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**Supriya Batwalkar**

Lecturer, Dr. G.D. POL

Foundation College of Nursing,

New Mumbai, Maharashtra,

India

## Assess the effectiveness of structured teaching program on knowledge, attitude and practices regarding preventive measures among solid waste collectors

**Supriya Batwalkar**

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### Abstract

Solid waste collectors 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 Solid waste collectors have got the high risk of occupational health hazards. The important morbidity that has been commonly observed among workers is respiratory diseases, eye diseases, dermatological problems, nail infections, musculoskeletal morbidities and water-borne diseases. The most common health problem investigated among this working group includes respiratory symptoms, irritation of the skin, nose, and eyes, gastrointestinal problems, fatigue, headache, allergies, musculoskeletal and injury, risks such as strains to sprains, confusions, fractures, and lacerations.

**Methodology:** Research approach used in this study was evaluatory approach. Pre experimental one group pre-test post-test research design was adapted. The sample was solid waste collectors who fulfilled inclusion criteria selected by using non probability convenient sampling technique. The study was conducted in selected Municipal Corporations. The researcher used semi structured questionnaire to assess knowledge, modified attitude scale to assess attitude and observational checklist to assess practices of solid waste collectors. The data was analysed in terms of the objective and hypothesis using SPSS format.

**Result:** Wilcoxon Signed rank Test value for knowledge is 6.757 which is statistically significant at 5% level of significance. Wilcoxon Signed rank Test value for attitude is 6.597 which is statistically significant at 5% level of significance. Wilcoxon Signed rank Test value for practices is 6.897 which is statistically significant at 5% level of significance. The calculated value was statistically significant at 5% level of significance. Hence the null hypothesis is rejected which shows that structured teaching program is effective.

**Conclusion:** This study emphasized on preventive measures. Structured teaching program on preventive measures found effective to increase the level of knowledge, change to favourable attitude and follow preventive practices of solid waste collectors. This study helps to improve their health status.

**Keywords:** Structured teaching program, preventive measures, solid waste collectors

### Introduction

Solid waste is an outcome of economic productivity and consumption and includes wastes from households, commercial establishments, institutions, markets, and industries and its handling and disposal is a growing environmental and public-health concern. Population growth and economic development have brought increasing amounts of solid waste to urban areas <sup>[1]</sup>. Solid waste management encompasses a wide range of activities including, Collecting garbage; collection, sorting recyclable materials; collection and processing of commercial and industrial waste. Risks 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>[1]</sup>. Solid waste management operations are hazardous in nature involving high risks in terms of the employees getting injured and getting into contact with disease causing pathogens. This makes it important to put safety first before any task is performed to ensure operations run smoothly and with minimal or absent of safety incidents or accidents <sup>[3]</sup>.

**Corresponding Author:**

**Supriya Batwalkar**

Lecturer, Dr. G.D. POL

Foundation College of Nursing,

New Mumbai, Maharashtra,

India

Hence, they are prone to various occupational diseases. Occupational diseases are usually defined as diseases arising out of or in the course of employment from the work or working conditions<sup>[4]</sup>. Solid waste collectors 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. In areas, infectious medical wastes and toxic industrial wastes are not segregated from domestic waste, the waste collectors are exposed to a wide array of risks. As a result of their exposure to multiple risk-factors they suffer high rates of occupational health-problems. Most diseases (Water borne, air born, Contact) have exposure pathways and most injuries had contact pathways (hepatitis B virus [HBV], human immunodeficiency virus [HIV], Tetanus). Making waste technologies more contained, reducing contaminant emissions, changing working methods to interrupt the pathways and using of personal protective equipment can reduce risks<sup>[1]</sup>.

In developing countries like India, there have been few studies of the health and injury incidence of solid waste workers. Most of the reviewed studies suffer from limitations related to poor exposure assessment, and lack of information on relevant confounders. Waste work is overridden by the social, economic, and environmental deprivations<sup>[1]</sup>.

### **Aim of the Study**

To assess the effectiveness of structured teaching program on knowledge, attitude and practices regarding preventive measures among solid waste collectors of selected Municipal Corporation.

### **Need of the study**

Solid waste collectors 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 Solid waste collectors have got the high risk of occupational health hazards. The important morbidity that has been commonly observed among workers is respiratory diseases, eye diseases, dermatological problems, nail infections, musculoskeletal morbidities and water-borne diseases. The most common health problem investigated among this working group includes respiratory symptoms, irritation of the skin, nose, and eyes, gastrointestinal problems, fatigue, headache, allergies, musculoskeletal and injury, risks such as strains to sprains, confusions, fractures, and lacerations.

As per the article on business world - Plight Of the Sanitation Workers, an estimated 1.2 million sanitation workers in India (Intercontinental Journal of Human Resources Research Review, 2014). A decade long projection is unsure, but it has been calculated that 22,327 deaths of sanitation workers dying in the last 5-10 years in India. This number has rightly so been expressed as a conservative claim<sup>[12]</sup>. In Mumbai, there are 28,000 permanent workers in the BMC and 6,500 contract workers. The BMC's own study in 2015 revealed that 1,386 sanitation workers died in six years due to poor working condition. These figures don't include contract workers, only permanent workers. Their life expectancy is shortened, many die between 40 and 55 years of age and among those who do the full length service, very few reach 70.<sup>[13]</sup>

There is a crucial need to identify the number of sanitation

workers across India as no public document states the exact figure yet and no attempt has been made to get realistic statistics on the same. Until we know the universe of sanitation workers, it is impossible for policies to be effective without knowing the type and numbers of its direct beneficiaries. The researcher felt to do this study because there is a lack of awareness about the personal safety in the Municipal solid waste collectors which can help to reduce the mortality and morbidity rate among them.

### **Methodology**

To assess the effectiveness of the structured teaching program regarding preventive measures among solid waste collectors of selected Municipal Corporation. Assess the pre-test knowledge, attitude and practices regarding preventive measures among solid waste collectors of selected Municipal Corporation before structured teaching program. To assess the post-test knowledge, attitude and practices regarding preventive measures among solid waste collectors of selected Municipal Corporation after structured teaching program. To compare the pre-test and post-test knowledge, attitude and practices regarding preventive measures among solid waste collectors of selected Municipal Corporation before and after structured teaching program. To find out the association between pre-test knowledge, attitude and practices regarding preventive measures among solid waste collectors of selected Municipal Corporation with selected demographic variables. Research approach used in this study was evaluatory approach. Pre experimental one group pre-test post-test research design was adapted. In this study the sample consists of 60 solid waste collectors of selected Municipal Corporations who fulfilled the inclusion criteria.

### **Inclusion criteria**

Solid waste collectors willing to participate in the study. Solid waste collectors available at the time of data collection. Solid waste collectors, who are able to read, write and understand Marathi, Hindi, or English.

### **Exclusion criteria**

1. Solid waste collectors who are suffering with chronic disease or mental illness.

The researcher adopted a practical approach for the development of tool prior to preparation of tool. The investigator visited the various areas of garbage collection and disposal where solid waste collectors works. Researcher observed the practices of the solid waste collectors and had an informal talk with them. Researcher gathered information from them which help to develop the tool. The investigator also reviewed previous literature and research studies done on solid waste collector.

### **Result**

The data has been tabulated and organized as follows:

**Section I:** Distribution of samples according to demographic data.

**Section II A:** Distribution of pre and post-test knowledge regarding preventive measures among solid waste collectors before and after structured teaching program.

**Section II B:** Distribution of pre and post-test attitude

regarding preventive measures among solid waste collectors before and after structured teaching program.

**Section II C:** Distribution of pre and post-test practice regarding preventive measures among solid waste collectors before and after structured teaching program.

**Section III A:** Analysis of pre and post-test knowledge regarding preventive measures among solid waste collectors before and after structured teaching program.

**Section III B:** Analysis of pre and post-test attitude regarding preventive measures among solid waste collectors before and after structured teaching program.

**Section III C:** Analysis of pre and post-test practice regarding preventive measures among solid waste collectors before and after structured teaching program.

**Section IV:** Comparison of pre and post-test knowledge, attitude and practice regarding preventive measures among solid waste collectors before and after structured teaching program.

**Section V A:** Association of knowledge regarding preventive measures with selected demographic variables.

**Section V B:** Association of attitude regarding preventive measures with selected demographic variables.

**Section V C:** Association of practice regarding preventive measures with selected demographic variables.

**Analysis**

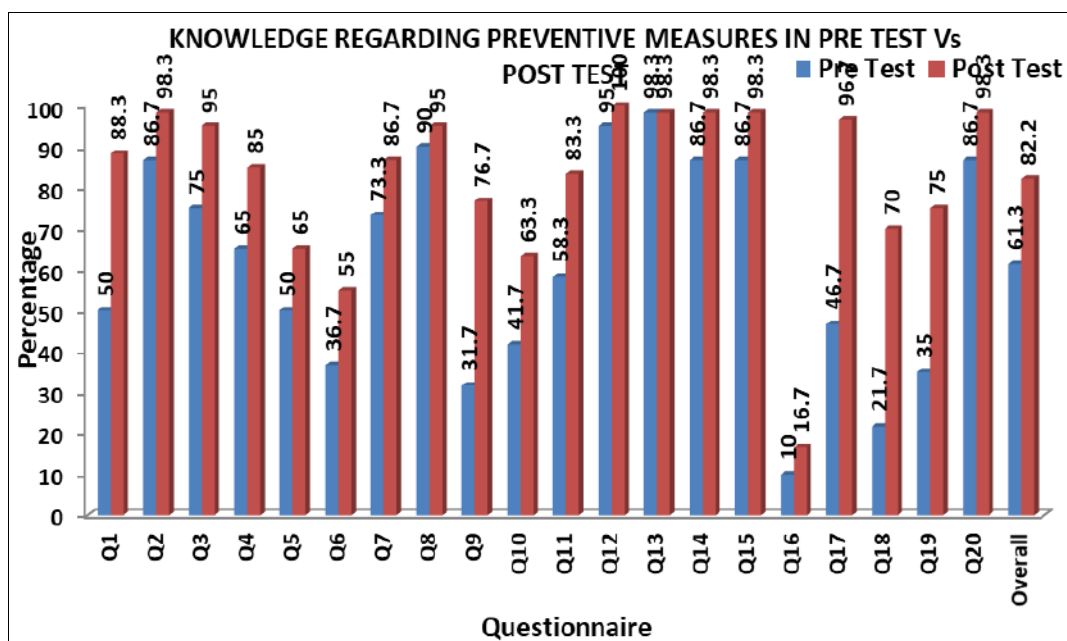
**Section I: Distribution of samples according to demographic data**

**The analysis of the samples as per demographic data**

- According to Age in years, where 23.3% samples (14) were from the age group of 20-29 years. Maximum 40% samples (24) were from the age group of 30-39

- years. 21.7% samples (13) were form the age group of 40-49 years whereas 15 % samples (9) were from the age group of 50-59 years.
- Distribution of samples according to Annual income in Rupees shows maximum 81.7% samples (49) having annual income between Rs.200001 – 300000. 13.3% samples (8) having annual income between Rs.100001 – 200000 whereas 5.0% samples (3) having annual income above Rs.300000.
- Distribution of samples according to Educational Qualification as maximum 41.7% samples (25) had studied till secondary school. 31.7% samples (19) attended primary school whereas 26.7% samples (16) had studied up to higher secondary level. All the samples were literate.
- Distribution of samples according to Types of Housing shows maximum 50% samples (30) were living in a chawl. 36.7% samples (22) living in a building whereas 13.3% samples (8) were living in a zopadpatti.
- Maximum 78.3% samples (47) were permanent on job whereas 21.7% samples (13) were on contract basis.
- 33.3% samples (20) have less than 5 years of experience. Maximum 38.3% samples (23) have 5-10 years of experience whereas 6.7% samples (4) have 11-15 years of experience and 21.7% samples (13) have more than 15 years of experience.
- Distribution of samples according to Source of information regarding any preventive measures to prevent health hazards related to job shows 10% samples (6) got information from TV and Radio. 8.3% samples (5) got information from Newspaper and Magazine. Seniors and colleagues provided information to 55% samples (33). 26.7% samples (16) attended training programme to obtain information.

**Section II A/B/C:** Distribution of pre and post-test knowledge/Attitude/practices regarding preventive measures among solid waste collectors before and after structured teaching program.



**Fig 1:** Distribution of pre and post-test knowledge regarding preventive measures among solid waste collectors before and after structured teaching program

Hence there is an increase in post-test score of knowledge regarding preventive measures among solid waste collectors

after structured teaching program.

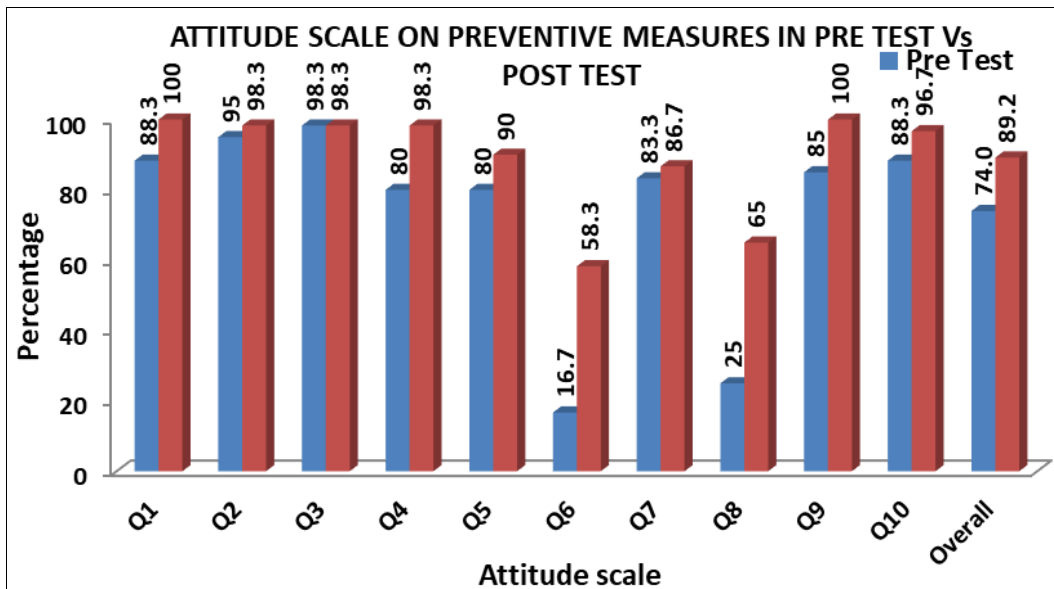


Fig 2: Distribution of pre and post-test attitude score regarding preventive measures among solid waste collectors before and after structured teaching program

Hence there is an increase in favorable attitude core in post-test regarding preventive measures among solid waste

collectors after structured teaching program.

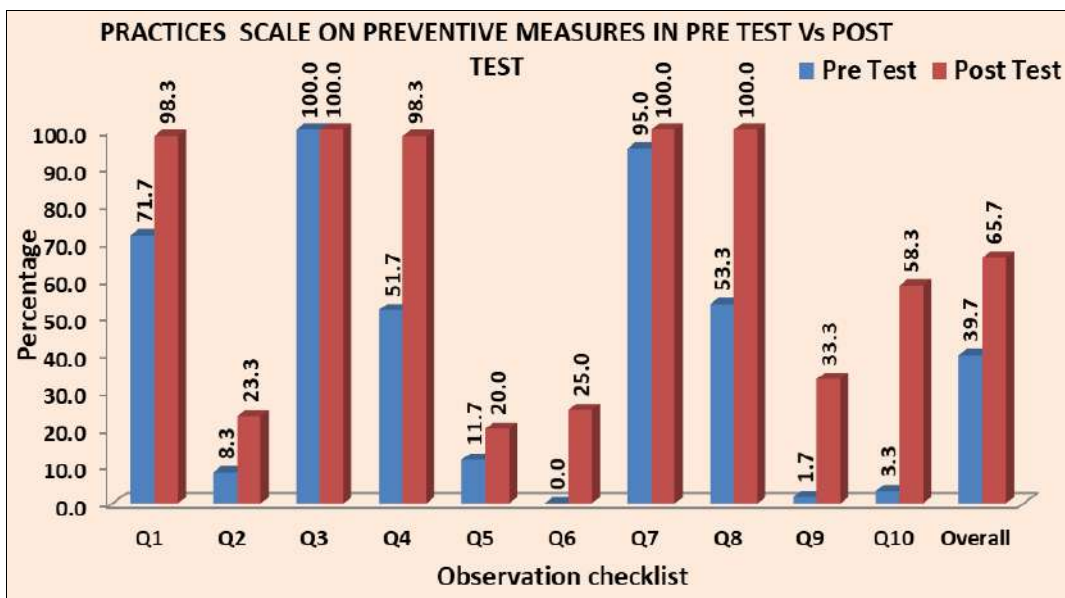


Fig 3: Distribution of pre and post-test practice regarding preventive measures among solid waste collectors before and after structured teaching program

Hence there is an increase in practice score regarding preventive measures among solid waste collectors after structured teaching program.

structured teaching program.

The evaluation of effectiveness of structured teaching program by comparing pre-test and post-test knowledge score of sample analyzed in terms of Wilcoxon Signed rank test to find out the level of significance and proving of hypothesis.

**Section III A/B/C:** Analysis of pre and post-test knowledge/Attitude/Practices regarding preventive measures among solid waste collectors before and after

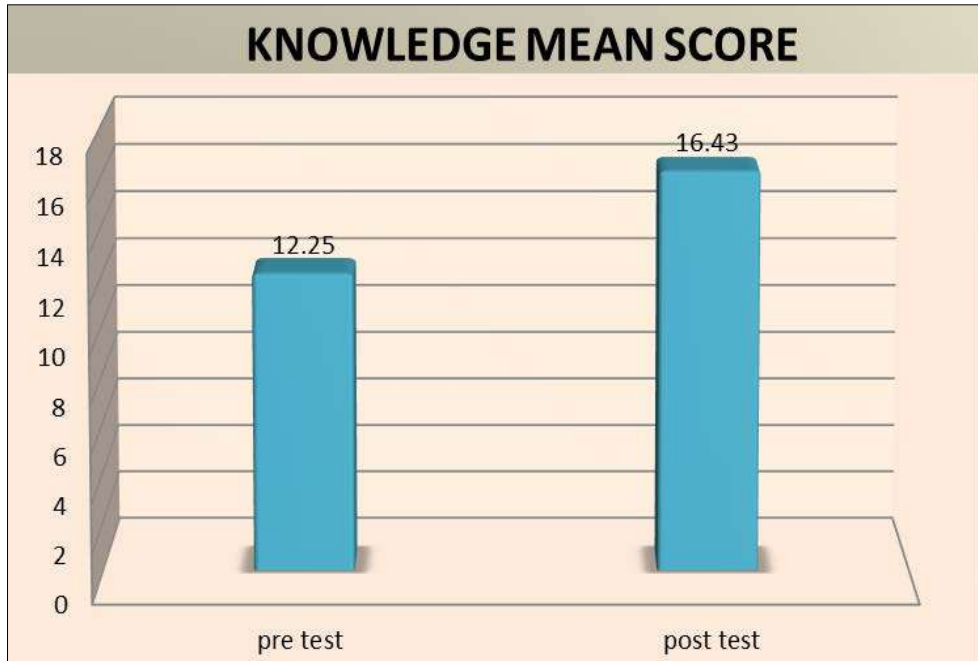
**Mean scores**

**Table 1:** Analysis of pre and post-test knowledge regarding preventive measures among solid waste collectors before and after structured teaching program

Knowledge	No. of Questions	Max. Score	Pre Test		Post Test		Wilcoxon Signed rank Test	P-value	Significant at 5% level
			Mean±SD	Median	Mean±SD	Median			
Overall	20	20	12.25±3.66	12.0	16.43±2.40	17.0	6.757*	<0.001	Yes

\*Statistically Significant at 5% level i.e., P<0.05.

The difference in mean score is 4.18 which show improvement in knowledge score. Thus the knowledge of solid waste collectors significantly improved in post-test.



**Fig 1:** Analysis of pre and post-test knowledge regarding preventive measures among solid waste collectors before and after structured teaching program

Wilcoxon Signed rank Test value is 6.757 which statistically significant at 5% level of significance. This indicates that there is significant difference in the knowledge regarding preventive measures among solid waste collectors before and after the structured teaching program. Hence the null hypothesis (H<sub>0</sub>) is rejected.

improvement in knowledge score. Thus the knowledge of solid waste collectors significantly improved in post-test. Hence research hypothesis (H<sub>1</sub>) is accepted.

The evaluation of effectiveness of structured teaching program by comparing pre-test and post-test attitude score of sample analyzed in terms of Wilcoxon Signed rank test to find out the level of significance and proving of hypothesis.

The difference in mean score is 4.18 which show

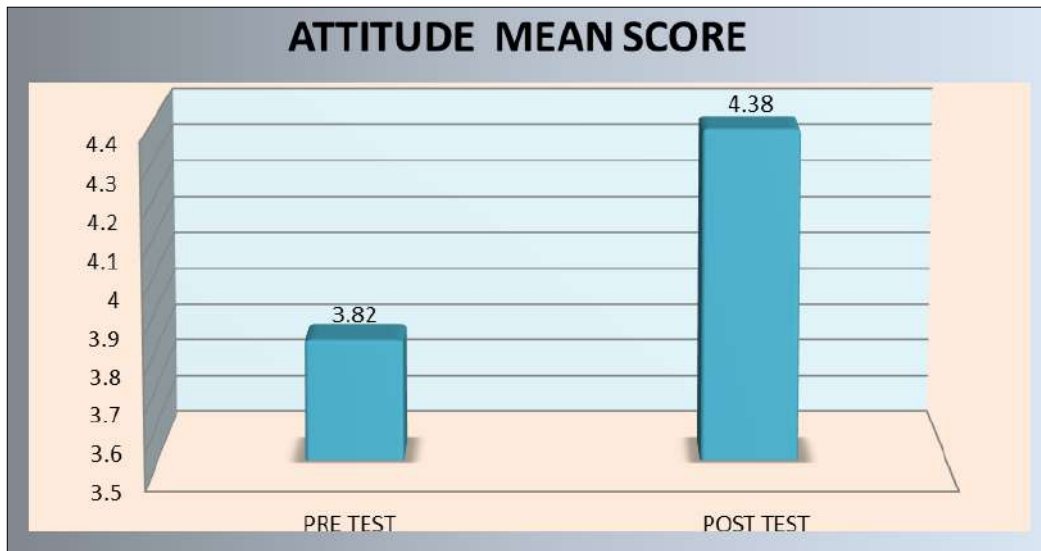
**Table 2:** Analysis of pre and post-test attitude regarding preventive measures among solid waste collectors before and after structured teaching program

Attitude	N	Mean	Std dev	Median	Wilcoxon Signed rank Test	P-value	Significant at 5% level
Pre Test	60	3.82	0.4643	3.85	6.597*	<0.001	Yes
Post Test	60	4.38	0.3689	4.40			
Improvement		0.56					

\*Statistically Significant at 5% level i.e., p<0.05

The difference in mean score is 0.56 which show improvement in attitude score. Thus the attitude of solid

waste collectors significantly improved in post-test.



**Fig 2:** Analysis of pre and post-test attitude regarding preventive measures among solid waste collectors before and after structured teaching program

Wilcoxon Signed rank Test value is 6.597 which statistically significant at 5% level of significance. This indicates that there is significant difference in the attitude regarding preventive measures among solid waste collectors before and after the structured teaching program. Hence the null hypothesis (H0) is rejected. The difference in mean score is 0.56 which show

improvement in attitude score. Thus the attitude of solid waste collectors significantly improved in post-test. Hence research hypothesis (H1) is accepted. The evaluation of effectiveness of structured teaching program by comparing pre-test and post-test practice score of sample analyzed in terms of Wilcoxon Signed rank test to find out the level of significance and proving of hypothesis

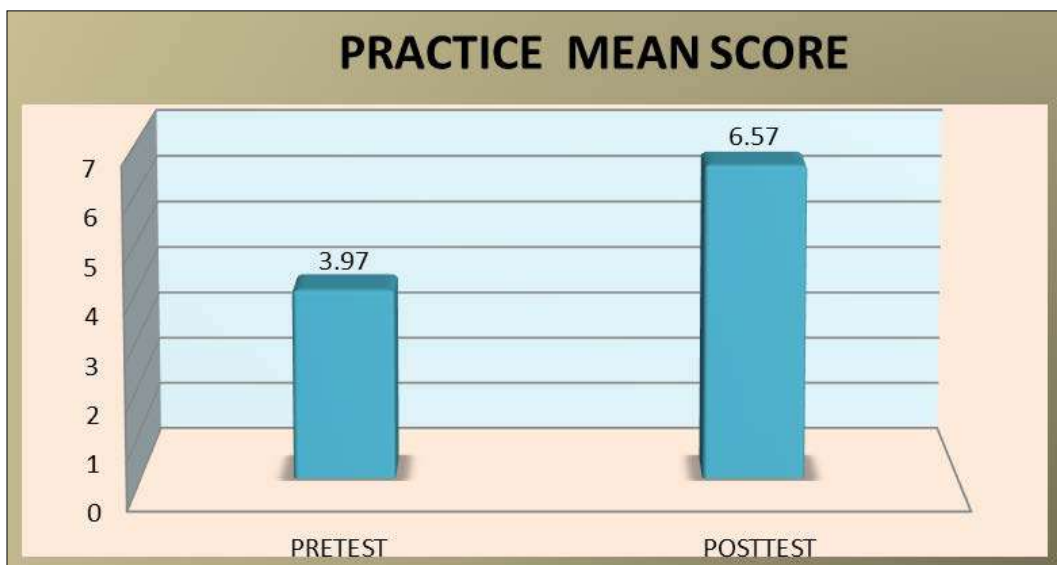
**Table 3:** Analysis of pre and post-test practice regarding preventive measures among solid waste collectors before and after structured teaching program

Practice	No. of Questions	Max. Score	Pre-Test		Post-Test		Wilcoxon Signed rank Test	P-value	Significant at 5% level
			Mean±SD	Median	Mean±SD	Median			
Over all	10	10	3.97±1.09	4.0	6.57±0.92	7.0	6.897*	<0.001	Yes

\*Statistically Significant at 5% level i.e., P<0.05.

The difference in mean score is 2.6 which show improvement in practice score. Thus the practices of solid

waste collectors significantly improved in post-test.



**Fig 3:** Analysis of pre and post-test practice regarding preventive measures among solid waste collectors before and after structured teaching program

Wilcoxon Signed rank Test value is 6.897 which statistically significant at 5% level of significance. This indicates that there is significant difference in the practice regarding

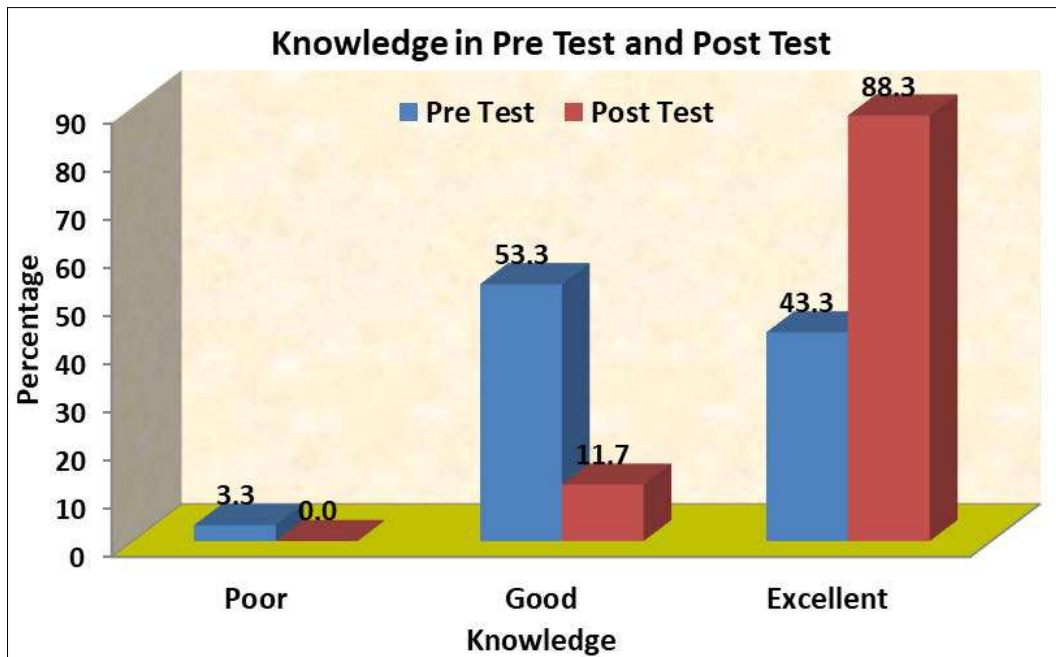
preventive measures among solid waste collectors before and after the structured teaching program. Hence the null hypothesis (H0) is rejected.

The difference in mean score is 2.6 which show improvement in practice score. Thus the practices of solid waste collectors significantly improved in post-test. Hence research hypothesis (H1) is accepted.

**Section IV:** Comparison of pre and post-test knowledge, attitude and practice regarding preventive measures among solid waste collectors before and after structured teaching program.

**Comparison**

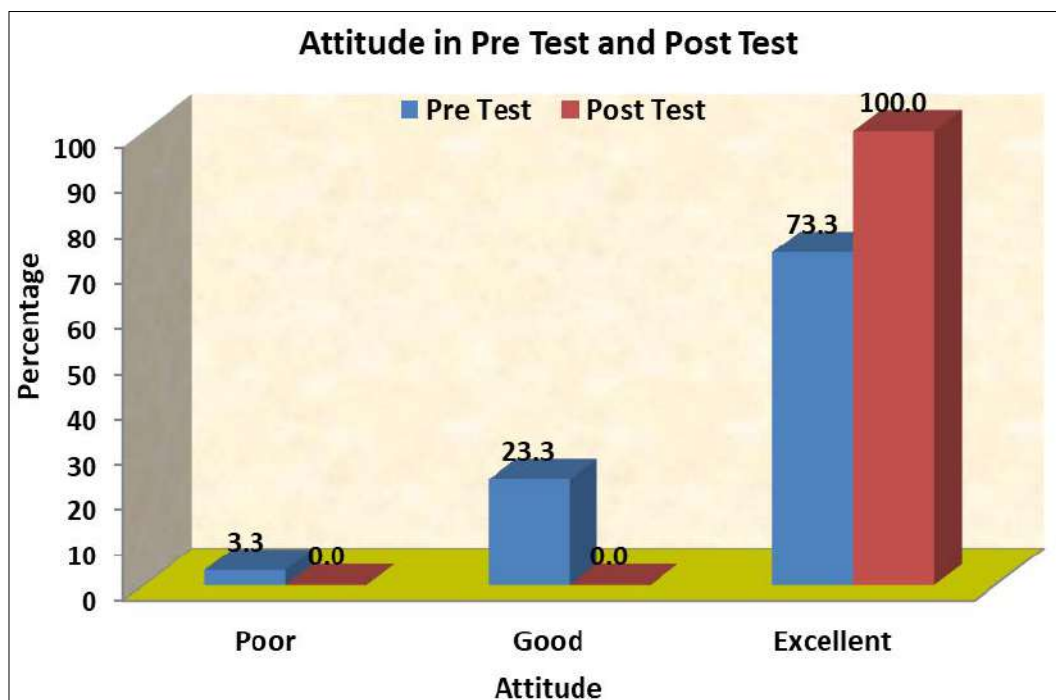
In pre-test 3.3% samples (2) shows poor knowledge(0-6) which improved in post-test that is 0%. In pre-test 53.3% samples (32) have good knowledge (7-13) whereas in post-test only 11.7% samples (7) have good knowledge. In pre-test 43.3% samples (26) have excellent knowledge (14-20) which increased to 88.3% samples (53) in post-test.



**Fig 4:** Comparison of pre and post-test knowledge regarding preventive measures among solid waste collectors before and after structured teaching program

In pre-test 3.3% samples (2) shows poor attitude (0-3) which improved in post-test that is 0%. In pre-test 23.3% samples (14) shows good attitude (4-6) whereas in post-test

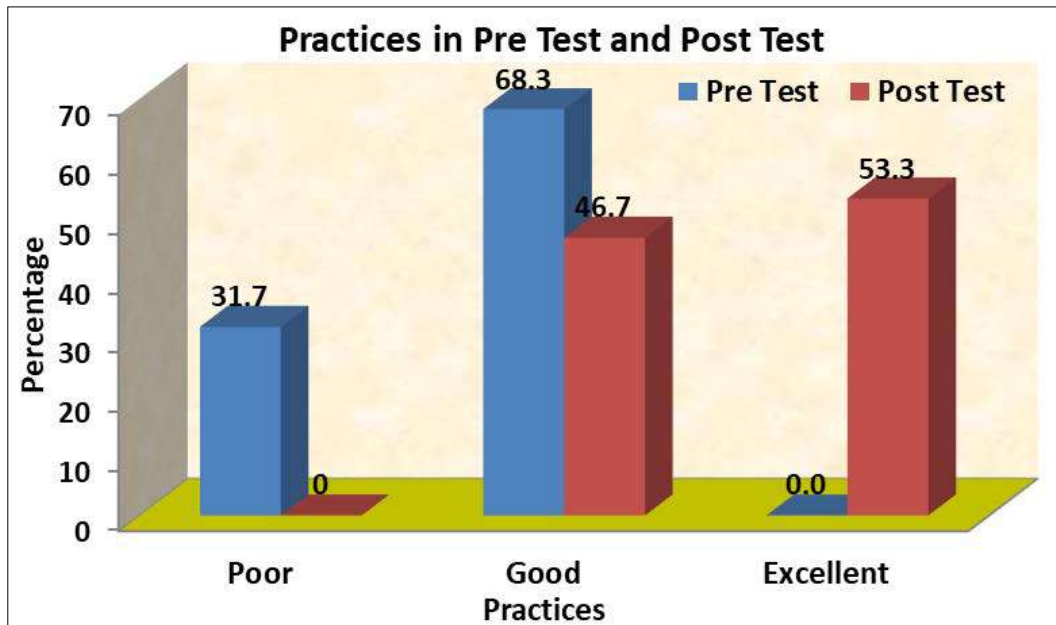
it is 0%. In pre-test 73.3% samples (44) have excellent attitude (7-10) which was increased to 100% in post-test.



**Fig 5:** Comparison of pre and post-test attitude regarding preventive measures among solid waste collectors before and after structured teaching program

In pre-test 31.7% samples (19) demonstrated poor practices (0-3) which improved in post-test that is 0%. In pre-test 68.3% samples (41) demonstrated good practices (4-6) whereas in post-test it is 46.7%. In pre-test 0% samples (0)

demonstrated excellent practices (7-10) whereas 53.3% samples (32) demonstrated excellent practices (7-10) in post-test.



**Fig 6:** Comparison of pre and post-test practices regarding preventive measures among solid waste collectors before and after structured teaching program

A solid waste collector shows 88.3% of excellent knowledge, 100% favourable attitude and 53.3% improvement in practices in post-test which shows the effectiveness of structured teaching program.

**Section V A/B/C:** Association of knowledge / Attitude/Practices regarding preventive measures with selected demographic variables.

This section deals with association of knowledge, attitude and practices regarding preventive measures among solid waste collectors with selected demographic variables like Age, Type of family, Annual income, Education, type of housing, Nature of work/job, Years of experience in the field, Source of information regarding any preventive measures to prevent health hazards related to job.

**Chi square formula**

$$X^2 = \sum (O-E)^2 / E$$

Where,

O=observed value

E=expected value

**Discussion**

**Demographic data:** Maximum 40% samples (24) were from the age group of 30-39 years. 50 %samples (30) are from Nuclear family whereas 45% samples (27) have joint family. Maximum 81.7% samples (49) having annual income between Rs.200001 – 300000. In regard to education all the samples were literate. Maximum 50% samples (30) were living in a chawl. 36.7% samples (22) living in a building whereas 13.3% samples (8) were living in a zopadpatti. In relation to nature of work maximum 78.3% samples (47) were permanent on job whereas 21.7%

samples (13) were on contract basis. In view of years of experience 33.3% samples (20) have less than 5 years of experience. Maximum 38.3% samples (23) have 5-10 years of experience whereas 6.7% samples (4) have 11-15 years of experience and 21.7% samples (13) have more than 15 years of experience. in relation to source of information seniors and colleagues provided information to 55% samples (33) whereas 26.7% samples (16) attended training programme to obtain information.

**Comparison:** The overall knowledge post-test mean of 16.43 which shows significant changes when comparing to pre-test mean of 12.25. Over all attitude mean score of post-test is 4.38 which was high compared to over all mean score of pre-test is 3.82. The difference in mean score of practices is 2.6 which show improvement in practice score. Thus the knowledge, attitude and practices of solid waste collectors were significantly improved in post-test.

**Effectiveness of structured teaching program:** Wilcoxon Signed rank Test value for knowledge is 6.757 which is statistically significant at 5% level of significance. Wilcoxon Signed rank Test value for attitude is 6.597 which is statistically significant at 5% level of significance. Wilcoxon Signed rank Test value for practices is 6.897 which is statistically significant at 5% level of significance. The calculated value was statistically significant at 5% level of significance. Hence the null hypothesis is rejected which shows that structured teaching program is effective.

**Association:** There is association of knowledge with age, type of family and education. Knowledge is not associated with annual income, type of housing, nature of work/job, years of experience, and source of information. Attitude is associated with type of family and type of housing and not



with age, education, annual income, nature of work/job, years of experience, and source of information. Practices are associated with age and education and not on type of family, type of housing, annual income, nature of work/job, years of experience, and source of information.

**Interpretation:** structured teaching program is effective in enhancing the knowledge, attitude and practices of solid waste collectors regarding preventive measures.

### Conclusion

The study allowed the researcher to interact with many solid waste collectors and to understand their problems. The solid waste collectors were happy to see that they are also a part of society and community also interested in their health maintenance. They actively participated in study and shared their problems, discussed their queries and cleared their doubts. They assured that they will continue all the good practices in future. The waste collectors face more amounts of exposure and risk on their health during their work. In addition, their hard work requires repeated heavy physical activity such as lifting, carrying, pulling and pushing. Therefore, health hazards and injuries are very frequent among waste collectors. This study emphasized on preventive measures. Structured teaching program on preventive measures found effective to increase the level of knowledge, change to favourable attitude and follow preventive practices of solid waste collectors. This study helps to improve their health status.

### Financial Support and sponsorship

Nil

### Conflicts of Interest

There are no conflicts of interest

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