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Research Article

KNOWLEDGE, ATTITUDE AND PRACTICES AMONG THE PRACTICING DENTISTS REGARDING BIO-MEDICAL WASTE MANAGEMENT IN VISAKHAPATNAM [ANDHRA PRADESH] –A CROSS-SECTIONAL STUDY

Pichika Swathi., Manjunath C., Archana Krishnamurthy., Shilpashree KB and Shruti Vandakudri

Department of Public Health Dentistry, The Oxford Dental College, Bangalore, India

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ABSTRACT

Aim of the study: To assess the knowledge, attitude and practices on Bio-medical waste management among practicing dentists in Visakhapatnam city**.**

Objectives:

1. To compare the Biomedical waste practices among the young and experienced dental practitioners.
2. To compare the Biomedical waste practices between the MDS and BDS practitioners.

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Materials and methods: The present cross-sectional questionnaire study was conducted in Visakhapatnam city. The study sample included 41 graduate and 248 postgraduate practitioners. The survey was scheduled over a period of 15 days. Data was collected by using self-administered questionnaire.

Results: Of 289 (100%) study participants, 241 (83.4%) were males and 48 (16.6%) were females. Among 289(100%) study participants, more than three‑fourth, i.e., 241 (88.4%) knew about BM waste generation and legislation, whereas 23 (6.8%) each did not know and were not aware of it.

Conclusion: There is a good level of knowledge and awareness about BM waste generation hazards, legislation, and management among health care personnel in Visakhapatnam city. Regular monitoring and training are still required at all levels, and there is a need for continuing dental education on dental waste management practices to these dental practitioners.

INTRODUCTION

Biomedical waste means any waste which is generated during the diagnosis, treatment or immunization of human beings or in research activities or in the production or testing of biologicals.[1] Bio-medical waste management (BMWM) has recently emerged as an issue of major concern not only to hospitals, health care authorities but also to the environment. Infections, injury and toxic effects to public, flora and fauna of the environment are the important harmful effects of improper BMWM. The potential of the problem is such that at anytime, anywhere, anybody can be a victim of improper BMWM.[2]

Hospital waste management has been brought into focus in India, particularly with the notification of the Biomedical Waste (Management and Handling) Rules, 1998, which make it mandatory for healthcare establishments to segregate, disinfect and dispose of their waste in an eco-friendly manner. The legal provisions (Biomedical Waste Management and Handling Rules 1998, amended 2003 and drafted 2011), are aimed at mitigating the impact of hazardous and infectious hospital waste on the community. These Rules are applicable to all persons who generate, collect, receive, store, transport, dispose or handle bio-medical waste. Color coding for containers or bags used for various categories of waste collection, including the waste disposal options, has been specified. Under the new draft rules, the categories of biomedical waste have been reduced from 10 to 8, e.g. human anatomical waste, animal waste, other laboratory waste, waste sharps, discarded medicines and cytotoxic drugs, infectious solid waste and chemical waste, and soiled waste. Biomedical waste management has been entrusted with waste segregation, at the source of generation, into labelled color-coded containers/bags that have been pre-assigned for the eight defined categories. Attitude and understanding of the issues are important determinants of proper waste triage at the source.[1]

Nurses, sanitary and hospital attendants and clinicians spend maximum time with patients, increasing their exposure and risk of the hazards present in a hospital environment, mainly biomedical waste. They need to be well-equipped with the latest information, skills and practices for managing this waste

to reduce hospital-acquired infections, and to protect their own health. They are also responsible for preventing risk, due to waste, to the community at large.[3] Inadequate and inappropriate knowledge of the handling of healthcare waste may have serious health consequences and a significant impact on the environment as well. Of the total amount of waste generated by healthcare activities, about 80% is general waste. The remaining 20% is considered hazardous material that may be infectious, toxic or radioactive. If this waste is mixed with the general waste, it will all become biohazardous (WHO, 2011).[4] It is important to realize that if both these types are mixed together then the whole waste becomes harmful. It is estimated that annually about 0.33 million tons of hospital waste is generated in India and, the waste generation rate ranges from 0.5 to 2.0 kg per bed per day.

Table 1 Questions Based on Knowledge Assessment

Sl.No	Question	Option	n (%)	Educational Qualification		p value	Years of Experience		p value
				BDS	MDS		≤10 years	>10 years	
1	Which statement describes one type of BM waste?	a)Materials that may be poisonous, toxic, or flammable and do not pose disease related risk	51 (17.6)	2	49	0.001*	28	23	0.300
		b)Waste that is saturated to the point of dripping with blood or body fluids contaminated with blood.	231 (79.9)	35	196		134	97	
		c)Waste that does not pose a disease related risk	7 (2.4)	4	3		6	1	
2	Do you know about Bio-Medical waste generation and legislation?	a) Yes	214 (74)	30	184	0.664	131	83	0.036*
		b) No	14 (4.8)	1	13		10	4	
		c) Not sure	61 (21.1)	10	51		27	34	
3	What agency (ies) and who regulate(s) wastes generated at health care facilities?	a) Government agencies	130 (45)	18	112	0.935	77	53	0.562
		b) Private agencies	135 (46.7)	19	116		75	60	
		c) Do not know	24 (8.3)	4	20		16	8	
4	Are you aware of the agencies authorized by government to collect waste from hospital/clinical set up	a) Yes	188 (65.1)	23	165	0.290	113	75	0.649
		b) No	53 (18.3)	11	42		29	24	
		c) Don't know	48 (16.6)	7	41		26	22	
5	According to the Bio-Medical waste (management and handling) rules, waste shouldnot be stored beyond	a) 12hours	89 (30.8)	8	81	0.359	45	44	0.093
		b) 48hours	155 (53.6)	26	129		90	65	
		c) 72hours	35 (12.1)	6	29		26	9	
		d) 96hours	10 (3.5)	1	9		7	3	
6	Do you need a separate permit to transport Bio-Medical waste?	a) Yes	268 (92.7)	39	229	0.685	154	114	0.441
		b) No	6 (2.1)	1	5		3	3	
		c) Not sure	15 (5.2)	1	14		11	4	
7	Who regulates the safe transport of medical waste?	a) Pollution control board of India	181 (62.6)	23	158	0.424	102	79	0.128
		b) State Transport corporation of India	56 (19.4)	11	45		39	17	
		c) Don't know	52 (18)	7	45		27	25	
8	Can improper waste management cause various health hazards?	a) Yes	285 (98.6)	40	245	0.460	116	119	0.740
		b) No	4 (1.4)	1	3		2	2	
		c) Don't know	0 (0)	0	0		0	0	
9	Are there any guidelines laid down by Government of India for BMW management?	a) Yes	239 (82.7)	35	204	0.003*	142	97	0.312
		b) No	12 (14.2)	5	7		8	4	
		c) Don't know	38 (13.1)	1	37		18	20	
10	Is maintaining Bio-Medical Waste records mandatory in your hospital/clinic?	a) Yes	265 (91.7)	39	226	0.603	157	108	0.436
		b) No	20 (6.9)	2	18		9	11	
		c) Don't know	4 (1.4)	0	4		2	2	

All Bio-medical waste generated in the hospital should be disposed of strictly in accordance with Bio-medical Waste Management & Handling Rules 1998. Schedule I of which describes the categories of Bio-medical waste their treatment and disposal methods. Schedule II of which describes the colour coding and type of container for disposal of Bio-medical waste.

Most importantly there is no mechanism to ensure that all waste collected and segregated in hospital is disposed off according to schedule I & II of Bio-medical Waste Management & Handling Rules. There is also no mechanism for ensuring waste treatment within prescribed time limits. Biomedical waste if not handled properly and within the stipulated time period could strike in the form of fatal infection. Additional hazard includes pilferage during transport and recycling of disposables without even being washed. In some hospitals there is no proper training of the employees in hazardous waste management.[5] With this background, the present study was planned to assess the knowledge, attitude and practices among the practicing dentists regarding bio-medical waste management in Visakhapatnam city [Andhra-Pradesh].

MATERIALS AND METHODS

A cross- sectional study was carried out among the practicing dentists regarding the Knowledge, Attitude and Practices of Bio-Medical Waste management in Visakhapatnam.

The list of 490 dental practitioners (including multispecialty clinics, single speciality clinics corporate hospitals) was collected from IDA branch office (Visakhapatnam). The dental practitioners present at the time of visit were given informed consent and along with the questionnaire. The practitioners who gave informed consent and the practitioners who are present at the time of the visit were taken into the study. The total practitioners who consented for the study were up to a total of 289 dental practitioners.

Through a personal interview, the respondents were informed about the aim of this study as well as the fact that participation in the questionnaire survey was totally voluntary and anonymous. The questionnaire was in English; its respective psychometric properties (validity and reliability) were assessed.

Table 2 Questions Based on Attitude/Behaviour Assessment

Sl.No	Question	Option	n (%)	Educational Qualification		p value	Years of Experience		p value
				BDS	MDS		≤10 years	>10 years	
1	Safe management of health care waste is not an issue at all	a) Agree	41 (13.8)	8	32	0.363	26	14	0.367
		b)Disagree	244 (84.4)	33	211		138	106	
		c) Can't comment	5 (1.7)	0	5		4	1	
2	Waste management is team work/no single class of people is responsible for safe management	a) Agree	283 (97.9)	41	242	0.314	165	118	0.683
		b)Disagree	6 (2.1)	0	6		3	3	
		c) Can't comment	0 (0)	0	0		0	0	
3	Safe management efforts by the hospital increase the financial burden on management	a) Agree	187 (64.7)	20	167	0.015*	102	85	0.228
		b) Disagree	74 (25.6)	18	56		47	27	
		c) Can't comment	28 (9.7)	3	25		19	9	
4	Safe management of health care waste is an extra burden on work	a) Agree	119 (41.2)	15	104	0.449	62	57	0.05*
		b) Disagree	154 (53.3)	25	129		93	61	
		c) Can't comment	16 (5.5)	1	15		13	3	
5	Do you think that the dental institutions should organize separate classes or a continuing dental education program to upgrade existing knowledge about BM waste management	a) Yes	281 (97.2)	39	242	0.374	164	117	0.636
		b) No	8 (2.8)	2	6		4	4	
		c)Can't comment	0 (0)	0	0		0	0	
6	Would you like to attend voluntarily programs that enhance and upgrade your knowledge about waste management	a) Yes	261 (74.7)	33	183	0.185	125	91	0.983
		b) No	54 (18.7)	8	46		32	22	
		c)Can't comment	19 (6.6)	0	19		11	8	
7	Do you think that labeling the container before filling it with waste is of any clinical significance	a) Yes	285 (98.6)	40	245	0.533	165	120	0.491
		b) No	4 (1.4)	1	3		3	1	
		c)Can't comment	0 (0)	0	0		0	0	
8	Have you enrolled with any agency to collect and transport the Bio-Medical Waste from your hospital/clinical set up?	a)Yes	242 (83.7)	34	208	0.879	143	99	0.453
		b)No	47 (16.3)	7	40		25	22	

Content validity was assessed by a panel of seven experts of staff members of the Department of Public Health Dentistry and Aiken's V was used to quantify concordance between experts for each item, values higher than 0.92 were obtained. Details of the dental practitioners was recorded. These included demographic details such as name, gender, age, educational qualification, and years of experience. The questionnaire was divided into three sections. The first section of the questionnaire contained questions regarding knowledge of Bio-medical waste generation, hazards, and legislation. The second section contained questions regarding the level of attitude/ awareness on biomedical waste management practices. The third section contained checklist regarding practices towards biomedical waste management. All the questions were in English language.

Statistical analysis

All the data were entered into a database on Microsoft Excel. Microsoft Word and Excel have been used to generate the tables and graphs. Statistical analysis was performed using SPSS software version 16 (SPSS Inc. Released2007 SPSS for Windows, Version 16.0.Chicago,).

RESULTS

Among 289 (100%) study participants, 241 (83.4%) were males and 48(16.6%) were females and half of the participants were in the age group of 30-45 years and the mean age was 37.69±7.430. Among the study participants 41(14.2%) had completed BDS and 248(85.8%) had completed MDS. Among the participants 289(100%), 168(58.1%) had an experience of 10 years of practice and 121(41%) had more than 10 years of experience. The questions regarding the knowledge and attitude of the practicing dentist were given in the Table 1 and Table 2. The current practices of the dentist regarding the biomedical waste segregation were assessed using a checklist and was given in the Table 3.

DISCUSSION

Exposures to many risk factors are possible in workplace. Occupational diseases can be caused by chemical, physical, biological and ergonomic risks and accidents can be caused by structural factors or incorrect procedures and maneuvers.

Traditional risk factors, such as biological agents, still cause concern in workplaces, despite the advent of modern technologies, such as LASER systems and other electromagnetic sources. Hospitals and other health care establishments have a "duty of care" for the environment and for public health, and have particular responsibilities in relation to the waste they produce. It is ironical that the very hospital that brings relief to the sick can create a health hazard for hospital staff, patients as well as the community at large. Safe management of healthcare waste becomes very important when it comes to environment conservation and health of the community.

According to the WHO, "The human's element is more important than the technology." Almost any system of treatment and disposal that is operated by well- trained, and well‐ motivated staff can provide more protection for staff, patients and the community than an expensive or sophisticated system that is managed by staff who do not understand the risks, and the importance of their contribution.[19]

According to WHO, South‐ East Asia Regional Office, the 11 South‐ East Asian countries together produce some 350,000 tons of health care waste per year, close to 1000 tons a day which is both hazardous and nonhazardous.

In this study 83.4% practitioners were males and 16.6% were females, while in the other studies 63% were males and 37% were females. In this study 85.5% had completed MDS and 14.2% had completed BDS, whereas in a similar study 68.6% had completed postgraduate and rest 31.4 % were undergraduates.[19]

Table 3 Checklist for Bio-Medical Waste Management Practices

Sl.No	Items of Observation	Options	n (%)	Educational Qualification		p value	Years Of Experience		p value
				BDS	MDS		≤10 Years	>10 Years	
1	Segregation of bio-medical waste done according to color coding	A)FOLLOWED	238 (82.4)	31	207	0.221	141	97	0.408
		B)NOT FOLLOWED	51 (17.6)	10	41		27	24	
2	Tied up with any authorised bio-medical waste agency	A)FOLLOWED	245 (84.8)	34	211	0.722	143	102	0.848
		B)NOT FOLLOWED	44 (15.2)	7	37		25	19	
3	Proper storage and disposal of silver amalgam	A)FOLLOWED	221 (76.5)	28	193	0.257	130	91	0.846
		B)NOT FOLLOWED	68 (23.5)	13	52		38	30	
4	Proper storage and disposal of sharps	A)FOLLOWED	260 (90)	37	4	0.949	152	108	0.733
		B)NOT FOLLOWED	29 (10)	223	25		16	13	
5	Has the practitioner/clinician has undergone any immunization for his/her personal protection	A)FOLLOWED	274 (94.8)	38	236	0.508	157	117	0.220
		B)NOT FOLLOWED	15 (5.2)	3	12		11	4	
6	Has the assistant has undergone any immunization for his/her personal protection	A)FOLLOWED	127 (43.9)	16	111	0.493	70	98	0.358
		B)NOT FOLLOWED	162 (56.1)	25	137		57	64	

In this study about 88.8% of the practitioners were aware of the Bio- Medical waste generation rules and legislations and had knowledge regarding the BMW and 84% of the practitioners had positive attitude towards BMW management. Another similar study was done by Nirupama N 16 among nursing, technical and housekeeping staff. The study involved data collection from 47 private hospitals and nursing homes in Karimnagar town of Andhra Pradesh. The study revealed that 95.8% of subjects had knowledge about the health hazards. Only 1.6% of study subjects had knowledge about the 10 categories of BMW. The study also revealed that 47.2% of Nurses, 26.4% of Technicians and 26% of housekeeping staff were having positive attitude towards BMW management.[17] A similar study conducted among 337 practitioners in Bengaluru city 88.4 % knew about Bio-Medical waste generation and legislation whereas 6.8% didnot know and were not aware of it.[19]

This study revealed that the practitioners were aware of the legislation policy and registered their clinic with the certified waste management services of the city. However, a study carried out to assess the dental Bio-Medical waste management and awareness of waste management policy among private dental practitioners in Mangalore city, India, revealed that a largenumber of practitioners were aware of the legislation policy but had failed to contact and register their clinic with the certified waste management services of the city.[19]

In the present study 97% of the participants felt that college should organize separate classes or a continuing dental education programme to upgrade existing knowledge about Bio-Medical waste management. Similar study in which about 304 (90.2%) felt the college should organize separate classes or a continuing dental education program to upgrade existing knowledge about BMW management whereas 17(5%) felt no need and 16 (4.7%) could not comment. An important challenge to be overcome is the need to progress from the concept of "waste management" to one of sustainable decision making regarding resource use, including methods of waste minimization at source and recycling. It is therefore strongly recommended that waste management programs should be a part of academic curricula for all health care workers and in continuing dental education.[19]

In the present study 82.4 % of the study participants segregate waste according to the color coding as per the rules laid by the Bio-Medical Waste similar study showed that a substantial percentage of practitioners (29.5%) dispose dental waste without segregation and prior disinfection which exposes garbage collectors to a high risk of getting infected from health care waste.[18]

In the present study the 94% of the practitioners are cautious about their self protection and had undergone immunizations for their self protection and 43.9% of the practitioners assistants had undergone immunization for their personal protection.

The present study showed, there was no much statistically significant association between knowledge and practice among BDS qualified and MDS qualified dentists. This is in contrast to the finding of other Studies, showed that there was no significant difference between the graduate and post-graduate groups regarding proper practice of BMW management indicating that the knowledge is limited mostly to theoretical aspect, in need of practical implementation.[18]

It is important to outline the possible limitations of the present study. Firstly as a descriptive cross sectional study based on self administered questionnaire the response rate was 98.8% although they received the questionnaires by hand, but they did not respond and their answers may change the results. Secondly the study of this vital issue may be most appropriately designed observationally as what you see in practice may not be the real on the questionnaire. Thirdly the study was limited to one area of large city Visakhapatnam may be biased as this area of the capital of high socioeconomic status and well educated people who can judge the quality of services provided. So it is difficult to generalize the results to the whole state.

CONCLUSION

There is a good level of knowledge and awareness about Bio-Medical waste generation hazards, legislation, and management among health care personnel in Visakhapatnam city. A large number of practitioners were aware of different categories and color coding of different types of waste yet have failed to practice the same in their clinics. A subsequent literature review suggests that this is a common problem in many other health care institutions in both India and other countries. It is imperative that waste should be segregated and disposed of in a safe manner to protect the environment as well as human health. Regular monitoring and training are still required at all levels, and there is a need for continuing dental education on dental waste management practices to these dental practitioners. The need of the hour is to conduct training and retraining workshops on biomedical waste management so as to improve the overall knowledge, attitude and practice towards BMW.

References

1. Ministry of Environment and Forest, notification N.S.O. 630(E). Biomedical waste (management and handling) rules 1998. Available from http://www.cpcb.nic/ (Accessed on 10 December 2017 at 14:22)
2. Krishnan KU, Doris Devamani TS, Jayalakshmi G. On the path of continual improvement: An evaluation of biomedical waste management training. *Indian J Med Microbiol* 2015; 33:S119-21.
3. Singh R, Kishore J, Mathur RG, Mandal K, Puri S. The role of an information booklet on bio-medical waste management for nurses. *Nurs J India* 2002; 93:271-2.
4. Sarotra P, Medhi B, Kaushal V, Kanwar V, Gupta Y, Dr. Gupta AK. Health care professional training in biomedical waste management at a tertiary care hospital in India. *The J Biomed Res* 2014; 28(5):1-3.
5. Vishal B, Swarn L, Mahesh M, Arvind A, Sanjay A, Uma S: Knowledge assessment of hospital staff regarding biomedical waste management in a tertiary care hospital. *Natl J Community Med* 2012;3(2):197-200.
6. Patidar M, Jain PK, Ravindra H.N. Effectiveness of structured teaching programme on biomedical waste management. IOSR *Journal of Nursing and Health Sciences* 2014; 3(3):60-5.
7. Sanjeev R, Kuruvilla S, Subramaniam R, Prashant PS, Gopalakrishnan M. Knowledge, attitude, and practices about biomedical waste management among dental

healthcare personnel in dental colleges in Kothamangalam: A cross-sectional study. Health Sci 2014;13:1-1
8. Srivastava DK, Bansal M, Choudhary P, Jain PK, Chouksey M, Pathak P. A study of the impact of three day training program on knowledge regarding biomedical waste among paramedical staff of District Hospital Etawah (UP). *Indian J Community Health* 2013;25(3):272-6.
9. Pandit NB, Mehta HK, Kartha GP, Choudhary SK. Management of bio-medical waste: Awareness and practices in a district of Gujarat. *Indian J Public Health* 2005;49:245-7.
10. Bhatt S, Kohli M, Patel K,Shah A, Gupta P. Evaluation of awareness regarding biomedical waste management in institute of Ophthalmology, Ahmedabad, Gujarat. NJIRM 2013;4(2):32-5.
11. Ahmed AAM, Awooda EM, Elbeshir EI. Dentists Knowlwedge,Attitude and Practices towards Dental Waste Management in Private Clinics- Khartoum locality. *International Journal of Latest Research in Science and Technology* 2014;3(4):93-6.
12. Khatri M, Agrawal R, Reddy M, Khatri J, Neha Kokil S. Knowledge and Practice adopted by Dental auxiliaries regarding Biomedical waste management in Pune. *J.Dent.Res.Sci.* Dev 2014;1(2).
13. Singh RD, Jurel SK, Tripathi S, Agrawal KK, Kumari R. Mercury and other biomedical waste management practices among dental practitioners in India. BioMed Research International 2014.
14. Singh GP, Gupta P, Kumari R, Verma SL. Knowledge, attitude and practices regarding biomedical waste management among healthcare personnel in Lucknow, India. *Indian Journal of Clinical Practice* 2014;24(9).
15. Kishore J, Agarwal R, Kohli C, Sharma PK, KamatNV, Tyagi SC. Status of biomedical waste management in nursing homes of Delhi, India. *J ClinDiagn Res* 2014;8(3):56-8.
16. Madhavi KV, Reddy BC, Ravikumar BP. Awareness regarding biomedical waste management among interns in a tertiary health care hospital, Khammam. *J Evol Med Dental Sci*. 2:5360-5.
17. Chaudhari K, Patel J, Rudani J, Dawda D. Knowledge, Attitude and Practices among Dentists regarding Bio-Medical Waste Management in Ahmedabad City, Gujarat: A Questionnaire Based Study. *Int J Oral Health Med Res* 2015;2(1):23-26.
18. Abhishek KN, Supreeth S, Varma Penumatsa N, Sam G, Khanapure SC, Sivaranjan S. Awareness- knowledge and practices of dental waste management among private practitioners. *Katmandu Univ Med J* 2016;53(1):17-21s.
19. Lakshmikantha R, Kanyadara J, Bullappa D, Vanishree N, Keerthi Prasad KS, Naveen N, *et al*. To assess the knowledge, level of awareness, and attitude on biomedical waste management among practicing dentists in Bengaluru city: A cross-sectional study. CHRISMED *J Health Res* 2016; 3:161-7.

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