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IP Journal of Nutrition, Metabolism and Health Science

Journal homepage: <https://www.jnmhs.com/>

Original Research Article

A study to assess the knowledge regarding biomedical waste management among group-d workers of Era's hospital Lucknow (U.P)

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ARTICLE INFO

Article history:

Received 16-03-2022

Accepted 19-03-2022

Available online 11-04-2022

Keywords:

Assessment of Knowledge
Biomedical Waste Management
Group – D Workers
Bio-Medical

ABSTRACT

Introduction: According to Bio-Medical Waste Rules of 1988, India- Bio-medical waste is defined as “Any waste which is generated during diagnosis, treatment of human beings and animals or any other waste produced during production or testing of biological”.

Objective: 1. To assess the knowledge regarding Biomedical Waste Management among Group—D workers. 2. To find the association between knowledge on bio medical waste management with selected demographic variable.

Materials and Methods: This study was conducted by using quantitative research approach at Era Hospital, Lucknow.

Research Design: In the present study, descriptive research design was used to achieve the objectives of the study.

Sample Size: The total sample size was 48 as calculated statistically. Before conducting the study informed consent was obtained from the sample.

Sample Technique: Purposive sampling technique was used.

Tool used for data collection: Data collection was done by using self-structured knowledge questionnaire to assess the knowledge regarding biomedical waste management.

Result : This study result showed that the overall knowledge mean was 20.58 among Group – D workers.

Conclusion : The present study revealed that planned self-structured questionnaire on knowledge assessment regarding biomedical waste management is effective. Researcher observed that Group – D worker are having Moderate knowledge regarding biomedical waste management. In the future, structured teaching program will be provided to improve the knowledge regarding bio medical waste management among group – D workers.

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1. Introduction

MS. J. Manorajini” (2014)¹ stated that an ideal hospital requires infection free environment not only to treat the patient but also to keep the visitor’s safe and surrounding areas infection free. Hospital generates biomedical waste in both forms solid and liquid.¹ Liquid wastes generated from the department are infected in

nature. Biomedical wastes are generated during treatment, surgical intervention, immunization, dressing of wounds, Pathological investigation and radiological investigation. This is the primary responsibility of Health Administrators and infection control team to manage hospital waste in most safe and eco-friendly manner.

Suganya Panneerselvam” (2016)² stated that good health depends in part on a safe environment. Practices or a technique that control or prevent transmission of infection helps to protect clients and health care workers from

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diseases.² Clients in all health care settings are at risk for acquiring infection. The last decade witnessed a significant increase of public concern regarding biomedical waste disposal. The concern regarding the medical waste is mainly due to the presence of pathogenic organisms and organic substances in solid waste significantly high in concentration. Improper hospital waste management has serious impact on our environment. Apart from the air, water & soil pollution, it has considerable impact on human health.

“P. V. Srinivasakumar” et al. (2017)³ defined that medical waste management rules has promulgated by Government of India in 1998 and was came into effect from January 2003. The rules are about to guide others regarding collection, segregation and proper disposal of waste.³ The amount biomedical waste production ranges from 1-2kg/bed/day in developing countries which is as high as 4.5kg in developed countries. 10-25% is estimated to be hazardous waste which has potential to injure, infect or harm to patients, visitors, health care personnel and to the public which is more dangerous to the other types of wastes.

Harender Singh et. al. (2014)¹¹ defined that Bio-medical waste’ (BMW) means any solid and/or liquid waste including its container and any intermediate product, which is generated during the diagnosis, treatment or immunization of human beings or animals or in research pertaining there to or in the production or testing.⁴ Adequate knowledge amongst the health care employees about the biomedical waste management rules and regulation, and their understanding of segregation, will help in the competent disposal of the waste in their respective organization Studies documented from different parts of the country, still convey that there are gaps in the Knowledge, lacunae in the attitudinal component and inconsistency in the practice aspects which are matters of concern among the health care professionals. With this background, the study was carried out to assess the current knowledge, attitude and practices of the health care workers like group D workers with regard to the management of biomedical waste.

1.1. Need of the study

Bekir Onursal, (2003)¹² defined that one of India’s major achievement has been to change the attitudes of the operators of health care facilities to incorporate good HCW management practices in their daily operations & to purchase on-site waste management service from the private sector.⁵

Risk of air, water and soil pollution directly due to waste, or due to defective incineration emissions and ash. As per our clinical experience we have observed most of the group — d workers have lack of knowledge regarding Biomedical Medical Waste segregation, handling and management, that can lead to needle stick injury, nosocomial infection as Group-D workers are indulge in it. Hence, we want to conduct a research among Group-D workers to assess their

knowledge regarding Biomedical Waste Management.

1.2. Problem statement

“A study to assess the knowledge regarding Biomedical Waste Management among Group D workers of Era Medical Hospital, Lucknow.

1.3. Aims

“To assess the level of knowledge regarding Biomedical Waste Management.”

1.4. Objectives

1. To assess the knowledge regarding Biomedical Waste Management among Group-D workers
2. To find the association between knowledge on bio medical waste management with selected demographic variable.

1.5. Operational definition

1.5.1. Assess

It refers to evaluate the level of knowledge on Bio medical waste management and ability of workers.

1.5.2. Knowledge

It refers to the ability of workers to understand Biomedical Waste Management by responding to the structured knowledge questionnaire on biomedical waste management.

1.5.3. Biomedical waste

In this study, it refers to any waste generated from the hospital during the diagnosis, testing, treatment, research or production of biological products for humans or animals (WHO).

1.6. Group-d workers

In this study, Group–D workers refers to all fourth class employees working in Era Hospital.

1.6.1. Assumptions

1. Some workers may have knowledge regarding Biomedical waste management

1.6.2. Delimitation

1. The study is delimited to Group–D employees working at Era Medical Hospital, Lucknow

1.7. Review of literature

Review of literature is one of the most important steps in research process.

It is an account of what is already known about a particular phenomenon. The main purpose of literature

review is to convey to the readers about the work already done and the knowledge and idea that have been already established on a particular topic of research.⁶

The review of literature has been presented under the following heading:

1. Studies related to knowledge
2. Studies related to knowledge, Practice.
3. Studies related to Attitude.

1.7.1. Studies related to knowledge

Nagaraju B" et. al. (2013)⁴ stated that unwanted materials generated during diagnosis, treatment, operation, immunization or in research activities including production of biological is termed as biomedical waste.⁷ Day to day activities in health institutions generate a lot of waste which is biological in nature and are potential sources of infection transmission especially hepatitis B & C, HIV and tetanus. Approx 1.45 kg waste is generated per patient per day in Indian hospitals it is as high as 4.5kg in developed countries. In western figures approx.15-20% of this total waste is hazardous whereas it would be much higher in India because proper waste segregation and waste disposal does not exist or not practiced.

Dhasarathi Kumar (2018),⁸ stated that today the problem is intensified because of liability issues, land-fill laws, public concern and a tremendous increase in the cost of handling, transport, and disposal of medical waste. All activities of living thing on earth produce waste in some form or other.⁸ The fast decade witnessed a significant increase in public concern regarding medical waste disposal. The concern regarding medical waste is mainly due to the preparation of pathogenic organism and organic substances in hospital solid waste is significantly high concentration. Poor waste management practices may lead to a negative risk on the health of the public.

Studies related to practice

Dr. C Priya Ganesh (2016)²¹ focuses various terminologies of biomedical waste management and disposal of clinical waste in private hospital in India. This also includes waste transportation, waste accumulation, and storage, waste minimization techniques. A major problem related to current biomedical waste management in several hospitals is that the implementation of bio-waste regulation is disappointing as some hospitals are disposing of waste in an improper and indiscriminate manner.

1.7.2. Studies related to attitude

Mr. Sunmeet, (2017)²² this study evaluated the knowledge, attitudes and practices of health-care providers towards biomedical waste management at Arbor Biotech Ltd, Mumbai. In this cross-sectional study 12 physicians, 16 laboratory technicians and 09 housekeepers were interviewed using a pre-designed study questionnaire. Housekeepers were significantly more knowledgeable than

physicians or laboratory technicians regarding policies and systems for waste disposal, however less so about precise details regarding its disposal. Housekeepers also had the highest overall scores for attitudes to waste disposal among the 3 groups. Significantly more laboratory technicians had satisfactory practice scores (84.0%) than did physicians (67.3%) (Housekeepers were not assessed).⁹ Training and duration of work experience were not significantly associated with knowledge, attitude and practice scores, except for laboratory technicians with longer work experience, who were more likely to have satisfactory knowledge about waste disposal than less experienced laboratory technicians.

2. Materials and Methods

The research methodology is the most important part of research as it is the framework for conducting study. It indicates the general pattern for conducting study. It indicates the general pattern for organizing the procedure to get valid and reliable data for an investigation.

This chapter deals with the methodology adopted for "Biomedical Waste Management among Group-D workers."

2.1. Research approach

In the present study, the **Quantitative research approach** was considered appropriately.

2.1.1. Research Design

In the present study, descriptive research design was used to achieve the objectives of the study.

2.1.2. Research Setting

Setting is the physical location and conditions in which data collection takes place. Present study was conducted in Era's Hospital, Lucknow (UP)

Population: Group-D health worker

2.2. Target Population

Sharma SK (2016)³⁷ the entire population in which the researchers are interested and to which they would like to generalize the research finding. For the present study, all the group-d employees working at Era Hospital, Lucknow.

2.2.1. Sample and sample technique

Sampling technique for present study was **Purposive Sampling Technique**.

2.2.2. Sample Size

In present, as per statistical calculation the sample size will be 48.

Formula: where, N population (91)

N= find, find sample size comes out here

$$N = \frac{\frac{N=n1}{1+n1-1}}{N} = 48$$

2.2.3. Variables

Study variable: Knowledge regarding ‘Biomedical waste management’.

Socio Demographic Variables: Age (in years), Gender, Educational Status, Years of working experience in hospital, Present working area, Educational program of biomedical waste.

2.2.4. Inclusion Criteria

Group-D workers working at Era hospital.

2.2.5. Exclusion Criteria

Those who are not willing and not available during data collection period.

Selection and Development of Tool:

As the study is to assess the knowledge regarding Biomedical Waste Management, among Group-D workers of Era Medical Hospital, structured knowledge questionnaire was used to collect the data.

2.3. Selection and development of tool

As the study is to assess the knowledge regarding Biomedical Waste Management, among Group-D workers of Era Medical Hospital, structured knowledge questionnaire was used to collect the data.¹⁰

2.3.1. Demographic data

This part includes items for obtaining personal information of Group D workers such as age (in years), gender, educational status, work experience (in year). Current working area in the hospital, attended any previous academic programme on biomedical waste management.

2.3.2. Self structured knowledge questionnaire related to bio medical waste management

This part consist of 30 questionnaire related to bio medical waste management. This tool is used to assess the knowledge on bio medical waste management among Group-D workers attending in wards and OPD of selected hospital Lucknow.

2.4. Validity of Tool

Polit and Hungler (2010), stated that validity of an instrument refers to the degree to which an instrument measures what is supposed to be measuring. The content validity of tool was done by the panel by 5 experienced in various speciality area of nursing.

Table 1: Criterion measure

Level of knowledge	%	Score
Inadequate	0-50%	0-14
Moderate	50-75%	15-22
Adequate	75-100%	23-30

Interpretation

Maximum score: 30

Minimum score: 00

2.5. Reliability of Tool

The reliability of self- structured tool was computed by spit half method and it was found to be 0.8.

2.6. Pilot study

Pilot and beck (2008), stated that pilot study is a small scale version or trial run design to test the methods to be used in larger, more rigorous study. The purpose is to find out the feasibility and reliability of the study.

It was conducted on 28/12/2019 at selected Hospital, Lucknow. The data was collected from 6 fourth class workers who were attending in wards of respective hospital by using purposive sampling technique. Formal permission was obtained from official authorities of the hospital before approaching the subject. Written consent was taken from the subject before data collection and they were assured that their response will be kept confidential and information will be used only for research purpose. Socio demographic profile was used to collect personal information of subject and self structured questionnaire was used to assess the knowledge on bio medical waste management. The maximum time spent for collecting the data from each fourth class worker was 5-10 minute.

2.7. Data collection procedure

Data for final study was collected on 4/01/2020. The data was collected from 48Group-D class workers who were attending general wards, critical ward, operation theatre and OPD of Era’s Lucknow Medical College & Hospital, by using purposive sampling technique. Prior to data collection procedure, formal permission was obtained from medical superintendent of the hospital. Written permission was taken from the subject and they were assured that their responses will be kept confidential and information will be used only for research purpose. Socio demographic profile was used to collect personal information of subject and self structured questionnaire was used to assess the knowledge on Bio medical waste management. The maximum time spent for collecting the data from each Group-D workers was average 5-10 min.

2.8. Ethical consideration

Keeping in mind the legal rights of the subject, only those Group-D workers were included who were willing to participate. Written consent is obtained from study subjects. Anonymity of the study subject and confidentiality of the information is maintained.

2.9. Plan of data analysis

Descriptive and inferential statistics was found for data analysis. The collected data will be form of table, diagrams and graphs. Mean, standard deviation, percentage was used for descriptive statistics.

The analyzed data was organized according to the objectives and presented under the following major headings:

Section 1: Sample characteristics.

Section 2: Objectives wise analysis.

2.9.1. Section 1: Sample characteristics

Table 2: Frequency and percentage distribution of group-d worker according to sociodemographic variable

Sr. No.	Demographic Data	Category	Freq. (N)	Percentage (%)
1.	Age (in years)	20-30	14	29
		31-40	21	44
		41-50	12	25
		51-60	1	2
2.	Gender	Male	1	2
		Female	47	98
3.	Educational status	Illiterate	32	67
		Primary	10	21
		Junior high school	5	10
		High school and above	1	2
4.	Occupational experiences	<_1	7	14
		2-4	12	25
		5-7	16	34
		8 and above	13	27
5.	Present Working Area	General ward	28	59
		Critical ward	9	18
		Operation theatre	3	6
		OPD	8	17
6.	Educational Programmes On BMW	Attending	45	94

N=48

Table 2 revels the frequency and percentage distribution of group D worker. According to social demographic

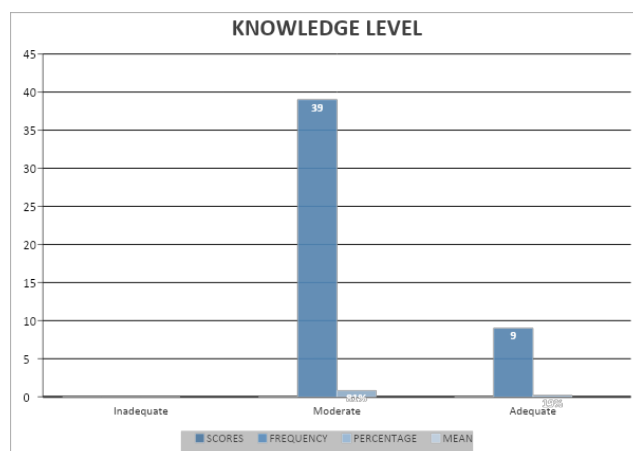


Fig. 1: Percentage distribution of level of knowledge on bio medical waste management among group-d workers.

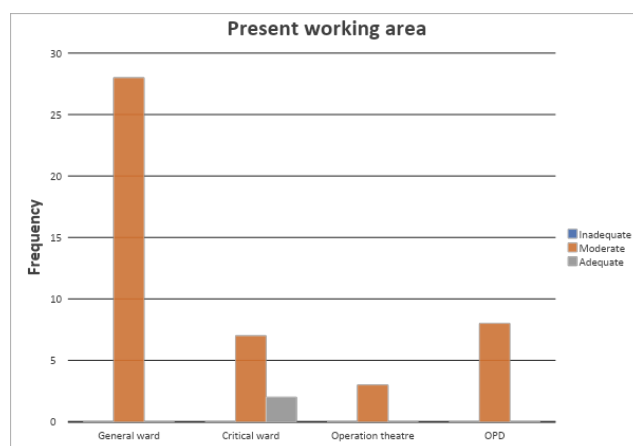


Fig. 2: Association table of knowledge score related to work experiences.

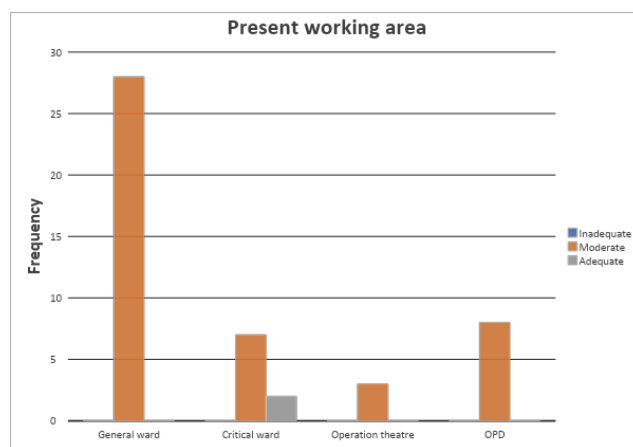


Fig. 3: Association table of knowledge score related to present working area.

Table 3: With selected demographic variables.

S.no	Variables	Category	Frequency	Level of Knowledge			Df	Chi Sq.
				Inadequate	Moderate	Adequate		
1.	Age(in years)	20-30	14	0	14	0	2	0.63**
		31-40	21	0	21	0		
		41-50	12	0	12	0		
		51-60	1	0	1	0		
2.	Gender	Male	47	0	45	2	2 P value	3.34**
		Female	1	0	1	0		
3.	Educational Status	Illiterate	32	0	29	3	4	1.76**
		Primary	10	0	10	0		
		Junior high school	5	0	5	0		
		High School &above	1	0	1	0		
4.	Work Experiences	<_1	7	0	7	0	4	0.65**
		2—4	12	0	12	0		
		5—7	16	0	16	0		
		8 and above	13	0	11	2		
5.	Present Working Area	General ward	28	0	28	0	4	1.35**
		Critical ward	9	0	7	2		
		Operation Theatre	3	0	3	0		
		OPD	8	0	8	0		
6.	Educational Programme on BMW	Attending	45	0	45	0	2 P value	2.14**

**=Non-Significant.

*Significant at $p < 0.05$ level.

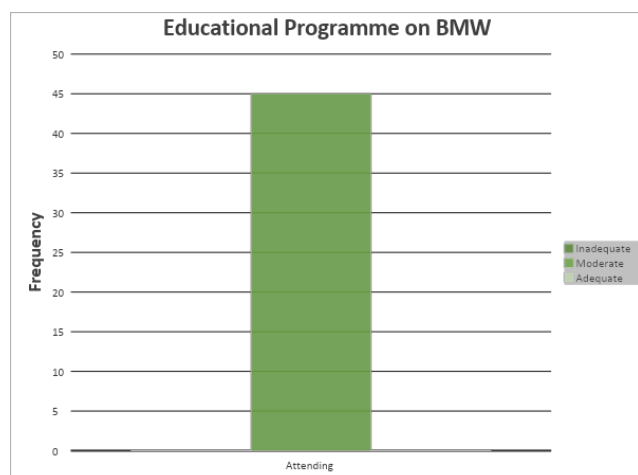


Fig. 4: Association table of knowledge score related to educational programme on BMW.

variables a total of 48 group- D workers were selected as sample to assess the knowledge regarding bio medical waste management. All the subjects were from Era's hospital for whom the socio demographic variables were analyzed.

1. Distribution of study subjects, according to **Age (in years)** reveals that, majority (44%) of Group -D

workers were in the age group of 20-30 years, followed by 31-40 years (30%), 41-50 years (25%), 51-60 years (2%).

2. Distribution of study subjects according to **Gender** revealed that, majority (47%) were female and remaining (2%).
3. As per their educational status majority of illiterate (67%) followed by primary education (21%), middle education (10%) and remaining (2%) were having secondary education.
4. In context to occupational experiences the majority(27%) were having experience of 8years and above, experience of 5-7years(34%), 2-4years of experience(25) and remaining(14%) were experience of less than 1years or equal to 1year.
5. As per present working area the majority (59%) were in general ward followed by critical ward (18%), operation theatre (6%) and O.P.D (17%).
6. As per attending educational programme on bio medical waste management (94%) attended the programme.

Objective 2: To find the association between level of knowledge regarding bio medical waste management among group D workers with selected demographic variables.

Table 3 depicts the association between levels of knowledge with selected demographic variable. The researcher calculated the value of chi Square in order to find out the association between the knowledge score with their selected socio-demographic variables at $p < 0.05$ level of significance. The data presented in the above table shows that association between level of knowledge with Age ($\chi^2 = 0.63$).

3. Discussion

This chapter deals with the findings of the present study, “A study to assess the knowledge regarding bio medical waste management among group-D workers in Era hospital. In this chapter, an attempt has been made to discuss the findings of other studies. The present study was conducted in Era Hospital, Lucknow. Total sample was 48 group-d worker who worked in Era Hospital, Lucknow. Purposive sampling technique was used to select the sample. Before collecting the data, the investigator introduce herself explained the purpose of the study and obtained written consent. Socio-demographic data was used to collect personal information of subjects and questionnaire method was used to assess the knowledge of Group-D workers who work in Era hospital Lucknow.

Objective 1: To assess the knowledge regarding biomedical waste management among group-d workers in Era hospital

The findings of the present study revealed that, majority (81%) of Group -D workers were having a moderate knowledge, followed by (19%) having adequate knowledge regarding biomedical waste management among group D workers in Era hospital. The findings of the present study revealed that information about bio medical management was assessed and the majority was highest in doctors 80%, were having average knowledge followed by (70%) post graduate were having moderate knowledge and then followed by (75%) staff nurses were having moderate knowledge and housekeeping having (65%) knowledge regarding biomedical waste. The finding of the study were supported by “DIVYA RAO” 04-09-2018 who conducted a study to assess the knowledge regarding bio medical waste among group- D workers.

The finding show that among 472 health worker, doctors 65(80%) had good knowledge (highest), post graduate 83(70%) had good knowledge and then staff nurse 172(75%) had good knowledge and then housekeeping 96(65%) had average knowledge.

Objective 2: To find the association between knowledge on biomedical waste management with selected demographic variables

This study evaluated the knowledge, attitudes and practices of health-care providers towards biomedical waste management at Arbor Biotech Ltd, Mumbai. In this cross-sectional study 12 physicians, 16 laboratory technicians

and 09 housekeepers were interviewed using a pre-designed study questionnaire. Housekeepers were significantly more knowledgeable than physicians or laboratory technicians regarding policies and systems for waste disposal, however less so about precise details regarding its disposal. Housekeepers also had the highest overall scores for attitudes to waste disposal among the 3 groups. Significantly more laboratory technicians had satisfactory practice scores (84.0%) than did physicians (67.3%) (Housekeepers were not assessed). Training and duration of work experience were not significantly associated with knowledge, attitude and practice scores, except for laboratory technicians with longer work experience, who were more likely to have satisfactory knowledge about waste disposal than less experienced laboratory technicians. The finding of the study were supported by “Mr. Sunmeet.

Author”JAN-2017- who conducted a study to assess the knowledge, attitudes and practices of healthcare personnel towards biomedical waste disposal management.

4. Summary

The present study was conducted to assess the knowledge regarding Biomedical Waste Management among Group-D workers. A descriptive research design, was adopted to conduct the present study. The study was conducted in Era Hospital Lucknow. By using Purposive Sampling Technique 48 Group-D workers from Era Hospital were selected. To collect personal information of subjects socio-demographic profile was used to assess the knowledge regarding Biomedical Waste Management. A pilot study was done on 6 Group-D workers who work at Era Hospital, Lucknow.

The data of the final study was analyzed using descriptive statistics, calculations of frequency, percentage, mean, standard deviation, z test was done. The data has been represented in the form of tables, pie diagrams and bar graphs.

5. Conclusion

The study concluded that out of 48 sample maximum age group were 40-50 years. Results revealed that the knowledge regarding biomedical waste management were moderate among Group-D workers within our sample size 48. Results related to association of knowledge on biomedical waste management that there was no significant among Group-D workers with socio-demographic variables such as age, religion, educational status. However, in Group-D workers, years of experience, or attended any classes on biomedical waste management were found to be statistically significant.

6. Limitations

The study was limited to:

1. 48 Group-D Workers.
2. Present at the time of Data Collection.
3. Those who were willing to participate in the study.

6.1. Implication of the study

The study findings have certain important implications for the nursing profession in clinical practice, nursing education, nursing administration and nursing research. In these entire areas, nurse act as an educator, organizer, leader, counsellor, motivator, and can help in improving knowledge on biomedical waste management among Group-D workers.

6.1.1. Nursing education

1. The study has an important implication in the nursing education and other field. In the revised curriculum of basic nursing education and in post graduation much emphasis is laid on knowledge regarding biomedical waste management.
2. Teaching learning activities should include health education on assessment of knowledge on Biomedical waste management, its handling techniques, management.
3. Nurse should provide guidance to Group-D workers regarding Biomedical Waste Management
4. In service education needs to be planned and implement for clinical nurse and staffs to enrich their information on recent researches regarding Biomedical Waste Management among Group-D workers.

6.1.2. Nursing practice

1. Mainly working in clinics, hospitals and in health centers play a very important role in promoting health and well-being of the Group-D workers.
2. Nurses working in clinical area may come across the situation that many group-D workers have moderate knowledge regarding biomedical waste management.
3. The evidence based practices is the need of today's practice. Based on evidence, nursing practice can be modified and improved.

6.1.3. Nursing administration

1. There is an increasing need for quality and holistic care in today's health care system. The findings of this study can be utilized by nursing personnel, while providing knowledge regarding biomedical waste management.
2. Nursing administration should organize periodic in - service educational and training programme (regarding latest innovation) for nursing staff and group-D workers to improve their knowledge regarding biomedical waste management.
3. The knowledge about biomedical waste management will help the nurse and group-D workers for providing

care and precautions to their health and gaining knowledge.

4. The nurse administrator should take initiative to provide knowledgeable nurse and working staffs to practice biomedical waste management, its handling process and management.

7. Source of Funding

None.

8. Conflict of Interest

The author declares that there is no conflict of interest.

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Cite this article: Muthukumar A. A study to assess the knowledge regarding biomedical waste management among group-d workers of Era's hospital Lucknow (U.P). *IP J Nutr Metab Health Sci* 2022;5(1):18-25.