



RESEARCH ARTICLE

BIOMEDICAL WASTE MANAGEMENT: KNOWLEDGE, ATTITUDE AND PRACTISE AMONG POST GRADUATE STUDENTS AND STAFF OF DEPARTMENT OF ORAL PATHOLOGY AND MICROBIOLOGY FROM VARIOUS DENTAL COLLEGES IN INDIA

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ABSTRACT

Lots of problems can be fenced if the biomedical waste management is properly executed. The activities that are usually performed as part of health care waste management involve segregation, storage, collection, transportation and disposal of biomedical waste. Since the implementation of the biomedical waste management rule in 1998, every concerned health personnel is expected to have proper knowledge and application of the same. In Oral Pathology & Microbiology department, a great number of hazardous and non-hazardous wastes are generated that can be detrimental to the environment and to personnel handling it if not properly managed. With this background, the study was conducted to assess the knowledge, attitude and Practise of biomedical waste management among post graduate students and staff of Oral Pathology and Microbiology department, in various dental colleges across India.

Methods: A cross-sectional questionnaire based survey containing 24 questions to assess the knowledge, attitude and practise on biomedical waste management was done. These questionnaires were distributed to teaching staff members and post graduate students belonging to Department of Oral Pathology and Microbiology of various dental colleges in India. Results were expressed as number and percentage of respondents for each question and chi-square test was performed for statistical analysis.

Results: The percentage of knowledge, attitude and practise scores were 72%, 65%, 42% among staffs and post graduate students and a significant association ($p < 0.001$) was seen.

Conclusion: The study proved that the knowledge and attitude regarding biomedical waste management among staff members and post graduate students were high but practise was comparatively low, implying the need for creating awareness and thus make its practise mandatory by including it in the dental curriculum compulsorily.

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INTRODUCTION

The essence of this study was to emphasise on safe and effective sewage systems by proper management of all solid and liquid wastes generated by department of oral pathology and microbiology.

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Bio- medical 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 thereto or in the production or testing of biological and the animal waste from slaughter houses or any other like establishments (Agarwal et al., 2011)". A number of hazardous and non-hazardous waste will be generated in oral pathology and microbiology dept, which if not properly disposed causes harm to environment as well as variety of health problems.

For example, the liquid hazardous wastes discharged into sewer system, potentially impact the wastewater treatment plant or pass through the treatment plant into bay, ocean, river or other receiving waters¹. Although, there is an increased global awareness among health professionals about the hazards and appropriate management techniques, the level of awareness in India is found to be unsatisfactory (VaneshMathur *et al.*, 2011). Approximately 1.45 kg waste is generated per patient per day in Indian hospitals as compared to 4.5kg in developed countries. It may be higher in India because proper waste segregation and waste disposal methods either does not exist or not practiced (Nagaraju *et al.*, 2013). American Dental Association and Centre for Disease Control notified that medical waste disposal must be carried out in harmony with guidelines (Singh *et al.*, 2014). The biomedical waste management and handling rules were notified in 1998 and amended in 2000 (Singh *et al.*, 2014). The rule makes it mandatory for the health care establishments to segregate, disinfect and dispose their waste in an eco-friendly manner. An important pre-requisite and key to successful waste management program is segregation which is the separation of different types of waste as per treatment and disposal options. Segregation and collection of various categories of waste should be done at the source, in separate containers so that each category is treated in suitable manner to render it harmless. For waste management to be effective, the waste should be managed at every step, from acquisition to disposal (Sanjeev *et al.*, 2014). With this background, the study is conducted to assess the knowledge, attitude and practise of biomedical waste management among staff and post graduate students, of department Oral Pathology and Microbiology.

MATERIALS AND METHODS

The study was a cross-sectional questionnaire based survey. The staff members and post graduate students of department of Oral Pathology & Microbiology of various dental colleges across India were included in the study. A validated questionnaire consisting of 24 questions on assessment of knowledge, attitude and practise regarding biomedical waste management and were distributed, by mailing to department of oral pathology & microbiology. The respondents were asked to return the questionnaire by mailing. All returned questionnaires were collected and coded. The available data were analysed by descriptive statistics & chi- square test with level of significance set at 0.01 using SPSS 20.0 version software (Sanjeev *et al.*, 2014). The study was conducted after obtaining approval by the ethical and research committee of the institution.

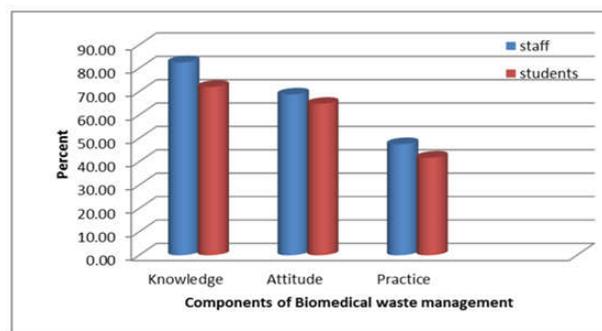
RESULTS

The knowledge of biomedical waste management is more in staffs (82.5%) when compare to postgraduate students (72%). Similarly, the attitude and practise regarding biomedical waste management in staffs (68.7% & 47.5%) and students (64.75% & 47.5%) did not have much difference between them as shown in Table-I & Graph-I. The knowledge and attitude towards biomedical waste management is better than practise

towards biomedical waste management among both the groups as shown in Table-II & Graph-II.

Table 1. Knowledge, attitude and practice of biomedical waste management in staffs and post graduate students of Oral Pathology & Microbiology Department

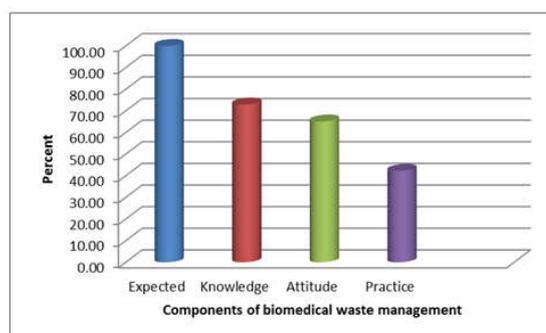
	Group	N	Mean	Std.Deviation
Knowledge	Staffs	100	82.50	15.81
	PG students	100	72.00	15.50
Attitude	Staffs	100	68.75	16.92
	PG students	100	64.75	15.72
practise	Staffs	100	47.50	27.51
	PG students	100	41.75	19.88



Graph 1. Comparison of knowledge, attitude and practice of biomedical waste management among staff and post graduate students of Oral Pathology and Microbiology

Table 2. Knowledge, attitude and practise of biomedical waste management among Oral Pathologists (Post Graduate students and staff)

	N	Mean	Std. Deviation
Knowledge	200	72%	16
Attitude	200	65%	16
Practise	200	42%	21



Graph 2. Knowledge, attitude and practise of biomedical waste management among Oral Pathologists (Post Graduate students and staff)

DISCUSSION

The hazards of waste disposal from Department of Oral Pathology & Microbiology can be divided into two main areas. First, the variety of hazardous products which can be environmental pollutants and second, the potentially infectious material encountered by individuals handling the waste (Sanjeev *et al.*, 2014).

Knowledge, attitude and practise act as three pillars, which make up the dynamic system of life itself. Knowledge being the basic criterion that allows one to earmark between the right and the wrong, is a mixture of comprehension, experience, discernment and skill. Attitude accredits to thinking towards a proper situation. Practise means contemplation of rules and knowledge that lead to action. Thus, a right knowledge, a positive attitude and good practise are imperative to guide and serve the patients (Sanjeev *et al.*, 2014). The purpose of effective biomedical waste management is not only a legal necessity, but also a social responsibility. Hence, this study was conducted with predesigned and pretested questionnaire to assess the knowledge, attitude, and practise regarding biomedical waste management among the staff and post graduate students in department of Oral Pathology and Microbiology.

200 oral pathologists (both staff and post graduate students) participated in the present survey study. An interesting & important observation made was that 73% were aware of the biomedical waste management and handling rules. Among these oral pathologists, the staff had better knowledge than postgraduate students. Similar results were obtained in a study by Sanjeev R *et al.*, in Kerala, which stated that the knowledge and practise among doctors and the nursing staff were good (Sanjeev *et al.*, 2014). Few other studies have found that biomedical waste management awareness was lacking. Among health care providers working in PHCs of Bagepalli Taluk Karnataka, due to lack of proper complete knowledge about biomedical waste management and hence suggested service education as the solution to proper bio- medical waste management (Nagaraju *et al.*, 2013; VaneshMathur *et al.*, 2011; Chudasama *et al.*, 2013).

In our study, the questions regarding attitude towards biomedical waste management showed 65% of positivity and the mean attitude score did not show much difference between the staff and post graduate students. A study was conducted by Sood *et al.*, in Delhi and observed that a positive attitude towards health care waste management was over 90% and they were aware of colour coding bins used for waste disposal⁸. In a similar study by Sanjeev R *et al.*, the attitude towards biomedical waste management among the faculty members was seen to be high (Sanjeev *et al.*, 2014). In the present study, question related to Practise of biomedical waste management showed that, 42% of the participants were following the rules and regulation of biomedical waste management and there was no significant difference between the staff and postgraduate students. Studies have stated that the practise of biomedical waste management was not proper as the knowledge regarding the same was low (VaneshMathur *et al.*, 2011; Sanjeev *et al.*, 2014; Chudasama *et al.*, 2013). In another survey by Pandit *et al.*, reported that proper hospital waste management was not being practised⁹. Yadavannavar MC *et al.*, stated that majority of staff were conscious of measures for safe collection and final disposal of biomedical waste (Yadavannavar *et al.*, 2010). One more study found that health workers were not ready to implement the rules or even showed interest to attend the training programmes, for biomedical waste management they thought it was an extra amount of work (Madhukumar *et al.*, 2012).

This study thus throws light on existing knowledge, attitude and practise among the post graduate students and staff of Oral Pathology and Microbiology, India. The knowledge and attitude regarding biomedical waste management is better than its practise. There is a significant difference in knowledge regarding biomedical waste management between staff and post graduate students. To achieve quality in disposal of waste, we should introduce syllabus on biomedical waste management and make it mandatory part of the dental curriculum. The importance of biomedical waste management training should be emphasised and regularly training of health care personnel regarding safety measures should be done. Awareness programmes, on-going education and training, continuing dental education and updates should be held at regular intervals for all health care personnel. Periodic monitoring of the safe management of health care waste systems will largely help in implementing it.

Conclusion

Our study proved that although the knowledge, attitude and practise of biomedical waste management is high among the staff members when compared to post graduate students, the practise of the same is low among all. Therefore there is a need for creating awareness, giving effective training and education regarding biomedical waste management practise among the oral pathologist. Strict measures should be taken by the government and should raise the awareness among the medical professionals. A strict supervision and surveillance, if followed in various categories of personnel involved will aid in proper bio-medical waste management.

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