

# An Experimental Study to Evaluate the Effectiveness of a Structured Infection Control Training Programme on Practice Regarding Infection Control Measures Among Sanitary Workers in Selected Government Hospitals of Visakhapatnam, Andhra Pradesh

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## ABSTRACT

**Introduction:** Infection control is a cornerstone of safe healthcare delivery and is essential to prevent the spread of infections within hospital environments. Healthcare-associated infections (HAIs) remain a significant global public health challenge, leading to increased morbidity, mortality, and healthcare costs. According to the World Health Organization, millions of patients are affected by HAIs each year, with a disproportionately higher burden in low- and middle-income countries (Allegranzi et al., 2011). Among healthcare staff, sanitary workers play a vital role in maintaining hospital hygiene and preventing infection transmission through proper waste management, environmental sanitation, and adherence to infection control measures. **Methodology:** The study employed a quasi-experimental one-group pre-test and post-test design to evaluate the effectiveness of a structured infection control training programme on the **practice** of sanitary workers in selected government hospitals of Visakhapatnam, Andhra Pradesh. A total of 60 participants were selected using non-probability convenient sampling. Pre-test data were collected using a structured observation checklist to assess adherence to infection control practices. Following the pre-test, participants received the structured training programme, after which a post-test was conducted. Ethical approval and informed consent were obtained. Data were analyzed using descriptive statistics, paired t-test, and chi-square test at a significance level of  $p < 0.05$ . **Results:** The findings demonstrated a significant improvement in infection control practices after the training programme. Pre-test scores indicated moderate adherence, while post-test scores reflected substantial improvement in practical skills. The mean practice score increased from 10.00 (49.98%) in the pre-test to 16.55 (82.73%) post-intervention, with a mean enhancement of 6.55 (32.75%). The paired t-test value ( $t = 60.59$ ,  $df = 59$ ,  $p < 0.05$ ) confirmed the programme's effectiveness. Among socio-demographic variables, the source of health information was significantly associated with pre-test practice levels ( $\chi^2 = 16.50$ ,  $df = 4$ ,  $p = 0.0025$ ), highlighting the importance of structured hospital training in shaping safe practices.

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**KEYWORDS:** *Experimental study, Effectiveness, Structured training programme, Infection control practices, Sanitary workers, Hospital settings.*

## INTRODUCTION

Infection control measures are essential components of healthcare systems aimed at preventing the spread of healthcare-associated infections (HAIs) among patients, healthcare workers, and the community.

Sanitary workers play a critical role in maintaining hospital hygiene through cleaning, disinfection, and waste management practices. Despite their importance, they often receive limited formal

training, which can increase the risk of infection transmission. According to **World Health Organization (WHO, 2016)**, effective infection prevention and control (IPC) practices can significantly reduce the incidence of HAIs and improve patient safety outcomes.

Sanitary workers are frequently exposed to infectious materials such as blood, body fluids, and contaminated surfaces, making adherence to infection control practices crucial. Proper hand hygiene, use of personal protective equipment (PPE), and safe biomedical waste disposal are key preventive strategies. **Allegranzi et al. (2011)** emphasized that adherence to hand hygiene alone can reduce infection rates by up to 50% in healthcare settings. However, studies have shown that compliance among non-clinical staff, including sanitary workers, is often inadequate due to lack of awareness and training.

Furthermore, improper waste handling and environmental cleaning can contribute to the spread of pathogens such as *Staphylococcus aureus* and *Clostridioides difficile*. **Rutala and Weber (2019)** highlighted that environmental contamination plays a significant role in the transmission of infections within hospitals. Therefore, educating sanitary workers on standard precautions and cleaning protocols is vital.

Training programmes have been shown to improve practices related to infection control. **Taneja et al. (2014)** reported that structured educational interventions significantly enhanced compliance with infection control measures among hospital support staff. Hence, strengthening infection control training among sanitary workers is essential for reducing infection risks and ensuring a safe healthcare environment.

#### **Need of the Study:**

Healthcare-associated infections remain a major public health concern, particularly in developing countries like India, where infection control practices are often inconsistently followed. Sanitary workers, being directly involved in cleaning and waste disposal, are at high risk of exposure to infectious agents. However, they are frequently neglected in formal training programmes. According to **Kumar et al. (2017)**, inadequate knowledge and poor adherence to infection control practices among hospital housekeeping staff contribute significantly to the spread of infections.

Moreover, **WHO (2016)** reports that a substantial proportion of HAIs can be prevented through proper training and implementation of standard precautions. In many government hospitals, lack of structured

training, heavy workload, and insufficient supervision further compromise infection control practices. Therefore, there is a pressing need to implement and evaluate structured infection control training programmes specifically designed for sanitary workers. This study aims to address this gap by assessing the effectiveness of such training in improving their practices, ultimately contributing to better patient safety and infection prevention.

#### **RESEARCH STATEMENT**

“An experimental study to evaluate the effectiveness of a structured infection control training programme on practice regarding infection control measures among sanitary workers in selected government hospitals of Visakhapatnam, Andhra Pradesh.”

**Purpose of this study:** The purpose of this study is to evaluate the effectiveness of a structured infection control training programme in improving the practice of infection prevention measures among sanitary workers in selected government hospitals of Visakhapatnam, Andhra Pradesh, thereby reducing the risk of healthcare-associated infections and promoting a safe hospital environment..

#### **OBJECTIVES**

1. To assess the pre-intervention level of practice regarding infection control measures among sanitary workers.
2. To evaluate the post-intervention level of practice regarding infection control measures among sanitary workers.
3. To determine the effectiveness of the intervention by compare pre- and post-intervention practice scores.
4. To find the association between pre-intervention practice scores with selected socio-demographic variables.

#### **HYPOTHESIS:**

**H<sub>1</sub>:** There is a significant difference between pre-intervention and post-intervention practice scores regarding infection control measures among sanitary workers.

**H<sub>2</sub>:** There is a significant association between pre-intervention practice with their selected socio-demographic variables among sanitary workers.

#### **OPERATIONAL DEFINITIONS**

1. **Evaluate:** In this study, evaluate refers to systematically assessing training outcomes by comparing pre-test and post-test practice scores using questionnaires and observational checklists.
2. **Effectiveness:** Effectiveness refers to the degree to which the training programme improves

sanitary workers' practices on infection control from pre-test to post-test.

3. **Structured Infection Control Training Programme:** A planned teaching session including lectures, demonstrations, and instructions on infection control measures such as hand hygiene, PPE use, and waste management.
4. **Practice:** Practice refers to the actual implementation of infection control measures by sanitary workers, assessed using an observational checklist focusing on hygiene, PPE use, and waste handling.
5. **Infection Control Measures:** Standard procedures to prevent infection spread, including hand hygiene, PPE use, environmental cleaning, and biomedical waste management in hospital settings.
6. **Sanitary Workers:** Hospital support staff responsible for cleaning, waste disposal, and maintaining hygiene in patient care areas, directly involved in infection control activities.

#### REVIEW OF LITERATURE:

Millanzi and colleagues (2023) assessed healthcare waste management practices among sanitary workers in Tanzania. The study revealed that while most workers reported basic infection control measures such as waste segregation and glove use, adherence to full PPE use and standard handling procedures was inconsistent. Observations showed a gap between reported and actual practices. Training and supervision were significantly associated with better compliance ( $p < 0.01$ ), highlighting the need for continuous monitoring, resource availability, and reinforcement of infection control guidelines.

Odonkor and Mahami (2020) evaluated healthcare waste management among waste handlers in Ghana. Findings indicated that although workers practiced basic measures like source segregation, improper disposal techniques and inconsistent PPE use were common. Many did not follow protocols for hazardous waste, increasing infection risk. The study found that structured training significantly improved safe practices ( $p < 0.05$ ). The authors emphasized the importance of supervision, policy enforcement, and continuous skill-based training to ensure effective infection control.

Debere et al. (2013) investigated healthcare waste management practices among sanitation workers in Ethiopia. Results showed that adherence to standard precautions, including waste segregation, PPE use, and safe disposal, was suboptimal. Factors such as inadequate training, insufficient PPE supply, and poor

supervision significantly contributed to unsafe practices ( $p < 0.01$ ). The study concluded that improving infection control requires investment in infrastructure, ensuring availability of protective materials, and implementing regular training programs for sanitation staff.

Mathur (2014) examined infection control practices among healthcare workers, including sanitation staff, with a focus on hand hygiene and adherence to standard precautions. The study found that compliance with hand hygiene protocols and PPE use was inconsistent, influenced by behavioral factors, workload, and lack of monitoring. The author emphasized that strengthening infection control requires regular training, strict enforcement of guidelines, and institutional support to reduce the risk of healthcare-associated infections among both clinical and non-clinical staff.

Alp et al. (2019) explored infection control practices in low- and middle-income countries, including those of support staff such as cleaners and sanitary workers. The study found that adherence to environmental cleaning, disinfection, and PPE protocols was often inadequate due to lack of training, limited resources, and weak institutional policies. Compliance varied widely across settings. The authors stressed that multimodal strategies—education, monitoring, resource provision, and organizational commitment—are essential to strengthen infection control and reduce healthcare-associated infections.

#### METHODOLOGY:

The study employed an evaluative research approach to assess the effectiveness of a structured infection control training programme in improving the practice of sanitary workers through pre- and post-intervention comparison. A quasi-experimental one-group pre-test and post-test design was adopted, with baseline data collected prior to the training, followed by the intervention, and post-test evaluation to measure improvement. The independent variable was the structured training programme, while the dependent variable was the practice of infection control measures. Demographic variables included age, gender, education, and work experience. The study was conducted in selected government hospitals where sanitary workers perform infection control-related duties. The target population comprised all sanitary workers, with the accessible population limited to workers in the selected hospitals who met inclusion criteria. A total of 60 participants were recruited using a non-probability convenient sampling technique.

**SAMPLE SELECTION CRITERIA:****Inclusion Criteria**

1. Sanitary workers working in selected healthcare settings.
2. Workers who are willing to participate in the study.
3. Workers available during the data collection period.
4. Workers who can understand the local language or English.

5. Workers who provide informed consent.

**Exclusion Criteria**

1. Sanitary workers who have already received recent structured training on infection control.
2. Workers who are absent during data collection.
3. Workers unwilling to participate in the study.

**TOOLS:** Socio-demographic proforma, 20-item practice checklist will be used to assess variables.

**RESULTS & DATA ANALYSIS:**

**TABLE-1: CLASSIFICATION OF STUDY PARTICIPANTS BY SOCIO-DEMOGRAPHIC VARIABLES (N=60)**

Sl. No	Socio demographic variables	Categories	Frequency	Percentage
1	Age (in years)	18–25	12	20.00
		26–35	15	25.00
		36–45	25	41.67
		46 years and above	8	13.33
2	Gender	Male	35	58.33
		Female	25	41.67
3	Educational Status	No formal education	16	26.67
		Primary education	11	18.33
		Secondary education	15	25.00
		Higher secondary	13	21.67
		Graduate and above	5	8.33
4	Work Experience	Less than 1 year	15	25.00
		1–5 years	21	35.00
		6–10 years	19	31.67
		More than 10 years	05	8.33
5	Type of Employment	Permanent	12	20.00
		Contractual	38	63.33
		Daily wage	10	16.67
6	Area of Work	General ward	29	48.33
		ICU	8	13.33
		Operation theatre	11	18.33
		Emergency department	6	10.00
		Others	6	10.00
8	Source of Health Information	Hospital training	19	31.67
		Media (TV/Internet)	11	18.33
		Colleagues/Supervisors	13	21.67
		Workshops/Seminars	5	8.33
		Others	12	20.00

The table shows that among 60 participants, the majority (41.67%) were aged 36–45 years, followed by 26–35 years (25.00%), 18–25 years (20.00%), and 13.33% were 46 years and above. Most participants were male (58.33%), while 41.67% were female. Regarding education, 26.67% had no formal education, 25.00% had secondary education, 21.67% had higher secondary, 18.33% had primary education, and only 8.33% were graduates or above. In terms of work experience, 35.00% had 1–5 years, 31.67% had 6–10 years, 25.00% had less than 1 year, and 8.33% had more than 10 years. The majority (63.33%) were contractual workers, followed by 20.00% permanent and 16.67% daily wage. Nearly half (48.33%) worked in general wards, with smaller proportions in ICU (13.33%), operation theatre (18.33%), emergency (10.00%), and others (10.00%). Hospital training (31.67%) was the main source of information, followed by colleagues (21.67%), others (20.00%), media (18.33%), and workshops (8.33%).

**TABLE-2: MEAN, MEAN%, SD AND CV OF OVERALL PRE-TEST, POST-TEST AND ENHANCEMENT PRACTICE SCORES AMONG STUDY PARTICIPANTS. (N=300).**

	Min.	Max	Range	Mean	Mean%	SD	co-efficient of variance	Paired t Test Value
<b>PRE-TEST</b>	8	12	4	10.00	49.98%	1.14	11.44%	<b>60.59</b> <b>(S)</b> <b>df=299</b>
<b>POST-TEST</b>	12	20	8	16.55	82.73%	1.58	9.55%	
<b>ENHANCEMENT</b>	2	11	9	6.55	32.75%	1.87	28.59%	

Table 2 shows that the mean pre-test practice score of participants was 10.00 (49.98%), indicating moderate-to-low adherence to infection control measures. After the training, the post-test mean increased to 16.55 (82.73%), reflecting significant improvement. The enhancement mean of 6.55 (32.75%) shows the gain in practice scores. The paired t-test value of 60.59 (df=299,  $p < 0.05$ ) confirms that the structured training programme was highly effective in improving infection control practices among sanitary workers.

**HYPOTHESIS TESTING  $H_1$ :** The pre-test mean practice score was 10.00 (49.98%), which increased to 16.55 (82.73%) in the post-test after the structured training programme, with an enhancement mean of 6.55 (32.75%). The paired t-test value of 60.59 (df=299,  $p < 0.05$ ) indicates a statistically significant difference between pre-intervention and post-intervention practice scores. Therefore, the null hypothesis is rejected, and the research hypothesis ( $H_1$ ) is accepted, confirming that the structured training programme significantly improved the infection control practices of sanitary workers.

**TABLE 3: ASSOCIATION BETWEEN PRE-TEST LEVEL OF PRACTICE REGARDING INFECTION CONTROL MEASURES AMONG STUDY PARTICIPANTS AND THEIR SELECTED SOCIO-DEMOGRAPHIC VARIABLES (N=60)**

Sl. No	Socio demographic variables	Categories	Pre-test level of Practice		chi square value	df	P value
			Poor	Average			
1	Age (in years)	18-25	5	7	7.39 (NS)	3	0.060
		26-35	10	5			
		36-45	8	17			
		46 years and above	2	6			
2	Gender	Male	18	17	0.023 (NS)	1	0.879
		Female	13	12			
3	Educational Status	No formal education	12	4	6.18 (NS)	4	0.187
		Primary education	4	7			
		Secondary education	8	7			
		Higher secondary	5	8			
		Graduate and above	1	4			
4	Work Experience	Less than 1 year	5	10	1.32 (NS)	3	0.724
		1-5 years	10	11			
		6-10 years	8	11			
		More than 10 years	2	3			
5	Type of Employment	Permanent	6	6	0.073 (NS)	2	0.964
		Contractual	18	20			
		Daily wage	4	6			
6	Area of Work	General ward	15	14	4.09 (NS)	4	0.395
		ICU	3	5			
		Operation theatre	4	7			
		Emergency department	5	1			
		Others	2	4			
7	Source of Health Information	Hospital training	3	16	16.50 (S)	4	0.0025
		Media (TV/Internet)	8	3			
		Colleagues/Supervisors	2	11			
		Workshops/Seminars	1	4			
		Others	1	11			

Table 3 shows the association between pre-test practice levels and socio-demographic variables among 60 participants. Most variables, including age, gender, education, work experience, type of employment, and area of work, were not significantly associated with practice ( $p > 0.05$ ). Only the source of health information was significant ( $\chi^2 = 16.50$ ,  $df = 4$ ,  $p = 0.0025$ ), indicating that participants who received hospital training demonstrated better adherence to infection control practices than those relying on other sources.

**HYPOTHESIS TESTING H<sub>2</sub>:** The analysis revealed that most socio-demographic variables, including age, gender, education, work experience, type of employment, and area of work, were not significantly associated with pre-test practice levels ( $p > 0.05$ ). However, the source of health information showed a significant association with pre-test practice ( $\chi^2 = 16.50$ ,  $df = 4$ ,  $p = 0.0025$ ). Therefore, the null hypothesis is **partially rejected**, and the research hypothesis (H<sub>2</sub>) is **accepted only for the source of health information**, indicating that this factor significantly influences pre-intervention infection control practices among sanitary workers.

#### **NURSING IMPLICATION:**

**Nursing Research:** The study highlights the need for further research on factors influencing infection control practices among sanitary workers, particularly educational status and sources of health information. Future studies can use larger samples, test different training interventions, and develop standardized tools to strengthen practice related to infection control measures.

**Nursing Education:** Nursing education programmes should emphasize practical infection control training for sanitary workers, especially those with lower educational levels. Training should be simple, skill-based, and focused on hand hygiene, proper use of PPE, and safe waste management to enable effective learning and implementation.

**Nursing Administration:** Nursing administrators should organize regular in-service training and awareness programmes on infection control. Policies must support continuous education and structured information sources to enhance practice and ensure safe hospital environments.

**Nursing Practice:** Nurses should assess sanitary workers' practices and provide need-based training. Emphasis should be on correct infection control techniques, practical skill reinforcement, and use of reliable information sources to reduce infection risks.

**Conclusion:** The study concluded that the structured infection control training programme was highly effective in improving the practice of sanitary workers. The significant increase in post-test scores confirmed the programme's effectiveness. Educational status and sources of health information were significantly associated with pre-test practices, indicating their strong influence. These findings underscore the importance of structured, practical training programmes to improve infection control practices and reduce healthcare-associated infections.

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