Tanzania Journal of Health Research
Volume 25: Number 3, July 2024
https://dx.doi.org/10.4314/thrb.v25i3.9

Dental Wastes and Practices Among Dental Students and Practitioners

[1]Somalee Mahapatra*, [2]Manoranjan Dash, [3]Subhashis Mohanty

[1]PhD Scholar, Faculty of Management Science, IBCS, Tutor, Department of Prosthodontics & Crowns &Bridges, Ids, Siksha O Anusandhan, Bhubaneswar, Odisha, India.
[2]Professor, Faculty of Management Science, IBCS, Siksha O Anusandhan, Bhubaneswar, Odisha, India.
[3]Histopathology Consultant, Histopathology Department, Sum Ultimate Medicare, Bhubaneswar, Odisha, India.

Abstract

Background: The increasing worldwide worry about dental waste stems from the widespread use of materials in dental treatments. Therefore, it was crucial to conduct a comprehensive analysis to evaluate how dental waste is handled by dentistry professionals and students, resulting in important discoveries.

Objectives: This study seeks to investigate dental waste management procedures among dental students and practitioners while assessing the various forms of dental waste produced in different departments. Moreover, it aims to explore possible strategies for improving the handling and disposal of dental waste.

Methods: Students, interns, teachers, and practitioners completed an online questionnaire to provide primary data. A survey was conducted using random sampling procedures to obtain a sample of 406 persons from different dental institutions and hospitals.

Results: The research findings indicated that a significant percentage of staff members and students exhibited awareness of appropriate disposal techniques for different categories of dental waste. The Department of Oral Medicine & Radiology faculty members have shown exceptional skill. In general, the participants demonstrated a significant understanding of proper disposal methods, especially for items linked to dentistry. However, there were differences in knowledge levels across other departments, as shown by a greater proportion of skilled staff in departments like Oral Pathology & Oral Microbiology and Orthodontics compared to the students in such departments.

Conclusion: This research highlights the need to include thorough waste management education in dentistry schools to tackle the increasing environmental and health issues related to dental waste.

Keywords: Dental Waste, Students, interns, teachers, practitioners, and Dental Department

Introduction

Dental waste is a major environmental and health concern. It includes a wide range of materials, from discarded dental instruments and materials to leftover clinical waste, such as syringes, needles, and dental amalgams (Ayub et al., 2019). This waste is generated by dental offices, laboratories, and other dental healthcare facilities. It is estimated that between 4 and 10 pounds of hazardous materials are generated by each dental patient visit, depending on the type of treatment. In addition to being

* ***Corresponding Author****: msomalee@gmail.com*

https://dx.doi.org/10.4314/thrb.v25i3.9

hazardous to the environment, dental waste can be a source of occupational health and safety hazards for dental practitioners and students.

The improper disposal of dental waste can lead to contamination of the environment, as well as the spread of infectious diseases. Furthermore, improper handling of dental waste can also lead to accidental needle stick injuries, which can result in serious infections. Dental practitioners and students must adopt proper waste management practices for these reasons. This includes proper handling, storage, and disposal of dental waste (Borglin et al., 2021).

As the world's population grows, the need for different types of dental treatments has become increasingly important. This is especially true in highly populated civilizations, where the population size and density necessitate specialized and comprehensive dental services (Duane et al., 2020)In such contexts, dental waste generated can be substantial, and it is important to ensure that this waste is properly managed and disposed of to preserve the health of the population and the environment.

This article will explore the impact of population growth on dental waste, the need for different types of dental treatments, and the strategies that can be employed to manage dental waste in highly populated civilizations. In this section, the study will explore the influence of various kinds of dental wastes generated by different dental departments.

Impact of Population Growth on Dental Waste

As civilization's population increases, so does the amount of dental waste generated. This is because a larger population means more people are accessing dental services, and thus, more waste is produced. The increased demand for dental services also necessitates many dental care facilities, increasing the amount of dental waste generated. In highly populated civilizations, the amount of dental waste can be pretty substantial, and it is essential to make sure this waste is managed in a safe and effective way (Duane et al., 2019).

Need for Different Types of Dental Treatments

The demand for various forms of dental treatments is driven by the changing needs of a population over time. As populations evolve and develop, so too do their dental needs. For example, in highly populated civilizations, there is likely to be a greater demand for cosmetic dentistry, orthodontics, and restorative dentistry as people seek to improve the aesthetics of their smiles and correct any existing dental problems. Additionally, as people age, they may require more specialized treatments such as periodontal care, dental implants, and crowns. All these treatments generate a significant amount of waste, and it is crucial to ensure that this garbage is handled and disposed of correctly.

Strategies for Managing Dental Waste in Highly Populated Civilizations

To effectively manage dental waste in highly populated civilizations, it is essential to employ various strategies. These strategies should focus on reducing the amount of waste generated and ensuring that the waste generated is appropriately managed and disposed of. Some of the methods that can be employed include (Nimbulkar et al., 2020):

- **Implementing waste segregation policies:** Segregating dental waste into different categories allows for easier and more efficient disposal. It also reduces the risk of cross-contamination and helps to ensure that hazardous materials are disposed of safely and responsibly.
- **Utilizing waste reduction strategies:** Strategies such as reusing materials and recycling can help minimize the quantity of waste generated.
- **Adopting new technologies:** Technologies such as digital dentistry can help lessen the waste generated and make the disposal process more efficient.

 https://dx.doi.org/10.4314/thrb.v25i3.9

- **Investing in proper waste management systems:** Investing in proper waste management systems can help to ensure that dental waste is disposed of in an environmentally responsible manner (Pandis et al., 2021).

Literature review

In the literature section, many writers examined dental waste practices and types of dental waste created by different departments and examined the various methods of disposing of dental waste. Many studies discussed dental waste practices and types of dental waste generated from other departments. In one of the studies, applying green dentistry practices among graduate and postgraduate dental practitioners is insufficient. It aimed to assess dental practitioners' and final-year students' comprehension and safe practices of biomedical and dental waste. The participants' knowledge and habits of dental waste management were determined to be modest.

According to another study, interviews with the practitioners were conducted by the primary investigator with the use of a standardized questionnaire that had been prepared expressly for this research and was pre-tested (Naz et al., 2020). The author's goal in that research was to assess dental practitioners' degree of knowledge and attitude towards disinfection worldwide. Such research found that oral health professionals had a substantial and favourable attitude towards disinfection in the face of the coronavirus 2019 (COVID-19) pandemic, despite a lack of expertise in essential parts of disinfection procedures (Sarfaraz et al., 2020).

This research aimed to analyze the knowledge, attitude, and practice of dental practitioners in Chitwan and its neighbouring districts. From June to August 2020, 142 dental practitioners participated in this descriptive, cross-sectional survey in Chitwan (Khanal et al., 2022). Another study evaluated the efficacy of dental waste disposal bins such as Yellow Bins, Green Bins, Red Bins, and Black Bins regarding their ability to contain and dispose of hazardous dental waste.

The study found the Yellow Bin was the most effective in containing and disposing dental waste, while the Green and Red Bin were less effective. The Black Bin was the least effective in containing and disposing of dental waste. The study concluded that the Yellow Bin was the most suitable option for dental waste disposal due to its superior containment and disposal capabilities (Singh et al., 2011).

One more study showed that the red bin (for clinical waste) and Black bin (for infectious waste) were the most effective in disposing of dental waste. Additionally, the yellow and green bins were found to be less effective in containing dental waste.

The authors concluded that the red bin and black bin should be used for disposing of dental waste in dental clinics (Lakbala, 2020)Another study reviewed the use of dental waste disposal bins like the Yellow Bin, Green Bin, Red Bin, and Black Bin. The author found that these bins reduce the risk of environmental contamination and the cross-contamination of infectious materials. In addition, they are effective in reducing the workload of dental staff and providing a safe and efficient waste disposal system.

Research Gap

There is a lack of research on the amount of dental waste generated by dental students and practitioners and how it could be reduced through sustainable practices. Additionally, there is limited research on the types of dental waste generated by different departments and how this may affect the amount of waste produced. Furthermore, there is a need to explore dental students' and practitioners' knowledge and attitudes towards dental waste and to identify strategies to reduce the amount of waste produced. Although the practitioners are well aware and knowledgeable about the disposal techniques for the different types of dental waste, they don’t practically practice them.

https://dx.doi.org/10.4314/thrb.v25i3.9

Aim of the study

This research aims to investigate dental waste practices through dental students and practitioners and assess the types of dental waste generated from different departments. Additionally, the study seeks to identify potential solutions for improving the management and disposal of dental waste, assess the different types of dental waste from different Dental departments, and assess the practices followed for the various types of dental waste from the different Dental departments.

Hypothesis

H1: Different types of dental waste are generated by different dental departments.

H2: The practices for managing various types of dental waste vary across different Dental departments.

Methodology

The primary purpose of this study is to investigate dental waste practices among dental students, faculty, and practitioners and find awareness of various types of dental waste from the different dental departments. The study will utilize a quantitative method. The research methodology used in this research is a quantitative approach. This will include a data collection approach and a study of several departments' many rules and norms governing dental waste disposal.

Data Collection

A structured questionnaire will be developed based on the research objectives, and items on the Likert scale will be used to measure variables from students, interns, faculties and practitioners. A sample of 406 students and faculty from different dental colleges and hospitals were selected for the survey. The questionnaires were formed by other departments which are mentioned.

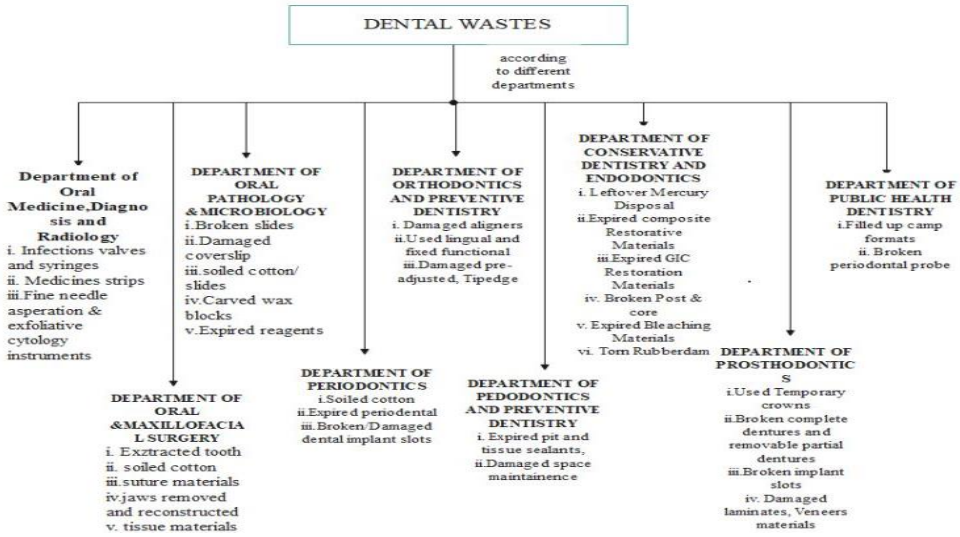

Figure 1: Dental wastes in different departments

Inclusion & Exclusion Criterion

The research comprises dental students in the first, second, third, and fourth years of their Bachelor of Dental Surgery (BDS) program. It also includes faculty members from dental institutions and practicing dentistry practitioners. Furthermore, the study invites those willing to participate, regardless of their personal information, and those who completed the questionnaire sent to them

 https://dx.doi.org/10.4314/thrb.v25i3.9

during data collection. On the other hand, the research excludes non-dental college associates and practitioners. Non-respondents who did not complete or return the questionnaire during data collection are excluded. Incomplete or inconsistent questionnaire answers are eliminated from the analysis. Participants who openly refused the study were also excluded.

Sampling Technique

Respondents will be asked to respond to this study, and the full questionnaire will be saved for future research. The data will be collected using a self-designed structured questionnaire and the random sample approach.

Random Sampling

For this study, we create a comprehensive list of dental colleges in the study area as part of the random sampling process. Next, a predetermined selection of colleges is chosen at random. Students from each BDS year, faculty, and practitioners are randomly selected within these colleges. We maintain a rigorous focus on fairness and transparency throughout the entire process. The sample size is determined through statistical analysis. Participants who have been chosen are encouraged to participate in the study by completing questionnaires or engaging in interviews. This approach seeks to offer a wide range of data to gain a comprehensive understanding of dental waste practices. In the case when a sample is only picked once, the formula for random sampling is as follows:

$$P = 1 - \left(\frac{N-1}{N}\right)\left(\frac{N-2}{N}\right).....\left(\frac{N-n}{N-(n-1)}\right)$$

Here, P is the probability, n is the sample size, and N represents the population.

Data Analysis

The study will utilize statistical methods to evaluate the types and quantities of dental waste generated by different dental departments. Additionally, it will assess the current practices employed for managing these wastes. Frequencies and percentages will be calculated using descriptive statistics to provide a comprehensive overview of the types of dental waste each department produces. Statistical methods, such as ANOVA, will be used to analyze and compare the variations in waste generation across various departments. The study uses quantitative methods to uncover significant findings regarding the discrepancies in dental waste practices among multiple departments. It also aims to offer recommendations for enhancing waste management and disposal strategies based on solid evidence.

Results

This study evaluates the dental waste practices followed among dental students, faculty, PGs (Postgraduate), and Interns. Also, it aims to raise awareness about the various types of dental waste in different dental departments such as the Department of Oral Medicine & Radiology, the Department of Oral & Maxillofacial Surgery, the Department of Orthodontics, the Department of Periodontology, the Department of Prosthodontics, the Department of Conservative Dentistry, and the Department of Pedodontics.

https://dx.doi.org/10.4314/thrb.v25i3.9

H1: Different types of dental waste are generated by different dental departments.

Table 1 ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Dept. of Oral Medicine Radiology	Between Groups	2.367	6	.394	10.805	.035
	Within Groups	195.452	399	.490		
	Total	197.818	405			
Dept. of Oral Maxillofacial Surgery	Between Groups	2.937	6	.489	8.077	.022
	Within Groups	181.381	399	.455		
	Total	184.318	405			
Dept. of Orthodontics	Between Groups	3.583	6	.597	11.014	.001
	Within Groups	235.079	399	.589		
	Total	238.662	405			
Dept. of Periodontology	Between Groups	1.632	6	.272	10.507	.031
	Within Groups	214.117	399	.537		
	Total	215.749	405			
Dept. of Prosthodontics	Between Groups	3.819	6	.636	11.301	.026
	Within Groups	195.167	399	.489		
	Total	198.986	405			
Dept. of Conservative Endodontic & Dept. of Pedodontics	Between Groups	1.833	6	.306	9.641	.015
	Within Groups	190.078	399	.476		
	Total	191.911	405			

The analysis of variance (ANOVA) table shows the findings of a study on the differences in the types of dental waste created by various dental departments. Each department was evaluated, including Oral Medicine Radiology, Oral Maxillofacial Surgery, Orthodontics, Periodontology, Prosthodontics, and a united department of Conservative Endodontics and Pedodontics. The table displays each department's total squares, degrees of freedom, mean squares, F-values, and significance levels. The F-values show considerable disparities between departments in terms of dental waste output. The departments of Orthodontics, Prosthodontics, and Conservative Endodontic & Pedodontics reveal substantial differences, with F-values of 11.014, 11.301, and 9.641, respectively, with p-values less than 0.05. As a result, the analysis validates the idea that there are differences in the types of dental waste generated by different dental departments, focusing on Orthodontics, Prosthodontics, and Conservative Endodontics & Pedodontics.

H2: The practices for managing various types of dental waste vary across different Dental departments.

For this hypothesis, a descriptive analysis is used, which is shown below

https://dx.doi.org/10.4314/thrb.v25i3.9

Department of Oral Medicine & Radiology

Table 2 Statement-wise frequencies of the Department of Oral Medicine & Radiology

Statements		1st BDS	2nd BDS	3rd BDS	4th BDS	Faculty	PG	Intern	Total
Do you know where to dispose the lead apron, x-ray film's lead cover and undeveloped x-ray films into:	Black Bin	28	38	46	53	93	27	35	320
	Common Dustbin	3	0	6	4	2	3	3	21
	Don't Know	6	7	13	12	21	4	2	65
Do you know where to dispose the medicines (Antibiotic, analgesic), expired and discarded medicines into:	Black Bin	27	31	45	40	85	25	33	296
	Common Dustbin	2	2	7	5	9	5	4	34
	Don't Know	8	12	13	14	22	4	3	76

Table 2 shows waste disposal knowledge from students (1st BDS, 2nd BDS, 3rd BDS, 4th BDS), teachers, postgraduates (PGs), and interns at the Department of Oral Medicine & Radiology. Disposal of the lead apron, x-ray film's lead cover, undeveloped x-ray films and antibiotics, analgesics and expired and abandoned pharmaceuticals were investigated. 320 respondents knew how to dispose of lead aprons and associated objects, most preferring the "Black bin." Notably, instructors were more informed than BDS students. For pharmaceuticals, 296 respondents selected the "Black bin," showing instructors are more knowledgeable than BDS students. The data indicate that Oral Medicine & Radiology professors know more about waste disposal. Accordingly, comprehensive trash disposal education for all stakeholders, including students and professors, is necessary to encourage sustainable waste management in the department.

Department of Oral & Maxillofacial Surgery

Table 3 Statement-wise frequencies of the Department of Oral and Maxillofacial Surgery

Statements		1st BDS	2nd BDS	3rd BDS	4th BDS	Faculty	PG	Intern	Total
Do you know where to dispose the dental tooth and post-operative oral tissues into:	Yellow bin	27	39	52	51	83	30	34	316
	Common dustbin	2	1	1	0	5	0	2	11
	Don't know	8	5	12	18	28	4	4	79
Do you know where to dispose the	Yellow bin	28	39	48	55	83	27	34	314
	Common dustbin	2	0	3	2	4	2	3	16

https://dx.doi.org/10.4314/thrb.v25i3.9

infected suture material into:	Don't know	7	6	14	12	29	5	3	76
Do you know where to dispose the expired local anesthetics reagent into:	Black bin	24	31	48	48	88	27	33	299
	Common dustbin	8	7	5	13	6	3	4	46
	Don't know	5	7	12	8	22	4	3	61

Table 2 shows the waste disposal expertise of Oral and Maxillofacial Surgery students (1st BDS, 2nd BDS, 3rd BDS, 4th BDS), instructors, postgraduates (PGs), and interns. The disposal of dental teeth and post-operative oral tissues, infectious suture material, and expired local anaesthetic reagents were assessed. 316 respondents knew how to dispose of dental teeth and post-operative oral tissues, most preferring the "Yellow bin." Several responders, especially 3rd BDS students and teachers, were unsure about the proper disposal technique. 314 respondents selected the "Yellow bin," indicating great awareness of contaminated suture material. However, many across all groups, notably 3rd BDS students and teachers, were unsure about the best disposal strategy. For expired local anaesthetic reagents, 299 respondents preferred the "Black bin," suggesting a majority of knowledge of proper disposal. However, many responders, especially 3rd BDS students and teachers, were unsure about disposal techniques. These results emphasize the necessity of trash disposal education and awareness, especially for students and teachers who are uncertain of correct waste disposal techniques.

Department of Orthodontics

Table 3 Statement-wise frequencies of the Department of Orthodontics

Statements		**1st BDS**	**2nd BDS**	**3rd BDS**	**4th BDS**	**Faculty**	**PG**	**Intern**	**Total**
Do you know where to dispose of orthodontic wires into:	Blue bin	26	34	46	48	80	25	32	291
	Common dustbin	3	2	9	2	5	4	2	27
	Don't know	8	9	10	19	31	5	6	88
Do you know where to dispose the used metallic orthodontic brackets into:	Blue bin	27	36	47	46	79	26	31	292
	Common dustbin	2	1	6	4	6	2	5	26
	Don't know	8	8	12	19	31	6	4	88

https://dx.doi.org/10.4314/thrb.v25i3.9

Do you know where to dispose the plastic brackets, bands used in orthodontic treatment & the used night guard into:	Red bin	28	35	39	43	76	27	31	279
	Common dustbin	1	2	9	2	9	1	1	25
	Don't know	8	8	17	24	31	6	8	102

Table 3 shows how students (1st, 2nd, 3rd, and 4th BDS), teachers, postgraduates (PGs), and interns at the Department of Orthodontics responded to waste disposal questions. Three assertions were evaluated: disposal of orthodontic wires, metallic and plastic brackets, orthodontic bands, and night guards. 291 respondents knew how to dispose of orthodontic wires, most preferring the "Blue bin." Many responders, especially 4th BDS students and professors, were unsure about the proper disposal technique. 292 respondents preferred the "Blue bin" for metallic orthodontic brackets, indicating excellent knowledge. However, many across all groups, especially 3rd BDS students and teachers, were unsure about the disposal procedure. For plastic brackets, bands, and worn night guards, 279 respondents preferred the "Red bin," suggesting a majority of knowledge of proper disposal. However, many responders, particularly 3rd BDS students and staff, were unsure about disposal. These results emphasize the necessity of trash disposal education and awareness, especially for students and teachers who are uncertain of correct waste disposal techniques.

Department of Periodontology

Table 4 Statement wise frequencies of the department of Periodontology

Statements		**1st BDS**	**2nd BDS**	**3rd BDS**	**4th BDS**	**Faculty**	**PG**	**Intern**	**Total**
Do you know where to dispose the broken scalar points into:	Blue bin	24	31	44	41	76	23	29	268
	Common dustbin	3	0	6	3	8	3	2	25
	Don't know	10	14	15	25	32	8	9	113
Do you know where to dispose post perio-surgical waste materials into:	Yellow bin	30	39	47	54	89	28	33	320
	Common dustbin	2	0	4	1	4	1	4	16
	Don't know	5	6	14	14	23	5	3	70

https://dx.doi.org/10.4314/thrb.v25i3.9

In the table-4, 1st, 2nd, 3rd, and 4th, BDS students, teachers, postgraduates (PGs), and interns in the Department of Periodontology answer questions on waste disposal. Broken scalar point disposal and post-period-surgical waste disposal were assessed. For broken scalar points, 268 respondents knew how to dispose of them, with most preferring the "Blue bin." A significant number of all groups, notably 4th BDS students and professors, were unsure about the proper disposal technique. 320 respondents preferred the "Yellow bin," demonstrating great awareness for post-period-surgical trash. Many responders, especially 3rd BDS students and professors, were unsure about the best disposal strategy. These results emphasize the need to reinforce awareness of trash disposal, particularly among students and teachers unsure about correct disposal techniques.

Department of Prosthodontics

Table 5 Statement-wise frequencies of the Department of Prosthodontics

Statements		1st BDS	2nd BDS	3rd BDS	4th BDS	Faculty	PG	Intern	Total
Where do you dispose impression materials, dental waxes, green stick compound, impression pastes; shellac base plates into:	Yellow bin	32	35	39	53	84	28	31	302
	Common dustbin	2	4	11	4	10	2	3	36
	Don't know	3	6	15	12	22	4	6	68
Where do you dispose the rubber base impression material, investment material, pumice, acrylic, metal dust, alginate, old models and casts, old acrylic dentures and acrylic teeth into:	Black bin	28	32	41	52	87	28	34	302
	Common dustbin	6	4	13	5	8	3	2	41
	Don't know	3	9	11	12	21	3	4	63

Table 5 shows the waste disposal knowledge of Department of Prosthodontics students (1st BDS, 2nd BDS, 3rd BDS, 4th BDS), instructors, postgraduates (PGs), and interns. Disposal of impression materials, dental waxes, and related things, as well as rubber-based impression material, investment material, and related items, were analyzed. Most respondents across all categories knew how to dispose of imprint materials, with 302 suggesting the "Yellow bin." However, many responders, especially 3rd BDS students and teachers, were unsure about the proper disposal technique. For rubber base imprint material and associated products, 302 respondents preferred the "Black bin,"

https://dx.doi.org/10.4314/thrb.v25i3.9

indicating high knowledge. However, many responders, including 3rd BDS students and teachers, were unsure about the disposal technique. These results highlight the need to increase awareness of garbage disposal, especially among students and teachers unsure about safe disposal techniques.

Department of Conservative &Endodontic, along with the Department. of Pedodontic
Table 6 Statement wise frequencies

Statements		1st BDS	2nd BDS	3rd BDS	4th BDS	Faculty	PG	Intern	Total
Do you know where to dispose both the deciduous and permanent dental tooth into:	Yellow bin	31	38	48	54	84	25	34	314
	Common dustbin	4	3	5	3	6	3	2	26
	Don't know	2	4	12	12	26	6	4	66
Do you know where to dispose the orthodontic appliances into:	Black bin	31	36	47	57	86	28	32	317
	Common dustbin	1	3	4	1	4	1	2	16
	Don't know	5	6	14	11	26	5	6	73
Do you know where to dispose the files and reamers into:	Blue bin	22	27	43	32	73	23	26	246
	Common dustbin	1	4	5	1	5	0	4	20
	Don't know	14	14	17	36	38	11	10	140

The table displays the frequency of replies from students (1st BDS, 2nd BDS, 3rd BDS, 4th BDS), teachers, postgraduates (PGs), and interns about their understanding of waste disposal methods within the Department of Conservative & Endodontic and the Department of Pedodontics. Three claims were evaluated: the disposal of deciduous and permanent dental teeth, orthodontic equipment, and files and reamers.

Regarding the disposal of dental teeth, most respondents from all groups demonstrated knowledge of the correct disposal technique, with 314 replies indicating a preference for the "Yellow bin." Nevertheless, a significant percentage, especially among 3rd and 4th BDS students and professors, acknowledged their lack of assurance about the appropriate manner of disposal. Similarly, out of the 317 respondents, most preferred the "Black bin" when it came to orthodontic equipment, indicating a significant degree of knowledge among the respondents. Nevertheless, a substantial proportion of students and staff members voiced their confusion over the appropriate way of disposal.

 https://dx.doi.org/10.4314/thrb.v25i3.9

About files and reamers, the "Blue bin" was the preferred disposal method for most respondents, with 246 replies. Nevertheless, a notable percentage of 3rd and 4th BDS students, along with staff members, expressed a deficiency in their understanding of appropriate disposal methods. These results indicate both positive aspects and places for development in waste disposal awareness within the departments. This suggests the need for focused educational activities to promote correct waste management practices among students and teachers.

Discussion

The study on dental waste management among dentistry students and practitioners found that faculty and students were aware of proper disposal methods for various types of dental waste. The Department of Oral Medicine & Radiology has the most faculty awareness. Most responders knew how to dispose of lead aprons, x-ray films, pharmaceuticals, dental teeth and oral tissues, suture material, local anaesthetics, needles, scalpel blades, and other objects. However, some departments have more knowledgeable staff than pupils.

These results emphasize the need for comprehensive waste management instruction in dentistry schools. The results we obtained match prior research and advance dental waste management knowledge. First, our findings on awareness and behaviour inequalities among dental students and professors across departments support past studies on knowledge-practice gaps among dental practitioners. Our analysis also shows that dental waste disposal containers vary in effectiveness, supporting previous studies.

Some dumpsters, like the Yellow Bin, are better at containing and disposing of dental waste. As discussed in the literature and our study, department-specific waste management approaches are essential due to these differences in disposal container reactions. Our findings also support the literature's need for complete dental waste management education and training, including disinfection. Our study did not examine disinfection procedures, but it supports the literature's demand for targeted educational interventions to bridge knowledge and practice gaps. This study illuminates dentistry students' and faculty's waste management knowledge and actions in various departments, adding to the body of research. Comparing our findings to the literature emphasizes the need for sustainable dental waste management approaches and department-specific education programs.

Conclusion

The research aimed to analyze differences in dental waste practices and awareness across different dental departments, particularly emphasising waste generation and disposal techniques. The findings show considerable variations in waste generation and administration strategies among departments.

First, the ANOVA analysis revealed significant differences between departments, specifically in Conservative Endodontics & Pedodontics, Orthodontics, and Prosthodontics, with respect to the hypothesis that different dental departments generate distinct types of dental waste (H1). These departments produced variable amounts of garbage, indicating the necessity for specific waste management techniques. Second, the descriptive analysis confirmed substantial variations in waste management procedures amongst dental departments, supporting the hypothesis that the techniques used to handle distinct forms of dental waste varied (H2).

Faculty members regularly demonstrated better levels of awareness and knowledge than students in all disciplines. This shows a possible knowledge gap and emphasizes the significance of focused education and training initiatives to enhance waste management practices among students. In conclusion, the research underscores the need for department-specific waste management policies and educational activities to raise awareness and assure safe disposal methods in dental settings. In

 https://dx.doi.org/10.4314/thrb.v25i3.9

promoting sustainable waste management practices among dental students, faculty members assume a pivotal role as educators and role models.

This, in turn, contributes significantly to advancing public health and preserving the environment. The difference may be explained by the faculty members' long track records of working in dentistry. The health and safety of healthcare workers and the well-being of their patients depend on the institution's adherence to best waste management practices.

References:

Ayub, S. S., Sinor, M. Z., Ahmad, B., & Ibrahim, N. (2019). Compliance towards Infection Control Practice among Clinical Dental Students, Universiti Sains Malaysia, Malaysia. *Health Science Journal*, *13*(5), 1–5. https://doi.org/10.21767/1791-809X.100675

Borglin, L., Pekarski, S., Saget, S., & Duane, B. (2021). The life cycle analysis of a dental examination: Quantifying the environmental burden of an examination in a hypothetical dental practice. *Community Dentistry and Oral Epidemiology*, *49*(6), 581–593. https://doi.org/10.1111/cdoe.12630

Duane, B., Harford, S., Ramasubbu, D., Stancliffe, R., Pasdeki-Clewer, E., Lomax, R., & Steinbach, I. (2019). Environmentally sustainable dentistry: a brief introduction to sustainable concepts within the dental practice. *British Dental Journal*, *226*(4), 292–295. https://doi.org/10.1038/s41415-019-0010-7

Duane, B., Stancliffe, R., Miller, F. A., Sherman, J., & Pasdeki-Clewer, E. (2020). Sustainability in Dentistry: A Multifaceted Approach Needed. *Journal of Dental Research*, *99*(9), 998–1003. https://doi.org/10.1177/0022034520919391

Khanal, B., Mishra Sapkota, S., Narayan Thakur, S., & Chaulagain, R. (2022). Denture hygiene habit and denture care practice in complete denture wearing patients visiting a dental college. *Nepal Medical Journal*, *5*(1), 16–19. https://doi.org/10.37080/nmj.124

Lakbala, P. (2020). Dental waste management among dentists of bandar abbas, iran. *AIMS Environmental Science*, *7*(3), 258–267. https://doi.org/10.3934/environsci.2020016

Naz, S., Naqvi, S. M. Z. H., Jafry, S. I. A., & Asim, S. (2020). Knowledge, attitude and practice regarding management of health care waste among private dental practitioners. *Journal of the Pakistan Medical Association*, *70*(7), 1259–1262. https://doi.org/10.5455/JPMA.22368

Nimbulkar, G., Wagh, V., Gaidhane, A., & Gaurav, K. (2020). *Assessment of knowledge , attitude and adherence to radiation safety measures and radiological waste management among mapped manpower assisting dental practitioners in Wardha district : A Protocol*. *7*(2), 2038–2043.

Pandis, N., Fleming, P. S., Katsaros, C., & Ioannidis, J. P. A. (2021). Dental Research Waste in Design, Analysis, and Reporting: A Scoping Review. *Journal of Dental Research*, *100*(3), 245–252. https://doi.org/10.1177/0022034520962751

Sarfaraz, S., Shabbir, J., Mudasser, M. A., Khurshid, Z., Al-Quraini, A. A. A., Abbasi, M. S., Ratnayake, J., & Zafar, M. S. (2020). Knowledge and attitude of dental practitioners related to disinfection during the covid-19 pandemic. *Healthcare (Switzerland)*, *8*(3). https://doi.org/10.3390/healthcare8030232

Singh, A., Agarwal, B., Agarwal, S., & Shekhar, A. (2011). Bio Medical Waste And Dentistry. *Journal of Oral Health and Community Dentistry*, *5*(3), 153–155. https://doi.org/10.5005/johcd-5-3-153