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Evaluating Awareness and Practices of Dental Students on Disinfection Methods for Extracted Infectious human Teeth at Prince Sultan Military College of Health Sciences

Alhanouf mohammed alahmadi[1], Rawan Talal Sairafi[2], Alaa Faihan Al Harithi[3], Samah ali alfuraydi[4], Abeer Abdullah Al-Awfi[5], Noura Ahmed Aldosari[6], Yosra Zubedi kabi[7], Wadha Ayed Alkhibery[8], Shahad Mazen Hamoh[9], Mashael Mazyad Almutairi[10]

[1,2,3,4,5,8,10]Dental assistant , Prince sultan Armed Forces Hospital
[6]Dental Assistant ,Northern Area Armed Forces Hospital
[7]Dental assistant specialist, King salman Forces Hospital
[9]Dental assistant, Alhada Armed Forces Hospital

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ABSTRACT
Undergraduate and postgraduate dental students refine mechanical and clinical patient treatment abilities utilizing excised human teeth. They must adhere to preclinical and clinical safety guidelines, as educational methodologies reflect clinical proficiency. In order to evaluate the comprehension of infective disinfection techniques for excised human teeth among undergraduate and bridge dental students at Prince Sultan Military College of Health Sciences. Given that Saudi Arabia has not conducted comprehensive research in this region, it necessitates evaluation.Thus, this research encompassed female undergraduate and bridging dental students at PSMCHS in Dhahran, KSA. Data was obtained by a self-administered questionnaire and results showed that 61.5% of female dental students at PSMCHS are knowledgeable about managing extracted teeth, whereas 8.2% are uncertain. Other observations among the study showed that Employment history and educational background did not influence depression rates. Substantial link between the quantity of Depression rates differ by academic level, with senior nursing students exhibiting the highest frequency at 25.94%. This study revealed that dental students recognize the importance of cleaning or sterilizing extracted teeth prior to handling them and acknowledge that human teeth are infectious.Additional variables, such as the source of transmission and the disposal of extracted teeth, revealed a deficiency of practical information regarding human excised teeth.

Keywords: Infectious, Dental, Disinfection, Depression, Awareness

INTRODUCTION

Infection control is a crucial aspect of dentistry, encompassing the health of dental practitioners, dental assistants, and patients. In their initial training years, undergraduate dentistry students conduct procedures in preclinical simulation facilities to attain technical proficiency prior to treating patients in clinical settings. Preclinical training frequently utilizes excised teeth for practical assessments, educational purposes, and research activities. Extracted teeth utilized in educational contexts are classified accordingly and must undergo either disinfection or sterilization; this also encompasses items employed in simulated preclinical education that may have been contaminated with blood or saliva. The body fluids associated with extracted teeth pose a risk of infection and cross-contamination to dental undergraduate students who routinely handle these specimens to enhance their clinical skills and techniques; therefore, individuals who collect extracted teeth must ensure decontamination prior to their use. Diverse techniques have been employed to preserve and convey removed teeth. The Occupational Safety and Health Administration (OSHA) The Blood-borne infections Standard identifies human teeth as a possible source of blood-borne infections. Deogade et al. (2016). The hepatitis B virus (HBV), human immunodeficiency virus (HIV), and various other blood-borne bacterial pathogens may exist in the pulp, radicular, and periradicular tissues of extracted human teeth. In accordanceThe CDC and preventive have established standards for the infection control of extracted teeth utilized in research and education, mandating sterilization before to use to mitigate the danger of transmitting blood-borne diseases. Numerous authors have addressed the issues related to the utilization of extracted human teeth, which are significantly contaminated and challenging to sterilize due to their structure. Additionally, these teeth may sustain damage or undergo alterations from the sterilization methods employed (Passarelli et al., 2020; Aslam, 2018). Efficient techniques for tooth disinfection or sterilization encompass immersion in formalin, hydrogen peroxide, or glutaraldehyde, as well as steam sterilization. Fractures may arise during procedures, causing

frustration for students. Attam et al. (2016) investigated the effects of autoclaving and 10% formalin storage on removed teeth, concluding that chemical agents such as 2.6% sodium hypochlorite and 3% hydrogen peroxide are not suitable nor effective for disinfecting or sterilizing excised human teeth. Although research exists on the efficacy of disinfectants, evaluations of dental students' knowledge, attitudes, and practices concerning the management of removed teeth are scarce. This study aimed to evaluate the knowledge, attitudes, and practices concerning the disinfection and sterilization of extracted human teeth among undergraduate dental students in the Dental Oral Health Care Department at Prince Sultan Military College of Health Sciences in Dhahran, Saudi Arabia.

MATERIAL AND METHODS

The present study was a cross-sectional design to assess the awareness and practices of handling extracted human teeth among dental students that was conducted at the Prince Sultan Military College of Health Sciences (PSMCHS) in Dhahran, Saudi Arabia. The study population included 54 female undergraduate and bridging dental students enrolled in the Bachelor's in Dental Oral Health program at PSMCHS. Data collection tools were a self-designed online questionnaire that was developed based on a previous study conducted in the East Coastal Region of India. The questionnaire consisted of 15 close-ended questions, including sociodemographic details and items assessing awareness and practices related to handling extracted human teeth. The questionnaire was reviewed and validated by a panel of experts and subjected to a reliability test using Cronbach's Alpha coefficient, yielding a value of **0.66**. The validated questionnaire was distributed among the 54 students in the Dental Oral Health Department at PSMCHS. Participants were informed about the study's aims, and informed consent was secured before participation All Female undergraduate and bridging dental students in the Dental Oral Health Department at levels: Undergraduate: 3rd, 4th, 5th, 6th, 7th, and 8th levels. Bridging: 1st and 2nd years. On the other hand, Pre-clinical students and students from other health sciences departments were excluded. Responses were collected and compiled for analysis. Data were represented in tables and figures for clarity. Then Data were entered in SPSS software version 25.Descriptive statistics (means and standard deviations) were calculated, and graphical presentations were generated using **Microsoft Excel 2020**. The findings were compared with previous literature to address the research questions effectively.

RESULTS

based on the data obtained from the questionnaire. First of all, general descriptive analysis is presented on the sociodemographic data of the participants as well as the questions that investigates their awareness and knowledge regarding disinfection methods of infectious extracted human teeth. Central tendency measurements (means and standard deviations) of the variables are presented; to get a general comprehensive understanding of the data. Each question is then investigated in frequency tables that illustrate the frequency and percentage of each answer to the questions and accompanied with graphs for better view on the data. Before discussing all these findings, a reliability test using Cronbach's Alpha coefficient that gives a value for the reliability of the study tool. This test is presented below in table 1, which shows that the score for such a test was 0.66.

Table 1: Reliability statistics of the questionnaire

Cronbach's Alpha	N of Items
.660	17

Table 2: Means and standard deviations of the data

	Mean	Std. Deviation
Work experience	1.9508	1.41923
Education level	4.1803	1.68828
Is preclinical practical procedure practiced on mounted Extracted human teeth?	1.5246	.76608
Can extracted human teeth be a source of infection?	1.2951	.61493
Can these teeth be a source of HBV transmission?	1.4426	.74217
Can these teeth be a source of HCV transmission?	1.4426	.74217
Can these teeth be a source of HIV transmission?	1.4754	.76608
Is there a necessity to disinfect/ sterilize extracted teeth before Working on them?	1.3279	.62507
Is there a necessity to use mask while working on extracted human teeth?	1.2787	.55170
Is there a necessity to use safety glasses while working on extracted human teeth?	1.4098	.69227
Is there a necessity to use gloves while working on extracted human teeth?	1.3115	.62024
Should student be taught about different methods of disinfection for extracted human teeth?	1.3607	.65911
For which departments do you use extracted teeth for educational purpose?	3.9836	2.03709
From where do you collect extracted teeth for educational purpose?	1.6393	.68393
Disinfection/sterilization method for extracted human teeth preferred?	2.6885	1.23208
With which do you feel better to work with?	1.5738	.49863
How extracted teeth should be disposed of?	1.6557	.77212
Valid N (listwise)		

Table 2 represents information of the central tendency measurements (means and standard deviations) of the variables. For the sociodemographic data, most of the participants did not have a working experience period, as the mean is 1.95 ± 1.41. Furthermore, most of the participants where studying in senior undergraduate levels, as the mean for the education level variable was 4.18 ± 1.68. for the rest of the questions,themeanofthedatarangedfrom1.2to2.9,withanoutliermeanthatgoes to the question about the departments they use to learn about teeth extraction (3.98 ± 2.03).

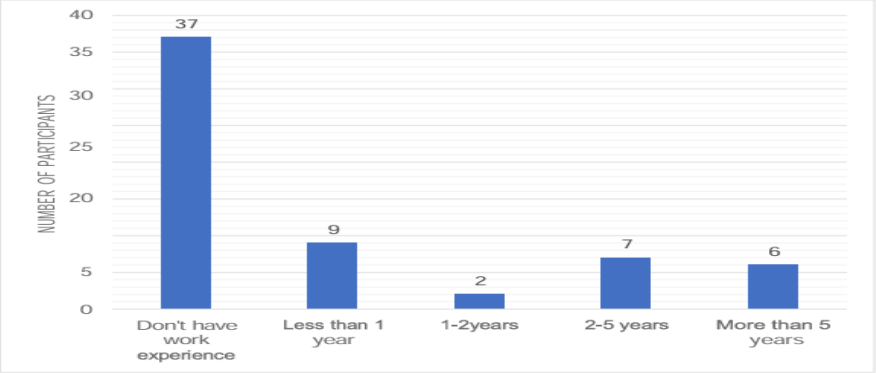

Figure 1: Participants' working experience (in years)

Most of the participants (60.7%) did not have any work experience. However, this percentage is followed by only 14.8% of the total sample who have a work experience that is less than one year. For those who have a longer experience (5 years), the data shows that they were 9.8% of the sample.

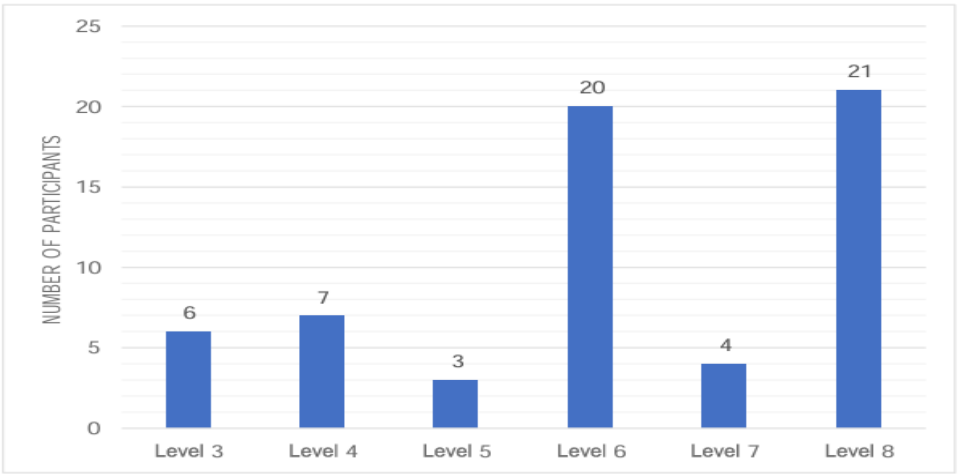

Figure 2: Participants' Education levels

The educational levels of the participants are presented in figure 2. The levels ranged from level 3 all the way to level 8 -which was the most chosen level by the participants (34.4%), followed by level 6 had (32.8 participants). Level 7, however, scored the least level enrolled by the students (6.6%).

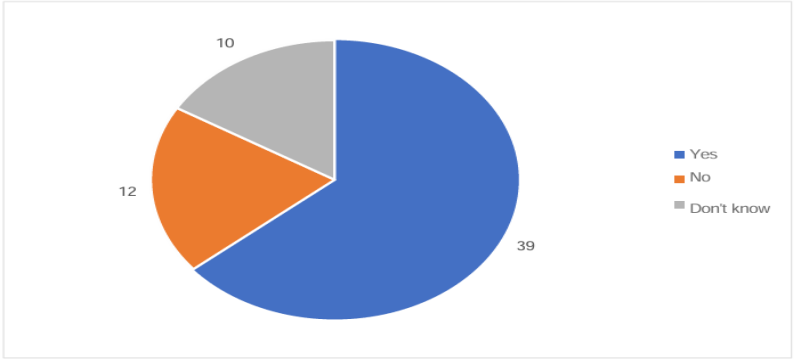

Figure 3: Distribution of participants' response on whether preclinical practical

procedure practiced on mounted extracted human teeth The vast majority of the participants (63.9%) indicated that they are positive regarding this matter, while only 19.7% preferred to say “no”

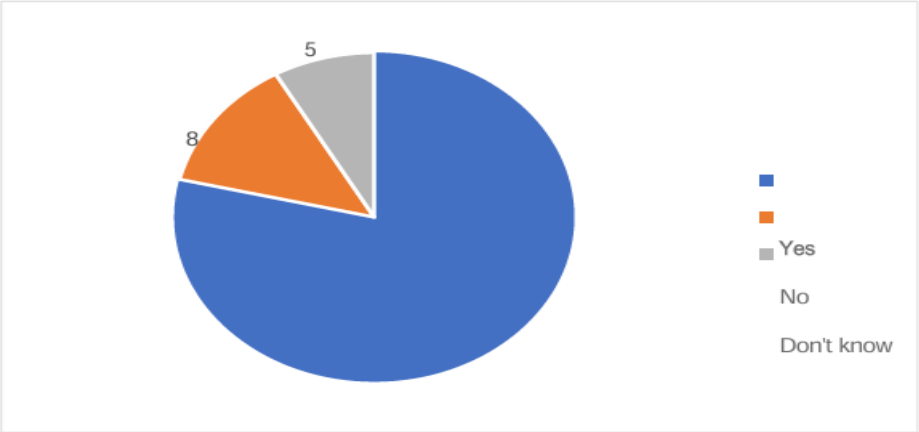

Figure 4: Distribution of participants’ views on whether human teeth can be infectious

The vast majority of the sample (78.7%) said that they think that human teeth can be infectious, while only 8 participants opposed such an answer. However, only 5 participants were not sure about this matter.

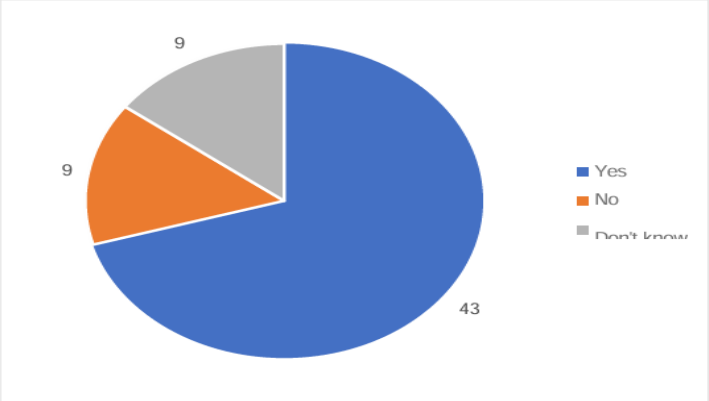

Figure 5: Distribution of participants’ responses on whether teeth can be a source of HBV transmission.
most of students (70.5%) choose “yes” as a respond to this question, while 29.6% either responded as “no” or “do not know”.

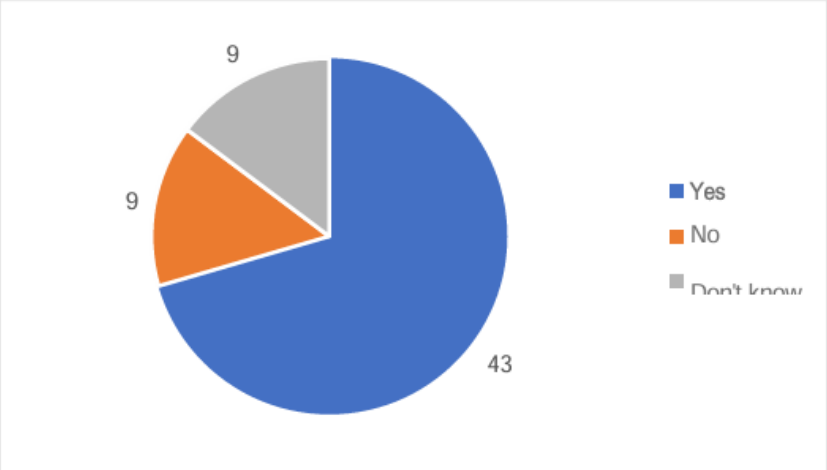

Figure 6: Distribution of participants’ responses on whether teeth can be a source of HBV transmission.

Most of the participants (43 participants) confirmed that kind of transmission can happen, while 9 participants opposed this answer, and another 9 participants were not sure.

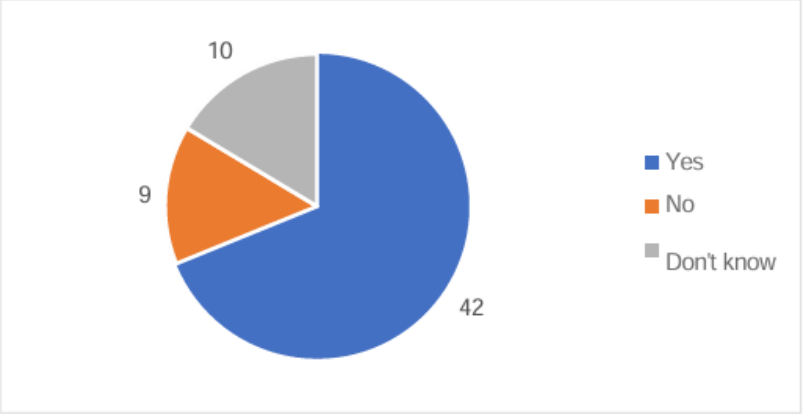

Figure 7: Distribution of participants' responses on whether teeth can be a source of HIV transmission

About sixty eight(68.9%) of them confirmed that, while 14.8% choose "no" as their answer. However, 16.4% of the sample choose "do not know".

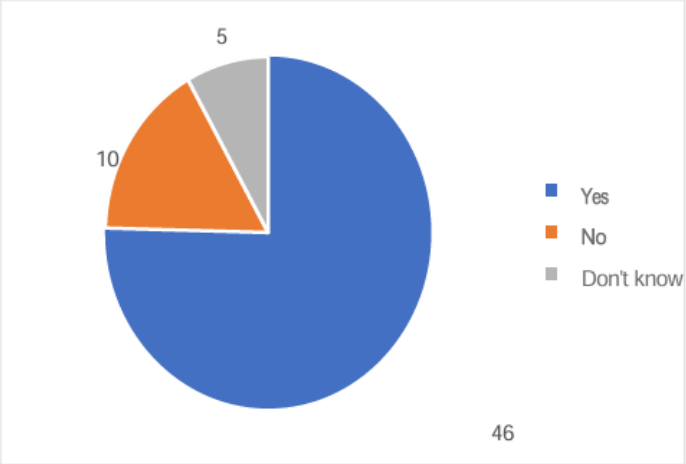

Figure 8: Distribution of participants' opinion on the necessity to disinfect/sterilize extracted teeth before working on them.

About 75.4% of the total sample indicated that it is necessary to disinfect/sterilize extracted teeth before working on them, while 16.4% disagreed with that. Only 8.2% of the participants were not sure about this question.

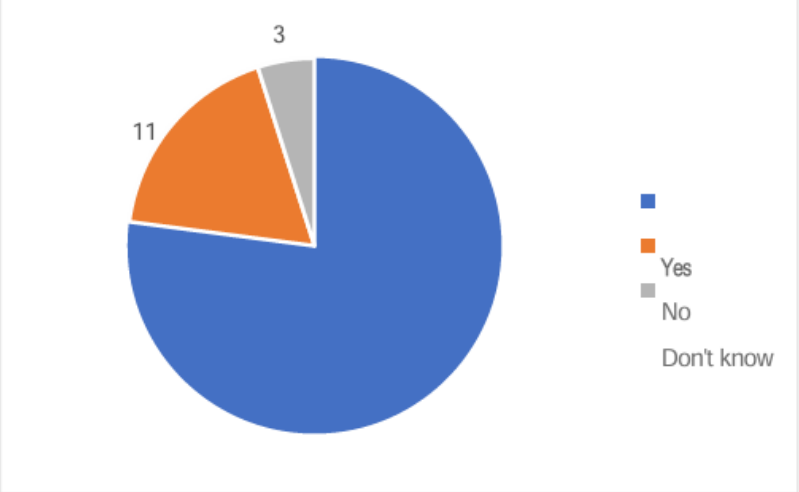

Figure 9: Distribution of participants' response on the necessity of using a mask while working on extracted human teeth.

The participants' views on the necessity of using a mask while working on extracted human teeth were investigated in this study. 77% of the total sample indicated that such a matter is important, while 18% of the sample indicated the opposite.

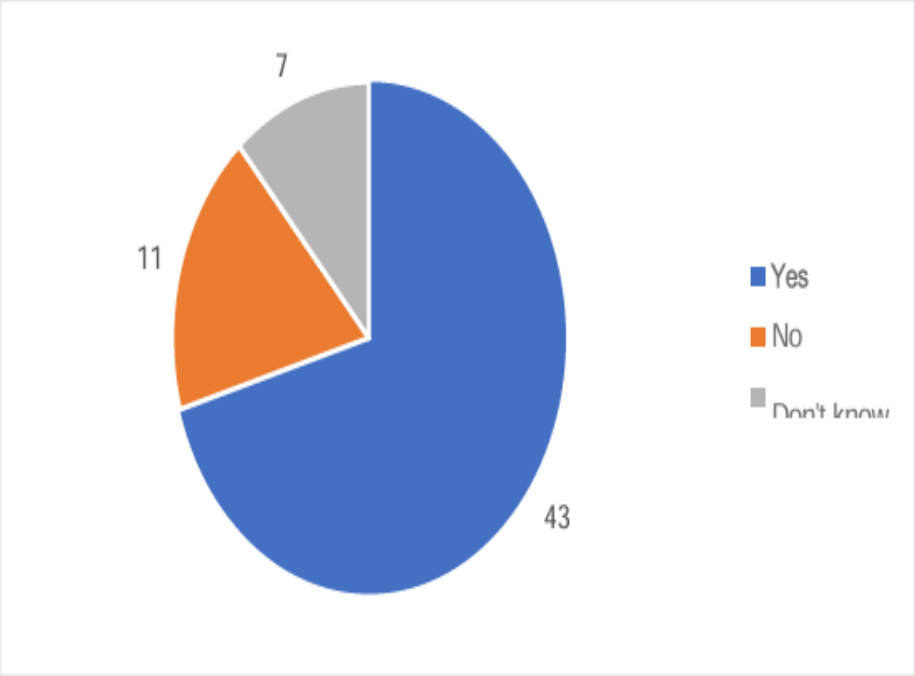

Figure 10: Distribution of participants' response on the necessity of using safety glasses while working on extracted human teeth

The participants' views on the necessity of using safety glasses while working on extracted human teeth were also investigated in this study. Most of the participants answered that it is imperative to wear safety glasses while working on extracted human teeth, while only 18% of the total sample said the opposite. Only 11.5% were not sure about this matter

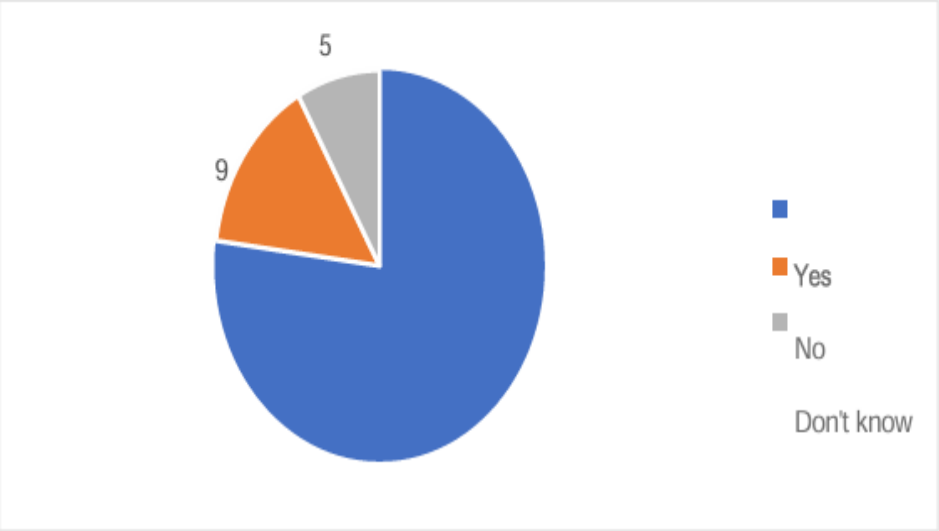

Figure 11: Distribution of participants' response on the necessity of using gloves while working on extracted human teeth.

The participants' views on the necessity of using gloves while working on extracted human teeth were explored in this study. About seventy seven of the participants agreed with the importance of using gloves while working on extracted human teeth, while only 14.8% of the participants disagreed with this matter.

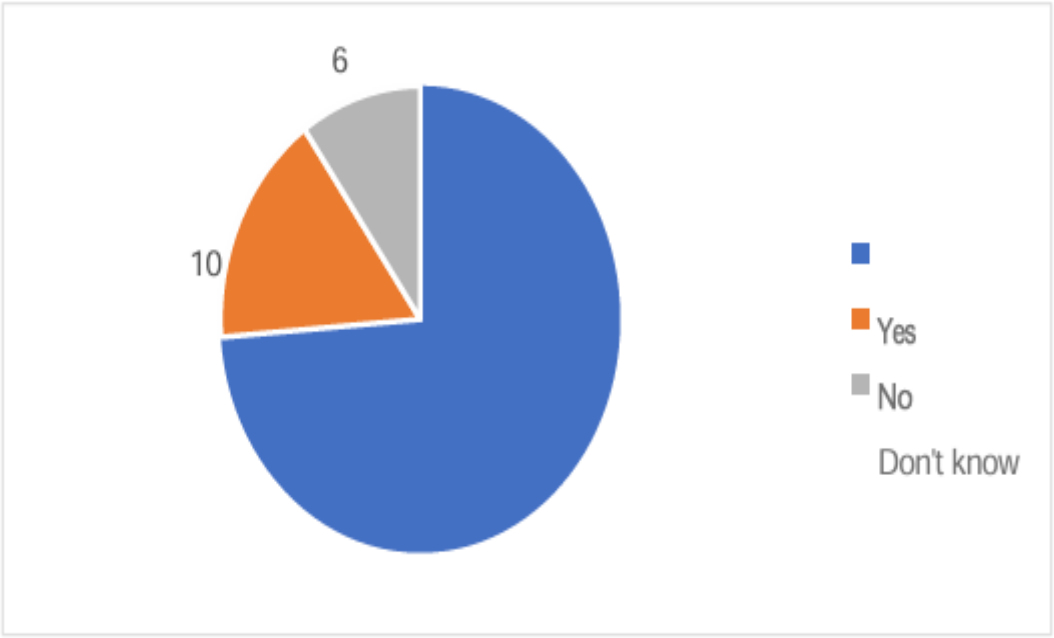

Figure 12: Distribution of participants' views on whether students should be taught about different methods of disinfection for extracted human teeth.

When the were investigated about whether students should be taught about different methods of disinfection for extracted human teeth, most of them (73.8) said that they agree with this matter, while 16.4% disagreed. Only 9.8% were not sure.

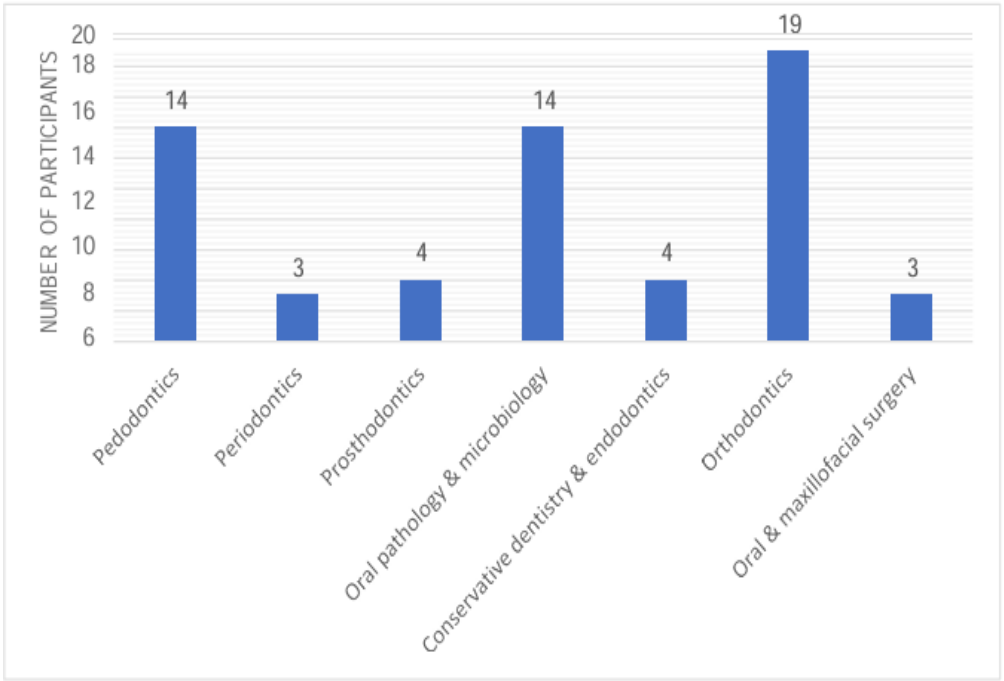

Figure 13: Distribution of departments used by the participants to extract teeth for educational purpose.

When the participants were asked about what departments they use to extract teeth for educational purpose, the vast majority of them (31.3%) indicated that they would go to the orthodontics department, followed by 23% of the total sample who said they would use the pedodontics department. Only 3 participants indicated that they would go to the periodontics department, and another 3 participants said that oral and maxillofacial surgery is the department they would use.

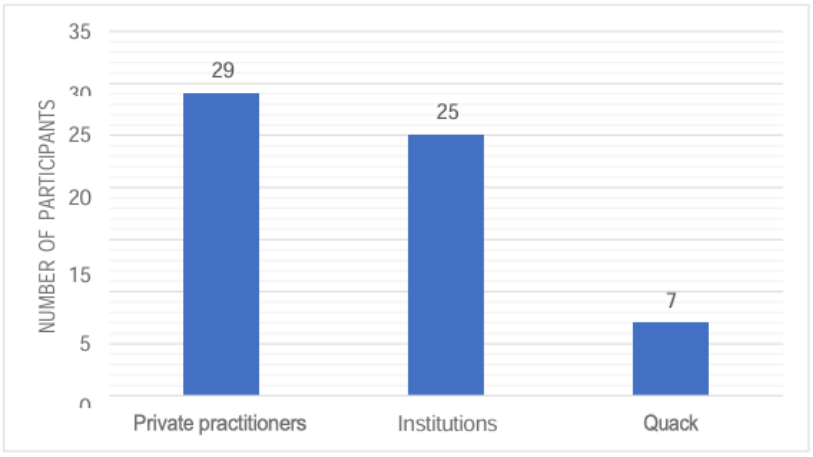

Figure 14: Distribution of participants' place for collecting extracted teeth for educational purpose.

As to the participants' place for collecting extracted teeth for educational purpose, most of them (47.5%) indicated that they would go to private practitioners, followed by 41% of the sample who would go to institutions. Only 11.5% said that they would go to quackery for this reason.

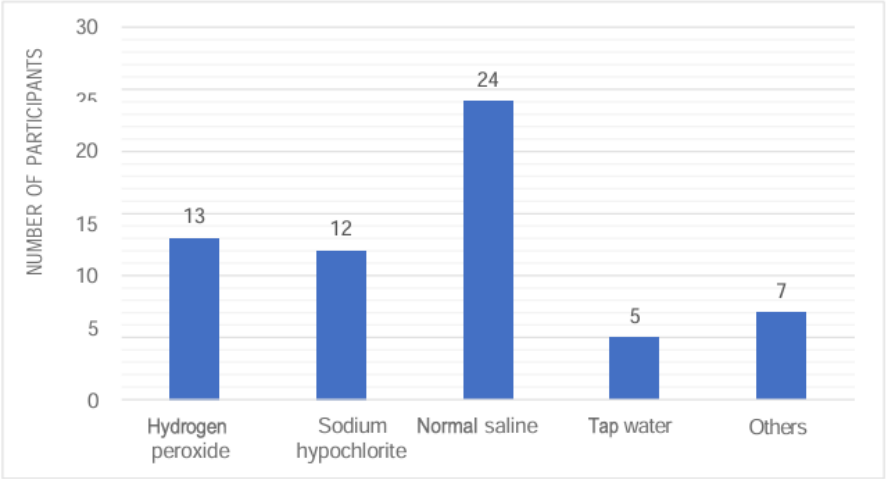

Figure 15: Distribution of the preferred disinfection/sterilization method for extracted human teeth by the sample.

When the participants were asked about the method for disinfection/sterilization of extracted human teeth, most of them (39.3%) chose normal saline followed by 21.3% who decided to go with hydrogen peroxide. On the other hand, only 8.2% of the participants who said that they would choose tap water for such a reason.

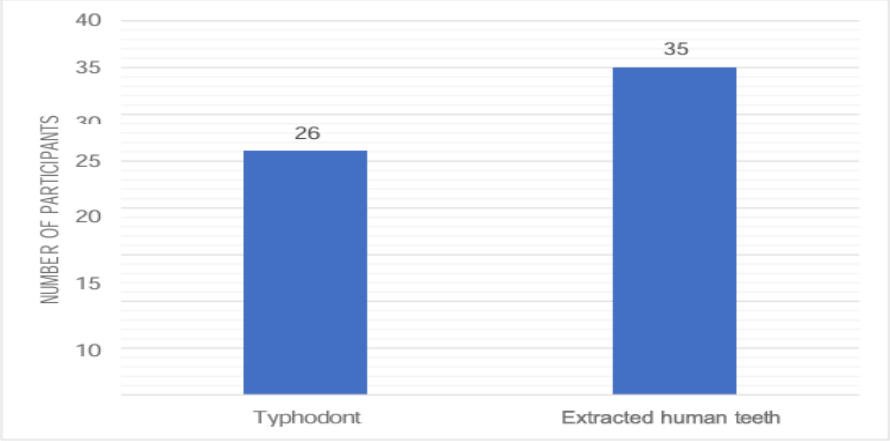

Figure 16: Distribution of the participants' responds on the preferred model of teeth

participants' responds on what type of teeth model they prefer to work with. Most of the participants (57.4%) indicated that they prefer extracted human teeth, while 42.6% would rather work with typodonts.

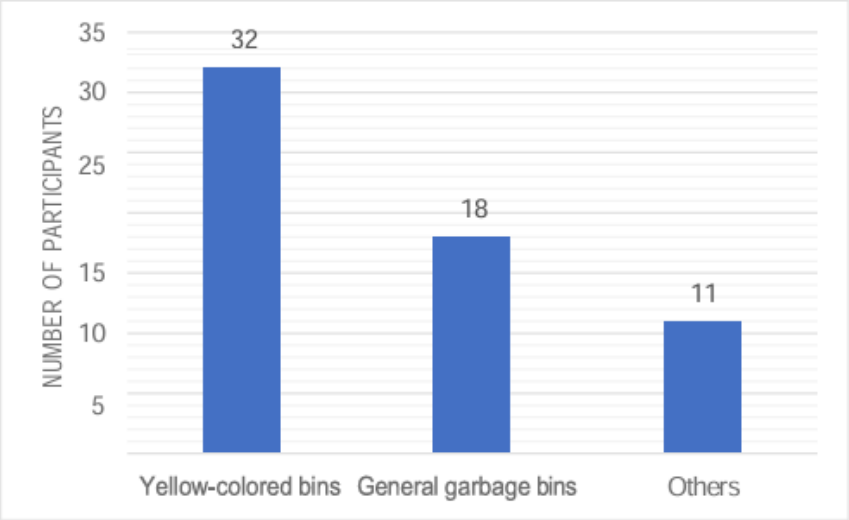

Figure 17: Distribution of the participants' attitudes toward the disposal of extracted teeth .

When they were asked about the adequate method for extracted teeth disposal, 52.5% of the participants indicated that extracted teeth should be disposed in the yellow-colored bins, while 29.5% of the total sample said that they would dispose extracted teeth in the general garbage bins. Only 18% of the sample indicated that they would use other methods

DISCUSSION

This study examined 61 undergraduate dental students from the Dental Oral Health Care Department at Prince Sultan Military College of Health Sciences in Dhahran, Saudi Arabia, to evaluate their knowledge, attitudes, and practices concerning the disinfection and sterilization of extracted human teeth. A significant finding of this study is that the majority of the sample (78.7%) believes that human teeth can be infectious, whereas only 8 persons disagreed. This data aligns with Omar and Farrag (2016), who revealed that dental students reported human teeth as a potential source of infection and a risk for disease transmission.This survey revealed that 75.4% of the overall sample deemed it essential to disinfect or sterilize extracted teeth prior to handling, whilst 16.4% opposed this view. Merely 8.2% of the participants expressed uncertainty over this subject. Omar and Farrag (2016) reported similar findings, indicating that the majority of dental students across all grades concurred on the necessity of disinfecting and/or sterilizing extracted teeth prior to handling them.This study evaluated the students' understanding of the methods for disinfecting and sterilizing excised human teeth. A majority (39.3%) indicated that normal saline is the appropriate approach for the disinfection/sterilization of extracted human teeth, while 21.3% opted for hydrogen peroxide. Conversely, merely 8.2% of the participants indicated that they would select tap water for that reason. Research conducted by Deogade et al. (2016) yielded varying results, revealing that 57% of participants identified hydrogen peroxide as the preferred sterilizing agent, whilst 24.6% of students considered autoclave sterilization to be an effective method. Lolayekar et al. (2007) reported divergent findings, stating that the dental students identified 10% Formalin, 5.25% Sodium Hypochlorite, and autoclaving as the most effective methods for the disinfection and sterilization of extracted human teeth.

CONCLUSIONS

This study concluded that dental students possess a significant awareness of the necessity to disinfect or sterilize extracted teeth prior to handling them, which aligns with their extensive understanding of the infectious nature of human teeth. Conversely, the dental students appear to possess inadequate knowledge regarding the proper techniques for disinfecting and sterilizing excised human teeth. Additional variables, such as the source of transmission and the disposal of extracted teeth, corroborated the deficiency in information concerning the actual management of human excised teeth.

RECOMMENDATIONS

In light of this investigation, the following recommendations are made:

Educators and authorities should furnish dentistry students with programs that enhance their proficiency in managing human removed teeth.

The risks associated with the use of human removed teeth should be clearly articulated in locations where these teeth are utilized.

Further research is necessary to examine dental students' knowledge, attitudes, and practices about the disinfection and sterilization of extracted human teeth, utilizing a bigger sample from various regions in Saudi Arabia.

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