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A STUDY TO DETERMINE THE KNOWLEDGE AND PRACTICE REGARDING BIO- MEDICAL WASTE MANAGEMENT AMONG GROUP–D WORKERS IN SELECTED HOSPITAL, CHENNAI.

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ABSTRACT

Introduction: Biomedical waste management is crucial for healthcare facilities to prevent harm to human health, protect the environment, and comply with regulations. It can be categorized into infectious, hazardous, radioactive, sharps, and general non-hazardous waste. **Aim of the study:** The aim of the study to determine the Knowledge and Practice regarding Bio- Medical Waste Management among Group–d workers in selected Hospital, Chennai. **Methodology:** This study adopts quantitative research. A descriptive research design was employed. The variables included demographic, as well as research variables focused on knowledge and practice related to biomedical waste management. **Results:** Results from this study showed that 90% participants demonstrated inadequate knowledge alongside 10% who demonstrated moderate knowledge and no participants showed adequate knowledge. The practice levels among participants included 10% with good practice and 83% with average practice along with 7% with poor practice. **Conclusion:** The study highlights the urgent need for targeted training programs to enhance biomedical waste management knowledge and practice among Group-D workers, improving hospital waste management efficiency.

Keywords: Biomedical waste management, Hazardous, Knowledge, Practice

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Introduction

Healthcare facilities need proper biomedical waste management systems for protecting human health and environmental preservation and regulatory compliance. Unique handling approaches together with proper disposal procedures protect both workers and the environment for all waste types. The complete system of biomedical waste management requires effective procedures for waste segregation followed by collection and storage together with transportation and treatment processes and disposal system alongside documentation and record keeping alongside staff training and public awareness.

The waste identification system uses colour codes to separate waste categories into seven specific types including infectious waste in red and sharps waste in yellow followed by blue identifying hazardous waste that is non-infectious and black signifying general non-hazardous waste and white or transparent showing decontaminated waste as well as green highlighting recyclable waste and finally yellow with black bands indicating radioactive waste.

Improper biomedical waste management poses significant health hazards, including infectious disease transmission, sharps injuries, chemical exposure, toxicological hazards, radiation exposure, accidental exposure during handling and transportation, and environmental contamination. It is essential to educate healthcare staff, waste handlers, and anyone involved in biomedical waste management about the colour coding system and implement clear labelling and training programs.

The high risk of healthcare waste to cause infection and inspire injuries requires dependable methods for proper handling. Medical waste materials consist of 75 to 90 percent non-hazardous content so the hazardous portion makes up 10 to 25 percent which presents real harm to living beings and environmental elements. Hospital facilities produce substantial amounts of biomedical waste according to Bangalore survey outcomes which indicate the daily waste generation at 40 tons where infectious waste amounts to 45 to 50 percent.

Large hospital establishments have created an acute biomedical waste management challenge because research shows hospitals generate between 1 and 5 kilos of waste per bed each day. Local government licenses most biomedical waste treatment facilities to enforce guidelines that regulate waste ownership and disposal.

Among the highest risk groups exist nurses together with paramedical staff and waste management operators and scavengers. Hospital waste management depends on the continuous attention of multiple workers who include collection staff and waste disposal personnel. Failure of knowledge or carelessness from anyone in the chain will result in broken protocols which create security threats to infections.

AIM OF THE STUDY

The aim of the study to assess the Knowledge and Practice regarding Bio-Medical Waste Management among Group – d workers.

METHODOLOGY

A quantitative research methodology used for the study. The research design used descriptive to create a systematic profile of Group-D worker knowledge and practice regarding biomedical waste management. The research included both

demographic aspects which included age, sex, marital status, religion, educational status, occupation, years of experience, income, and training participation and research variables concentrated on biomedical waste management knowledge and practice. This research project took place at ACS Medical Hospital in Chennai among Group-D staff members. A systematic approach led to participant selection from Group-D workers at ACS Medical Hospital based on their employment criteria. The research examined thirty workers who performed Group-D duties and matched the study requirements.

The study included Group-D workers at ACS Medical Hospital who could read Tamil and voluntarily participated, excluding those unwilling, unavailable, or previously trained in biomedical waste management. The research tool comprised three parts: demographics (age, sex, religion, education, experience, work area, prior training), a 15-item knowledge questionnaire (scored as inadequate <7, moderately adequate 8-11, and adequate >12), and a 10-item practice checklist (scored as poor 0-3, average 4-6, and good >7).

The tool was validated by one medical expert and two nursing experts for clarity, relevance, sequence, and content validity. Necessary modifications were made based on expert recommendations. The questionnaire was originally designed in English and later translated into Tamil. Reliability testing used the test-retest method, yielding R' = 0.82 for knowledge assessment, indicating high reliability, and R' = 0.78 for practice assessment, suggesting acceptable reliability. Ethical considerations included obtaining written consent from all participants before data collection, securing ethical clearance and official permission from the Medical Superintendent and Nursing Superintendent of ACS Medical Hospital, and maintaining confidentiality of participants' identities and responses.

The research period lasted throughout one complete week. Authorities at ACS Medical Hospital granted official permission for this study to the Medical and Nursing Superintendents. Studied participants met the selection criteria before researchers introduced them to the research and gained consent approvals. All participants completed questionnaires which they self-administered. A statistical analysis of the gathered data utilized descriptive together with inferential methods. The researchers used descriptive statistical methods (mean, frequency, percentage) to measure Group-D workers' knowledge and practice in biomedical waste management. Pearson's correlation and the Chi-square test helped identify a correlation between hospital workers' knowledge and practice of biomedical waste management while the Chi-square test analyzed how demographic features related to their knowledge and practice. The research findings will show the degree of knowledge alongside actual implementation of biomedical waste management protocol practices among hospital Group-D workers thus providing valuable information for training programs and intervention strategies.

Result and Findings:

Table 1: Frequency and Percentage distribution of demographic variables of Group -d workers.

Demographic Variables	Frequency	Percentage
1.Age (in years)		
21 – 25	02	6.6
26 – 30	06	20
31 & above	22	73

Demographic Variables	Frequency	Percentage
2.Sex		
Male	02	6.6
Female	28	93
3.Marital Status		
Unmarried	01	3.3
Married	29	96.6
4.Religion		
Hindu	23	76
Muslim	05	16
Christian	02	6.6
5.Education status		
No formal education	16	53
Primary education	12	40
High education	02	6.6
6.Occupation		
Housekeeping / Sanitary worker	13	43.3
Attendant	11	36.6
Others	06	20
7.Year of experience (in yrs.)		
1-5 years	16	53
6-10 years	12	40
11 & above year	02	6.6
8.Income		
Below 7,000	09	30
7,001-12,000	19	63
12,001 & above	02	6.6
9.Did Attended any Training program?		
Yes	00	00
No	30	100

The table 1 shows that most of the group -d workers, 2(6.6) were between 21-25 , 6(20%) were aged between 26-30 , 22(73%) were aged between 31 above,2(6.6%) were males, 28(93%) were female,29(96.6) were married, 1(3.3%) were unmarried, 23(76%) were hindus,5(16%) were muslims, 2(6.6) were Christian, 16(53%) were no formal educational status,12(40%) were primary education, 2(6.6%) were high education, 13(43.3) were housekeeping/sanitary workers, 11(36.6%) were attendant, 6(20%) were others, 16(53%) were 1-5 years experience, 12(40%) were 6-10 years, 2(6.6%)

were 11 and above years,9(30%) were below 7,000, 19(63%) were 7001-12,000, 2(6.6%) were 12,001 and above,30(100%) were not attended any training program

Table 2: Frequency and Percentage distribution level of Knowledge of Group -d workers.

Level of Knowledge	Frequency	Percentage
Inadequate (≤50%)	27	90
Moderately Adequate (51 – 75%)	03	10
Adequate (>75%)	0	0
Total	30	100

The table 2 shows that 27(90%) had inadequate knowledge on bio medical waste Management and 3 (10%) had moderately adequate knowledge on bio medical waste Management among group -d workers.

Table 3: Frequency and Percentage distribution level of Practice of Group -d workers

Level of Attitude	Frequency	Percentage
Good practice = >7	3	10
Average practice = 4 - 6	25	83
Poor practice = 0 - 3	2	7
Total	30	100

The table 3 shows that 3(10%) had good practice towards bio medical waste Management, 25(83%) had average practice towards bio medical waste Management,2(7%) had poor practice towards bio medical waste Management among group -d workers.

Table 4: Correlate the Knowledge and Practice regarding Biomedical waste Management among Group-d workers. N=30

Variables	Mean	S.D	Karl Pearson's Correlation & p-value
Knowledge	5.0	2.0	r=0.043 p=0.05,s***
Practice	5.23	1.38	

The table 4 shows that the mean score of knowledge was 5.0±2.0 and the mean score of practice was 5.23±1.3. The calculated Karl Pearson's correlation value r = 0.043 shows a positive correlation which was found to be statistically significant at p <0.05 level. This clearly infers that's when knowledge on Biomedical Waste Management on Group-d workers increases than their practice towards it also increases.

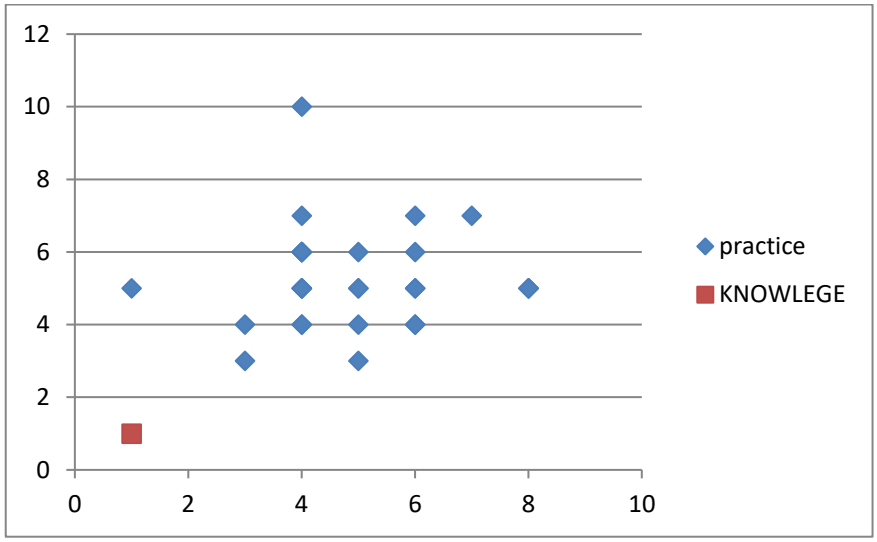

Figure 1: Scatter plot diagram showing the correlation between knowledge and practice of group-d workers on bio medical waste management (r=0.043)

Table :5 Association of level of knowledge of Group-D Workers on Bio-Medical Waste Management with selected demographic variables.

Demographic Variables	Inadequate		Moderately Adequate		Chi-Square & p-value
	F	%	F	%	
Age (in years)					χ^2=0.835 d.f=2 p=0.659 N.S
21 – 25	1	3.3	1	3.3	
26 – 30	3	10.0	3	10.0	
31 & above	15	50.0	7	23.3	
Sex					χ^2=0.164 d.f=1 p=0.685 N.S
Male	1	3.3	1	3.3	
Female	18	60.0	10	33.4	
Marital status					χ^2=3.701 d.f=1 p=0.054 N.S
Married	0	0	2	6.7	
Unmarried	19	63.3	9	30.0	
Religion					χ^2=0.811 d.f=2 p=0.667 N.S
Hindu	14	46.7	9	30.0	
Christian	4	13.4	1	3.3	
Muslim	1	3.3	1	3.3	
Educational status					χ^2=1.202 d.f=2 p=0.548 N.S
Illiterate	9	30.0	7	23.3	
Primary education	9	30.0	3	10.0	
Secondary education	1	3.3	1	3.3	
Occupation					χ^2=2.577 d.f=2 p=0.276 N.S
Housekeeping / Sanitary worker	10	33.3	3	10.0	
Attendant	5	16.7	6	20.0	
Others	4	13.3	2	6.7	
Years of experience (in yrs)					χ^2=4.163

Demographic Variables	Inadequate		Moderately Adequate		Chi-Square & p-value
	F	%	F	%	
1 – 5	10	33.3	6	20.0	d.f=2 p=0.125 N.S
6 – 10	9	30.0	3	10.0	
11 & above year	0	0	2	6.7	
Income					χ^2=0.599 d.f=2 p=0.741 N.S
Below 7,000	5	16.7.	4	13.3	
7,001 – 12,000	13	43.3	6	20.0	
12,001 & above	1	3.3	1	3.3	
Attended any training program					-
Yes	-	-	-	-	
No	19	63.3	11	36.7	

N.S – Not Significant

The table 5 shows that the demographic variables did not show statistically significant association with of knowledge Group of -D Workers on Bio-Medical Waste Management at $p<0.05$ level.

Table: 6 Association of practice level of bio-medical waste management among group-d workers with selected demographic variables

Demographic Variables	GOOD		AVERAGE		POOR		Chi-Square & p-value
	F	%	F	%	F	%	
Age							χ^2=5.77 d.f=4 p=0.500 N.S
21 – 25 years	-	-	3	11	1	3.3	
26 – 30 years	1	3.3	4	13.3	-	-	
30 years Above	4	13.3	17.7	56.6	-	-	
Sex							**χ^2=5.484 d.f=2 p=0.050 S***
Male	-	-	-	-	-	-	
Female	3	11	26	86.6	1	3.3	
Marital Status							χ^2=2.534 d.f=2 p=0.500 N.S
Married	4	13.3	25	83.3	1	3.3	
Unmarried	-	-	-	-	-	-	
Religion							χ^2=1.302 d.f=4 p=0.500 N.S
Hindu	3	11	17	56.6	1	3.3	
Muslim	-	-	2	6.6	-	-	
Christian	1	3.3	6	20	-	-	
Education							**χ^2=1.077 d.f=4 p=0.010 S***
Illiteracy	9	30.0	12	40.0	1	3.3	
Primary	1	3.3	5	16.6	-	-	
Secondary	1	3.3	1	3.3	-	-	
Occupation							χ^2=0.020 d.f=2 p=0.500 N.S
House wife	-	-	21	70.0	-	-	
Attendant	1	3.3	8	26.6	-	-	
Others	-	-	-	-	-	-	
Experience							**χ^2=2.589 d.f=4**
1-5yrs	1	3.3	17	56.6	-	-	

Demographic Variables	GOOD		AVERAGE		POOR		Chi-Square & p-value
	F	%	F	%	F	%	
6-10yrs	3	11.0	6	20.0	1	3.3	**p=0.010**
11 yrs	-	-	2	6.6	-	-	**S***
Income							**χ^2=0.035**
<7,000	2	6.6	7	23.3	-	-	**d.f=4**
7,000-12,000	2	6.6	17	56.6	1	3.3	**p=0.010**
13,000 above	-	-	1	3.3	-	-	**S***
Training							χ^2=1.965
Yes	-	-	-	-	-	-	d.f=1
No	14	13.3	25	83.3	1	3.3	p=0.100
							N.S

(P=0.010, p=0.050, S*,NS)

The table 6 depicts that the demographic variables sex (**χ^2=5.484,p=0.050), education(χ^2=1.077,p=0.010),** experience (**χ^2=2.589p=0.010) ,**andincome **(χ^2=0.035, p=0.010)**This shows that association departs from symmetry and the proportion is highest in average practice group, and the other demographic variables did not show statistically significant association with practice of bio-medical waste management among Group-d workers

DISCUSSION

This chapter analyzes data based on study objectives and hypotheses, assessing Bio-Medical Waste Management knowledge and practice among Group-D workers at ACS Medical Hospital, Chennai. Demographic findings showed that most workers were above 31 years (73%), female (93%), married (96.6%), and predominantly Hindu (76%). More than half (53%) lacked formal education, 43.3% were in housekeeping, 53% had 1-5 years of experience, 63% earned ₹7,001-₹12,000, and none had attended biomedical waste management training. Knowledge assessment revealed that 90% had inadequate knowledge, 10% had moderate knowledge, and none had adequate knowledge. Practice levels showed 10% with good practice, 83% with average practice, and 7% with poor practice. These results align with Basavaraj TJ (2021), highlighting the need for improved practices. A positive correlation ($r = 0.043$, $p < 0.05$) between knowledge and practice was found, indicating that better knowledge enhances practice, consistent with Andal (2020), who reported a strong correlation ($r = 0.935$) among Group-D workers handling biomedical waste. Demographic factors such as sex (χ^2=5.484, p=0.050), education (χ^2=1.077, p=0.010), experience (χ^2=2.589, p=0.010), and income (χ^2=0.035, p=0.010) were significantly associated with practice levels, supported by Mathur et al. (2019) and Aaqib Shahzad Alvi et al. (2021).

CONCLUSION

The study highlights the urgent need for targeted training programs to enhance biomedical waste management knowledge and practice among Group-D workers, improving hospital waste management efficiency.

RECOMMENDATIONS:

1. Researchers could perform this study using samples of greater size.
2. A structured teaching program for knowledge and practice should be studied through an experimental approach.
3. Researchers could perform a similar study to determine the number of infectious diseases caused by improper biomedical waste management practices.

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