

Research Article

Effectiveness of Structured Teaching Programme on Knowledge regarding Prevention of Health Hazards related to Biomedical Waste among the Healthcare Workers at SKIMS, Soura

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A B S T R A C T

Background: Staff nurses spend maximum time with patients in the ward, which increases their exposure and risk to the hazards present in the hospital environment, mainly due to biomedical waste and inadequate knowledge. Thus they need to be well-equipped with the latest information, skills and practices in managing this biomedical waste besides reducing hospital-acquired infections to protect their own health and the environment.

Objectives: The objectives of the study were to assess the pre-test and post-test knowledge of the healthcare workers at SKIMS, Soura regarding the prevention of health hazards related to biomedical waste, to compare their pre-test and post-test knowledge scores, and to determine the association between their pre-test knowledge scores and the selected demographic variables.

Methodology: A quantitative research approach with a descriptive design was used to conduct the study on 60 subjects in SKIMS Soura, Srinagar. Assessment of knowledge was done using a self-structured questionnaire.

Results: In the pre-test, most of the study subjects (75%) had moderate knowledge, 21.7% had inadequate knowledge, and 3.3% had adequate knowledge while in the post-test, most of them (85%) had adequate knowledge, 10% had adequate knowledge, and 5% had inadequate knowledge regarding the prevention of health hazards related to biomedical wastes. The mean post-test knowledge score of study subjects was higher than the mean pre-test knowledge scores.

Conclusion: The healthcare workers had moderate knowledge regarding the prevention of health hazards related to biomedical waste. Inadequate knowledge in this area may lead to serious consequences. Hence they should be informed about the preventive measures for biomedical hazards and their management. The structured teaching programme was found effective in increasing the knowledge level of study subjects.

Keywords: Healthcare Workers, Effectiveness, Structured Teaching Programme, Health Hazards, Knowledge, Pre-Test, Post-Test

Introduction

Medical waste poses serious health risks. Although those involved in sanitation and housekeeping are doing their part, the present situation of biomedical waste management cannot be said to be satisfactory due to many deficiencies and obstacles. No specific guidelines and parameters are being followed and implemented by the staff concerned. They are less educated and belong to the lower ranks of workers, working without adequate and proper guidance and supervision.¹

Biomedical waste is defined as “any solid or liquid waste, including its containers and any intermediate products, generated during the diagnostic treatment or immunisation of humans or animals during research related thereto, or collected in production or testing”. It contains infectious or potentially infectious material. This includes the generation of biomedical wastes that are typically medical or laboratory-generated as well as research laboratory wastes that contain bio-molecules or organisms that are prohibited from environmental release.²

Biomedical waste can be solid or liquid. Waste disposal is an environmental concern because it is infectious or biohazardous and can potentially lead to the spread of infectious diseases. It poses serious threats to environmental health and requires scientific treatment and management before final disposal. The problem is compounded by the ever-increasing number of hospitals, clinics and diagnostic laboratories.³

Improper management of waste generated in healthcare facilities causes direct health impacts on the community, healthcare workers, and the environment. Biomedical waste is different from general waste and from other types of hazardous wastes such as chemicals and radioactive materials.⁴

Biomedical waste management requires due diligence and care from a chain of people through available technologies for effective management. It must be properly managed and disposed of to protect the environment, general public and workers, especially health care and sanitation workers who may be exposed to biomedical waste.⁵

Need for Study

The influx of “disposable” waste into hospitals has led to the ills of its ills, namely improper recycling, unauthorised and illegal reuse and increased waste volumes. Due to the extensive use of medical and non-medical disposal, the volume of hospital waste and the proportion of infectious waste is certainly higher than that expected in India. Most of the waste generated in hospitals, including food waste, is no more hazardous than general municipal waste. Therefore, hospital waste should be separated into hazardous waste

and non-hazardous waste and disposed of accordingly. The last century saw rapid development of hospitals in the public and private sectors, in line with the needs of a growing population, and the advent and acceptance of “disposables” have made the generation of hospital waste a significant factor in present hospitals.

Biomedical waste management refers to a systematic and scientific method of managing healthcare waste through a step-by-step process such as segregation, storage, transportation and disposal.

According to the information submitted by the State Pollution Control Boards (SPCBs)/ Pollution Control Committees (PCCs), the generation of biomedical waste in Jammu and Kashmir during the year 2018 was 4482.9 kg per day.⁶

Biomedical waste has been disposed of illegally into the garbage and sewers in most parts of the world including India. In many places, much of the hospital waste particularly disposable syringes and needles, is reused and recycled, which increases the risk of HIV and hepatitis B and C to handlers and users.⁷

The average amount of hospital solid waste generated in Indian hospitals has been estimated by different workers and varies from 1 kg/day/bed to 2.2 kg/day/bed. In the United States, this amount was found to be more than 4 kg/bed/day, and the main reason for this has been attributed to the increase in the use of disposables. Non-adherence to minimum standards of hospital waste management not only reduces the quality of life and health in the community, but also increases the workload of health services. This worsens the situation and brings people and nature closer to dangerously unhealthy conditions. Over the past two decades, the public has become increasingly aware of one of the major consequences of rapid development, namely the amount and variety of hazardous waste generated.⁸

Amin et al.⁹ conducted a study on a sample of 120 staff nurses to assess the knowledge of staff nurses on biomedical waste management at GMC Srinagar and its affiliated hospitals. The results revealed that the majority of respondents (87%) had average knowledge while 8% had good knowledge and 5% had poor knowledge about biomedical waste management.

Biomedical waste is potentially hazardous. Sorting medical waste at the point where it is generated is an important step. Other forms of waste should not be mixed with biomedical waste as different laws apply to the treatment of different types of waste.

Therefore, proper collection and disposal of waste is of great importance as it can cause direct and indirect health hazards to people and damage to flora, fauna and the environment.

Methodology

A quantitative research approach with non-experimental descriptive design was used for the study in order to assess the effectiveness of a structured teaching programme on knowledge regarding the prevention of health hazards related to biomedical waste. The setting chosen for the present study was SKIMS Soura, Srinagar Kashmir. Ethical clearance was obtained from the Institutional Ethics Committee (IEC), SKIMS to conduct the research study on healthcare workers at SKIMS, Soura, Srinagar, Kashmir. Informed written consent was obtained from the study subjects to confirm their willingness to participate. The study was ethically exempted. The current study included 60 healthcare workers selected by convenient sampling technique. After pre-testing of the tool and structured teaching programme, a pilot study was conducted and it was found feasible for the final study which was conducted from Sep 10, 2022 to Oct 8, 2022. A structured questionnaire schedule was administered to healthcare workers to assess their knowledge regarding the prevention of health hazards related to biomedical waste, as pre-test, followed by the implementation of intervention on the first day. A post-test for assessment of knowledge was done on the 7th day using the same structured tool. The knowledge score was categorised into various levels based on the criteria developed by Anitha in his study. If the score was more than 75%, it was considered adequate knowledge; if the score was 50-75%, it was considered moderate knowledge, and if the score was less than 50%, it was considered inadequate knowledge.¹⁰

Statistical Package for Social Sciences (SPSS) software programme was used for data analysis. Frequency distributions were obtained and descriptive statistics were calculated.

Results and Discussion

Demographic Profile of Participants

The present study showed that more than 50% of study subjects (58.3%) belonged to the age group of 30-35 years whereas, 23.3% belonged to the age group of more than 35 years. The maximum number of study subjects (55%) were female. As per educational status, most of the study subjects (60.0%) had B Sc. nursing qualification, 21.7% M Sc. nursing qualification and 18.3% had Diploma A grade nursing qualification. As per professional experience, (48.3% of participants) had 5-10 years of experience, 25.0% had more than 10 years of experience and 26.7% had less than 5 years of experience. 93.3% of study subjects had received information regarding the prevention of health hazards related to biomedical waste, whereas 6.7% had not received any information regarding it as shown in Table 1.

The findings of the present study are supported by a study

conducted by Ahmad and Vinsi¹¹ on 30 staff nurses in Index Hospital, Indore, MP (India) to evaluate the effectiveness of a structured teaching programme on bio-medical waste management. The study results showed that equal number of study subjects (46.67%) were in the age group of 21-25 years and 26-30 years whereas, 6.6% were in the age group of 31-35 years. Maximum study subjects were male (66.67%). As per educational status, it was seen that maximum (73.34%) study subjects had GNM Nursing qualification, 10% had Post Basic Nursing qualification, and 16.66% had BSc Nursing qualification. As per professional experience, 10% had 1-year experience, 30% had 1-2 years of experience, 23.33% had 2-3 years of experience, and 36.67% of participants had more than 3 years of experience. 16.66% of study subjects had received in-service education regarding biomedical waste management, whereas 83.43% had not received in-service education regarding it.

Assessment of Knowledge Score Before and After Administration of Structured Teaching Programme regarding Prevention of Health Hazards related to Biomedical Waste

Pre-test Knowledge Score: Majority of the study subjects (75%) had moderate knowledge, 21.7% had inadequate knowledge and 3.3% had adequate knowledge regarding the prevention of health hazards related to biomedical waste (Table 2).

Post-test Knowledge Score: Majority of the study subjects (85%) had adequate knowledge, 10% had moderate knowledge and 5% had inadequate knowledge.

The findings of the study are supported by a study conducted by Jyoti and Kumari¹² in selected hospitals of Panipat, India to determine the effectiveness of a structured teaching programme on knowledge regarding occupational health hazards among the housekeeping staff. 60 housekeeping staff were selected with non-probability sampling technique. The results revealed that most of the participants had an average knowledge score in the pre-test and post-test. There was a significant difference between pre-test and post-test cognitive scores ($p = 0.05$).

Comparison of Pre-test and Post-test Knowledge Scores of Study Subjects regarding Prevention of Health Hazards related to Biomedical Waste

The mean post-test knowledge score (30.38 ± 6.076) of the study subjects regarding the prevention of health hazards related to biomedical waste was significantly higher than the mean pre-test knowledge score (17.67 ± 5.888) at 0.05 level of significance. This indicated that the structured teaching programme was effective in enhancing the knowledge of healthcare workers regarding the prevention of health hazards related to biomedical waste as shown in Table 3.

The findings of the present study are supported by a study

conducted by Karth et al.¹³ to assess the effectiveness of a structured teaching programme on knowledge regarding health hazards of bio-medical waste among 60 GNM students in a selected school of Nursing, Villupuram, Tamil Nadu. The study showed that the pre-test mean score was 7.0 ± 2.9 and the post-test mean score was 12.5 ± 5.5 . The paired t test value showed that there was a statistical significance between pre and post-test knowledge at $p < 0.0001$ level.

Association between Pre-test Knowledge Score among Healthcare Workers regarding Prevention of Health Hazards related to Biomedical Waste and their Selected Demographic Variables (Age, Gender, Professional Qualification, Professional Experience, and Previous Exposure to In-service Education)

The findings of the present study showed that there was a statistically significant association between the pre-test

knowledge scores of study subjects with their demographic variables like age (< 0.001), professional qualification (< 0.001), professional experience in years (< 0.001), previous information received (0.021), and there was no significant association between the score and gender (0.893), as shown in Table 4.

The findings of the study are also supported by a study conducted by Uma¹⁴ on 50 staff nurses in Kidwai Cancer Institute, Bangalore (India) to assess the effectiveness of the planned teaching programme on knowledge regarding bio-medical waste management. The results revealed that the variables such as age in years, educational qualification, and years of experience were significant, and other variables were non-significant at 0.05 level of significance. Thus, it can be interpreted that there was a significant association between the knowledge of staff nurses regarding bio-medical waste management with their selected demographic variables.

Table 1. Frequency and Percentage Distribution of Study Subjects according to Demographic Variables (N = 60)

Variables	Category	Frequency	Percentage
Age (years)	25 -30	11	18.3
	30-35	35	58.3
	> 35	14	23.3
Gender	Male	27	45.0
	Female	33	55.0
Professional qualification	Diploma 'A' grade Nursing	11	18.3
	BSc Nursing	36	60.0
	MSc Nursing	13	21.7
Experience (years)	< 5	16	26.7
	5-10	29	48.3
	> 10	15	25.0
Received information previously	Yes	56	93.3
	No	4	6.7

Table 2. Frequency and Percentage Distribution of Study Subjects according to Pre-test Knowledge Score and Post-test Knowledge Score (N = 60)

Knowledge Level	Knowledge Score	Pre-test Knowledge Scores Obtained		Post-test Knowledge Scores Obtained	
		Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Inadequate	0-18	13	21.7	3	5
Moderate	19 - 27	45	75	6	10
Adequate	28 -37	2	3.3	51	85

Table 3. Comparison between Mean Pre-test and Mean Post-test Knowledge Score of Study Subjects regarding Prevention of Health Hazards related to Biomedical Waste (N = 60)

Knowledge Score	Mean \pm SD	Mean %	Mean Diff.	t-test Value	p value
Pre-test knowledge	17.67 \pm 5.888	47.70	12.710	12.54	< 0.001 * *
Post-test knowledge	30.38 \pm 6.076	82.10			

**Significant at 0.01 level.

Table 4. Association of Pre-test Knowledge Score of Study Subjects with their Selected Demographic Variables (N = 60)

Demographic Variables	Categories	Adequate Knowledge	Moderate Knowledge	Inadequate Knowledge	df	Chi-square Test	p Value	Result
Age (in years)	25-30	0	9	2	4	35.667	< 0.001**	Significant
	30-35	1	27	7				
	> 35	1	9	4				
Gender	Male	1	17	9	2	0.226	0.893	Non-significant
	Female	1	28	4				
Professional qualification	Diploma 'A' grade Nursing	0	9	2	4	35.658	< 0.001**	Significant
	BSc Nursing	1	28	7				
	MSc Nursing	1	8	4				
Professional experience (years)	< 5	0	13	3	4	29.118	< 0.001**	Significant
	5-10	1	22	6				
	> 10	1	10	4				
Received information previously	Yes	2	42	12	2	7.689	0.021*	Significant
	No	0	3	1				

*Significant at 0.05 level

**Significant at 0.01 level

Conclusion

The study subjects had moderate knowledge regarding the prevention of health hazards related to bio-medical waste. It may be due to a lack of education in this area. Thus, a structured teaching programme is required to enhance their knowledge regarding the prevention of health hazards related to bio-medical waste and to create awareness among them which may further help to reduce occupational hazards.

The present study showed that there was a statistically significant association of the knowledge score of study subjects with their demographic variables like age, professional qualification, professional experience, and previous information received while no significant association was found between the pre-test knowledge scores of study subjects with gender.

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Conflicts of Interest: None

References

- Rahman H, Ahmed NS, Ullah SM. A study on hospital waste management in Dhaka city. Proceedings of 25th WEDC Conference. Ethiopia; 1999. p. 342-4. [Google Scholar]
- Charan S. Treated poorly, bio-medical waste turns hazardous. The Hindu. 2007 Sep 26.
- Park K. Parks textbook of preventive and social medicine. 18th ed. Jabalpur: Banarsidas Bhanot; 2005. p. 30-2.
- Wikipedia [Internet]. Biomedical waste; [cited 2023 Jan]. Available from: https://en.wikipedia.org/wiki/biomedical_waste
- World Health Organisation [Internet]. Health-care waste; 2018 [cited 2023 Jan]. Available from: <https://www.who.int/news-room/fact-sheets/detail/health-care-waste>
- Ministry of Health and Family Welfare [Internet]. Bio-medical waste. PIB Delhi; 2020 [cited 2023 Jan]. Available from: <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=160235>

7. Datta P, Mohi GK, Chander J. Biomedical waste management in India: critical appraisal. *J Lab Physicians* [Internet]. 2018 [cited 2022 Dec 22];10(1):6-14. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5784295/> [PubMed] [Google Scholar]
8. Centre for Environment Education and Technology [Internet]. Bio-medical waste management - burgeoning issue; [cited 2023 Feb]. Available from: http://www.ceetindia.org/bio_medical_waste_management_burgeoning_issue.html
9. Amin N, Bhat AA, Mohammad Y, Naik S. A study to assess the knowledge of staff nurses regarding biomedical waste management in Government Medical College Srinagar and its associated hospitals. *Int J Emerg Trauma Nurs*. 2016;1(2). [Google Scholar]
10. Marry AA. A study to assess the effectiveness of structured teaching programme on knowledge and practice regarding prevention of health hazards related to biomedical wastages among the health team members in the selected primary health centers in Bangalore [dissertation]. 2010.
11. Ahmad SJ, Vinsi MS. Effectiveness of structured teaching programme (STP) on knowledge regarding bio medical waste management among staff nurses in Indore, M.P. *IOSR J Nurs Health Sci* [Internet]. 2017 [cited 2023 Mar];6. Available from: <https://www.iosrjournals.org/iosr-jnhs/papers/vol6-issue3/Version-5/D0603052932.pdf>
12. Jyoti, Kumari M. A pre-experimental study to assess the effectiveness of structured teaching program on knowledge regarding occupational health hazards among the housekeeping staff in selected hospitals of Panipat. *Int J Nurs Educ* [Internet]. 2020 [cited 2023 Jan];12(1):21-5. Available from <https://medicopublication.com/index.php/ijone/article/download/3618/3395/6725> [Google Scholar]
13. Karth R, Kumuthavalli D, Brindha M, Mahalakshmi G, Padmapriya P, Priya V, Tamilarasi U. Effectiveness of structured teaching programme on knowledge regarding bio-medical waste management among GNM students in selected school of nursing. Galore *Int J Health Sci Res*. 2020;5(4):59-64.
14. Uma N. A study to assess the effectiveness of planned teaching programme on knowledge regarding bio-medical waste management among staff nurses at Kidwai Cancer Institute, Bengaluru [dissertation]. 2018.