

## Original Article

# A Study of Knowledge, Attitude and Practices on Use of Personal Protective Equipments among Sanitary Workers in Erode Corporation Area, Tamilnadu

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**Introduction :** In recent decades, as a result of Urbanization, has caused many sanitation problems, including a lot of garbage, dirty streets and blocked drains which greatly increase the Sanitation Workers' workload. India generates approximately 1,33,760 tonnes of municipal solid waste per day. In Tamilnadu 14,659 tons per day. Occupational health risks among Sanitary Workers occur at every step in the process, from the point of collection at homes, during transportation and at the sites of recycling or disposal. As a result of these hazards, they suffer from Skin diseases, Accidental injuries, Gastroenteritis, Diarrhoea, Dysentery, Hepatitis (Hep B vaccines), HIV, Meningitis, Tetanus, Respiratory Diseases, Eye & Ear Infections. This study was conducted to assess the Knowledge, Attitude and Practices of Sanitary Workers on use of Personal Protective Equipment in Erode Corporation, Tamilnadu.

**Materials and Methods :** Cross-sectional study was conducted among Sanitary Workers (1404) working in four administrative zones of Erode Corporation were considered for study purpose. Among them 244 study subjects were selected by using Probability proportionate sampling and studied for 2 months period from Jun-July 2018 by using pre tested questionnaire. Data were analysed by using SPSS software version 16.

**Results :** Among the 243 participants, 182 (74.9%) Male, 61 (25.1%) were Female. Most of them were belonging to 35-44 years of age. among the Male participants 57.7% and Female 65.6% received Tetanus Toxoid Vaccine. Only 0.4% received Hepatitis B vaccine. Among male workers 84.1% received training on Personal Protective Equipments (PPE) and 88.5% received PPE, likewise in Female the proportions were 90.2% & 91.8% respectively. All the participant had adequate knowledge and positive attitude on usage of Personal Protective Equipments (PPE). But among them more than half of them (52.2% & 57.4) were only regularly using glove while working, 11% & 9.8% of male & female never use it. Majority of the participants were using other PPE like mask, boots etc while working. Among the total participants 9.9%, 14.8%, 12.3% & 8.2% didn't use Mask, Boots, Reflector and not wearing clean uniform respectively.

**Conclusion :** The result of this study is revealed that the overall level of the Knowledge and Attitude of the Sanitary Workers is very high about the benefits of using PPE in their working stations but the magnitude of using PPE among them was moderately low.

[J Indian Med Assoc 2023; 121(5): 14-8]

**Key words :** Personal Protective Equipments (PPE), Occupational Health Risk, Sanitary Workers.

In recent decades, Urbanization has become a widespread trend in developing countries with rapid economic development. As a result of Urbanization, the large population concentrated in cities has caused many sanitation problems, including a lot of garbage, dirty streets and blocked drains which greatly increase the Sanitation Workers' workload<sup>1</sup>. These Sanitation

### Editor's Comment :

- Overall level of the knowledge and attitude of the sanitary workers is very high about the benefits of using personal protective equipments in their working stations but the magnitude of using PPE among them was moderately low. This raises a public health concern.
- Periodic health education and continuous motivation and monitoring of the availability PPE and its usage are to be ensured.

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Received on : 05/04/2022

Accepted on : 02/05/2022

Workers form the backbone of the civic cleaning system of any society<sup>2</sup>. In India, we have nearly 1.2 million sanitation workers and with limited resources most of the cleaning process in urban localities remains manual<sup>3</sup>.

As per 2013 report from the International Solid Waste Association (ISWA), the total garbage generation in 2013 was 1.84 billion tonnes per year

around the World. The countries creating the highest amounts of waste were China, followed by the United States and India<sup>4</sup>. According to data given by World Bank, around the World waste generation rates are rising. In 2016, the Worlds' cities generated 2.01 billion tonnes of solid waste<sup>5</sup>.

India generates approximately 1,33,760 tonnes of municipal solid waste per day<sup>6</sup>. In Tamilnadu 14,659 tons per day<sup>7</sup> & Chennai itself every day around 5400 MT of garbage is collected from the city<sup>8</sup>. Amongst the total 1,33,760 tonnes of waste generated in India, Uttar Pradesh tops the list with 19,180 tonnes per day of waste followed by Maharashtra (app 17000) and Tamil Nadu (app 14532)<sup>4</sup>.

Sanitation Workers are responsible for cleanliness of the city. Occupational health risks among Sanitary Workers occur at every step in the process, from the point of collection at homes, during transportation and at the sites of recycling or disposal<sup>9</sup>. Sanitation workers are exposed to occupational health and accident risks related to the content of the materials they handled, emissions from those materials, and the equipment's being used. Several studies have reported that these workers have got the high risk to occupational health hazards<sup>10</sup>.

With improper segregation of waste materials at the source and all types of garbage being disposed on the street these workers are exposed to dirt, infective organisms and other hazardous chemicals, harmful gases, animal excreta and sharp objects and injury during garbage handling. As a result of these hazards, they suffer from Skin Diseases, Accidental Injuries, Gastroenteritis, Diarrhoea, Dysentery, Hepatitis (Hep B Vaccines), HIV, Meningitis, Tetanus, Respiratory Diseases, Eye & Ear Infections<sup>11,12</sup>.

A study conducted in Pudukottai, revealed that lack of awareness of health-oriented protective methods while handling the garbage resulted in various diseases<sup>13</sup>. Most of the above diseases are preventable. These burden can be minimized by educating the sanitary workers and train them to use appropriate personal protective equipment like Rubber Boots, Face Masks, Gloves, Goggles, High Visibility Clothing and Reinforced Trousers and take recommended vaccines like Tetanus Toxoid & Hepatitis B Vaccine<sup>11,12</sup>. The Sanitary Workers need adequate education and training about the Personal Protective Equipment (PPE) in order to protect their own health.

#### Justification for Study :

There is a paucity of studies regarding Knowledge, Attitude and Practices on use of PPE among Sanitary Workers in India. Therefore this study was conducted

to assess the Knowledge, Attitude and Practices of Sanitary Workers on use of PPE in Erode Corporation, Tamilnadu. This would facilitate to plan Health Education to Sanitary Workers on use of PPE.

#### Objectives of the Study :

To assess the Knowledge, Attitude and Practices on usage of PPE among Sanitary Workers in Erode Corporation.

#### MATERIALS AND METHODS

**Study Design :** Cross-sectional study

**Study Area :** Erode Corporation

**Study Population :** Sanitary Workers (1404) working in four Administrative Zones of Erode Corporation were considered for study purpose. Among them 244 study subjects were selected by using Probability Proportionate sampling.

#### Probability Proportionate Sampling :

Multiplication factor $x = 244 / 1404 = 0.174$					
Zones	Ward	Permanent Sanitation Workers	Total Sanitation Workers	Total workers* multiplication factor (x)	Study population
Zone 1	1 to 15	120	293	$293 \times 0.174$	51
Zone 2	16 to 30	197	427	$427 \times 0.174$	74
Zone 3	31 to 45	145	340	$340 \times 0.174$	59
Zone 4	46 to 60	155	344	$344 \times 0.174$	60
Total	60	617	1404	$1404 \times 0.174$	244

#### Sample Size Estimation :

Based on the study conducted among municipal solid waste management workers by Marhatta, *et al*<sup>6</sup> in which about 45.8% of participants used PPE, the sample size for the present study was calculated.

Formula Used: Sample size =  $4pq/d^2$

$p = 45.8$

$q = 54.2$

$d = 7$

$= 4 * 45.8 * 54.2 / 49$

$= 203$

20% of non-responders =  $203 * 20 / 100$   
= 41

Total sample size =  $203 + 41$   
= 244

**Inclusion criteria :** Sanitary Workers both Male and Female working for more than one year

**Exclusion criteria :** Sanitary Workers taken leave (absent) during the day of interview.

**Study Period :** 2 months (Jun – July, 2018)

**Sampling Method :** The required number of Sanitary Workers in each zone was selected according to Probability Proportionate sampling from the 4 zones

**Study Tool :** pre tested questionnaire

**Data Collection Method :** Data was collected by the investigator through interview method

**Risk and Benefits :** There is no risk for participants and they get benefits from knowing importance of use of PPE and thereby benefitting from less exposure to occupational health hazards.

**Ethical Issues :** Written informed consent was taken from the study participant. The information collected was used only for the purpose of study and strict confidentiality was maintained throughout the study.

### ANALYSIS

Data was coded and entered in Microsoft excel software. Analysis were done with SPSS-22 version. Percentage of Sanitary Workers having adequate Knowledge, favorable attitude and regular use of PPE were calculated.

### RESULTS

In this study 182 Men & 61 Women totally 243 people were included to determine the Knowledge Attitude & Practice on use of PPE.

Table 1 shows, among the 243 participants, 182 (74.9%) Male, 61 (25.1%) were Female. Most of them were belonging to 35-44 years of age. The mean age of the study subjects was 35 years, which varied from 17 to 65 years. Among the Females 57% were illiterate whereas among Male 21% were illiterate, one third of them have completed high school. Interestingly 3.8% were graduates. 86.3% of male and 54.1% of female

Basic characters	Male (%)	Female (%)	Total (%)
Gender	182 (74.9)	61 (25.1)	243 (100)
<b>Age (years) :</b>			
<25	13 (7.1)	1 (1.6)	14 (5.8)
25-34	55 (30.2)	5 (8.2)	60 (24.7)
35-44	57(31.3)	30 (30)	87 (35.8)
45-54	53 (29.1)	20 (32.8)	73 (30)
>55	4 (2.2)	5 (8.2)	9 (3.7)
Total	182 (100)	61 (100)	243 (100)
<b>Education status :</b>			
Illiterate	39 (21.4)	35 (57.4)	74 (30.5)
Primary	35 (19.2)	11 (18)	46 (18.9)
Secondary	40 (22)	9 (14.8)	49 (20.2)
High school	55 (30.2)	4 (6.6)	59 (24.3)
Higher secondary	6 (3.3)	2 (3.3)	8 (3.3)
Graduate above	7 (3.8)	0	7 (2.9)
Total	182 (100)	61 (100)	243 (100)
<b>Marital status :</b>			
Unmarried	24 (13.2)	2 (3.3)	26 (10.7)
Married	157 (86.3)	33 (54.1)	190 (78.2)
Separated	0	2 (3.3)	2 (0.8)
Widow	1 (0.5)	24 (39.3)	25 (10.3)
Total	182 (100)	61 (100)	243 (100)

were married. It is important to notice that 39.3% were widow among women.

Table 2 depicts, among the Male participants 57.7% and among Female 65.6% received Tetanus Toxoid Vaccine. Only 0.4% (one woman) received Hepatitis B Vaccine among total participants.

Table 3 explains, among male 23% & 29% had habit of Smoking & Alcohol and among female 1.6% had habit of Smoking & Alcohol.

Table 4 explains that all the participant had adequate knowledge on usage of Personal Protective Equipments.

Table 5 shows that among male workers 84.1% received training on PPE and 88.5% received PPE, likewise in female the proportions were 90.2% & 91.8% respectively.

Table 6 explains that all the participant had positive attitude on usage of PPE.

Table 7 shows, among Male and Female Sanitation Workers, more than half of them (52.2% & 57.4) were regularly using glove while working, 11% & 9.8% of Male & Female never use it. Majority of the participants were using Mask, Boots, Wearing reflector and wearing clean uniform while working. Among the total participants 9.9%, 14.8%, 12.3% & 8.2% didn't use

Table 2 — Vaccination status

Vaccination status	Male (%)*	Female (%)*	Total (%)*
Hepatitis B	0.0	1 (1.6)	1 (0.4)
Tetanus toxoid	105 (57.7)	40 (65.6)	• (59.7)

\*Column percentage

Table 3 — Life Style Behavioural Pattern

Life Style Behaviours	Male (%)*	Female (%)*	Total (%)*
Smoking	42 (23.1)	1 (1.6)	43 (17.7)
Alcohol	53 (29.1)	1 (1.6)	54 (22.2)
Tobacco / betel nut chewing	12 (6.6)	15 (24.6)	27 (11.1)
Pan, Hans & others	17 (9.3)	0	17 (7)

Table 4 — Knowledge on Personal Protective Equipments

Knowledge on Personal Protective Equipments	Male(%)	Female(%)	Total(%)
Importance of using Glove	182(100)	61(100)	243(100)
Importance of using Mask	182(100)	61(100)	243(100)
Importance of using Rubber Chapels /Boots	182(100)	61(100)	243(100)
Importance of wearing Reflector	182(100)	61(100)	243(100)
Importance of wearing Clean Uniform	182(100)	61(100)	243 (100)

Table 5 — Training on importance of Personal Protective Equipments

PPE	Male (%)	Female (%)	Total (%)
Received Training on Personal Protective Equipments	153 (84.1)	55 (90.2)	208 (85.6)
Received Personal Protective Equipments	161 (88.5)	56 (91.8)	217 (89.3)

Attitude	Positive attitude		
	Male(%)	Female(%)	Total(%)
Wearing Gloves will reduce damage to your hand	182(100)	61(100)	243(100)
Wearing Mask will reduce damage to respiratory organs	182(100)	61(100)	243(100)
Wearing Rubber Chapels/Boots will reduce damage to feet	182(100)	61(100)	243(100)
Wearing Reflector will reduce accidents.	182(100)	61(100)	243(100)
Working with washed clean uniform can Prevent Skin Diseases	182(100)	61(100)	243(100)

Practice of Personal Protective Equipment	Male (%)	Female (%)	Total (%)
<b>Using Glove while working :</b>			
Regular	95 (52.2)	35 (57.4)	130 (53.5)
Occasional use	67 (36.8)	20 (32.8)	87 (35.8)
Never use	20 (11.0)	6 (9.8)	26 (10.7)
<b>Using Mask while working :</b>			
Regular	100 (54.9)	37 (60.7)	137 (56.4)
Occasional use	64 (35.2)	18 (29.5)	82 (33.7)
Never use	18 (9.9)	6 (9.8)	24 (9.9)
<b>Using Rubber Chapels /Boots while working :</b>			
Regular	123 (67.6)	46 (75.4)	169 (69.5)
Occasional use	30 (16.5)	8 (13.1)	38 (15.6)
Never use	29 (15.9)	7 (11.5)	36 (14.8)
<b>Wearing Reflector while Working :</b>			
Regular	110 (60.4)	37 (60.7)	147 (60.5)
Occasional use	47 (25.8)	19 (31.1)	66 (27.2)
Never use	25 (13.7)	5 (8.2)	30 (12.3)
<b>Wearing clean uniform while working :</b>			
Regular	163 (89.6)	48 (78.7)	211 (86.8)
Occasional use	7 (3.8)	5 (8.2)	12 (4.9)
Never use	12 (6.6)	8 (13.1)	20 (8.2)

Mask, Boots, Reflector and not wearing clean uniform respectively.

### DISCUSSION

182 Men & 61 Women totally 243 people were participated in this study. Majority of them were male (74.9%). This is in contrast with a study done by Marahatta, *et al*/where majority of the participants were female (61.4%). In our study one third (30%) of the workers were illiterate and among Male 21% & among Female it was 57% which is comparable with the study by Marahatta, *et al*<sup>9</sup> where 77.7% of the workers were illiterate.

In our study reported that, 59.7% of Sanitation Workers received Tetanus Toxoid (among Male 58% and female 66%) and only 0.4% (1 Female only) of them received Hepatitis B Vaccine despite they are

more prone for injuries and needle prick in their working environment. Therefore, emphasis should be given for the TT and Hepatitis B Vaccination to all the Workers. The vaccine coverage is low, compared to a study done in Nepal reported 85.3% and 71.5% of the Sanitary Workers received tetanus toxoid and hepatitis vaccine<sup>9</sup>. In a study done in Ethiopia showed that only 49 solid waste handlers had tetanus toxoid vaccine<sup>14</sup>.

In this study, we observed about 17% (Male 23.1% & Female 1.6%) of total Sanitation Workers reported smoking habit and 22.2% (Male 29.1% & Female 1.6%) reported alcohol consumption and about 11% (Male 6.6% & Female 24.6%) workers reported tobacco/ betel nut chewing habits. These findings seems to be low when compared to a study done in Colombo 72% were alcoholics, 64% had smoking habit and 2% had betel chewing habit<sup>15</sup>. In study done in Nepal reported 40.6% of the total sanitary workers were alcoholics, 20.3% of them were smokers and 9.9% had Tobacco Chewing habit<sup>9</sup>.

In this study 85% of the workers were trained on PPE and around 90% received PE. Among them, 65% of the workers were regularly using PPE. This findings is in contrast with a study done by Chellama, *et al*, only 18% regularly used PPE<sup>11</sup>. It is also reported that only about 42.6% of them received PPE like Glove, Facemask, Boots and Apron in a study done in Ethiopia and also revealed 55% of them were using PPEs<sup>14</sup>.

In our study, 100% of the participants had adequate knowledge and positive attitude on prevention of occupational health risks by using PPEs. This finding is comparatively high with a study done by Marahatta, *et al* they reported that only 31.5% had knowledge about PPE<sup>9</sup>. In another study done in ethopia showed that 73.9% of the waste handlers had knowledge on PPEs usage, majority (75.9%) of the study participants had favorable attitude<sup>14</sup>. The present study shows comparatively high level of knowledge and positive attitude towards PPE usage.

The present study revealed that 89% (217), 90% (219), 85% (207), 87.7% (213), 91.7% (223) respondents used PPEs like Gloves, Masks, Boots, Reflector and wore clean uniform respectively but not on regular basis. Among them 53.5% & 56.4% workers regularly using Glove & Mask, 69.5%, 60.5% & 86.8% were regularly using Boots, Reflector and Clean Uniform. This finding is comparatively high with a study done in Nepal ie, 32.7% respondents used PPEs like Gloves, Masks 47% and Boot 3.1%<sup>9</sup>. And 43.6% of respondents used PPE mentioned in a study done by Bogale, *et al*<sup>16</sup>. In another study in Ethiopia revealed 55% of them were using PPEs<sup>14</sup>.

In spite of 100% of the participants had adequate knowledge & positive attitude towards PPE, only 53.5% & 56.4% workers were using Glove & Mask and 69.5%, 60.5% & 86.8% were using Boots, Reflector and clean uniform on regular basis.

Hence, periodical Health Education, Continuous Motivation and Monitoring of the workers is very much needed from their supervisors and their concerned Administrators of the Corporation to enhance the usage of the PPE to the workers.

#### CONCLUSION AND RECOMMENDATIONS:

The result of this study is revealed that the overall level of the Knowledge and Attitude of the Sanitary Workers is very high about the benefits of using PPE in their working stations but the magnitude of using PPE among them was moderately low.

This raises a public health concern that despite of their high level of Knowledge and positive attitude towards usage of PPE, the usage was moderately low.

The interventions including periodic Health Education and continuous motivation and monitoring of the availability PPE and its usage are to be ensured.

Municipal Corporation officials should give more emphasis to the importance of tetanus toxoid & Hepatitis Vaccination during their training period and monitor them that they have received Vaccine and getting booster every 3 years as per National Immunization Schedule.

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