



The disposal of biomedical waste by the dental health professionals in Riyadh: Impact on current practice

Shahzeb Hasan Ansari¹✉, Nasser Abdullah Al Neemi², Saud Al Jadaan², Fahad Khaled Alsenan², Fayez Saad Aldawsari², Faisal Khalid Saleh²

¹Lecturer, Department of Preventive Dentistry, College of Dentistry, Riyadh Elm University, Riyadh 11681, Saudi Arabia; Email: shahzebhasan@riyadh.edu.sa

²Dental Intern, College of Dentistry, Riyadh Elm University, Riyadh 11681, Saudi Arabia

✉Corresponding author

Lecturer, Department of Preventive Dentistry, College of Dentistry, Riyadh Elm University, Riyadh 11681, Saudi Arabia; Email: shahzebhasan@riyadh.edu.sa

Article History

Received: 25 September 2020

Reviewed & Revised: 26/September/2020 to 01/November/2020

Accepted: 02 November 2020

E-publication: 10 November 2020

P-Publication: November - December 2020

Citation

Shahzeb Hasan Ansari, Nasser Abdullah Al Neemi, Saud Al Jadaan, Fahad Khaled Alsenan, Fayez Saad Aldawsari, Faisal Khalid Saleh. The disposal of biomedical waste by the dental health professionals in Riyadh: Impact on current practice. *Medical Science*, 2020, 24(106), 4133-4138

Publication License



This work is licensed under a Creative Commons Attribution 4.0 International License.

General Note



Article is recommended to print as color digital version in recycled paper.

ABSTRACT

Health care services generate tons of biohazard waste each day with their quantity depending on the size of the organization. Each country regulates its waste disposal and they generally follow the protocols presented by Occupational Safety and Health Act

(OSHA). The aim of the research was to determine the knowledge and practice of Saudi dentists towards the management of biomedical waste and compare the findings on the basis of work experience and gender. The cross-sectional study design involved all Riyadh based Saudi dentists willing to participate in this study were requested to fill up the survey. A total of 315 male and female dentists filled the survey using the online link of Google forms. Consultants have shown better knowledge and attitude towards the biomedical waste disposal. From the study it can be summated that general dental practitioners showed poor knowledge and attitude towards biomedical waste disposal. Dental students should be trained in order to learn how to properly dispose the biomedical waste.

Keywords: Biomedical waste, Dental professionals, Biohazards, Knowledge, practice

1. INTRODUCTION

Healthcare services generate tons of biohazard waste each day with their quantity depending on the size of the organization. Each country regulates its waste disposal and they generally follow the protocols presented by Occupational Safety and Health Act (OSHA). Biomedical waste management is of high importance and must be taken place by professionals or personnel having enough knowledge and training (DaSilva, 2018). Biomedical waste management is of equal importance when it comes to a dental practice. It is a well-known fact that dental clinics are a source of multiple fatal infectious diseases, which can be controlled if appropriate methods of disposal are utilized by the dentist or practice manager. Although dental clinics are not as massive organizations as general hospitals, the sensitivity of this issue cannot be overlooked and must be addressed to the satisfaction of local regulatory body and community (Naidu, n.d.).

Dental practice has to follow a certain waste disposal protocol in order to keep the environment hazard free. These steps include but are not limited to the disposal of routine waste, metal, sharps and other biohazard materials. Other areas of dental waste management include amalgam waste, shields and aprons, chemical sterile solutions, cleaners and other chemical waste. The waste can be categorized in to infectious waste, anatomical waste, sharps waste, pharmaceutical waste, radioactive waste, cytotoxic waste and sanitary waste (Datta et al., 2018). Several investigations have taken place in different parts of the world to determine the knowledge and practice of dental health professionals regarding professional waste disposal. A study conducted in Jammu and Kashmir, India revealed that the overall knowledge and practice of dental surgeons was on the lower side. There was a need of educating dental professionals in order to appropriately dispose the waste (Singh et al., 2014).

Other investigations conducted among the dental professionals in the UAE and Kenya showed a poor level of knowledge and attitude towards dental waste management. The participants were unaware of the protocols and did not know how to segregate the routine waste from the biohazard waste (Hashim et al., 2011). A Saudi research held in Hail region revealed that the knowledge of medical waste was high but the attitudes did not linked this level of knowledge (Dental Graduate Doctor, Faculty of Dentistry, Taif University, KSA. et al., 2019).

Study hypotheses

Senior dental professionals have better knowledge and attitude as compared to younger practitioners.

Aims of the study

To determine the knowledge and practice of Saudi dentists towards the management of biomedical waste

To compare the findings on the basis of work experience and gender

2. MATERIALS AND METHODS

Study Design

This is a cross sectional study conducted among the Saudi dentists using online surveys. The IRB approval number for the research was RC/IRB/2019/265 and the research was carried out from 15October 2019 till 15th July 2020.

Study Sample

All Riyadh based Saudi dentists willing to participate in this study were requested to fill up the survey. A total of 315 male and female dentists filled the survey using the online link of Google forms (Figure 1).

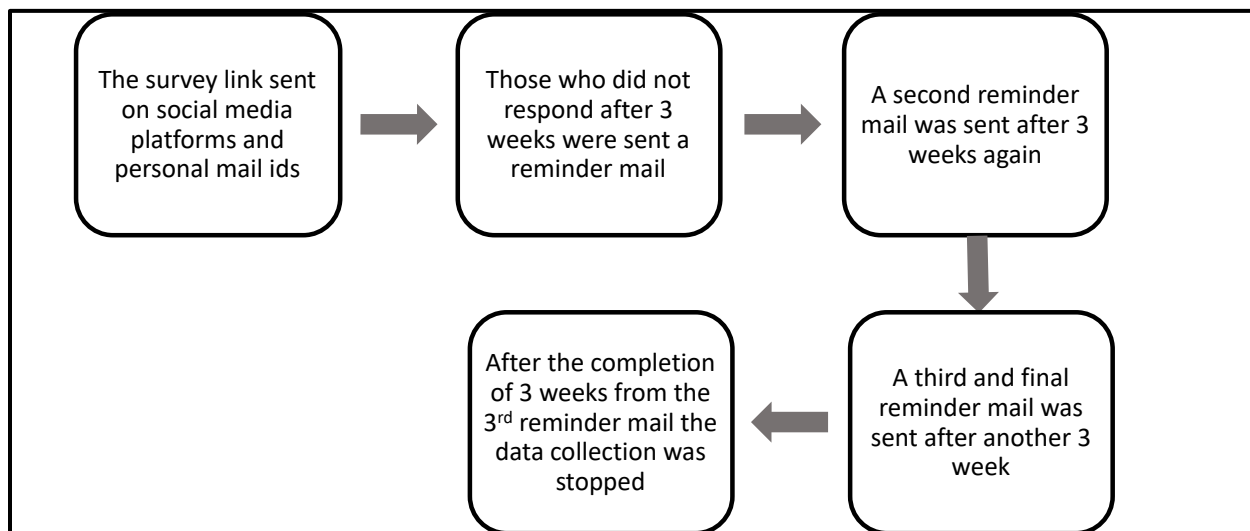


Figure 1 Flowchart of details of online data collection procedure

Study Instrument

An online questionnaire was designed with questions related to personal and demographic information followed by knowledge and practice related questions.

Instrument Validity and Reliability

A pilot study was conducted by sending the survey to 20 participants to determine the reliability by calculating Chronbach's alpha (0.843). Validity of the questionnaire was tested by sending it to experienced researchers in REU but no changes were suggested. The participants of pilot survey did not take part in actual survey.

Statistical Analysis

Collected data was analyzed using SPSS version 22, where descriptive as well as inferential statistics was conducted. Comparisons between groups were made using Chi-square test with the value of significance kept under 0.05.

3. RESULTS

According to the survey conducted the percentage of male dentists is 53% and female is 47%. The age was classified into 4 categories; 53% in 18-30 years, 29% in 31-45 years, 14% in 46-60 years and 4% in 60+ years. The work position consists of general practitioners (57%), specialists (24%) and consultants (18%). The work experience varied; 31% had experience of less than 2 years, 31% had experience of 3-5 years, 18% had experience of 6-10 years and 20% had experience of more than 10 years (table 1 & 2).

Table 1 Demographics of study participants

Variables		n	%
Age	18-30 Years	168	53%
	31-45 Years	91	29%
	46-60 Years	43	14%
	60+ Years	13	4%
	Total	315	100%
Gender	Male	168	53%
	Female	147	47%
	Total	315	100%
Work Position	General Practitioner	180	57%
	Specialist	77	24%
	Consultant	58	18%
	Total	315	100%

Work Experience	Less than 2 Years	97	31%
	3-5 Years	97	31%
	6-10 Years	57	18%
	10+ Years	64	20%
	Total	315	100%
Occupational Safety	Yes	233	74%
	No	82	26%
	Total	315	100%

Table 2a Comparison of the study participants on the basis of gender, age and work position

Items/Responses		Gender			Age (Years)					Work Position			
		M	F	p	18-30	31-45	46-60	60+	p	GP	Spl	Con	p
Are you aware of Occupational Safety and Health Act (OSHA)?	Yes	76%	72%	0.482	63%	87%	88%	77%	0.000	68%	83%	79%	0.028
Have you read the OSHA biomedical waste management protocol?	Yes	60%	52%	0.133	39%	73%	81%	77%	0.000	43%	70%	79%	0.000
Do you follow a waste management plan in your hospital/clinic?	Yes	74%	64%	0.059	57%	82%	88%	69%	0.000	61%	75%	86%	0.001
Which biomedical waste management practices do you/or your assistant follow?	Burning	18%	22%	0.639	24%	16%	16%	8%	0.004	24%	14%	14%	0.093
	Autoclaving	51%	53%		55%	55%	42%	23%		52%	55%	47%	
	Deep burial	8%	7%		5%	8%	16%	8%		7%	9%	7%	
	Segregation	23%	18%		16%	21%	26%	62%		16%	22%	33%	
Do you segregate the waste into different categories?	Yes	80%	70%	0.034	63%	88%	95%	85%	0.000	67%	84%	91%	0.000
Do you use color coded bins?	Yes	70%	63%	0.161	53%	81%	86%	69%	0.000	56%	77%	84%	0.000
Have you attended any bio-medical waste management program?	Yes	53%	41%	0.035	31%	64%	74%	54%	0.000	34%	65%	66%	0.000
M=Male, F=Female, GP=General Practitioner, Spl=Specialist, Con=Consultant													

Table 2b Comparison of the study participants on the basis of gender, age and work position

		Gender			Age					Work Position			
		M	F	p	18-30	31-45	46-60	60+	p	GP	Spl	Con	p
Amalgam	GW	43%	36%	0.428	46%	36%	28%	15%	0.001	45%	32%	33%	0.003
	IM	25%	30%		31%	24%	21%	23%		31%	27%	17%	
	RM	32%	34%		23%	40%	51%	62%		24%	40%	50%	
Dental Cements	GW	49%	48%	0.560	57%	41%	42%	23%	0.000	54%	42%	40%	0.007

	IM	27%	32%		32%	30%	23%	23%		31%	26%	29%	
	RM	24%	20%		12%	30%	35%	54%		14%	32%	31%	
Sharp Needle	GW	24%	26%	0.099	32%	16%	12%	31%	0.002	27%	27%	14%	0.058
	GW	20%	29%		27%	24%	21%	0%		28%	19%	21%	
	IM	56%	45%		40%	59%	67%	69%		45%	53%	66%	
File Burs	RM	29%	31%	0.209	37%	25%	9%	31%	0.000	33%	30%	17%	0.023
	GW	21%	28%		29%	20%	21%	0%		27%	21%	19%	
	IM	51%	41%		34%	55%	70%	69%		39%	49%	64%	
Discarded Medicine	RM	47%	39%	0.328	45%	42%	40%	38%	0.029	44%	44%	40%	0.005
	GW	24%	29%		33%	21%	16%	23%		32%	26%	12%	
	GW	29%	32%		22%	37%	44%	38%		24%	30%	48%	
Protective Wears	IM	43%	35%	0.075	46%	33%	35%	15%	0.001	39%	45%	31%	0.003
	RM	20%	31%		29%	23%	12%	23%		31%	17%	16%	
	GW	38%	34%		25%	44%	53%	62%		29%	38%	53%	
Contaminated Gauze Pieces	IM	51%	41%	0.010	46%	47%	40%	54%	0.517	45%	48%	47%	0.030
	RM	19%	34%		29%	25%	23%	8%		27%	34%	14%	
	GW	30%	25%		25%	27%	37%	38%		28%	18%	40%	
Anatomical Waste	GW	44%	35%	0.042	43%	34%	40%	38%	0.026	44%	39%	29%	0.002
	IM	23%	35%		33%	27%	14%	23%		32%	30%	17%	
	RM	33%	29%		23%	38%	47%	38%		24%	31%	53%	
Used Suction Tip	GW	54%	45%	0.184	52%	43%	56%	54%	0.420	51%	49%	48%	0.256
	IM	19%	27%		24%	26%	12%	15%		24%	26%	14%	
	RM	27%	29%		24%	31%	33%	31%		26%	25%	38%	
More Knowledge	Yes	68%	67%	0.867	69%	60%	74%	69%	0.022	70%	69%	57%	0.453
	No	4%	5%		4%	5%	2%	23%		4%	4%	7%	
	May Be	28%	28%		27%	34%	23%	8%		26%	27%	36%	
GW= General Waste, IM=Improper Manner, RM=Recommended Manner, M=Male, F=Female, GP=General Practitioner, Spl=Specialist, Con=Consultant													

4. DISCUSSION

The results of our survey were compared with another study where 50 percent of the dental practitioners failed to give satisfactory answers to questions related to OSHA guidelines to segregate and use color coded bins whereas the results (Bhaskar, 2020). Our study findings suggest that 75% of the participants were aware of the fact that waste should be segregated, whereas 67% used color coded bins that are suggested by OSHA. The results reported a high percentage of participants (74%) being aware of OSHA guidelines and 55% of them having read the biomedical waste management protocol. Another study conducted in similar settings suggested that the knowledge and awareness of dental professionals regarding the protocols given by OSHA was on the lower side (Quinn, 2013). Our study participants reported that 41% of them disposed Amalgam in the general waste. According to the guidelines by the American Dental Association, used amalgam should be deposited in a fixer solution or it could be transferred to any re-processor who can abstract silver and later be used for any other purposes. Amalgam putrefies on burning at high temperature so it shouldn't be burned directly (Elmehdi, 2010).

Injections and syringes are the most frequent sharpened tools used unsafe leftover in our dental clinics. When reviewed about the sharp management, the number varied amongst discarding in dustbins, burning the needles and breaking the needles. 25% of our study participants dispose them in general waste and 50% in recommended manner. Another study reported that 9% of the dental clinicians directly dispose of syringes and needles in the bin, 65.6% of the dental clinicians break the needles afore disposing it and the remaining 22.9% burn the needles. Burning needles is the gold standard for the disposal. This reflects that the clinicians do not follow the protocols for properly decontaminating the needles afore breaking and disposing it (Morenikeji, 2010).

The current survey concluded that about 70% of the contenders approved the ideology of separating the waste according to the color codes.

5. CONCLUSIONS

Our results conclude that better knowledge and attitude towards the biomedical waste disposal and OSHA was observed among male study participants. There is a need of encouraging the dental practitioners to attend waste management programs. Dental students should be trained in order to learn how to properly dispose the biomedical waste.

Author contribution

SHA contributed for the design, manuscript writing. NAA involved in literature search, data collection. SAJ contributed for the literature search and manuscript editing. FKA conducted manuscript review and editing. FA conducted manuscript review and editing. FKS performed data collection review of manuscript.

Funding

This study received no specific grant from any funding organization.

Conflict of Interest

The authors declare that they have no conflict of interest.

Data and materials availability

All data associated with this study are available upon request to the corresponding author.

Peer-review

External peer-review was done through double-blind method.

REFERENCES AND NOTES

1. Bhaskar, N.L. Biomedical Waste Management Practices in a Tertiary Care Teaching Hospital in Accordance with 5. 2020: 10;2:96-98
2. DaSilva, A. TerraFemme: A Social Entrepreneurship Investigation into Composting Menstrual Waste. 2018 NCUR 01-04
3. Datta, P., Mohi, G.K., Chander, et al, Awareness of biomedical waste (bmw) management among dental and medical students. *Int. J. Adv. Res* 2018. 10, 6–14. 7, 576–582.
4. Elmehdi, H., Assessing acoustic noise levels in dental clinics and its link to dental anxiety and fear among UAE population 2010 10;5;26-29
5. Hashim, R., Mahrouq, R., Hadi, N., Evaluation of Dental Waste Management in The Emirate of Ajman, United Arab Emirates 2011, 10;5;20-22.
6. Morenikeji, O.A., An investigation of the disposal of dental clinical waste in Ibadan City, south-west Nigeria: *Waste Manag. Res.* 2010;34-37
7. Naidu, n.d. Dental health-care waste management among dentists of Nellore City - A cross-sectional study 2019;17;2:136-140.
8. Quinn, R.J.B., Instrument management: Cleaning and sterilization in the dental setting. *Dent. Nurs* 2013;96-99
9. Singh, H., Bhaskar, D., Dalai, D.R., Rehman, R., Khan, M., Dental Biomedical Waste Management. 2014;2-3.