

Knowledge, Attitude and Practice of Biomedical Waste Management in Nursing Staff of a Private and a Government Tertiary Care Teaching Hospital: A Comparative Study

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Abstract

Introduction: Biomedical waste is “Any waste which is generated in the diagnosis, treatment or immunization of human beings or animals or during research” in a hospital. Improper disposal of hospital waste poses a major threat to the environment. Lack of proper management, awareness, insufficient resources and poor control of disposal of waste are the most pressing problems faced .

Objective: To compare the knowledge, attitude and practice of hospital waste management in nursing staffs and nursing assistants of a private and government tertiary care hospital in Chennai, Tamil Nadu.

Methodology: This is a cross sectional study done in a private and a government tertiary care teaching institute on 300 nursing staff (150 from each) using an orally administered structured questionnaire. The data were entered into excel and analysis was done.

Result: Of the 150 participants from government hospital 71% had training in BMW management, 82% knew where to report in case of a needle stick injury, 61% perceived that they have adequate knowledge regarding BMW management, 98% were willing to attend programmes regarding BMW. 73% had good knowledge regarding BMW management. 90% practice good management of BMW.

Of the 150 participants from private hospital 81% had training in BMW management, 79% knew where to report in case of needle stick injury, 67% perceived that they have adequate knowledge regarding BMW management, 95% were willing to attend programs regarding BMW management. 74% had good knowledge. 85% practice good management of BMW.

Conclusion: The knowledge, attitude and practice of BMW management among nurses and nursing assistants of the private and the government hospital are found to be satisfactory. There is no significant difference (at $p < 0.05$) in the knowledge, attitude and practice of BMW management among the nurses and nursing assistants of both the hospitals.

Keywords: Biomedical waste management, knowledge, attitude, practice, nursing staff.

Introduction

Biomedical waste (BMW) is the waste that is generated in hospitals and health care centres during

diagnosis, treatment or immunisation of human beings, mainly consists of needles, syringes, ampoules, dressing materials, disposable plastics and microbiological wastes⁽¹⁾. With the aim of reducing health problems and treating the sick, health care services inevitably produce wastes that may be hazardous to health. According to the World Health Organisation (WHO), 10-25% of the biomedical waste are estimated to be hazardous⁽²⁾. Improper handling of biomedical waste increases the airborne pathogenic microbes, adversely affecting the

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hospital environment and community at large. Apart from polluting water, air & soil, it also has considerable impact on human health due to aesthetic effects.

BMW management (BMWM) means the management of waste produced by hospitals using techniques that will check the spread of diseases. The objectives of biomedical waste management are to reduce waste generation, to ensure its efficient collection, handling, as well as safe disposal in such a way that it controls infection as these wastes need a special attention for their proper disposal. Adequate knowledge, attitude and practices regarding biomedical waste management is lacking in developing countries⁽³⁾. The volume of the health care wastes have also increased over the last 30 years. The World Health Organisation has hence prepared biomedical waste management guidelines to ensure proper handling of these wastes.

This study was done to assess and compare the knowledge, attitude and practice of biomedical waste management among the nursing staff working in a private tertiary care hospital and a government tertiary care hospital in Chennai.

Materials and Method

This was an observational cross-sectional study done from January 2019 to May 2019. This study was conducted in a private tertiary care hospital and in a government tertiary care hospital situated in Chennai, capital city of Tamil Nadu in South India. The study included the nurses and nursing assistants working in the above mentioned institutions.

The sample size of the study is $n=300$, 150 from each of the above mentioned institutions. The sample size was measured using the formula $\{(Z_{\alpha}-Z_{1-b})^2 \cdot [P_1(100-P_1)+P_2(100-P_2)]\} / (P_1-P_2)^2$, where $P_1 = 35\%$, $P_2=20\%$ ⁽⁴⁾, expected difference of 15%, alpha error of 5% at 95% confidence interval.

After obtaining permission from the human resource department, a list of all the nurses and nursing assistants working in the above mentioned institutions was obtained and the participants were selected randomly using random numbers table. Nurses and nursing assistants not willing to participate in the study were excluded.

The study tool used was an orally administered structured questionnaire containing questions regarding the knowledge, attitude and practice of Biomedical

waste management (BMWM) respectively. Questions related to demographic details like the participants name, age, sex, department they are currently working in, total years of experience, years worked in the current hospital, their training in biomedical waste management, years of experience, vaccination against Hepatitis, needle stick injury were also included. It included eleven questions to assess their knowledge, which included questions regarding where they would dispose certain wastes like anatomical wastes, contaminated gauze, disposable intravenous tubes and catheters, broken glass vials, discarded disinfectants, contaminated mattresses and linens. The six attitude questions were regarding whether they thought biomedical waste management as a financial burden on the setup, do they find it as a burden to report a needle stick injury, whether they are interested in attending programs to enhance and upgrade their knowledge on biomedical waste management and if they think it is important to dispose health care wastes in a proper manner. Six questions regarding their practice of biomedical waste management was also included (Table 2). One point was awarded to each correct answer and the wrong answers weren't given any point. Each of the three aspects were assessed separately and a score of more than 60% was considered that the participant had good knowledge, attitude and practice of biomedical waste management. The data was entered in MS- Excel spreadsheet and analysis was done using SPSS software. Qualitative data was expressed as frequencies and proportions, quantitative data were summarised as mean (standard deviation). Bivariate analysis was done using chi square.

Results

A total of 300 nurses and nursing assistants took part in this study, of which 150 were from the private institute and 150 were from the government institute.

The mean age of the participants from the government institute was 32.9 years whereas the that of participants from the private institute was 25.17 years. Of the participants, 81% from the government institute and 75% from the private institute were nurses. The mean years of experience was higher in the government, which is 8.29 years compared to 3.06 mean years in the private institute (Table 1).

Significantly more percent of the participants (90%) from the government institute separate biomedical waste during collection and they also collect liquid

waste in leakage proof bags (77%) when compared to the participants from the private institute. Significantly more participants from the private institute collect liquid and other wastes together (43%) whereas more percent (23%) of participants from the government institute store infectious waste together with the other wastes. 83% of the participants from the government institute use personal protection while handling biomedical waste whereas only 77% of the participants from the private institute do so which is significantly less when compared.(Table 2)

Only 71% of the participants from the government institute and 81% of the participants from the private institute have had training in biomedical waste management.(figure 1).

Although the difference is not statistically significant, it was found out that increased percentage of the participants from the government institute had a good knowledge, attitude regarding biomedical waste management and a good practice of biomedical waste management when compared with the participants from the private institute (Table 3).

All the participants from the private institute had been vaccinated against Hepatitis B compared to the 73% from the government institute and 82% of the government institute participants knew to whom they were supposed to report an incident of needle stick injury compared to the 79% from the private institute. 25% of the participants from the private institute have

had a needle stick injury in the past and 90% of them had reported the incident to appropriate authority, whereas 33% of the participants from the government institute have had a needle stick injury and all of them had reported the incident to the authority.

61% of the participants from the government institute showed a positive attitude towards biomedical waste management but only 48% of the private institute participants showed positive attitude. 98% of the participants from the government institute and 95% of the participants from the private institute were willing to attend programs regarding biomedical waste management.

70% of the participants from the private institute and 62% of the participants from the government institute think that there is an increased risk of injury if the health care waste is segregated at the source. 45% of the participants from the private institute and 33% of the participants from the government institute think BMWM setup as a financial burden on the institute. 31% of the total study population consider it as a burden to report needle stick injury .

Table 1: General profile of the participants

| General Profile | Government | Private |
|--------------------------|-------------|-------------|
| Mean age | 32.89 years | 25.17 years |
| Mean years of experience | 8.29 years | 3.06 years |
| Nurses | 122 (81%) | 112(75%) |
| Nursing assistants | 28 (19%) | 38 (25%) |

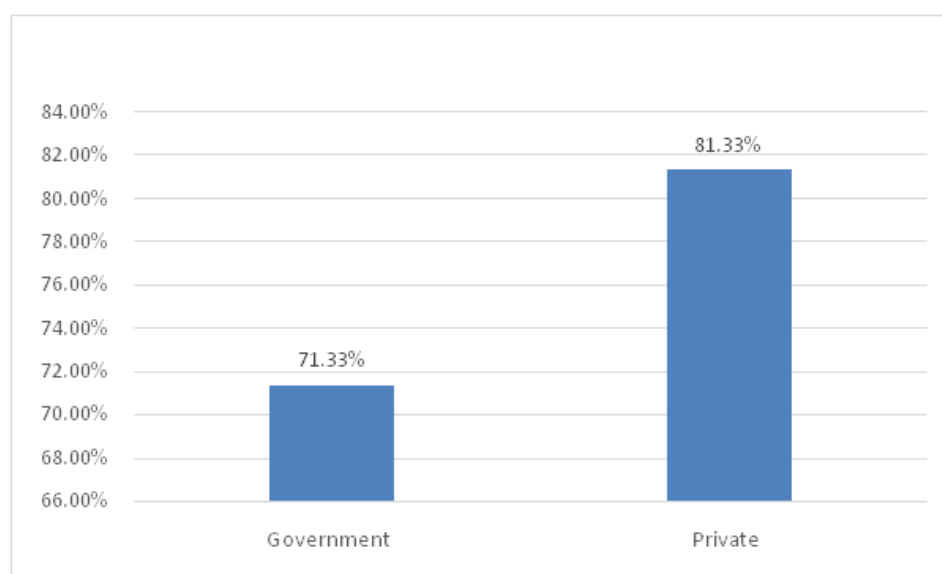


Figure 1: Participants with training in BMWM.

Table 2: Comparison between the various practice habits of the participants from the two institutes

| Practice Habits | Government | Private | P- Value |
|--|------------|-----------|-----------|
| Sort BMW during collection | 135 (90%) | 120 (80%) | 0.015293* |
| Separate sharps from blunt waste | 140 (93%) | 137 (91%) | 0.515049 |
| Use personal protection tools while handling BMW | 125(83%) | 116 (77%) | 0.191118 |
| Collect liquid waste in leakage proof bags | 115 (77%) | 91(61%) | 0.002815* |
| Collect liquid and other wastes together | 44 (29%) | 64 (43%) | 0.016145* |
| Store infectious wastes together with other wastes | 35 (23%) | 14 (9%) | 0.001039* |

* Significant at P < 0.05

Table 3 Comparison between the percentage of participants having good knowledge, practicing good management of BMW and having a good attitude regarding the same

| | Government | Private | P- Value |
|----------------|------------|---------|----------|
| Good knowledge | 73.33% | 74% | 0.872707 |
| Good attitude | 61.33% | 48.33% | 0.076136 |
| Good practice | 90% | 85.33% | 0.285049 |

Discussion

This is a cross sectional study conducted in a private and a government tertiary care hospitals regarding the knowledge, attitude and practice of BMW among their nurses and nursing assistants.

In this study it was found that 71% of the participants from the government institute and 81% of the participants from the private institute had training in biomedical waste management, compared to 68% of the nurses who participated in a study done by Lohani N et al⁽⁵⁾.

All the participants from the private institute had been vaccinated against Hepatitis B compared to the seventy three percent (73%) from the government institute. Only 20% of the nurses who participated in the study done by Soyam GC et al⁽⁶⁾ had been vaccinated against Hepatitis. Reporting of an incident of needle

stick injury was high in both the study groups (100% in the government and 90% in the private institutions) when compared to a study done by Stein et al⁽⁷⁾ which showed only 37% reporting .

83% of the participants from the government institute use personal protection while handling biomedical waste whereas only 77% of the participants from the private institute do so. In a study by Madhu Kumar et al⁽⁸⁾ all the participants wore personal protective equipments while handling biomedical waste.

98% of the study population knew about the different biomedical waste categories compared to 56% of the participants in a study done by Basu et al⁽⁹⁾, 45% of nurses of a study by Anand P et al⁽¹⁰⁾ and 90% of the study population consisting of doctors and nurses in a study conducted by Mathur et al⁽¹¹⁾.

Sixty one percent (61%) of the participants from the government institute and only forty eight percent (48%) of the private institute participants showed a positive attitude towards biomedical waste management. In a study done by Adekunle Olalfa et al⁽¹²⁾, 54% of the staff who participated showed a positive attitude towards biomedical waste management.

70% of the participants from the private institute and 62% of the participants from the government institute think that there is an increased risk of injury if the health care waste is segregated at the source, whereas in a study by Adekunle Olalfa⁽¹²⁾ et al 24% of the participants had the same idea. 31% of the participants consider it as a burden to report needle stick injury, while 44% of the nurses who participated in a study by Anand P et al⁽¹⁰⁾ thought the same. But in a study by Malini et al⁽¹³⁾, the participants did not consider it as a burden to report an incident of needle stick injury. 45% of the participants from the private institute and 33% of the participants from the government institute think biomedical waste management setup as a financial burden on the institute. In a study done by Khan MJ et al⁽¹⁴⁾, 53% of the physicians who took part thought BMW setup as a financial burden on the institute.

Conclusion

In this study it has been found that the difference in the knowledge, attitude and practice of biomedical waste management was not significant. But certain aspects in the practice of biomedical waste management like segregation of waste during collection and collection

of liquid and other wastes separately were better among the participants from the government institute, whereas more percent of participants from the private institute stored infective and other wastes separately. The attitude regarding biomedical waste management was better in the participants from the government institute than that of the participants from the private institute and more participants from the government institute were willing to attend programs to improve their knowledge and practice of biomedical waste management.

Even though the knowledge, attitude and practice of biomedical waste management are not poor among the participants of this study, it can be further improved by conducting programs stressing not only on the knowledge and practice but also should stress about the attitude of the workers towards biomedical waste management by educating them about the importance of it and by enlightening them about the hazardous effects of improper management of biomedical waste management on the environment, public health and also on health of the health care workers themselves.

Conflict of Interest: Nil

Source of Funding: Nil

Ethical Clearance: Approval was obtained from Institutional Research Board of Saveetha Medical College and Hospital, Thandalam, Chennai.

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