# Knowledge Attitude and Practices of Biomedical Hazard Disposal

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## Abstract

**Objective and Aim:** The waste created by the healthcare services may be hazardous to health and environment if there is indiscriminate disposal of hospital waste. Bio medical wastes have become a very important source of spreading infections in the environment. The aim of the present study was to assess knowledge, attitude, and practices of undergraduate students and teaching staff.

**Materials and Methods:** A cross-sectional study was conducted using a close-ended questionnaire among the students, interns and teaching staff of Rama dental college Kanpur Uttar Pradesh. A total of 220 subjects were included in the study with their prior consent. Statistical Analysis: The data were tabulated, and interpretation was done in percentages by using SPSS version 13.0 (SPSS Inc., Chicago, IL, USA).

**Results:** Many dentists have the knowledge about the waste management, but they lack in the attitude and practice.

**Conclusion:** There is a need for education regarding hazards associated with improper biomedical waste disposal at all levels of dental personnel.

**Keywords:** Biomedical hazard, disposal, dental, students, staff

## Introduction

Let the wastes of "the sick" not contaminate the lives of "the healthy." In spite of the remarkable innovations over the years in the health care system, it is strange that the health care settings, which reinstates and maintain the health of the community, are also threatening their well-being. A huge risk to the health of the public, patients, professionals, and environment arise due to poor waste management practices.[1] Waste management is all the activities and actions required to manage waste from its inception to its final disposal.[2]

"Swachh Bharat Abhiyan (SBA)" meaning clean India mission is one such national campaign by Government of India under the leadership of the Prime Minister, covering 4,041 statutory cities and towns, to clean streets, roads and infrastructure of the country.[3] The hospital hygiene and safety of health care workers and communities are ensured by the process of health care waste management (HCWM). One of the effective contributors of HCWM can be our health workers. Although their efforts may seem to be small, but their each step builds a base of sound morals and rational that are necessary for the success of the whole community. With the notification of the biomedical waste (BMW) rules, 1998, hospital waste management has been brought into focus in India. According to the rules, it is mandatory for the health care establishments to segregate, disinfect, and dispose their waste in an eco-friendly manner. Even though there is increased global awareness among health care professionals about threats and also suitable management techniques, in India, the level of awareness has been found to be unsatisfactory.[5] As there is no available information which describes the actual practice followed in handling these types of waste products in Uttar Pradesh at present, so this study aims to assess the knowledge, attitude, and practices among the dental health personnel's including undergraduate dental students and teaching staff regarding BMW handling in the dental institutions.

## Materials and Methods

For this cross-sectional closed-ended questionnaire study, as ethical approval was obtained from the ethical committee of Rama Dental College Hospital and research center Kanpur Uttar Pradesh. The study was carried out for a period of 4 months from January 2021 to April 2021.

The survey had questions in four major sections. Section 1 consisted of demographic questions, including the gender, college year, work experience, qualification. Section 2 had 10 close — ended questions concerning the knowledge about BMW management. The knowledge questions were answered using the options "correct" and "incorrect." Each question answered correctly received 1 point,

for a maximum score of 10. The scores were transformed into percentage of correct answers. Hence, a student's & teaching staff score could range from 0 (no correct answer) to 100% (all 10 answers correct). Students & staff with <25% was considered to have a poor knowledge, between 25% and 50% to have moderate knowledge, between 50% and 75% to have good knowledge and more than 75% to have excellent knowledge. The third section consisted of 10 questions were included to assess the attitude regarding the management of waste generated in the health sector. The answers to these questions were given on a five-point Likert scales (strongly agree, agree, don't know, disagree, and strongly disagree). Further strongly agreed, agreed, strongly disagreed and disagreed were combined. Then the correct attitude for each year was calculated in percentages. The fourth section consisted of ten closed-ended questions on practice items with the answer options as "Yes" and "No."

**Statistical analysis**: The data were tabulated, and interpretation was done in percentages using SPSS version 13.0 (SPSS Inc., Chicago, IL, USA).

## Results

Of total 220 questionnaires that were distributed among dental students and staff 220 were received back, which means the response rate of the study was 100%. There were 49.09% males and 50.90% females. The demographic details regarding the distribution of gender, work experience, and qualification are given in Table 1. When the knowledge regarding the BMW management was considered, 62 (28.10%) respondents had excellent knowledge regarding the proper management of BMW. Table 2 represents the distribution according to qualification of the respondents.

**Table 1: Demographic details of the subjects**

| Gender | 3rd year (%) | 4th year (%) | Internship (%) | Teaching staff (%) | Total (%) |
|---|---|---|---|---|---|
| Male | 28 (40) | 32 (45.7) | 23 (57.5) | 25 (62.5) | 108 (49.09) |
| Female | 42 (60) | 38 (54.2) | 17 (42.5) | 15 (37.5) | 112 (50.90) |
| Total | 70 (100) | 70 (100) | 40 (100) | 40 (100) | 220 (100) |

**Table 2: Level of knowledge of respondents regarding biomedical waste management**

| Dental qualification | Poor (%) | Moderate (%) | Good (%) | Excellent (%) |
|---|---|---|---|---|
| 3rd year | 28/70 (40) | 25/70 (35.7) | 7/70 (10) | 10/70 (14.28) |
| 4th year | 18/70 (25) | 22/70 (31.4) | 17/70 (24.2) | 13/70 (18.57) |
| Internship | 8/40 (20) | 9/40 (22.5) | 10/40 (25) | 13/40 (32.5) |
| Teaching staff | 3/40 (7.5) | 3/40 (7.5) | 8/40 (20) | 26/40 (65) |
| Total | 57/220 (25.9) | 59/220 (26.8) | 32/220 (14.5) | 62/220 (28.10) |

Table 3 Describes the profession wise distribution concerning the correct attitude toward hospital waste management. Totally, 175(79.5%) of the subjects agreed that decontamination/disinfection reduces chances of infection and 84(38.2%) disagreed that segregation of waste at the source increases the risk of injury to waste holders. Table 4 illustrates response toward practices of BMW management. Total 45.9% subjects used segregate waste into different categories at the point of origin. 43.1% of them collected waste sharps in heavy duty (puncture proof) plastic container.

**Table 3: Respondent's correct attitude towards hospital waste management**

| Questions | 3rd year (%) | 4th year (%) | Interns (%) | Teaching staff (%) | Total (%) |
|---|---|---|---|---|---|
| "Waste Segregation "at the source elevates the chances of injury to waste holders | 18 (25.7) | 22 (31.4) | 12 (30) | 32 (80) | 84 (38.2) |
| Decontamination/disinfection reduces possibility of the infection | 55 (78.6) | 61 (87.1) | 26 (65) | 33 (82.5) | 175 (79.5) |
| Infectious waste should be put in yellow colored plastic bag with a biohazard symbol | 45 (64.2) | 55 (78.5) | 20 (50) | 35 (87.5) | 155 (40.4) |
| Occupational safety of waste handlers is essential | 47 (67.1) | 60 (85.7) | 21 (52.5) | 37 (92.5) | 165 (75) |
| Reporting of needle stick injury is an additional burden on work | 25 (35.7) | 41 (58.5) | 13 (32.5) | 32 (80) | 111 (50.4) |
| "Color Coding" for segregation of waste is necessary | 35 (50) | 58 (82.8) | 22 (55) | 37 (92.5) | 152 (69.0) |
| Hepatitis B immunization prevents transmission of hospital acquired infection | 19 (27.1) | 25 (35.7) | 18 (45) | 26 (65) | 88 (40) |
| Post exposure prophylaxis should be commenced as soon as possible | 33 (47.1) | 36 (51.4) | 19 (47.5) | 38 (95) | 126 (57.2) |
| Excess mercury/amalgam should be stored in water or fixer solution | 20 (28.5) | 25 (35.7) | 18 (45) | 30 (80) | 95 (43.1) |
| Safe management of health care waste is the responsibility of government | 32 (45.7) | 45 (64.2) | 25 (62.5) | 31 (77.5) | 133 (60.4) |

**Table 4: Practice of respondents regarding BMW and its management**

| Practices regarding BMW | 3rd year (%) | 4th year (%) | Intern (%) | Teaching staff (%) | Total responders (%) |
|---|---|---|---|---|---|
| It is essential to segregate waste into different categories at the point of origin | 22 (31.4) | 26 (37.1) | 18 (45) | 35 (87.5) | 101 (45.9) |
| Treating and segregation of sharp waste prior to disposal is essential | 18 (25.7) | 21 (30) | 17 (42.5) | 25 (62.5) | 81 (36.8) |
| Infectious waste should be disposed in yellow colored plastic bags with biohazard symbol | 34 (48.5) | 36 (51.4) | 18 (45) | 32 (80) | 120 (54.5) |
| Use heavy duty (puncture proof) plastic container to collect the waste sharps | 19 (27.1) | 17 (24.2) | 28 (70) | 31 (77.5) | 95 (43.1) |
| Use of personal protective devices is imperative | | | | | |
| Use of Apron | 70 (100) | 70 (100) | 38 (95) | 38 (95) | 216 (98.1) |
| Glove | 70 (100) | 70 (100) | 36 (90) | 39 (97.5) | 215 (97.7) |
| Masks | 70 (100) | 70 (100) | 36 (90) | 32 (80) | 208 (95.5) |
| Goggles | 0 | 0 | 3(7.5) | 17(42.5) | 20(9) |
| Follow the guidelines for proper system of recording and reporting injuries/accidents | 2 (2.85) | 3 (4.2) | 2 (5) | 8 (20) | 15 (6.8) |
| Vaccination against hepatitis B is a requisite for dental professionals | 15 (21.4) | 16 (22.8) | 19 (47.5) | 30 (75) | 80 (36.3) |
| Post exposure prophylaxis should be ensured following percutaneous exposure | 5 (7.1) | 7 (10) | 12 (30) | 15 (37.5) | 39 (17.7) |

## Discussion

Proper handling, treatment, and disposal of BMWs are important steps in infection control program. Properly designed and applied waste management can be a relatively efficient compliance-related practice.[6] The inappropriate management of BMW can lead to various health hazards affecting the healthcare workers, communities, and surroundings.[7] Dentists have an ethical responsibility to the environment, so, it is the responsibility of the dental schools to ensure the formation of an association with solid technical, scientific, and ethical knowledge, aimed at promoting health, emphasizing the philosophy of prevention of health care risk due to improper disposal of waste. Hence, the study was conducted to assess the knowledge, attitude, and practices about BMW management among dental institute of Kanpur, Uttar Pradesh. The study population consisted of 49.09% males and 50.90%females.

28.10% of the total respondents had excellent knowledge which was lower than the results reported by Manchanda, et al. where 42.5% had excellent knowledge, Sharma et al. in their study reported that 30% had excellent knowledge. On comparing the average, knowledge percentage was highest among teaching staff followed by 4th years, interns and 3rd years. The reason that 4th years may be having good knowledge compared to the other 2 years could be due to the fact that BMW management is included in the theory curriculum apart from the practical.

In the present study, 69.0% of the participants agreed that use of color code for segregation is a must. This value were lower than what was reported by Manchanda,et al. 90%, Sanjeev et al.96.6%, Chudasama et al.96.5%. andMathur et al. (81.3%) where different colored bags were used for disposing the waste.[8-10] 81 (36.8%) used to treat sharp waste prior to disposal while 95(43.1%) collected the waste sharps in heavy duty (puncture proof) plastic container. This was much less than the results observed in studies conducted by Mathur et al.(65.3%), Bansal et al.(58%), and Chudasama et al.(63.1%)used to dispose sharps in puncture proof containers[9-11] But in our study the values were more than that reported by Osamong et al.(19.5%) along with Charania and Ingle(26.4%).[12,13] Maximum care and precaution are required to handle sharps as improper handling can lead to various health hazards. The needles, which comprised of the bulk of “sharps,” should be destroyed by needle destroyers and should be placed in puncture-proof container containing 1% NaOCl for disinfection. Once the container is three-fourth filled it should be sent for shredding, encapsulation, and disposal in landfills.[6 ]15(6.8%) subjects used to follow the system of recording and reporting injuries/accidents. Low reporting of injuries may be attributed to the fact that most of the doctors are not aware about a formal system of injury reporting which should be established within all the health facilities.[14]

The limitation of the study is that it is based on self administered questionnaire which may lead to over and under reporting plus recall bias can also occur where the respondent’s past experience influences his present action. But according to Gilbert et al. and Charania and Ingle, this method is sufficiently valid for most important research questions and is a good method of collecting data from a larger population in a quick and inexpensive manner. [13, 15]

## Conclusion

The findings of the study suggest that the BMW management program cannot successfully be implemented without the willingness and cooperation of the health professionals. If we want to protect our environment and health of the community, we must sense ourselves to this important issue not only in the interest of health managers but also in the interest of the community. As it was seen that the attitude and practice of regarding hospital waste management were less satisfactory there should be a continuing training program along with the monitoring those of practices, so that it leads to a safe protected biohazard free environment.

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