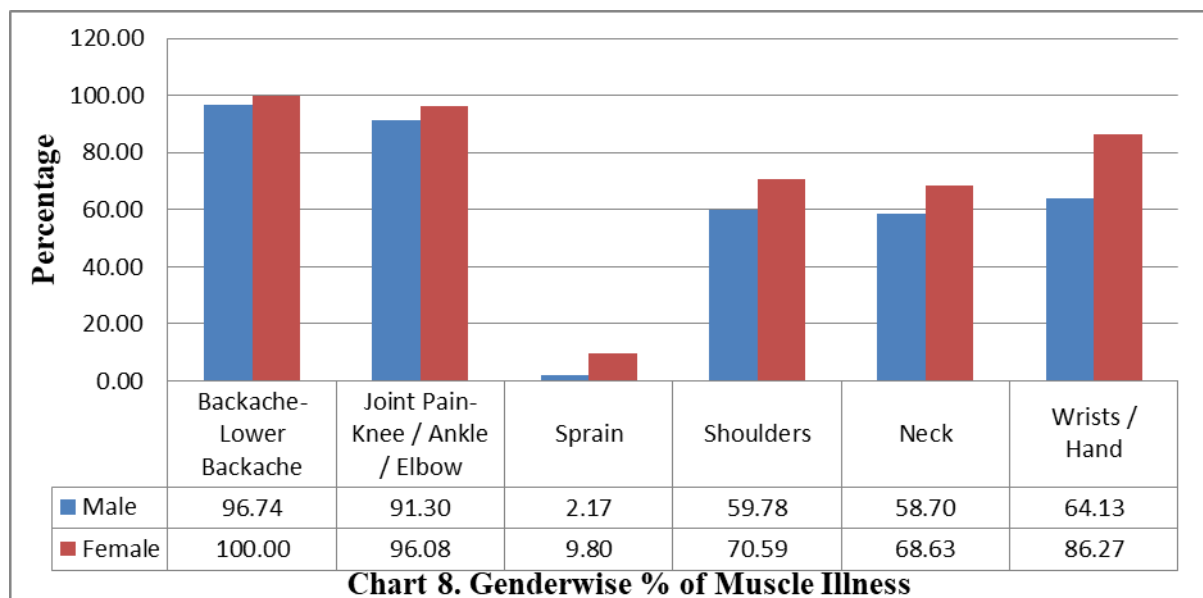
74.42% male sanitation workers and 78.13% female sanitation workers were facing eyes redness illness. While second big illness is watering of eyes 74.42% Male sanitation workers and 59.38% female sanitation workers facing this. 23.26% male sanitation workers and 37.50% female sanitation workers are facing eye soreness/infection. 18.60% male sanitation workers and 37.38% female sanitation workers are facing itching of eyes.



The analysis of eye-related problems among sanitation workers indicates a significant number of cases, with many workers experiencing issues such as eye redness, watering, soreness, infection, and itching. Eye redness emerged as the most common problem for both male and female workers, followed by watering of eyes. Female workers were more likely than their male counterparts to suffer from eye soreness, infection, and itching.

4.4.5 Muscle Disorder

96.74% male sanitation workers and 100% female sanitation workers are facing backache- lower backache. 91.30% male sanitation workers and 96.08% female sanitation workers have Joint Pain (knee/ankle/elbow) problem. 64.13% male sanitation workers and 86.27% female sanitation workers have wrists/hand pain. Whereas, 59.78% male sanitation workers and 70.59% female sanitation workers have shoulder pain and only 2.17% male sanitation workers and 9.80% female sanitation workers had faced sprain.

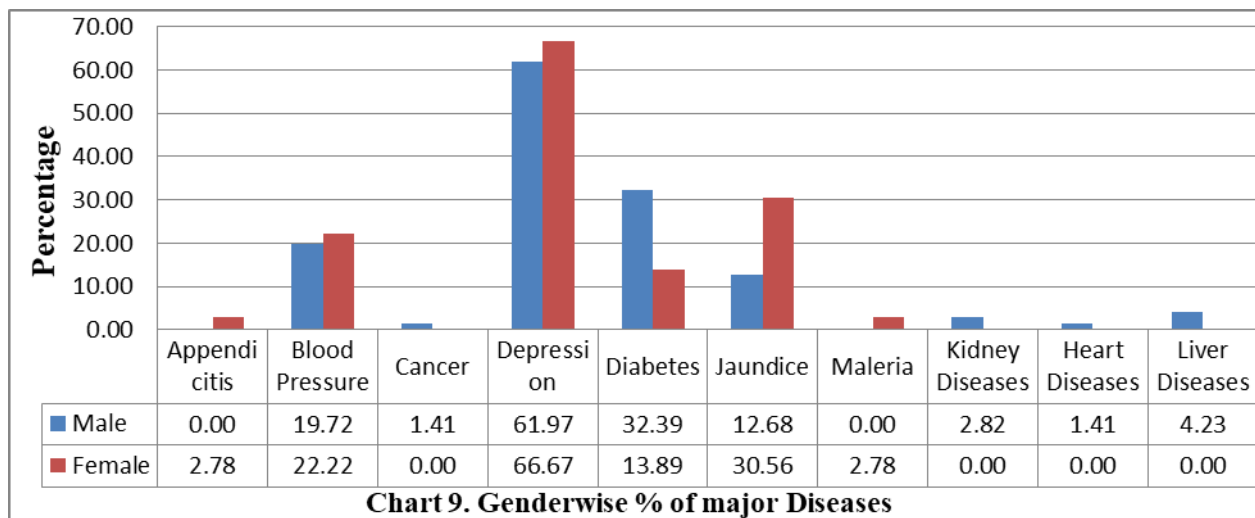


The assessment of muscle-related illnesses among sanitation workers reveals a widespread prevalence of musculoskeletal disorders. Almost all male and female workers reported experiencing regular back pain, lower backache, joint pain, shoulder pain, hand pain, wrist pain, and neck pain. Backache and joint pain were particularly common, with a slightly higher prevalence among female workers. Additionally, wrist and hand pain, as well as shoulder pain, were reported more frequently by female workers compared to males. While sprains were less common, they were still present, with female workers reporting a higher incidence than male workers.

4.4.6 Major Diseases

It is found that 61.97% male sanitation workers and 66.67% female sanitation workers had gone through or going through depression. 32.39% male sanitation workers and 13.89% female sanitation workers are diabetic whereas 19.72% male sanitation workers and 22.22% female sanitation workers have blood pressure. 12.68% male sanitation workers and 30.56% female sanitation workers had jaundice. Female

sanitation workers who had appendix and Malaria, those are 2.78% and 2.78% respectively. Male sanitation workers who have kidney, liver, and heart disease are 2.82%, 4.23% and 1.41% respectively.



The assessment of major diseases among sanitation workers reveals a significant prevalence of health issues, with a large proportion of both male and female workers suffering from one or more conditions. Depression was found to be the most common concern, affecting both genders, though slightly more prevalent among female workers. Diabetes and high blood pressure were also reported, with male workers showing a higher incidence of diabetes, while blood pressure issues were comparatively balanced between genders. Jaundice was more frequently reported by female workers. Additionally, a small percentage of male workers experienced kidney, liver, and heart diseases, whereas a few female workers reported cases of appendicitis and malaria.

5. Conclusions

1. The results of the Solid Waste Management worker inspection survey conclude that the underrepresentation of men and women in the older age group reflects the physically demanding nature of sanitation work, which leads to a decline in worker participation with age.
2. All female workers and most male workers faced injuries/accidents while collecting and sorting waste. Improved safety protocols, appropriate protective equipment and comprehensive training are needed at the workplace to reduce the risk of accidents and ensure the well-being of sanitation workers.
4. An analysis of skin-related problems among sanitation workers highlighted the need for improved sanitation facilities, availability of protective equipment, and regular health check-ups to prevent and manage skin diseases among sanitation workers.
5. The increasing incidence of respiratory diseases among women workers highlights the need for improved ventilation in the workplace, provision of protective equipment such as masks, regular health check-ups, and awareness programs to reduce the risk of respiratory hazards and ensure the well-being of sanitation workers.
6. The analysis of eye diseases among sanitation workers highlights the need for protective eyewear, improved workplace safety measures, regular eye examinations, and access to medical care to prevent and manage eye-related health problems among sanitation workers.

7. There is an urgent need for ergonomic interventions, proper training in lifting techniques and availability of physiotherapy and regular health assessments to reduce musculoskeletal problems and improve the overall well-being of sanitation workers.

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