

**Assess the knowledge and current system of practice regarding bio medical waste management among health care personnel working in selected phc's in Jaipur with a view to develop an information booklet**<sup>1</sup>Bharti Pilaniya, Faculty, Govt. College of Nursing, SK Government Medical College, Sikar, Rajasthan, India.<sup>2</sup>Randhir Singh Dhaka, Faculty, Govt. College of Nursing, SK Government Medical College, Sikar, Rajasthan, India.<sup>3</sup>Nopa Ram Rewar, Faculty, Govt. College of Nursing, SK Government Medical College, Sikar, Rajasthan, India.**Corresponding Author:** Bharti Pilaniya, Faculty, Govt. College of Nursing, SK Government Medical College, Sikar, Rajasthan, India.**How to citation this article:** Bharti Pilaniya, Randhir Singh Dhaka, Nopa Ram Rewar, “Assess the knowledge and current system of practice regarding bio medical waste management among health care personnel working in selected phc's in Jaipur with a view to develop an information booklet”, IJMACR – May – 2026, Volume – 9, Issue – 3, P. No. 98 – 107.**Open Access Article:** © 2026 Bharti Pilaniya, et al. This is an open access journal and article distributed under the terms of the creative common's attribution license (<http://creativecommons.org/licenses/by/4.0>). Which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.**Type of Publication:** Original Research Article**Conflicts of Interest:** Nil**Abstract**

**Context:** During the last few decades, the need for better health care has been felt globally and to cater to the needs and demands of the increasing population, a rapid mushrooming of hospitals, both in private and Government sector has occurred. Hospitals and other healthcare establishments in India produce a significant quantity of waste, posing serious problems for its disposal, an issue that has received scant attention. Each year, large amounts of hazardous waste are produced by various departments in the hospitals. It has been emphasized that for the proper disposal of bio-medical waste, introduction of laws is not sufficient enough. Hence, there is a need for resource material to help administrators, doctors, nurses and paramedical staffs. For this to happen, a conscious, coordinated, and

cooperative effort has to be made from physicians to ward-boys

**Statement of The Problem:** Assess the knowledge and current system of practice regarding bio medical waste management among health care personnel working in selected phc's in Jaipur with a view to develop an information booklet.”

**The objectives of the study**

1. To assess the knowledge of health care personnel regarding biomedical waste management.
2. To assess the current system of practice of biomedical waste management among health care personal in selected primary health centers.
3. To find the association between the knowledge of biomedical waste management and selected baseline variables.

4. To develop an information booklet on biomedical waste management.

### Methodology

The research approach adapted for the study was survey approach using descriptive design. Non probability - convenient sampling technique was used to select the sample for the study.

the sample consisted of 100 health care personnel working in selected primary health centers. Content validity of the tool was done by giving the prepared instrument along with the objectives and criteria checklist to 10 experts comprising of nursing educators in the field of community health nursing, physician and biostatistics for content validity. According to the expert's opinions and suggestions final tool was prepared. The reliability of knowledge questionnaire was found 0.93 and the reliability of direct observation checklist was found 0.81. For the main study the sample consisted of the 100 health care personnel selected from Jaipur.

### Results

#### Findings were presented under the following sections:

A total of 100 health care personnel were interviewed Among them (54.00%) of the health care personnel were in the age group of  $\leq 40$  years, (69.00%) were females, (50%) were designated as paramedical personnel, 53.00% had  $\leq 10$  years of experience in their present job, 64.00% had not attended any training previously exclusively on infection control.

The analysis of data reveals that out of the 100 health personnel 48(48.00%) have moderately adequate knowledge, only 6(6.00%) have inadequate knowledge and 44(44.00%) have adequate knowledge.

Out of the 232 direct observations in the vital clinical areas of the PHC all the events 232(100%) related to closure of container soon after putting the waste were incorrect. Out of the 1 observation in the labor room only 1(100%) of the event related to use of personal protective devices while handling the waste was correct. Out of the 120 and 80 observations in the OPD and laboratory 120(100%) related to use of needle cutter at the site of procedure were correct whereas 70(87.5%) were incorrect in the laboratory.

The analysis of data indicates that there is a significant association between knowledge levels and designation and years of experience in the present job and training attended at 0.05 levels.

**Keywords:** Biomedical waste management, health care personals, primary health centers, information booklet

### Introduction

According to "Biomedical Waste (Management and Handling) Rules, 1998 of India "any waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biologicals" is termed "Biomedical waste". Though 75-90% of the waste produced by health care institutions is non-risk being generated from administrative and housekeeping of health care establishment, the remaining 10-25% waste is regarded hazardous and may create a variety of health risks. Hospitals and other healthcare establishments in India produce a significant quantity of waste, posing serious problems for its disposal, an issue that has received scant attention. Each year, large amounts of hazardous waste are produced by various departments in the hospitals. It has been emphasized that for the proper disposal of biomedical waste, introduction of laws is not sufficient

enough<sup>32</sup> Since the implementation of the Biomedical Waste Management and Handling Rules (1998) every concerned health personnel is expected to have proper knowledge, practice and capacity to guide others for waste collection and management and proper handling techniques.

### **Need for the study**

The awareness regarding biomedical waste management is very less among health care personnel. Thus all the hospital care personnel are at a risk of getting many fatal infections like HIV, HBV, HCV and injuries by these infectious materials. The health care personnel are not aware of the process of biomedical waste management which includes collection, segregation, transportation and disposal of waste. In India health care centres are not paying adequate attention towards treatment and disposal of waste. As a consequence, health care personnel especially nurses and housekeeping personnel are at risk of injuries; annual injury rates are 10-20 per 1000 workers. The researcher thought that if knowledge level of health care personnel is adequate regarding biomedical waste management, thus will help in reduction of mortality and morbidity due to spread of infection and specially from nosocomial infection. In view of the above scenario this study was envisaged to assess the knowledge of the health care personnel and assess the current system of biomedical waste management among health care personal at primary health centers

### **Review of literature**

**Murthy PG, Mar 2011**, conducted a study on Biomedical wastes disposal and management in some major hospitals of Mysore City, India. Study average generation of various infectious and non-infectious waste items per hospital unit area was studied.

Observations were also made on the separation of wastes and collection of various types of waste. The study concluded that the problem was not due to waste generation but due to improper management of biomedical waste. Therefore, the study recommended the use of various strategies for management of these wastes.

**Galgali G, Mar 2012**, conducted a study to assess the awareness about biomedical waste management among the private dental clinics in Gulbarga city. The study concluded that biomedical waste management should be supported through appropriate education and an elaborate and still proper survey of waste management procedures in dental practices is needed.

**Basu M, Das P, Pal R. et. al., Jan-Jun 2012**, conducted a descriptive study to assess the knowledge and awareness about various aspects of BMW management among junior doctors. All the junior doctors were trained in all the essential aspects of BMW in their undergraduate curriculum still the study pointed to the loop holes of their gap in knowledge as well as practice at the cross roads of students and healthcare delivery arena. It was recommended that intensive training program at regular time interval for all staff with special emphasis on junior doctors is needed.

**Dohare S., Jun 2012**, conducted a study to assess the biomedical waste management practices in different health facilities of Noida, Uttar Pradesh. The study revealed that unqualified medical practitioners which were 39.4% of the study group were not using protective gear, not segregating / labeling/ disinfecting the biomedical waste. Among qualified medical practitioners, 32.5% were using mechanical devices, 65% were segregating and labeling biomedical wastes while only 6.9% were disinfecting the sharps. The study

concluded that biomedical waste management is grossly inadequately practiced and there is a need to implement present rules and regulations with renewed vigour.

### **Materials and Methods**

The research approach adapted for the study was survey approach using descriptive design. Non probability - convenient sampling technique was used to select the sample for the study. The population for this study includes all the health care personnel (designated as doctors, nurses, health workers, laboratory technicians, pharmacists and class IV workers) working in the primary health centers in Jaipur. The sample consisted of 100 health care personnel.

Structured knowledge questionnaire and observation checklists were developed by the investigator as per the objectives of the study. The tool was divided into three Sections

Section – I: Included 5 items of Demographic Performance i.e. age in years of the health care personnel, gender, designation, years of experience in the present job and previous training attended on infection control.

Section – II: Consisted of 24 items. The items were divided into questions under biomedical waste, biomedical waste management, standard precautions, personal protective measures and biomedical waste management law. Each right answer was given a score of 1 and wrong answers a score of 0. Total score- 24. The knowledge score was interpreted as Inadequate knowledge (<50% (<14)), Moderately adequate knowledge (50-75% (14-21)), Adequate knowledge (>75% (>21)).

Section III: Consisted Direct observation checklist to assess the current system of practice of biomedical waste management in the primary health centers. Content validity of the tool was done by giving the prepared

instrument along with the objectives and criteria checklist to 10 experts comprising of nursing educators in the field of community health nursing, physician and biostatistics for content validity. According to the expert's opinions and suggestions final tool was prepared. The reliability of knowledge questionnaire was found 0.93 and the reliability of direct observation checklist was found 0.81. For the main study the sample consisted of the 100 health care personnel selected from Jaipur

Data was collected in the Month of October, with informed consent and ethical approvals obtained. The data collection tools took approximately 30–40 minutes per participant.

Direct observation checklist was used to assess the current system of practice of biomedical waste management in the primary health centers. The data were analyzed using descriptive and inferential statistics including frequency distribution, Mean, SD and chi square test. An information booklet was developed, based on the review of literature. The steps adopted in the development of information booklet were Preparation of first draft of booklet, Content validity by experts, editing of booklet, Preparation of final draft and booklet was prepared on the basis of the review of literature which pertains to the development of information booklet regarding Biomedical Waste Management.

### **Results**

**Section A:** Description of the socio-demographic variables of the health care personnel.

Table 1: Frequency & Percentage distribution of health care personnel according to age: N 100

Sn.	Variables	Characteristics	Frequency	Percentage
1	Age	≤40	54	54.00
		>40	46	46.00

The above table shows that most (54.00%) of the health care personnel are in the age group below or equal to 40 years and about (46.00%) of the health the health care personnel are above 40 years of age.

Table 2: Frequency & Percentage distribution of health care personnel according to gender: N=100

Sn.	Variables	Characteristics	Frequency	Percentage
1	Gender	Male	31	31.00%
		Female	69	69.00%

The data of Figure depicts that majority (69.00%) of the surveyed health care personnel are females and rest 31.00% are males.

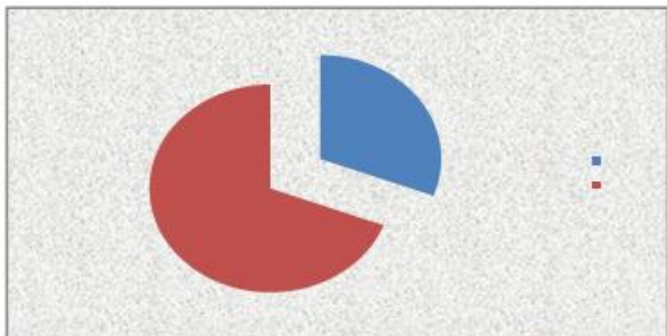


Figure 1

Table 3: Frequency & Percentage distribution of health care personnel according to designation: N=100

Sn.	Variables	Characteristics	Frequency	Percentage
1	Designation	Professional	32	32.00
		Paramedical Personnel	68	68.00

The data of table 3 depicts that half the proportion (68%) of the surveyed health care personnel are designated as paramedical personnel and about 32% are professionals.

Table 4: Frequency & Percentage distribution of health care personnel according to experience: N=100

Sn.	Variables	Characteristics	Frequency	Percentage
1	Experience	≤ 10 years	53	53
		> 10years	47	47

The data of Figure 4 shows distribution of health care personnel having ≥10 and ≤ 10 years of experience in their present job.

Table 5: Frequency & Percentage distribution of samples according to previous training attended: N=100

Sn.	Characteristics	Training Attended	Training not Attended
1	Medical officer	10	1
2	Staff nurse	20	16
3	Paramedical personnel	9	44

The data of figure 5 shows that 9 (16.98%) of the paramedical personnel have not attended any training previously exclusively on infection control. 10 (90.90%) of the medical officers and 20 (64.28%) of the staff nurses have attended training on infection control.

Section 2: Description of knowledge score of health care personnel regarding biomedical waste management.

Table 6: Range, frequency and percentage distribution of knowledge score of health care personnel. N=100.

Sn.	Knowledge Score	Range	Frequency	Percentage
1	Inadequate	0-13	6	6.00
2	Moderately Adequate	14-21	48	48.00
3	Adequate	22-28	44	44.00

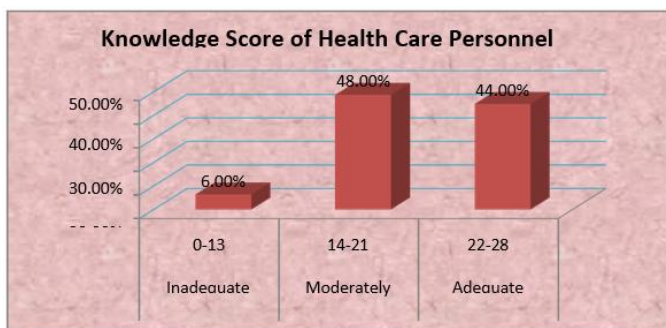


Figure 2: Bar diagram Range, frequency and percentage distribution of knowledge score of health care personnel. Table 6 and figure 2 data shows that out of the 100 health personnel 48 (48.00%) have moderately adequate knowledge, only 6(6.00%) have inadequate knowledge and 44(44.00%) have adequate knowledge.

Table 7: Frequency and percentage distribution of knowledge score of health care personnel. N 100

Sn.	Designation	Inadequate Knowledge		Moderately adequate knowledge		Adequate knowledge	
		F	%	F	%	F	%
1.	Medical officers	-	-	-	-	11	100
2.	Staff nurses	-	-	-	-	36	100
3.	Paramedical Personnel	5	21.97	38	85.71	10	25.64

Table7 shows that 11(100%) of the medical officers and 36(100%) of the staff nurses have adequate knowledge on biomedical waste management.

Table 8: Specific content area wise knowledge score of the healthcare personnel. N=100

Sn.	Content area	Max Score	Range	Mean	Mean%	S.D.
1.	Biomedical waste	2	0-2	1.46	73.00	0.86
2.	Biomedical waste management					
	Color coding	2	0-2	1.46	73.00	0.86
	Segregation	3	0-3	2.21	73.66	1.18
	Treatment	5	0-5	2.79	55.80	2.34
	Storage	3	0-3	2.55	85.00	1.04
	Biomedical symbol	2	0-2	1.82	91.00	0.56
3.	Standard precautions	2	0-2	1.63	81.50	0.69
4.	Personal protective measures	3	0-3	2.48	82.66	0.99
5.	Biomedical waste management law	2	1-2	1.66	83.00	0.72

Table 8 shows that the health care personnel have highest knowledge regarding biomedical symbol with a mean percentage of 91.00 and SD of 0.56 and least knowledge regarding treatment aspect of biomedical waste management with a mean percentage of 55.80 and SD of 2.34.

Section 3: Description of association between knowledge score and selected socio-demographic variables of health care personnel

Table 9: Association of knowledge level with selected socio-demographic variables. N 100

Sn.	Socio-demographic variables	Adequate knowledge		Moderately adequate knowledge		Chi square/ Fisher's exact test	P-Value
		F	%	F	%		
1.	Age(in years)						
	≤40	24	24.00%	30	30.00%	2	<0.001

	>40	22	22.00%	24	24.00%	$\lambda=19.17$ $df1=3.84$	S
2.	Gender						
	Male	11	11.00%	20	20.00%	2	0.704
	Female	35	35.00%	34	34.00%	$\lambda=0.14$ $df1=3.84$	NS
3.	Designation						
	Professional	20	20.00%	12	12.00%	$\lambda =47.94^*$ $df2=5.99$	
	Paramedical Personnel	32	32.00%	36	36.00%		<0.001
							S
4.	Year of experience in the present job						
	$\geq 10$	30	30.00%	23	23.00%	2	0.003
	>10	17	17.00%	30	30.00%	$\lambda=9.06$ $df1=3.84$	S
5	Training attended on infection control						
	Yes	23	23.00%	26	26.00%	2	<0.001
	No	20	20.00%	31	31.00%	$\lambda=16.03$ $df1=3.84$	S

S: Significant at  $p<0.05$ , NS: Not Significant, Chi Square association test, df: Degree of freedom

Table 9 data shows that the young healthcare personnel have better knowledge regarding biomedical waste management. The data shows a significant association between knowledge levels and age. There is a significant association between knowledge levels and designation and years of experience in the present job and training attended at 0.05 levels.

#### Section 4: Description of current system of practice of biomedical waste management in all the primary health centers using direct observation.

1. Data shows that out of the 120 observations in the OPD 20(16.66%) did identify and segregate infectious and non-infectious waste correctly and 100(83.33%) did not identify and segregate infectious and non-infectious waste. Out of the 80 observations in the laboratory 10(12.5%) did identify and segregate infectious and non-

infectious waste and 70(87.5%) did not identify and segregate infectious and non- infectious waste.

2. Data shows that out of the 120 observations in the OPD 20(16.66%) carried out segregation of waste at the site of waste Generation-Injection and 100(83.33%) did not carry out segregation of waste at the site of waste Generation-Injection. Out of the 75 observations in the laboratory 10(13.33%) carried out segregation of waste at the site of waste Generation-Injection and 65(86.66%) did not carry out segregation of waste at the site of waste Generation-Injection.

3. Data shows that out of the 23 observations in the OPD 5(21.73%) carried out segregation of waste at the site of waste Generation-Dressing and 18(78.26%) did not carry out segregation of waste at the site of waste Generation-Dressing.

4. Data shows that out of the 232 observations in the Labor room, OPD, IPD, Laboratory and Dressing room all the events 232(100%) related to closure of container soon after putting the waste are incorrect since open containers are used for segregation of waste.

5. Data shows that the 1(100%) observations in the labor room of the event related to use of personal protective devices while handling the waste was correct.

6. Data shows that out of the 120 observations in the OPD all the events 120(100%) related to use of needle cutter at the site of procedure were correct and out of the 80 observations in the laboratory 10(12.5%) of the events related to use of needle cutter at the site of procedure were correct and 70(87.5%) were incorrect. The needles were finally discarded into the disposal pits

### Major findings of the study

#### Findings were presented under the following sections:

Findings of this study revealed that 54.00% were in the age group of  $\leq 40$  years. A similar study revealed that 243(49.59%) were below 25 years of age.

The present study revealed that 69.00% of the health care personnel were females. Another similar study revealed that 198(40.32%) were males and 293(59.67%) were females. Similar findings were noted in a study which revealed that 42(30.7%) were males and 95(69.3%) were females.

The present study revealed that 68.00% of the health care personnel were designated as paramedical personnel (Health assistants, Laboratory technicians and Pharmacists).

A similar study revealed that 289(58.85%) were professionals, 105(21.38%) were paramedical personnel and 97(19.75%) were class IV workers.

The present study revealed that 53.00% of the health care personnel had  $\geq 10$  years of experience in their

present job. The findings of a similar study revealed that 29(58%) had experience of 3years.

The findings of the present study revealed that 9 (16.98%) of the paramedical personnel have not attended any training previously exclusively on infection control. 10 (90.90%) of the medical officers and 20 (64.28%) of the staff nurses have attended training on infection control.

**Sec-2: Knowledge of health care personnel regarding biomedical waste management** Among the 100 health care personnel selected for the study 38(48.71%) had moderate adequate knowledge. A similar study revealed that 36(15.65%) of the health care personnel had adequate knowledge about biomedical waste management. Similar findings were noted in a study where 15 (50%) of the health care personnel had adequate knowledge about biomedical waste management

#### Sec-3: Association of knowledge regarding biomedical waste management with selected baseline variables of the health care personnel

The association of knowledge score and baseline variables were done by using the chi-square test. The variables associated are age ( $\lambda^2=19.17p<0.05$ ), gender ( $\lambda^2=0.14p<0.05$ ), designation ( $\lambda^2=47.94p<0.05$ ), years of experience in the present job ( $\lambda^2=9.06p<0.05$ ) and training attended on infection control ( $\lambda^2=16.03p<0.05$ ). These values were significant at 0.05 level. It revealed that there is a significant association between knowledge levels and age, designation, years of experience in the present job and training attended by health care personnel and there is no association between knowledge levels and gender.

## Implications of the study

The findings of the study have implications in the field of nursing education, nursing practice, nursing administration and nursing research.

### 1. Nursing practice

The nurse has to provide prompt and adequate information to the health care personnel regarding biomedical waste management by the use of electronic media, AV aids and education materials. The findings of the study can be used as evidence in promoting the use of personal protective devices among health care personnel. The health care personnel will have direct contact with biomedical waste so they must be made aware regarding the risk of infections such as HIV and Hepatitis B and also communicable diseases and main emphasis must be given on teaching aspects to prevent such infections by using personal protective devices and immunization.

### 2. Nursing Education

Nursing education should focus more attention on giving education to medical and non-medical professionals. It is the nurse's responsibility to educate the health care personnel and the public regarding the importance of biomedical waste management and its various aspects.

The study findings revealed that 38(48.71%) had moderate adequate knowledge regarding biomedical waste management. Therefore, the nurse has to motivate the health care personnel to follow the proper steps of biomedical waste management.

### 3. Nursing Administration

Administrators should organize in-service education programmes, refresher courses and workshops for health care personnel on various aspects of biomedical waste management and encourage them to participate in these activities.

## 4. Nursing Research

Since management of biomedical waste is a serious issue research can be carried out in this area to become aware of the facts and problems faced and work towards overcoming these problems. Various studies can be conducted from time to time to assess the system of practice of biomedical waste management in different health care establishments. The findings of the study can be used as evidence in promoting the use of personal protective devices among health care personnel.

### Recommendations for Further Study

Similar study can be carried on the larger samples to validate the findings and make generalizations.

1. Comparative study could be done between biomedical waste management in public and private institutions.
2. Information booklet can be developed on some others aspects of biomedical waste and its management.
3. Structured teaching programme can be provided for the health care personnel and its effectiveness can be assessed.
4. Similar study can be carried out in terms to assess the problems faced by health professionals regarding biomedical waste management.

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