



Knowledge, attitude and practice regarding Biomedical Waste management amongst Medical and Dental residents in Pune: A Cross-sectional study

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Abstract

Biomedical wastes (BMW) are of utmost importance due to their potential environmental hazards and public health risks. Approximately 10-25% of the medical waste is injurious to health care professionals and poses a serious threat for disease transmission if not properly managed. Medical and Dental residents are budding future practitioners and are expected to be cognizant of various BMW management methods and protocols. However, there seems to be a lack of training in the same during medical as well as dental course. Therefore, a need was felt to assess the present status of knowledge, attitude and practice of these residents regarding BMW management. **Aim:** To determine knowledge, attitude and practice of BMW management amongst medical and dental residents. **Materials and methods:** The study included 146 participants (sample size correctly corrected). A pre-validated, peer reviewed, structured questionnaire consisting of three sections to assess knowledge, awareness and practices respectively was used as the study instrument. Collected data was sorted, tabulated and analyzed using descriptive statistics in the view of the study objectives. **Results:** The knowledge on BM waste was found to moderately good however, the

practices amongst them was not satisfactory **Conclusion:** Workshops and trainings on biomedical waste management would be a step forward towards obtaining a bio-hazard free environment in near future.

Keywords: Waste disposal, questionnaire, bio-hazard, medical professionals

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I. INTRODUCTION

Biomedical waste is defined as “any solid, fluid, or liquid waste, including its container and any intermediate product, which is generated during diagnosis, treatment, or immunization of human beings or animals, in research pertaining there to or in the production or testing of biological and animal waste from slaughter houses or any other like establishments.¹ Medical waste, household waste, industrial plastics, and e-waste are the primary cause of global pollution of air, water and soil, which can adversely affect the biosystem and life in our planet.²

These wastes pose a danger to human health and environment if not disposed properly. Dental care facilities produce a high amount of BMW and ineffective management of these wastes poses a threat not only to the patients and the health professionals but also to the general public who then become at a high risk for deleterious effects from BM waste.³

India approximately generates 2 kg/ bed/ day and this biomedical waste comprises wastes like anatomical waste, cytotoxic wastes, sharps, which when improperly segregated could cause different kinds of deadly infectious diseases like Human immunodeficiency virus(HIV) hepatitis C and B infections, etc , and also cause disturbance in the environment, and detrimental effects on ecological balance.⁴ Poor management, inadequate handling knowledge and unscientific disposal of various medical waste pose a serious direct and indirect public health threats to health-care professionals, nurses, technicians, waste workers, patients, surrounding communities and the environment as well.⁵ The recent BMWM Rules, 2016 are applicable to all individuals who produce, collect, receive, stock, transport, dispose, treat, or handle BMW in any form including personal clinics, hospitals, dispensaries, nursing homes, animal houses, veterinary institutions, blood banks, pathological laboratories, research or educational organizations, health camps, and even forensic laboratories. According to these rules, the occupier/administrative person is accountable for implementation of these guidelines.⁶ Lack of awareness and lack of knowledge has led to the hospitals becoming the hub for spreading life threatening diseases from improper BM waste management. Every institution has guidelines and protocol for management of biomedical waste. These policies and guidelines should strictly be followed at each and every aspect of generation, collection, transportation, storage, treatment, and disposal. The segregation should happen at the level of generation itself into color coded containers/bags. There should be an effective mechanism to collect, transport, store, or dispose such hazardous waste to prevent serious public health consequences. Healthcare facilities should implement strict rules and regulations with proper and regular training to staffs. Due to negligence in execution of the rules and unsatisfactory training to healthcare workers, there is an indiscriminate disposal of biomedical waste.¹ Hence adequate knowledge, attitudes, and practices of the staff of the health care institutes play a very crucial role. Although, there is increased global awareness among health care professionals about hazards and appropriate management tools, in India, the level of awareness has been found to be unsatisfactory.⁷ Therefore, the present study was conducted to assess the level of knowledge, attitude practices among medical and dental residents of a healthcare institute in Pune.

II.METHODOLOGY

For this cross-sectional closed-ended questionnaire study, ethical approval was obtained from the Institutional Review Board. The study was carried out for a period of two months in 2019.

The study participants included 146 resident doctors of Dental and Medical college in Pune. The tool used for the study was a pre-validated and peer reviewed questionnaire. It consisted of four parts. The first part comprised of questions for demographic profile (age, gender, and year of study) of the participants, while the second, third, and fourth part assessed the knowledge, attitude, and practice on biomedical waste management respectively with 25 questions in total. The questions on knowledge were related to matters like, if they think BM waste was hazardous, color-coding system for disposal, generation and legislation of BM waste. The questions on attitude appraised if the study participants wish to undergo programmes that enhance and upgrade their knowledge about BM waste, do they treat sharp waste prior to disposal, responsibility about proper disposal, use of personal protective devices. The last section of practices included questions on use of needle destroyer for discarding used needles, if the participants have been immunized against hepatitis-B, about reporting of injuries. The participants filled up the self-administered questionnaires without scope for undue help.

III. Results

Collected data was sorted, tabulated in Microsoft Excel spreadsheet, and analyzed using descriptive statistics in the view of the study objectives. Percentages were calculated and the same are presented graphically. A total of 146 post-graduate students participated in the survey. Responses to questions on the knowledge domain are presented in table 1. More than Half of the respondents believed that all health-care wastes were hazardous. Some were unable to identify the correct biohazard symbol. Many were unaware of the separate colour coding containers. The knowledge about BM waste was good in Medical residents (86.3%) compared to Dental residents (80.8%). 7.9% of all participants had poor knowledge while 11.3% of dental residents and 5.8% of medical residents had moderate level of knowledge on BM waste. Attitude of respondents toward proper biomedical waste management is given in [Table 2](#). 9.6% of dental residents & 34.2% medical residents felt that there is a financial burden when it comes to proper and effective BM waste management. 84.9% dental residents and 98.6% medical residents were of the opinion that they require additional training programmes in waste management. Among the practice questions, 6.8% of residents sometimes follow the color-coding system of waste management while 90.4% of dental and 93.2% Medical residents follow color-coding system regularly. 75.3% of dental and 73.2% of Medical residents have been immunized with hep-B vaccine. 12.3% of dental and 5.5% of medical students admitted that they do not report the injuries from sharp objects.

IV. DISCUSSION

This study discusses the knowledge, attitude, and practice of BMW management among Medical and Dental postgraduate students of a health care and teaching institute in Pune. These are centres of training where students learn clinical management of patients and other related activities. It is equally essential if they are trained in administrative aspects of health care like biomedical waste management. As these residents are future medical professionals of the country, assessing their knowledge, attitude and practices regarding BMW helps us to understand at which levels the necessary changes can be carried out for the proper implementation of the rules and policies regarding BMW management.

According to the present study it implies that majority of residents have sound knowledge on BM waste management however same is not reflected in their attitude and practices. This could be attributed to the fact the subject of BM waste is included in the curriculum at undergraduate level. Many of the studies reported that healthcare personnel have knowledge regarding BMW management but it has not put into practice.⁸ A study done by Malini A and Bala Ishwar revealed that >95% of the doctors had knowledge regarding BMW management guidelines & segregation. However most of the nursing staff (50%) and

MPWs(80%) had poor knowledge regarding the colour coding for segregation of waste.⁹ It is very essential to encourage students and other healthcare personnel to improve their skills and attitude towards effective BMW management. With respect to the attitude regarding the waste management, majority(87.7 & 93.2%) felt that it was a team work and all were responsible for safe disposal. This is comparable with the study where 91 (65%) health care personnel agreed that waste management requires teamwork and no single team member is responsible.⁷

In a study by Manchanda 53.8% subjects used to segregate waste into different categories at the point of origin. 41.7% of them collected waste sharps in heavy duty.¹⁰ In the present study 90.4% of dental residents and 93.2% medical residents followed the practice of segregation using color coded containers. Mathur included 283 participants which consisted doctors, nurses, lab technicians, sanitary staff, they found that the practice of reporting of injuries resulting from improperly disposed biomedical waste was found to be miserably low among the technical staff and was found to be completely absent among the nontechnical sanitary staff.¹¹

In contrast to our study where it was found that about 71.2 dental and 84.9% medical residents followed the protocol of reporting needle injuries. Malini study also showed that about 35% of nurses and technicians and 43% of MPWs are not vaccinated against Hepatitis B. In our study it was observed that 75.1% &78.1% of dental and medical residents have received hepatitis B immunization. Pandey 2016 The practice of BMW Management was lacking in 30-35% HCP which may lead to mixing of the 15% infectious waste with the remaining non-infectious.¹² In the present study 9.6% and 34.2% of dental and medical residents felt that BM waste management is extra burden on work and agreed that it ultimately leads to increased financial burden.

98.6% of medical residents felt that they require further training programmes on BM waste management. Thus it implies that intensive training programmes and updating at regular intervals are needed for all health care professionals with special emphasis on junior doctors. This study has helped us in identifying this gap and the necessity for training them. This study has also made us realize that such training programmes should be conducted regularly and make it compulsory for all the HCWs to attend

V.CONCLUSION

The findings of this study suggests that although the knowledge among residents about BM waste is good, the practices are found to be less satisfactory. A positive attitude towards BMW management should be instilled in junior doctors through creating awareness, training and motivation. There should be strict implementation of BM waste guidelines at all levels. Training programs should be conducted by healthcare facilities to its doctors, students, sanitary workers and monitoring and supervision of the same is required at regular intervals to know and understand potential risk involved.

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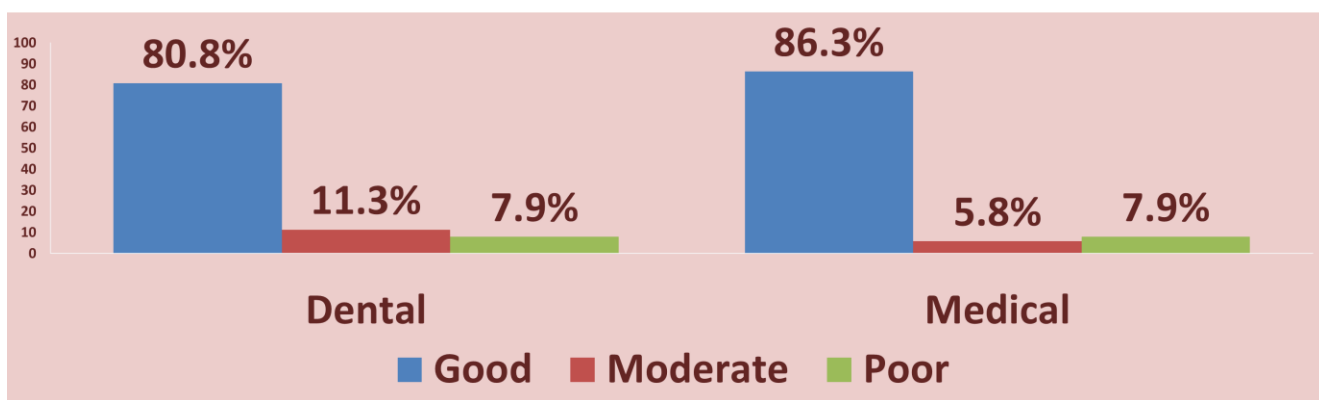


Table 1: Knowledge of BMW amongst the Dental and medical interns

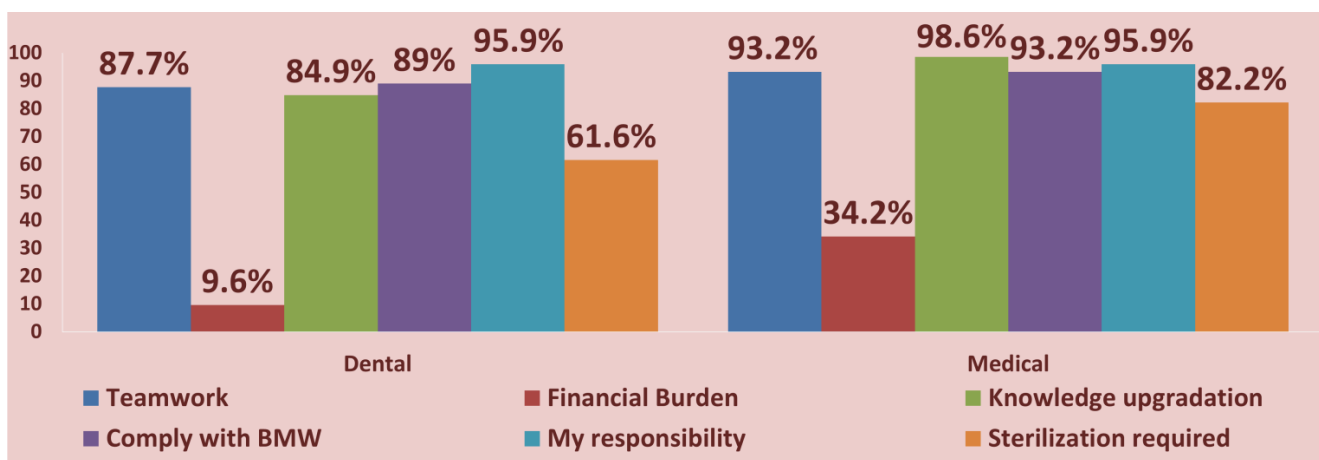


Table 2: Attitude towards BMW amongst the Dental and medical interns

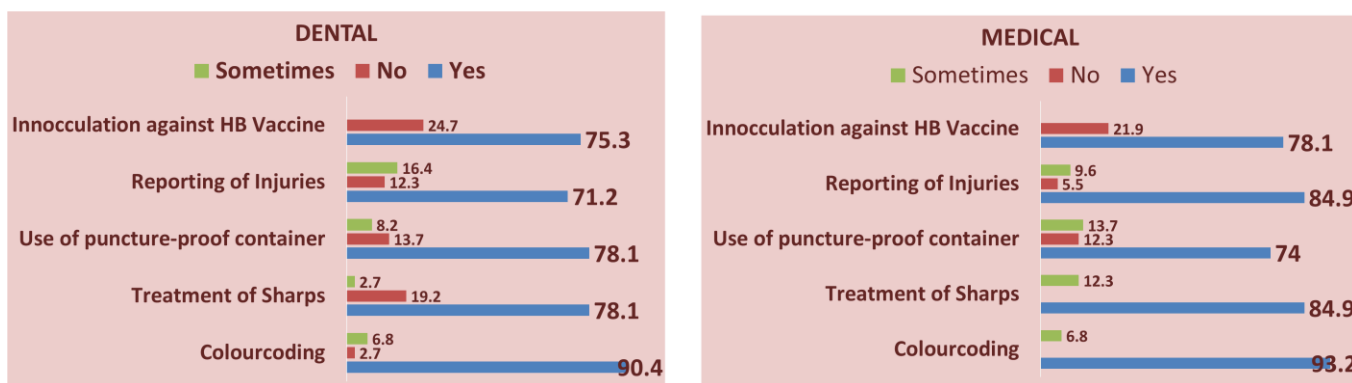


Table 3: Practice of BMW amongst the Dental and medical interns