

# Analysis on Attitude, Knowledge and Practice of Biomedical Waste Disposals by Dental Practitioners

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## ABSTRACT

**Background:** Dental health-care facilities should adopt strict rules and strategies for dental waste management to minimize the risk of transmission of the disease from the dental clinic to the community. Indiscriminate disposal of biomedical waste constitutes a massive risk to the general public health, health care workers, and patients.

**Aim:** This learning purposes to evaluate information, attitude, and practice between dental practitioners of different dental health sectors in Tanta city, Egypt. A cross-sectional learning is showed in 200 working dentists in Tanta city. A self-organized close-ended questionnaire is utilized to acquire the essential information.

**Results:** The level of dental practitioners' awareness of BMW management policies ranged from 82.5% to 96%. Regarding BMW management practices, 90% of dental practitioners are cognizant of the removal of various items hooked on dissimilar color-coded bags. Dental practitioners of the private dental sector had the lowest correct responses (20%) regarding the disposal of used plastic items. Finally, 81.5% of dental practitioners settled to be systematic instructive programs on biomedical waste management. Also, 80% of them recognized to obtain exercise in any procedure on BMW.

**Conclusion:** Based on The consequences of this learning, it can be determined that despite high awareness level of dental practitioners in Egypt about BMW management policies, proper disposal of contaminated plastic items, impression material, and soiled dressings was not yet accurately implemented by dental practitioners. Also, dental practitioners lacked knowledge regarding the correct practice of safe disposal of excess mercury and treating infectious waste before disposal.

**KEYWORDS:** Attitude, Practice, Biomedical, Waste, Knowledge, Dentist.

## INTRODUCTION

Recently, the remarkable improvement of dental technology and augmented convenience of dental healthcare amenities have not only enhanced excellence of life of the community but also pose a high risk to population health and sharing of environmental degradation due to the creation of a great amount of biomedical waste<sup>1</sup>.

Biomedical waste (BMW) referred to any waste produced during conduct or vaccination of human beings or animals. So, dental waste is a risky division of BMW as dental practices produce large amounts of wastes contaminated with blood and body fluids such as cotton, latex, sharps, extracted teeth, and other materials. Moreover, dental office wastewater contains a high concentration of metal such as mercury, silver, tin, and copper produced from amalgam restoration and X-ray fixer solution<sup>2</sup>.

According to Nakajima et al., 1996 dental health care facilities generated many types of wastes, the most dangerous types of dental wastes are hazardous and biohazardous waste. Firstly, Biohazardous wastes which contaminated with pathogenic creatures causation broadcast of diseases like Hepatitis B, C, and HIV to the individuals handling waste particularly in the attendance of open wounds. Secondly, Hazardous waste which contains metals such as silver, lead, mercury, X-rays films, and housework answers are toxic and not ever degrades when they influence the setting.

Consequently, every dental health-care facility should adopt strict rules and strategies for dental waste management to minimize the risk of disease transmission from the dental clinic to the community. These rules should be strictly shadowed at each single level of group, collection, transport, packing, action, and removal. Indiscriminate disposal of Biomedical waste constitutes an enormous danger to the overall population health, medicinal services workers, What's more patients<sup>3</sup>.

As stated by that universe wellbeing association (WHO), created nations prepare dependent upon 0.5 kg for dangerous waste for every healing facility bunk for every day. Despite the fact that the measure to creating nations is main 0.2 kg for every healing facility bunk for every day, social insurance waste is frequently not separated under dangerous or non-hazardous wastes, In this way those genuine measure of risky waste a great part higher. Resembling a lot of people low-income countries, egypt fights should enhance its healing center waste administration hones. In spite of the fact that those Ecological theory no. 4 for 1994 might have been conveyed to organize incorporated clinic waste oversaw economy implementation, powers need aid falling flat on set up effective frameworks viewing segregation, collection, exchange alternately treatment, due to feeble authoritative enforcement<sup>4</sup>. In Egypt, the elevated awareness about dental treatment among the public increased the number of dental healthcare facilities and the amount of biomedical waste generated together with cumulative global consciousness around biomedical waste management and related hazards. Therefore, the current study was conducted to access and compare knowledge, attitude, and practice of biomedical waste disposal among dental practitioners of different dental sectors in Tanta city, Egypt<sup>5</sup>.

## **MATERIAL AND METHODS Study design**

This research was carried out as a expressive cross-sectional study.

### **Sample selection**

The sample of this study is randomly selected from the dental practitioners in Tanta city who were distributed into four sectors; educational, ministry of health, insurance, and private sector. The sample excluded non-practicing dentists and dentists with an administrative job only<sup>6</sup>.

### **Sample size calculation**

Those test span might have been computed utilizing those Epi-Info program, rendition 6, for required recurrence by acceptable knowledge, mentality and act score 74% during alpha slip =0.05 What's more force of those test = 80%. This yielded An test extent of 200 dentists<sup>7</sup>.

According to the proportion of dental practitioners inside each dental health sector, a proportionally weighted sample is occupied as tracks 80 dentists from the ministry of health, 40 dentists from the faculty of dentistry, 20 dentists from the insurance sector, and 60 dentists from private sectors.

Approval from the Research Ethics Committee, Faculty of Dentistry, Tanta University was secured before the start of the study. Oral assent might have been picked up from members after clearing up the investigation destinations Furthermore guaranteeing information camouflage. To preserve confidentiality, those questionnaire might have been unknown and information were held private On An record that Might a chance to be accessed just by those authors<sup>8</sup>.

### **Survey tool**

Data collection is completed by the assistance of a organized, self-administered, close-ended survey. It was handed to the participants during evening clinic hours. The questionnaire originally developed by Narang RS et al; 2012 with some modifications. A pilot study was conducted among a sample of 10 dentists to pre-test the questionnaire to insure reliability and comprehensibility. Cronbachs alpha test showed the reliability coefficient of 0.89 and was found satisfactory for conducting the study<sup>9</sup>.

The pretested questionnaires were included in the final study. Those main and only that questionnaire held inquiries regarding that demographic profile of the participants, same time those second a major aspect assessed knowledge, Attitude, What's more act (KAP) at biomedical waste management for sixteen inquiries. Of the sixteen questions, those primary three inquiries evaluated dental practitioners' learning Furthermore state of mind in regards BMW management arrangements. Those next eight inquiries evaluated the learning for BMW oversaw economy hones and the most recent five inquiries assessed the participants' mindfulness Also instruction viewing BMW management<sup>10</sup>. That questionnaire might have been administered of the members by the writer with correct guidelines. Ace graph and coding rundown were arranged preceding entering the information et cetera the gathered information might have been entered under those machine through Microsoft exceed expectations Sheet11.

Data was exchanged on SPSS to Factual dissection. A Chi-square test might have been connected should think about the middle of right reactions got starting with dental professionals in distinctive dental parts. P-value  $\leq 0.05$  might have been viewed as statistically noteworthy.

## **Results**

The demographic outlined of study participants obtained from different dental health sectors of Tanta city showed that (60%) were males and (40%) were female. The majority of dental practitioners (66%) were general practitioners and (34%) were specialists. Among the respondents (56.5%) were practicing for the past 5 years, (27.5%) were practicing

for 6–10 years and (16%) had experienced more than 10 years. (Table 1)

**Table1:** Demographic profile of the participating dental practitioners

Characteristics		No	Total
Gender	Male	120 (60%)	200
	Female	80 (40%)	
Level of education	BDS	132 (66%)	200
	MDS	59 (29.5%)	
	PHD	9 (4.5%)	
Practicing Since	0-5ys	113 (56.5%)	200
	6-10ys	55 (27.5%)	
	>10ys	32 (16%)	

Table 2 revealed a statistically significant difference in information concerning government guidelines on waste management and waste management policy ( $p < 0.05$ ). The highest correct responses (95% and 96.25% respectively) were found in dental practitioners of the ministry of health. Meanwhile, no difference was found in knowledge concerning the responsibility for the safe management of biomedical waste between dental practitioners of different dental health sectors with 96% total correct responses<sup>12</sup>. In general, the level of dental practitioners' awareness of BMW management policies ranged from 82.5% to 96%.

**Table2:** Information and arrogance regarding BMW organization rules between dental practitioners of different dental health sectors

Survey question		Different Dental Health Sectors					$\chi^2$	P-value
		Educational (n= 40)	Ministry of health (n= 80)	Insurance (n= 20)	Private (n= 60)	Total (n=200)		
guidelines laid down by Government for BMW management	Correct	35 (87.5%)	76 (95%)	14 (70%)	45 (75%)	170 (85%)	20.380	<0.05*
	Incorrect	5 (12.5%)	4 (5%)	6 (30%)	15 (25%)	30 (15%)		
Waste management policy in hospital/clinic	Correct	38 (95%)	77 (96.25%)	18 (90%)	32 (53.33%)	165 (82.5%)	36.52	<0.05*
	Incorrect	2 (5%)	3 (3.75%)	2 (10%)	28 (46.67%)	35 (17.5%)		
Responsibility for the safe management of BMW	Correct	39 (97.5%)	78 (97.5%)	17 (85%)	58 (96.67%)	192 (96%)	2.63	>0.05
	Incorrect	1 (2.5%)	2 (2.5%)	3 (15%)	2 (3.33%)	8 (4%)		

Regarding BMW management practices, 90% of dental practitioners are attentive of the removal of various items into dissimilar color-coded bags. Though, the alteration is not important between dissimilar dental sectors ( $p > 0.05$ ). The highest incorrect responses among dental practitioners were found in the disposal of used plastic items, impression material, and soiled dressings (68.5% & 65.5%) respectively<sup>13</sup>.

**Table 3:** Information and brushness on BMW practices between dental practitioners of different dental health sectors

Survey question		Different Dental Health Sectors					$\chi^2$	P-value
		Educational (n= 40)	Ministry of health (n=80)	Insurance (n= 20)	Private (n= 60)	Total (n=200)		
Are different colored bags used?	Correct	36 (90%)	75 (93.75%)	18 (90%)	51 (85%)	180 (90%)	3.54	>0.05
	Incorrect	4 (10%)	5 (6.25%)	2 (10%)	9 (15%)	20 (10%)		
Disposal of plastic item	Correct	15 (37.5%)	27 (33.75%)	9 (45%)	12 (20%)	63 (31.5%)	18.45	<0.05
	Incorrect	25 (62.5%)	53 (66.25%)	11 (55%)	48 (80%)	137 (68.5%)		
Disposal of impression material, soiled dressings	Correct	16 (40%)	24 (30%)	8 (40%)	21 (35%)	69 (34.5%)	4.75	>0.05
	Incorrect	24 (60%)	56 (70%)	12 (60%)	39 (65%)	131 (65.5%)		

Disposal of sharps, needles	Correct	37 (92.5%)	75 (93.75%)	17 (85%)	49 (81.67%)	178 (89%)	7.98	>0.05
	Incorrect	3 (7.5%)	5 (6.25%)	3 (15%)	11 (18.33%)	22 (11%)		
Disposal of extracted teeth, human tissue	Correct	39 (97.5%)	76 (95%)	18 (90%)	52 (86.67%)	185 (92.5%)	6.87	>0.05
	Incorrect	1 (2.5%)	4 (5%)	2 (10%)	8 (13.33%)	15 (7.5%)		
Disposal of excess mercury	Correct	11 (27.5%)	24 (30%)	6 (30%)	11 (18.33%)	52 (26%)	16.42	<0.05
	Incorrect	29 (72.5%)	56 (70%)	14 (70%)	49 (81.67%)	148 (74%)		
Wearing protective barriers during handling of BMW	Correct	37 (92.5%)	76 (95%)	18 (90%)	55 (91.67%)	187 (93.5%)	2.32	>0.05
	Incorrect	3 (7.5%)	4 (5%)	2 (10%)	5 (8.33%)	13 (6.5%)		
treating infectious waste before disposing of them	Correct	15 (37.5%)	34 (38.75%)	13 (65%)	12 (20%)	74 (37%)	20.85	<0.05
	Incorrect	25 (62.5%)	46 (61.25%)	7 (35%)	48 (80%)	126 (63%)		

Of all dental sectors, the dental practitioners of the private dental sector had the lowest correct responses (20%) regarding the removal of used plastic items and the difference is statistically important ( $p < 0.05$ ). On the other side, the majority of dental practitioners (93.5%) agreed to wear gloves and mask while handling BMW<sup>14</sup>. (Table 3) Furthermore, the correct practice responses of dental practitioners regarding the disposal of contaminated needles and extracted teeth were (89% & 92.5%) respectively and the difference was not statistically significant. On the other hand, the correct responses concerning the disposal of excess mercury and treating infectious waste before disposal<sup>15</sup> were (26% & 37%) respectively and there is a statistically important alteration ( $p < 0.05$ ) among the different dental sectors. The dental practitioners of the private sector exhibited the highest incorrect responses (81.76% & 80%) among all study participants. (Table 3).

**Table 4:** information and arrogance on BMW consciousness between dental practitioners of different dental health sectors

Survey question		Different Dental Health Sectors					$\chi^2$	P-value
		Educational (n= 40)	Ministry of health (n=80)	Insurance (n= 20)	Private (n= 60)	Total (n=200)		
health hazards with improper waste management	Correct	38 (95%)	78 (97.5%)	19 (95%)	57 (95%)	192 (96%)	5.86	>0.05
	Incorrect	2 (5%)	2 (2.5%)	1 (5%)	3 (5%)	8 (4%)		
Maintained BMW records in your hospital/clinic	Correct	35 (87.5%)	74 (92.5%)	17 (85%)	33 (55%)	159 (79.5%)	32.54	<0.05
	Incorrect	5 (12.5%)	6 (7.5%)	3 (15%)	27 (45%)	41 (20.5%)		
Generation of biomedical waste in hospital/clinic	Correct	34 (85%)	58 (72.5%)	15 (75%)	48 (80%)	155 (77.5%)	2.54	>0.05
	Incorrect	6 (15%)	22 (27.5%)	5 (25%)	12 (20%)	45 (22.5%)		
regular educational programs on biomedical management needed	Correct	38 (95%)	77 (96.25%)	16 (80%)	32 (53.33%)	163 (81.5%)	30.85	<0.05
	Incorrect	2 (5%)	3 (3.75%)	4 (20%)	28 (46.67%)	37 (19.5%)		
received training on BMW management	Correct	37 (92.5%)	73 (91.25%)	15 (75%)	36 (60%)	161 (80.5%)	36.74	<0.05
	Incorrect	3 (7.5%)	7 (8.75%)	5 (15%)	24 (40%)	39 (19.5%)		

Concerning the education and awareness of BMW, nearly all dental practitioners (96%) agreed that biomedical waste causes health hazards and 77.5% of them believed that dental clinics generate biomedical waste. However, there was no statistical difference was found between different dental sectors ( $p > 0.05$ ).

Moreover, 79.5% of dental practitioners approved that maintaining BMW records in their clinics was mandatory. Finally, 81.5% of dental practitioners settled that there ought to be a chance to be standard instructive projects once biomedical waste management is in place. Also, 80% of them acknowledged with getting preparation in whatever structure ahead of BMW, which might have been statistically noteworthy for  $p$ -value  $< 0.05$  (Table 4)

## Discussion

Nowadays, one of the serious threats to the environment and human health is the haphazard disposal of biomedical waste. So, the best possible management from claiming biomedical wastes incorporates dynamic support. Furthermore, harmonization between governmental and non-governmental organizations, the dental institutions, and the social insurance personnel.

Concerning illustration, an Egyptian nation needed a deficiency for solid wastes. Also, regulations for the isolation of biomedical waste from claiming BMW. Henceforth, this research meant to evaluate those dental professionals in Tanta city on distinguishing the holes in the middle of those current KAP. Around those health-care specialists included over waste administration and the future fancied state that if made reached.

This cross-sectional study might have been led around a pre-designed and pre-tested self-administered questionnaire which analyzes the information about the mentality in regards to BMW oversight policies, practices, and furthermore mindfulness around dental professionals. Practically every last one of the inquiries were of a closed-end kind with an abstain from whatever review bias, not difficult to analyze, what's more accomplish a snappier reaction starting with members.

In this study (60%) of dental practitioners were males and (40%) were female, which is in the same line with studies done by Farmer GM et al., 1997 and Radha Ket al., 2009. Also, (66%) were general practitioners and (34%) were specialists in contrast to the study done by Sood AG & Sood A, 2011 where 47% were graduates and 53% were postgraduates<sup>19</sup>.

Among the respondents of this study (56.5%) were practicing dentistry for the past 5 years, (27.5%) were practicing for 6–10 years, and (16%) had experienced more than 10 years. This is nearly similar to the study done by Bansal et al.; 2013 where 60% of the focuses needed the involvement of  $< 5$  years; 28% had involvement  $< 5$ –10 years and 12% had involvement for more than 10 years.

In the present study, the level of dental practitioners' awareness about BMW management policies ranged from 82.5% to 96% which is in arrangement by the study completed by Singh T et al.; 2018 [21] who assessed the familiarity with biomedical waste administration for dental people about various dental schools of Nepal and they found that the mass of the dental understudies needed a certain disposition towards administration arrangements for biomedical waste<sup>20</sup>.

Also, in the same line of our results, the study was done by Sushma MK et al.; 2010 who evaluated the awareness level of policy related to waste organization in private dental clinics in India and they found that a high proportion of dental doctors were aware of the legislative policy.

In contrast to the present results, Kishore J et al.; 2000 assessed the awareness level about BMW management between dentists of a teaching hospital, and they revealed that the mainstream of the participant was not conscious of the correct clinical waste management regulations. This disparity of results may be attributed to the different survey sampling methodology and size.

Concerning BMW management practices, the current results showed that 90% of dental practitioners were aware of the removal of numerous substances into dissimilar color-coded bags which agreed with the study done by Narang RS et al.; 2012. While only 27.4% of dental practitioners in a study examined the removal of dental waste in Bangkok were aware of this practice<sup>21</sup>.

In respect to the disposal of used plastic items, impression material, and soiled dressings 65.5%–68.5% of the participants were unable to respond correctly that the disposal of used plastic items should be in a red-colored bag which agreed by the study completed by Bangannavar BF et al., 2015. However, in a study conducted by Indian hospitals revealed 100% correct responses by all participants. It was returned to the exercise that the team was conventional in their hospital.

Furthermore, the correct practice responses of dental practitioners regarding the disposal of contaminated needles and extracted teeth were (89% & 92.5%) respectively which is similar to the result obtained by Arora et al., 2014 and unlike the consequences of the study done by Singh et al., 2012 [30] & Asgad A et al., 2014 who found that a small percentage of dental practitioners (25.5%) use safety boxes for sharps and needles<sup>22</sup>.

Only 26% of dental practitioners in this study dispose of the excess mercury; simply by storing it in a closed container with a photographic fixer to reduce its hazard and facilitate its recycling. This is dependable by the consequences of done by Osamong et al., 2005 and Arora et al., 2014.

On the contrary, a study by Singh T et al., 2018 revealed a maximum awareness of dental students in regards to transfer of mercury (79.8%–97.9%) which might be owed to the point-by-point illustration about dental amalgam in the subject from claiming dental materials, which is instructed throughout the initially quite a while of a dental system.

The display effects which may be comparing of the effects for Singh T et al., 2018 found that (93.5%) of dental professionals were mindful from claiming utilizing protective obstructions same time taking care of BMW. This illustrated that dentists were mindful of dental waste created clinched alongside normal dental polishes which necessity uncommon consideration, similarly as they need aid wellbeing risk things. However, main 37% about

dentists a chance to be acquainted with treating BMW in the recent past disposing about them<sup>23</sup>.

Concerning the training Furthermore attention to biomedical waste management,. nearly all dental practitioners (96%) agreed that biomedical waste causes health hazards and 77.5% of them believed that dental clinics generate biomedical waste. However, there was no statistical difference was found between different dental sectors ( $p>0.05$ ). Moreover, 79.5% of dental practitioners approved that maintaining BMW records in their clinics was mandatory. In the same line, 81.5% of dental practitioners settled That there ought to a chance to be standard instructive projects once biomedical waste management Furthermore 80% for them acknowledged will accept preparation over whatever manifestation for BMW, which might have been statistically noteworthy for  $p\text{-value} < 0.05$ . Lastly, for those training What's more familiarity with biomedical waste management,it was found that the majority of dental practitioners in different dental sectors of Tanta city had a positive attitude<sup>24</sup>. These results were close to studies done by Radha R et al., 2012; Chaudhari et al., 2015 and Malini et al., 2015.

## CONCLUSIONS

Based on the consequences of this study, it can be determined that despite the high awareness level of dental practitioners in Egypt about BMW management policies, proper disposal of contaminated plastic items, impression material, and soiled dressings was not yet accurately implemented by dental practitioners. Also, dental practitionerslacked knowledge regarding the correct practice of safe disposal of excess mercury and treating infectious waste before disposal.

It is recommended that dental practitioners should receive intensive educational programs and training in biomedical waste management to improve their practices. The authoritative bodies in Egypt should effectively implement the rules and guidelines with regular audits to improve dental waste management practice.

## REFERENCE

1. Alagöz A, Kocasoy G, "Improvement and modification of the routing system for the health-care waste collection and transportation in Istanbul", *J. of Waste Management*, 2008; 28,1461–1471.
2. Mandal S, Dutta J, "Integrated bio- medical waste management plan for Patna city, Institute of Town Planners ", *India Journal*, 2009;6(2),1–25.
3. Radha K, Kalaiivani K, Lavanya R, " A case study of biomedical waste management in hospitals", *Global Journal of Health Science*, 2009; 1, 82–88.
4. Schaefer ME, "Hazardous waste management", *J. of Dental Clinics of North America*. 1991; 35, 383-390.
5. Li CS, Jenq FT, "Physical and chemical composition of hospital waste", *J. of Infect Control Hosp Epidemiol*. 1993;14,145-50.
6. Rutala W, Weber D, "Disinfection, sterilization and control of hospital waste", In: Mandell GL, Bennett JE, Dolan R, editors. *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases*. 6th ed. Philadelphia, PA: Churchill Livingstone Elsevier; 2005. 3331-3346.
7. Base RN, "Issues involved in hospital waste management—an experience from a large teaching institution,"*J*,of *Academy of Hospital Administration*, 1994;7, 79–83.
8. Nakajima et. al., "Initial mercury evaporation from amalgams made with Inert containing commercial alloys" ,*J. Of Dent .Mater*, 1996; 15, 168-174.
9. Farmer GM, StankiewiczN,Michael B, "Audit of waste collected over one week from ten dental practices", *J. of Aust dent* . 1997;42(2),114-7.
10. Park K, " Hospital waste management" In: Park K, editor. *Textbook of Preventive and Social Medicine*. 17th ed. Jabalpur (India): BanarsidasBhanot Publishers. 2002, 563-7.
11. Taiwo JO, Aderinokun GA, "Assessing cross infection prevention measures at the Dental Clinic", *J. of Afr Med SCI*, 2002;.31, 213-7.
12. Pandit NB, Mehta HK, Kartha GP, Choudhary SK, "Management of bio- medical waste; Awareness and practices in a district of Gujarat", *Indian Journal of Public Health*, 2005; 49,245-247.
13. [13]. Sreegiri S, Krishna Babu G, " Bio- medical waste management in a tertiary level hospital in Visakhapatnam" *J, of Community Medicine*, 2009; 5,1-6.
14. Rudraswamy S, Sampath N, Doggalli N, " Staff's attitude regarding hospital waste management in the dentalcollege hospitals of Bangalore city,India", *Indian J Occup Environ Med*, 2012; 16(2),75-8.
15. Ismail I M, Kulkarni A G, Kamble S V, "Knowledge, attitude and practice about bio-medical waste management among personnel of a tertiary health care institute in Dakshina Kannada, Karnataka,"*Al Ameen Journal of Medical Sciences*, 2013; 4,376–380.
16. Waste from health-care activities. Fact sheet No. 253, November 2011. World Health Organization [online factsheet] ([http:// www.who.int/mediacentre/factsheets/fs253/en/](http://www.who.int/mediacentre/factsheets/fs253/en/), accessed 27 November 2018).
17. Hakim SA, Mohsen A and Bakr I. "Knowledge, attitudes and practices of health-care personnel towards waste disposal management at Ain Shams University Hospitals, Cairo", *EMHJ*, 2014; 20 No. 5, 374-354.
18. AsgadA ,Elhadi M, Elnour , "Dentists knowledge, attitude and practice towards dental waste management in private clinics - Khartoum locality"2014; 3 (4),93-96.
19. Narang RS, Manchanda A, Singh S, Verma N, PaddaS. Awareness of biomedical waste management among dental professionals and auxiliary staff in Amritsar, India. *Oral Healthand Dental Management*. 2012; 11:162-168.

20. Chopra R, Mathur S, Dodwad V, Sharma N, Tevatia S. Awareness & attitude regarding biomedical waste disposal among post graduate students, under graduate students & auxiliary staff of a dental college: a questionnaire survey. *International Journal of Dental Research*, 2017;5 (1):64-67
21. Singh T, Ghimire TR, Agrawal SK. Awareness of Biomedical Waste Management in Dental Students in Different Dental Colleges in Nepal. *BioMed Research International*. 2018; Article ID 1742326, 6 pages <https://doi.org/10.1155/2018/1742326>
22. Sood AG, Sood A. Dental perspective on biomedical waste and mercury management: A knowledge, attitude, and practice survey. *Indian J Dent Res* 2011; 22:371-5
23. Bansal M, Vashisth S, Gupta N. Knowledge, awareness and practices of dental care waste management among private dental practitioners in Tricity (Chandigarh, Panchkula and Mohali). *J Int Soc Prev Community Dent*. 2013; 3:72-6.
24. Sushma MK, Bhat S, Shetty SR, Babu SG. Bio-medical dental waste management and awareness of waste management policy among private dental practitioners in Mangalore city, India. *Tanzania Dent J*. 2010;16:39-43.

