

Assessment of Knowledge, Attitude & Practices Regarding Biomedical Waste Management Among Healthcare Workers In A Tertiary Care Hospital, Navi Mumbai

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Abstract

Background: Biomedical waste (BMW) is a waste generated during diagnosis, treatment, research activities or immunization of human beings or animals and effective management of BMW is a legal as well as social responsibility of all health care workers (HCWs) as it transmits infection when not managed properly.

Objectives: The present study was conducted to assess the level of knowledge, attitude and practices regarding BMW management among HCWs in tertiary care hospital, Navi Mumbai, India.

Materials & Methods: A cross-sectional study was conducted from June 2019 to October 2019 at one tertiary care hospital, Navi Mumbai. Questionnaires

based on Knowledge, Attitude and practice (KAP) regarding biomedical waste management (BMW) was distributed randomly to health care workers after verbal informed consent and approval from ethics committee.

Results: Among 360 randomly selected HCWs, 158 were nurses followed by 87 post-graduate (PG) students, 37 housekeeping supervisors, 33 Doctors, 25 interns, 20 laboratory technicians participated in the study. The knowledge about BMW among doctors was the distinctively better. It was noted that the nurses had the best practices, followed by laboratory technicians, doctors, house- keeping supervisors, PGs and interns.

Conclusion: The study revealed better knowledge, practice aspects in doctors, nurses, laboratory

technicians and housekeeping supervisors but at the same time, certain paucity in knowledge and practices were observed in least experienced juniors. With aim of strengthening hospital infection control practices, there is need of regular, intensive training programme and monitoring of BMW management.

Key words: Attitude, Bio-medical waste management, Health care workers, Knowledge, Practice.

Introduction

Section 1. Let the wastes of “the sick” not contaminate the lives of “the healthy”.^[1] Inadequate and inappropriate handling of BMW have serious consequences to public health and significant impact on the environment.

Section 1.1 According to first BMW Rules , 1998 Govt. of India , “ Biomedical waste ” is defined as “ 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 thereto or in the production or testing thereof .^[1,2]

Section 1.2 Recently, MoEF (Ministry of Environment & Forest) has enforced the new BMW Management Rules 2016 and amended on 2018 & 2019. It is proposed that this new rule will change the way the country used to manage BMW and “make a big difference to the Clean India Mission”.^[3,4]

Section 1.3 It is estimated the quantity of solid waste generated in hospitals varies from 1/2 to 2 kg/bed.^[5] However, BMW accounts for a minor proportion of the total waste i.e. 20%. Approximately, 75 – 90 % of BMW is non-hazardous, 10-25% is hazardous and can be injurious to human, animals and harmful to environment.^[6]

Section 1.4 Expansion of health care facilities with the advancement of modern technologies as well as the recent trends of using disposables has led to a high burden of BMW. Since, the last three decades, unregulated handling of BMW is emerging as a serious threat to human health and safety, and many researchers have documented this as a priority area.^[7,8]

Section 1.5 BMW encompasses wastes like anatomical, cytotoxic wastes, sharps, broken or unbroken glass vials/ampoules etc. But, poor BMW management, lack of handling knowledge, inappropriate segregation and unscientific disposal could cause serious public health threats eg. Human immunodeficiency virus (HIV) hepatitis C and B infections among the HCWs and society.^[1,7,9,10]

Effective management of BMW is not only a legal necessity but also a social responsibility. The HCWs are responsible for segregating BMW and the awareness and practice regarding proper BMW management which is still lacking in India and utmost important.^[7, 11] The basic concept of 3Rs, namely, reduce, recycle, and reuse of the best BMW management methods aim at avoiding generation of waste or recovering as much as waste as possible, rather than disposing. Hence, the waste should be tackled at source rather than “end of pipe approach”.^[3, 12]

Subsection 1.5 The success of BMW management programme depends on knowledge, awareness and attitude of healthcare worker (HCW). So, keeping this as frontrunner, the present study was conducted with the objective of assessing knowledge, attitude and practices among health care workers regarding BMW management in a tertiary care teaching hospital in Navi Mumbai which may be of immense help to the authorities and society at large to form strategies to

improve the BMW handling and management as well as strengthening hospital infection control practices.

Material & Methods

Section 2 : The present cross-sectional study was conducted in a tertiary care hospital, Navi Mumbai, India, from June 2019 to October 2019. Using multilevel random sampling, a total of 360 healthcare workers willingly participated in the study. The approval from institutional ethical committee was obtained and informed consent also taken from each willing participant after explaining the purpose of present study.

Sub-section 2.1 The data for the study was collected by distributing a self -structured questionnaire including socio-demographic data and multiple-choice questions on knowledge, attitude and practices regarding BMW Management and data was entered in excel sheet. Confidentiality of all the study participants and respective data was maintained.

Sub-section 2.2 Questionnaire was divided into four parts as:

PART 1: It was consisted of socio-demographic profile of participants such as age, sex, designation, professional qualification/ level of education, years of experience, Immunization status.

PART 2: It was included questions on knowledge of BMW (BMW rules, segregation, transport, color-coding system of bags).

PART 3: It was included statements about attitude towards BMW (do they strictly adhere to the rules of BMW, Beneficial or responsibility of HCW, helpful in reducing the burden of spread if infection).

PART 4: It was comprised of questions on practices of BMW (do they follow standard precautions while handling, segregation of BMW , use of personal protective equipment [PPE] , disposal of sharps,

reporting of needle stick injury [NSI] if any, training in BMW.

Data Analysis

Data is compiled with use of Microsoft Excel 2010. Statistical testing is conducted with SPSS Statistics 23.0 (SPSS Inc., Chicago, IL, USA). Results for Qualitative variables like percentage of designation, gender, age groups, educational qualifications, work experience, immunization status are expressed as frequency and percentages. The association between participant's designation, knowledge, attitude and practices of handling and disposal of BMW management is calculated using the Fisher's exact test (for expected frequencies < 5) as appropriate. Standard for $p < 0.05$ is considered statistically significant.

Results

Section 3: A total of 360 participants were randomly selected for the study [Figure 1]. Most of the participants were nurses 158 (43.89%) followed by post-graduate students 87(24.17%) and Housekeeping supervisors 37 (10.28%).

Sub-section 3.1: Among 360 study participants, 70.28% were females and 29.72% were males. The majority (46.94%) of the study participants were the age group of 26-30 years. About 62.5% were having work experience of 0 to 5 years and (17.22%) had more than 10 years of work experience. Out of 360 study population, (58.89%) participants were immunized for Hep B and TT and immunization status was not known in (8.33%) participants. (Figure 2).

64.72% of the participants were aware about BMW rules and its year of implementation. 83.89% were aware about hazards and risks associated with poor BMW management. Bio-hazard symbol was known to 79.72% of study population. Knowledge regarding the correct statement of BMW, categories of BMW and

correct sequence of BMW was observed in doctors followed by nurses. About 70.28% knew the maximum storage time for BMW. Overall, The knowledge about BMW among doctors was the distinctively better and followed by that of nurses, post graduates, interns, laboratory technician and housekeeping supervisors. (Table 1).

Subsection 3.2 : The study of attitude towards handling of BMW among study participants showed that the positive attitude was displayed towards BMW but (43.5%) and (45.28%) of population felt that it was an extra burden at work and financial issue for hospital management respectively. (Table 2)

Among 360 participants, 80% of the participants were in favour of segregation of BMW at the point of generation. 84.17% of the population correctly aware of waste disposal as per colour coded bins which are present in every ward and OPDs. About 80.28% knew the correct way of sharp disposal in puncture proof white container. However, 83.89% were aware about risk associated with BMW, but 18.33% of the study participants, still recapped used needles. Better knowledge and practices regarding transportation of BMW after segregation to common collection site (CCS) were observed in 86.07% of nurses and 89.19% of housekeeping supervisors. About 72.5% of the study participants had attended training on handling and disposal of BMW, maximum were nurses 90.51% followed by doctors 78.79% and housekeeping supervisors 78.38%. It was observed that nurses had the best practices, followed by laboratory technicians, doctors, housekeeping supervisors, PGs. (Table 3)

Discussion

Section 4 : Approximately 75 – 90 % of total waste generated in health care activities is non-hazardous but the remaining 10-25% is hazardous which involves

toxic, infectious and radioactive waste and can be serious threat to humans, animals and environment if improperly disposed off. The current BMW 2016 rules are an improvement over earlier rules in terms of improved segregation, transportation, and disposal methods, to decrease environmental pollution and ensure public health safety.

Section 4.1 ;The present study was conducted for assessment of knowledge, attitude and practices regarding BMW management in the hospital among 360 randomly selected HCWs which included PGs, senior doctors, nursing staffs, interns, laboratory technicians and housekeeping supervisors.

Almost all the participants have heard about the BMW. The finding was similar to the study conducted by Das SK et al whereas Chudasama et al found 95.4% of the participants were aware of BMW management.^[7,13]

Sub-section 4.2, In present study, about 192(53.33%) of the study participants knew about BMW rules & its year of implementation. These findings were nearly similar to the studies conducted by Saini S et al.^[14] Another study by Chudasama et al, showed 54.5% and 51.4% of HCWs were aware about BMW rules respectively.^[13] However, Das SK et al and Narang RS et al demonstrated maximum awareness in this regard 94.4% and 80% respectively.^[7,15]

Sub-section 4.3: In our study, awareness about biohazard symbol was found to be 287(79.72%) among HCWs was higher as compared to the studies conducted by Das SK et al and Sanjeev R et al (61.6% and 64% awareness respectively).^[7,16]

Sub-section 4.4 : In the present study, awareness regarding hazards and risk associated with improper BMW was found in 302(83.89%) of HCWs, of which 100% were doctors and 91.77% were nurses. The findings were consistent with the studies done by

Sharma P et al and Ndiaye M et al where awareness regarding the same was 82.9% and 80% of HCWs respectively.^[17,18] Another study conducted by Bansal M et al. found 100% of doctors were aware regarding hazards associated with BMW, which is similar to our study findings whereas awareness with this regard was comparatively high (98%) in a study by Mehta TK et al.^[19,20]

Sub-section 4.5 : Correct knowledge regarding the maximum time limit for BMW storage was found in 253(70.28%) of our study participants whereas, study done by Sanjeev R et al showed awareness in about 60% of the participants.^[16]

In the present study, 283(78.61%) of HCWs use PPE while handling BMW. Other studies by Das SK et al and Chudasama RK et al reported 100% and 84.8% HCWs used PPE respectively.^[7,13]

Sub-section 4.6 : Recapping of needles is one of the important risk factors for needle NSI. The practice of recapping the needles was low (18.33%) in our study participants. Similar findings were observed by Rao D et al.^[2] This finding is associated to the awareness of the staff through regular training programmes.

Sub-section 4.7: Most of the study participants agreed that the proper segregation of BMW at the source of generation is of paramount importance and it was a part of their duty. In the present study, 288(80%) of the study participants were in favour of segregation of BMW at the source of generation. The practice was more among nurses (94.30%) and laboratory technicians (90%) than doctors (78.79%) and PG students (62.09%). This could be due to nurses are aware about their duties and responsibilities and attending on- site training programme on BMW management. Whereas, the study done by Sharma P et al found awareness regarding segregation of BMW in

76.6% of HCWs with 72.4% in doctors and 84.4 % in nurses.^[17] Other studies conducted by Chudasama RK et al and Riswana et al found correct responses in 86.9% and 82.4 % of study participants respectively.^[13,21]

Sub-section 4.8: Correct practices regarding BMW disposal in correct colour coded bins was seen in 303(84.17%) in our study, especially in nurses 154 (97.47%). Nearly similar findings were observed in studies done by Chudasama RK et al in Rajkot (84.4%) and Riswana et al (82.4%) in Chennai.^[13,21] About 289(80.28%) of the respondents knew the correct response for sharp disposal in white- coloured Puncture proof container.

Sub-section 4.7: In our study 231(64.17%) of HCWs were aware about the transportation of BMW to Common Collection Site (CCS) which was comparatively higher than the study by Sharma P et al who observed 55.3% of HCWs are aware about the same.^[17]

Sub-section 4.8: About 261(72.5%) of the study participants had attended training programme on BMW management of which 143 (90.51%) were nurses & 26(78.79%) were doctors, while only 38(43.68%) of PGs attended the same training. This suggests that there is a need to conduct BMW training programme more frequently and making this training program mandatory to all resident doctors and newcomers. While in the studies by Chudasma RK et al and Sharma P et al 44.7% and 79.42% of HCWs have attended BMW training respectively.^[13,17]

Sub-section 4.9 : Thus, in the current study it was found that knowledge regarding BMW management was comparatively better among doctors and PG students than nurses and laboratory technicians and housekeeping supervisors. This may be attributable to

the level of educational qualification, understanding of the subject. While correct practices followed regarding BMW management was significantly better among nurses, laboratory technicians and housekeeping supervisors. This might be due positive attitude and more awareness towards the duties and responsibilities allocated to this category of staff and frequent on – site training programmes. The paucity in practices regarding BMW in senior doctors and PGs may be due to increasing patient overload as it is charitable hospital, inadequate supplies of recourses and manpower. It is also evident from our study that almost all HCWs have better attitude towards BMW management. Overall, knowledge, attitudes and practices toward BMW management were better among doctors and nurses than the other categories of staffs.

Conclusion

Safe and effective management of BMW is not only a legal necessity but also a social responsibility. The present study highlighted significantly better knowledge, positive attitude and practices among nurses, doctors compared to other study participants. Certain paucity in practices regarding BMW was observed in PGs, interns and junior nursing staff and Lacunae in knowledge regarding BMW was seen in house- keeping supervisors which may affect the practices adversely. Thus, there is a need to incorporate effective, regular training programme with adequate supplies and equipment along with continuous monitoring of BMW practices HCWs which will improve hospital infection control practices.

Limitations

The study was based on multiple choice questions, relied on self-reporting which may have resulted in over reporting of positive responses. The study could not collect direct observational data about practices

regarding BMW management among study participants and more details regarding the problem faced by HCWs could not be obtained in this study format.

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