

A Study of Health Care Professionals' Knowledge, Attitudes, And Practices About Biomedical Waste Management In A Tertiary Care Hospital In Puducherry

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Abstract

Introduction: Healthcare workers (HCWs) are frequently involved in the generation, separation, and disposal of biological waste (BMW). The three criteria utilized to measure the effective functioning of the Institution's BMW management system are knowledge, attitude, and practice (KAP) of BMW management among HCWs. This study aimed to analyze health care professionals' knowledge, attitudes and practices about biomedical waste and its management in the study environment. Methods: A cross-sectional study of 160 health care professionals in a tertiary care hospital in Puducherry was done. Conclusion: Postgraduates and interns were more knowledgeable about BMW management than the other categories. Nurses and sanitary staffs were not as good as laboratory technicians. Sanitation personnel were clueless about BMW management. On the other hand, their actions were out of proportion to their level of understanding and attitude. As a result, a yearly continuing medical education programme on BMW management should teach and update both newly appointed and incumbent HCWs.

Keywords: Attitude, Biomedical waste, Health care workers, Knowledge, Practices

Introduction

Waste generated during the diagnosis, treatment, or immunization of humans or animals, during research operations, or the production or testing of biologicals, is classified as biomedical waste (BMW). [1] BMW handling guidelines were first made public in 1998 and were last modified in March 2016. Biomedical waste is generated in large quantities in the health care context. Every year in India, over 0.33 million tons of medical waste are generated. [2] BMW management is an essential component of an infection control programme, and if not adequately handled, medical wastes can contaminate the hospital's whole environment. [3] If not handled effectively, all those exposed to BMW are in danger of being hurt or infected, and if not appropriately managed, environmental deterioration occurs. [4] The issue is exacerbated further by BMW's lack of awareness about potential health risks, as well as budgetary and staffing limits. [5] Clinical waste is routinely generated, separated, and disposed of by health care workers (HCWs). Understanding, attitude, and practice among HCWs are the three variables used to assess the success of the BMW management platform at the Organization. Understanding of biological waste management is referred to as knowledge. Their feelings regarding BMW management are termed as their attitude. The practice of identifying, sorting, and packaging biological wastes is specified. [6] Adequate understanding of BMW's health dangers, a positive attitude toward BMW handling, and the implementation of safety measures can help ensure the safe disposal of these wastes. Biomedical waste management is still an issue for hospitals in underdeveloped nations because biomedical wastes have not

gotten adequate attention. [7] The healthcare system has made significant progress throughout the years. However, it is ironic that health care environments that restore and preserve community health are simultaneously endangering their well-being. Poor and ineffective waste management techniques endanger the health of patients, health care personnel, and the general public while also contributing to environmental deterioration. [3] With India's tremendous population growth, the need for healthcare services has expanded dramatically. As a result, the number of hospitals, health centres, small and medium-sized nursing homes, and clinics has rapidly expanded, resulting in massive amounts of biomedical waste. The situation is exacerbated further by the dramatic increase in disposable healthcare materials. [4]

It is estimated that 80–85 per cent of garbage produced in health care facilities is non-infectious general waste, 10% is infectious waste, and the remaining 5% is another hazardous waste. However, if the infectious component is mixed with the regular non-infectious trash, the entire bulk of hospital waste may become infected.[5] Every year, almost three million tons of health care waste are generated in India alone, and this figure is predicted to grow at an annual pace of 8%.[6] The contagious and sharp components of biomedical waste pose the most significant risk, as health care personnel and those involved in their processing frequently suffer needle prick injuries and can develop infections such as HIV/AIDS, Hepatitis B and C. 7 Other concerns linked with improper waste management include problems associated with hazardous chemicals or pharmaceuticals, as well as disposables being repacked and sold without being washed. Waste piles also attract some disease vectors, such as mosquitoes and flies. [5] Following that, the Government of India notified the biological waste (management and handling) rules on July 20, 1998, with further changes (June 2, 2000, September 2003, and 2011) under the Environment Protection Act of 1986. These laws establish explicit procedures for handling and disposing of bio-medical waste, and all hospitals are now required to follow them to avoid legal ramifications. Effective biomedical waste management is both a legal requirement and a social duty. The primary goals of biomedical waste management are to limit waste creation, assure effective collection, treatment, and disposal, and control infection and increase safety for people working in the system.

[8] Furthermore, raising knowledge about the proper handling and disposal of healthcare waste can help to reduce the spread of infectious diseases and other risks. With this,

Aim and Objective:

The purpose of this study was to determine the knowledge, attitudes, and practices of health care personnel in the study environment about biomedical waste and its management.

Materials and Methods:

A five-month cross-sectional survey was undertaken among all health care personnel (both medical and paramedical) at a tertiary care hospital in the Puducherry state from December to August 2020. The relevant authorities gave their consent for the study in advance. The study included all hospital employees who had worked there for more than six months. After receiving informed consent, the participants were given a detailed explanation of the study's purpose, and data was collected using a pretested, semi-structured questionnaire. Those who were not accessible at the data collection were eliminated from the study and conducted anonymously. Used the replies provided by the participants to the questionnaire to define the knowledge, attitude, and practices in this study. The information gathered was loaded into an excel spreadsheet and analyzed with the WHO Epi info programmer version 3.5.4.

Statistical Analysis

The experiment procedures were replicated three times for statistical analysis. The results were expressed as mean±standard deviation. Analysis of Variance (ANOVA) was used to measure the significance. Differences were considered significant at P<0.05.

Results and Discussion:

The bulk of the 160 health care workers in our study, 92 (57.5 per cent), were nurses, followed by doctors, 35 (21.87 per cent), and lab technicians, 33 (20.62 per cent). Participants in the study ranged in age from 21 to 58 years old, with a mean of 28.975.99 years. Their experience ranged from zero to thirty years, with an average of three and a half years. In our study, males and females were nearly equal. The chart shows that the number of male participants in our study is higher than the number of female participants among doctors and lower among nurses; however, our study's number of male and female participants is equal among laboratory technicians. Table 1 depicts the distribution of research participants based on their accurate responses to questions about biomedical waste management.

Table 1: Distribution of study subjects according to their correct responses towards knowledge on biomedical waste management				
S.NO	Questions	Number of respondents N (%)		
		Doctor (n=35)	Nurses (n=92)	Lab technicians(n=33)
1	Have you ever heard about biomedical waste management?	35(21.87%)	90(56.25%)	30 (18.75%)
2.	Does the present hospital generate biomedical waste?	32(19.37%)	91(56.87%)	31 (19.37%)
3	Is there any biomedical waste disposal policy working in present hospital?	28 (17.5%)	88(55%)	26 (16.25%)
4.	Who disposes of the biomedical waste generated at a present hospital?	29(18.12%)	86(53.75%)	29 (18.12%)
5.	Is there any hazard associated with biomedical waste?	34 (21.25%)	91(56.87%)	30 (18.75%)
6.	Which of the following is a biomedical hazard symbol?	30 (18.75%)	84(52.5%)	27(16.87%)
7.	Do you know about colour-coding in biomedical waste management?	31(19.37%)	90 (56.25%)	25 (16.62%)
8.	As per biomedical waste management rules, should not store waste beyond?	25(16.62%)	84(52.25%)	29(18.12%)
9.	Have you ever heard of universal precautionary measures?	28(17.5%)	87(54.37%)	30(18.75%)

All health care employees have enough knowledge of biomedical waste management, except knowledge of the hospital's waste disposal agency, which has been assigned to a private business. Furthermore, most

nurses and lab technicians in our study had little knowledge of the hazardous nature of biomedical waste. Most nurses and lab technicians couldn't tell the exact number of containers used in biomedical waste management. In our study, only roughly a third of the doctors, half of the nurses, and two-thirds of the lab technicians had received formal biomedical waste management training outside of their regular curriculum. Table 2 shows the distribution of study participants based on how positive they are about biomedical waste management. As seen from the table, more doctors in our survey had a positive attitude toward biomedical waste management. In contrast, about half of the nurses and lab technicians saw it as an additional burden. Furthermore, one-third of them were unaware that they should report any needle prick injury, and of those who were told they should, just a few adequately identified who they should report. Needle prick injury should be treated as a medical emergency, and the affected health care professional should report to the casualty, of which most of our survey participants were unaware.

S.NO	Questions	Number of Respondents		
		Doctors (n=35)	Nurses(n=92)	Lab technicians (n=33)
1.	Do you think you are at risk of hazard from biomedical waste?	30(18.75%)	71(44.37%)	29 (18.12%)
2	Do you think you have a role in biomedical waste management	29 (18.12%)	85(53.12%)	30 (18.75%)
3	Do you think biomedical waste management is teamwork?	24 (15%)	88(55%)	26 (16.25%)
4	Do you consider the safe disposal of health care waste as an extra burden?	32 (20%)	87(54.37%)	19 (11.87%)
5.	Do you think you need training in biomedical waste management?	26 (16.25%)	68(42.5%)	21(13.12%)
6.	Do you think you should report to any authority if you get a prick while managing? If yes, to whom?	34(21.15%)	75 (46.87%)	22(13.75%)

Table 3 displays the distribution of study participants based on their correct biomedical waste management methods. Most of them were Tetanus, and Hepatitis B inoculated and wearing personal protective equipment such as gloves, masks, aprons, and caps. As seen in the table, more than 70% of health care employees agree that they segregate trash at the source. In addition, determined their waste separation techniques in distinct colour-coded containers to be satisfactory. Only four of the 160 participants in the study admitted to having experienced a needle prick injury in the previous three months, and only 15 of them reported it to the appropriate authorities.

Biomedical waste management necessitates its segregation and removal from healthcare facilities not to pose a health danger. Any negligence in this regard can transmit illnesses and taint the entire living environment in a hospital. Healthcare personnel are crucial players in managing biomedical waste generated in hospitals, and their lack of understanding is hazardous to their health and the health of others.

Table 3: Distribution of Study Subjects according to their correct practices towards biomedical waste management				
Synod	Questions	Number of respondents		
		Doctors (n=35)	Nurses (n=92)	Lab Technician (n=33)
1.	Are you suggesting biomedical waste at your workplace?	30(18.75%)	90(56.25%)	25(33.98%)
2.	Are you using personal protective measures while handling biomedical waste?	26(16.25%)	89(55.62%)	28(17.5%)
3.	In which bin do you dispose of general plastic items?	31 (19.37%)	75(46.87%)	23(14.37%)
4.	In which bin do you dispose of soiled dressings/plaster casts/ linen?	19(11.87%)	77(48.12%)	30(18.75%)
5.	In which bin do you dispose of anatomical waste?	28(17.5%)	86(53.75%)	31(19.37%)
6.	In which bin do you dispose of sharp and needle?	24(15%)	74(46.25%)	23(14.37%)
7.	Have you been vaccinated against Hepatitis B?	26(16.25%)	82(51.25%)	29(18.21%)
8.	Have you been vaccinated against Tetanus?	27(16.85%)	87(54.37%)	23 (14.37%)

The current study was carried out among health care personnel at various levels in a tertiary care facility. A total of 160 people took part in the study, including doctors, nurses, and laboratory technicians. The majority of the participants were young, with a nearly equal male-to-female ratio. All of the health workers in our study had a satisfactory level of awareness and understanding of biomedical waste management, comparable to other studies conducted around the country. On the other hand, a few other studies have revealed that participants have a low awareness and knowledge of biomedical waste management. This could be due to variances in the research settings, changes in the participants' work profiles and experience, discrepancies in the data collection technologies employed, etc. In our study, health care professionals found segregation of biological waste to be good, which is consistent with a few previous studies conducted in different settings. However, numerous other research has discovered inadequate waste management behaviours among study participants. The majority of the nurses in our survey were utterly unaware of the dangers linked with biomedical waste. In our study, more clinicians had a favourable attitude toward biomedical waste management than others, which was similar to the findings of a few other studies. In a study that contradicted our findings, the number of nurses and lab technicians who had a good attitude toward biomedical waste management was higher than resident doctors. According to the study's findings in Puducherry, most of the participants in our study were inoculated against Tetanus and Hepatitis B. However, a study indicated that participants had improved Tetanus vaccination coverage but inferior Hepatitis B vaccination coverage.

Conclusion:

Postgraduates and interns had a greater comprehension of BMW management than the other groups in our study. Nurses and sanitary staffs were not as good as laboratory technicians. Sanitation personnel were clueless about BMW management. As a result, an ongoing medical training programmer on BMW must teach new classes of postgraduates, trainees, and recently

hired health care personnel at least once every year, as well as offer an update for current healthcare personnel.

Conflicts Of Interest

The authors declared no conflicts of interest.

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