بسم الله الرحمن الرحيم

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NAPATA COLLEGE

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Faculty of Dentistry
Department of Dental Public Health

Assessment of Knowledge, Attitude and Practice to Infection Control Among the Final Dental Students in the Khartoum stat

Thesis Submitted to Napta College in Partial Fulfillment of the Requirements for the Degree of B.Sc. in Dentistry

Abdelaziz A Hassan and Shimaa A Jobara

Supervised by:

Dr. Ahmed Hashim Alfaki
BDS. (U of Novgorod),MD DPH (SMSB)

2021

بسم الله الرحمن الرحيم

:قال تعالي

(190) الذين يذكرون الله قياما ان في خلق السماوات والأرض واختلاف اليل والنهار لآيات لأولي الالباب" وقعودا وعلى جنوبهم ويتفكرون في خلق السماوات والأرض ربنا ما خلقت هذا باطلا سبحانك فقنا عذاب (191) النار

صدق الله العظيم

سورة ال عمران

Dedication

TO MY DEAREST KIND FATHER AND MOTHER...

LOVELY BROTHERS AND SISTERS...

AND SWEETEST FRIENDS

Acknowledgement

I would like to express my deep and sincere gratitude to my supervisor Doctor Ahmed Hashim Alfaki for his guidance, interest, helpful comments and encouragement during this study. Without his warm support, patience and inspiration this work would not have been possible.

Grateful thanks are extended to my father for his help and cooperation throughout the work. Without their support, this research would have been difficult to complete.

Abstract

Background:

Infection is one of the most crucial problems in health care services worldwide. It is considered one of the most important causes of morbidity and mortality associated with clinical, diagnostic and therapeutic procedures. Therefore, the purpose of this study was to investigate knowledge, attitude and practices with recommended infection control guidelines among final dental students in Khartoum University, AL-Raze University, AL-Nilain University, National Ribat University, University of Medical Sciences and Technology and Bayan College.

Objective:

The aim of this study was to evaluate the Knowledge, attitude and practices of the final dental students regarding infection control measurements.

Methodology:

A cross-sectional study was conducted to obtain information regarding knowledge, attitude, and practices with recommended infection control guidelines. The sample ($n = 186$) of final dental students in both male and female. This questionnaire contained three parts and was distributed to the participants online. After validation of the survey, data were collected, entered and analyzed by SPSS software.

Data collection:

Tool: Self-administered questionnaire consisted of "23" close-ended questions. It was being administrated to "186" dental students to answer in a time of 20-minutes. The questionnaire was sent to all students and interns by email to be filled electronically and informed consent was obtained before commencing the questionnaire.

Data analysis:

The collected data will be analyzed using SPSS version 20.0 for windows. General characteristics of subject articles will be analyzed using frequency and percentage.

Results:

Regarding the subject's attitudes toward infection control, the present study indicated that the, most of the students (90.3% - 81.7%) cared about protective parries (gloves, face mask). However, they were less concern about using other protective items (73.1% face shield, 72.1% gown and 52.6% head cap). Also, the findings of the present study indicated a very low rate of HBV vaccination. Only 72.7% of the students were vaccinated against Hepatitis B. In our survey, only 32.3% of students who were immunized have reported post-HBV immunization serology. In order to facilitate better understanding on how to evaluate awareness on infection control amongst final dental students, several questions related to previous education in infection control during the graduate studies were included in the questionnaire. The findings of this study showed insufficient knowledge among the subjects.

Conclusion:

The findings of this study indicate insufficient attitude and awareness toward infection control. Subjects responses showed deficiency of education to support infection control measures and their self-assessment and satisfaction reflect their performance toward infection control policy. The deficit of knowledge could be due to the inadequacy of infection control educational materials during years of study. Another reason might be the lack of belief that practice of standard precautions may interfere with patient health and care.

Recommendation:

It is recommended that the findings would be useful for planning and implementation of future interventions, including a national survey of dental institutions across the country.

Table of contents

Lists of Tables

Chapter one

Introduction and Literature Review

Introduction and Literature Review:

Knowledge, attitude and compliance act as three key elements, which make up the dynamic system of life itself. Knowledge is defined as information that could be acquired through various ways namely reading, experience and comprehension. Furthermore, it is the basic criterion that allows one to differentiate between right and wrong. On the other hand, according to the English dictionary attitude refers to the manner, feeling or position, with regard to a person or thing; tendency or orientation, especially of the mind. While compliance is the reflection of rules and knowledge that leads to action. Thus, right knowledge, positive attitude, and good compliance are imperative to guide health care professionals in treating and serving their patients [1].

Infection is one of the most crucial problems in health care services worldwide. It is considered one of the most important causes of morbidity and mortality associated with clinical, diagnostic and therapeutic procedures [2]. Infection control is defined as "Measures practiced by health care personnel to reduce the risks of transmission of infectious agents to patients and employees (e.g. proper hand hygiene, scrupulous work practices, use of personal protective equipment (PPE), such as masks or respirators, gloves, gowns and eye-protection)" (Centers for Diseases Control and Prevention 2005). Infection control measures include contact, droplet and airborne precautions based on how an infectious agent is transmitted [3]. In general, health care workers that do not use proper infection control procedures while providing patient care are more susceptible to infectious diseases [4]. A paper written by Laheij et al., in 2012, evaluated the literature to determine the risk of infection and cross-transmission by bacteria and viruses and that are of particular relevance in the dental practice environment (e.g. Hepatitis B, C and D viruses, HSV, VZV and HIV). The paper concluded that the transmission of, and infection with, Hepatitis B virus poses the greatest risk for both the dental team and the patients. However, the literature on the transmission of the other viruses and bacteria is scarce and the risk for transmission resulting in an infection with these microorganisms seems low [5].

During dental procedures, transmission of infections could occur either through direct contact with blood, saliva or contaminated treatment water from dental units, injury with an anesthetic needle or splash exposure of the mucous membranes, droplets, and aerosols or indirect contact with contaminated instruments and surfaces. By using safety precautions at work and implementing infection control guidelines, accidental exposure to infections in dental settings can be avoided [6, 7].

In the late 1970s, a study found that dentists were three times more likely than the general population to be infected by hepatitis B [8]. In the United States of America, the United States Department of Labor's Occupational Safety & Health Administration (OSHA), in 1991, issued the Blood-borne Pathogens Standard developed to protect workers from the risk of blood-borne pathogens exposure such as Hepatitis B, Hepatitis C and HIV/AIDS [9]. However, the limitations of universal precautions were subsequently recognized and in 1996, the CDC adopted the term "standard precautions" to apply a broader concept of prevention and transmission of infectious diseases. Standard precautions integrate and expand the elements of universal precautions into a standard of care designed to protect health care professionals and patients from pathogens in hospital settings [10]. The CDC new recommendation is that every dental clinic must have an infection prevention coordinator. The coordinator is responsible for the development of a written infection prevention policies based on the CDC's evidence-based guidance in the updated resource. The coordinator should assist the others in the clinic so they are up to date with the supplies and equipment necessary to ensure infection prevention [11].

Because of the limitations of routine health history information, the application of standard precautions to all patients becomes necessary. As some patients visiting dental clinics appear to be healthy, with normal physical examination findings and medical histories, the application of standard precautions should not be based on patients' appearance. By implementing infection control guidelines in addition to vaccinations and proper post-exposure management, exposure to infections in dental settings can be prevented [12].

According to Hazelkorn HM study in 1989, dentists apparently know what to do to protect themselves from contamination. Nevertheless, very few dentists discussed AIDS or HIV while recording a pretreatment history even if the patient was perceived to be in a high-risk group [13]. Strategies to protect health workers include 1-implementation of standard precautions, 2-immunization against infectious diseases of concern,3- provision of personal protective equipment,4-correct cleaning and disinfection of surfaces and equipment to remove pathogens, 5- sterilization of instruments and 6- proper techniques for handling sharp instruments and the management of exposure that are recommended by WHO [14]. Dental education can play an important role in dental students training, helping them to adopt adequate knowledge and attitude related to infection control [15].

1.2 Aim of present work:

The aim of this work deals with assist the general knowledge, attitude and practice of the infection control measurements in the clinic.

The aim and scope of the proposed work are as under:

- to evaluate the level of knowledge of infection control among the final dental student.
- to assess adherence to the use of PPE (personal protective equipment) among the final dental student.

1.3 Justification

Human oral cavity is a very good environment for the transmission, inoculation and growth of a variety of agents that can be infectious or detrimental to others [16]. Hence, disease transmission can easily occur in dental clinics through various routes [17]. These include direct contact (with blood, oral fluids, or other secretions) and indirect contact with contaminated instruments, operatory equipment, environmental surfaces or contact with contaminants that are airborne. This is the reason why infection control rules an integral part in dental practice. Presently, a large number of new dental personnel and dental undergraduate students are being trained in University hospitals where they can participate in rendering treatments to patients. Graduates in dental education worldwide necessitate a high level of medical training, clinical skills and knowledge on infection control [18]. Therefore, it is recommended that the importance of infection control is explained meticulously to students in their early years in dental education. This is also considered essential for them to adopt their learned attitudes and behaviors on infection control when they become professional dentists [19].

Chapter two:

Materials and Methods

Methodology:

2.1 Study design:

Descriptive cross-sectional study.

2.2 Study area:

Khartoum University, AL-Raze University, AL-Nilain University, National Ribat University, University of Medical Sciences and Technology and Bayan College.

2.3 Sample Size :

There is 38 dental schools in Sudan 31 of them are located in Khartoum , and there is only 24 schools have active final years students when the study was taken , 6 dental schools was selected randomly using an equation .

2.4 Study Population:

Final dental student in Khartoum State.

2.5 Sampling technique

Questioner developed after reviewing similar studies also use stander questioner to adopt infection control stander caring in the student.

2.6Data Collection Tools

Self-administered questionnaire using Google forms consisting of “23” questions collected from previous studies and about the objectives that written above and will be administrated to dental students to answer on their mobile phones.

2.7 Data Analysis

The collected data will be analyzed using SPSS version 20.0 for windows. General characteristics of subject articles will be analyzed using frequency and percentage.

2.8 Ethical Consideration:

The study was approved by the Institutional Review Board (IRB) of the Faculty of Dentistry, Napata. Administrative approvals were taken.

Chapter Three:
Results

The sample size for this study was 186 individuals. figure (1) and table (1) demonstrate participant's demographics.

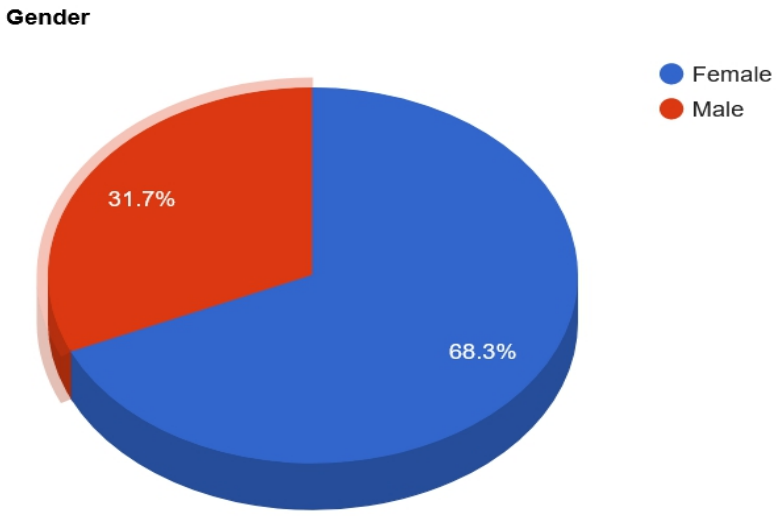

figure (1): study participant's demographics.

Table (1): show the number and percentage of individual's participant's in the study.

	OPTIONS	FREQUENCY	PERCENTAGE%
GENDER	MALE	59	31.7%
	FEMALE	127	68.3%

Table (1): shows that 127 (68.3%) were females, while the males was 59 (31.7%).

University	Khartoum University		University of Medical Sciences and Technology		AL-Raze University	
GENDER	Male	Female	Male	Female	Male	Female
	14	35	15	32	10	33
TOTAL	49		47		33	
Percentage	25.8%		24.7%		18.8%	

Table (2): data of university and collage final student participants in the study.

University	Bayan College		National Ribat University		AL-Nilain University	
GENDER	Male	Female	Male	Female	Male	Female
	9	20	6	9	4	9
TOTAL	29		15		13	
Percentage	15.6%		8.6%		6.5%	

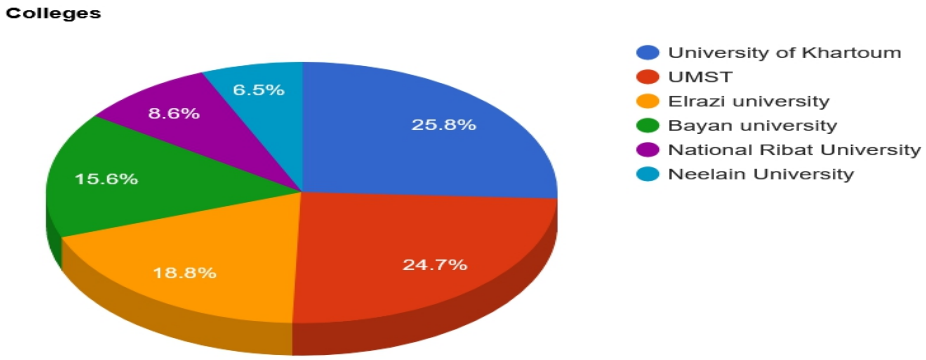

figure (2): show the percentage of the five university and collage participate in the study.

Table (3): distribution of study participants according to their adherence to Personal Protective Equipment.

PPE	OPTIONS	FREQUENCY	PERCENTAGE%
Wear Gloves	Yes	168	90.3%
	No	18	9.7%
Wear Face Mask	Yes	152	81.7%
	No	34	18.3%
Wear Face Shield	Yes	136	73.1%
	No	50	26.9%
Wear Gown	Yes	134	72.1%
	No	48	27.9%
Wear Head Cap	Yes	98	52.6%
	No	88	47.4%

Table (3): shows that 168 (90.3%) of the study participants wear gloves, 152 (81.7%) wear face mask, 136 (73.1%) wear face shield, 136 (72.1) wear gown and 98 (52.6%%) wear head cap.

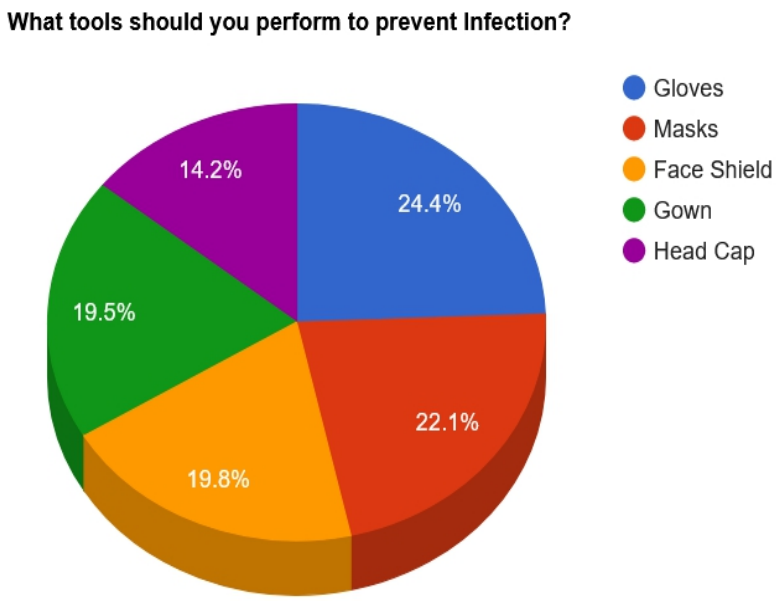

figure (3): show the percentage of the tool that should you perform to prevent infection.

Table (4): Distribution of study participants according to their attitude towards infection control.

Questions	Options	Frequency	percentage
Change instruments	Yes No	149 1	99.3% 0.7%
Sterilize instrument after each dental procedure	Yes No	147 3	98% 2%
Change gloves between each patients	Yes No	113 37	75.3% 24.7%
Wash hands between each gloves change	Yes No	139 11	92.7% 7.3%
hand hygiene used of alcohol based and rubs that do not require the use of water	Yes No	167 19	89.7% 10.3%

Remove gloves and mask while walking around	Yes No Sometimes	56 63 67	30.1% 33.9% 36%
Change gown/lab coat if visibly contaminated	Yes No Sometimes	139 21 26	74.7% 11.3% 14%
Disinfection of dental chair is Not a part of instrument sterilization	Yes No I Don't Know	150 10 7	66.1% 30.1% 3.8%
Dental clinics more conductive to infectious disease transmission that clinics in other medical fields	Yes No Sometimes	161 9 16	86.6% 4.8% 8.6%

Table (4): shows that 149 (99.3%) of the study participants change their instruments, 147 (98%) sterilize their instruments after each dental procedure, 113 (75.3%) Change gloves between each patients, 139 (92.7%) wash their hands before procedures, 167(89.7%) belief that hand hygiene used of alcohol based and rubs that do not require the use of water, Remove gloves and mask while walking around 56(30.1%) and 67(36%) sometimes do that ,139(74.7%) Change gown/lab coat if visibly contaminated and 26 (14%) sometimes do that. Also 150 (66.1%) belief that Disinfection of dental chair is not a part of instrument sterilization. finally, 161 (86.6%%) say that the Dental clinics more conductive to infectious disease transmission that clinics in other medical fields.

Table (5): show the information regarding hepatitis B vaccine.

	OPTIONS	FREQUENCY	PERCENT
Have you taken hepatitis B vaccine	Yes No	135 51	72.6% 27.4%
Complete The Dose	Yes No	114 45	61.3% 38.7%
Serology Test	Yes No	60 126	32.3% 67.9%

Table (5): shows that 135 (72.6%) of the study participants initiated the HBV vaccination, 114 (61.3%) completed the dose and 80 (43%) didn't do a serology test.

Table (6): Frequency of study participants according to their knowledge about occupational hazards.

	OPTIONS	FREQUENCY	PERCENT
HBV cannot be transmitted by needle	Yes No I Don't Know	48 137 1	25.8% 73.7% 0.5%
Disinfectant is effective in removing dried blood	Yes No I don't know	96 60 30	51.6% 16.1% 32.3%
Hand Washing minimizes infection risk	Yes No I Don't Know	181 5 0	97.3% 2.7% 0%
Incineration is not one of the biomedical waste disposal methods	Yes No I Don't Know	135 21 30	72.7% 11.3% 15%
Human anatomical waste should be disposed in red container	Yes No I Don't Know	103 17 66	55.4% 9.1% 35.5%
Awareness of biochemical waste management in Sudan	Yes No I Don't Know	56 96 34	30.1% 51.6% 18.3%
Do contaminated dental unit waterlines pose risk of infection to patients	Yes No I Don't Know	150 33 3	80.6% 17.7% 1.7%

Table (7): shows that 48 (25.8%) believe that HBV cannot be transmitted by needle, about 96 (51.6%) believe that disinfectant is effective in removing dried blood and 181 (97.3%) believe that hand washing minimizes infection risk. In addition, 135 (72.7%) believe that incineration isn't a biomedical waste disposal method, 103 (55.4%) Human anatomical waste should be disposed in red container. regarding awareness of biochemical waste management in Sudan only 56 (30.1%). Finally, 150 (80.6%) did contaminated dental unit waterlines pose risk of infection to patient.

Chapter four:

Discussion, Conclusion and recommendation

It is important for any dental clinic to set up its own measures to prevent the spread of infectious and transmissible diseases. For this purpose, it is important that dental health care professionals be aware of the risks and seriousness of infections. This survey was conducted to assess the level of knowledge, attitudes, and practices of final dental students regarding infection control procedures among dental students at five Sudanese university. therefore, we believe that our results can be generalized to other dental schools in the country.

Regarding the subject's attitudes toward infection control, the present study indicated that the, most of the students (90.3% - 81.7%) cared about protective parries (gloves, face mask). However, they were less concern about using other protective items (73.1% face shield, 72.1% gown and 52.6% head cap). This result is comparable to previous studies [20] were low and the frequency of face shield, gown and head cap use was very unsatisfactory. This poor utilization may indicate a low level of awareness among students about the probability of disease transmission via aerosols and blood splashes. Dental students should be encouraged to wear masks and a protective eyewear equipment to minimize the chance of transmitting airborne infections.

Also, the findings of the present study indicated a very low rate of HBV vaccination. Only 72.7% of the students were vaccinated against Hepatitis B. This rate is much lower than that reported by other studies in Brazil (90.8%) [21]. It is worth mentioning here that the vaccination against hepatitis B in Sudan is not considered a mandatory request by the dental and medical schools, which in turn explains the low vaccination rate uncovered in the present study. Furthermore, the cost of the vaccination and a lack of awareness about the importance of vaccination among dental students might also be contributing factors.

In our survey, only 32.3% of students who were immunized have reported post-HBV immunization serology, a percentage lower than that reported by other studies. In their study on senior dental students, Rahman *et al*. found that 50.4% were tested for post-immunization serology [21]. It is likely that students do not check their HBs antibody level after completing the vaccination because they are not aware of the lack of immune system response probability. Several studies have reported that not all vaccinated individuals exhibit an immune response [22,23]. Since dental students play a critical role in health care system, periodic mandatory assessment of their vaccination and immunization status is highly recommended.

In order to facilitate better understanding on how to evaluate awareness on infection control amongst final dental students, it was necessary to have a

background in their education about control infection in the dental clinic [24]. several questions related to previous education in infection control during the graduate studies were included in the questionnaire. The findings of this study showed insufficient knowledge among the subjects. The result of this study regarding knowledge on infection control is similar to previous studies by Askarian et al. and Abreu et al. on dental students in Iran and Brazil, respectively [25].

Conclusion:

The findings of this study indicate insufficient attitude and awareness toward infection control. Subjects responses showed deficiency of education to support infection control measures and their self-assessment and satisfaction reflect their performance toward infection control policy.

The deficit of knowledge could be due to the inadequacy of infection control educational materials during years of study. Another reason might be the lack of belief that practice of standard precautions may interfere with patient health and care.

Hand hygiene is considered the single most effective method for the prevention and control of healthcare-associated infections. One of the most positive results of the study was that 92.7% of our sample reported washing their hands between each gloves change.

One of the limitations of this study is the fact that the responses were based on students' self-assessment rather than being provided under the supervision of the investigators in a clinical environment. Therefore, the responses might not have accurately reflected the true levels of knowledge, attitude, and behavior, and thus, the reported level of practice might be lower than the real level. Moreover, this number of questions cannot show the real knowledge and practice of the respondents. Nonetheless, the number of questions was kept to a minimum to improve the response rate and this approach appeared to work well.

Recommendation:

Based on the findings and conclusion of the study, here are several recommendations to be considered:

1- There must be more focus on infection control.
2- Develop training workshops for final dental students to enhance knowledge, attitude and practice towards infection control.
3- posters or paintings could be hanged on the walls of the clinic containing some information to be visible to students to be always remembered.

Recommendation for future research:

it is recommended that the findings would be useful for planning and implementation of future interventions, including a national survey of dental institutions across the country.

Infection control should be included in the curriculum dental school

Google form is not accurate should be added another methods of data collection.

It is recommended to using google form under teachers or doctors supervision, to get a better feedback form the students .

References

1. Jain M, Sawla L, Mathur A, Nihlani T, Ayair U and Prabu D. (2010). Knowledge, attitude and practice towards droplet and airborne isolation precautions amongs dental health care professionals in India. Med Oral Patol Oral Cir Bucal. 15(6):957–961.

2. Shetty D, Verma M, Shetty S, Dubey S, Walters S and Bernstein I. (2011). Knowledge, attitudes and practice of dental infection control and occupational safety in India. World J Dent. 2(1):1–9

3. de Souza RA, Namen FM, Jr JG, Vieira C and Sedano HO. (2006). Infection control measures among senior dental students in Rio de Janeiro State, Brazil. 66(4):282–284.

4. Laheij A, Kistler J, Belibasakis G, Välimaa H and De Soet J. (2012). Healthcare-associated viral and bacterial infections in dentistry. J Oral Microbiol. 4(1):17659.

5. Rahman B, Abraham SB, Alsalami AM, Alkhaja FE and Najem SI. (2013). Attitudes and practices of infection control among senior dental students at college of dentistry, university of Sharjah in the United Arab Emirates. Eur J Dent. 7(1):15.

6. Singh A, Purohit B. (2011). Knowledge, attitude and practice towards infection control measures and its correlation among dental students in Bhopal city, Central India. Int J Infect Control. 7(1):54–59.

7. Mosley JW, Edwards VM, Casey G, Redeker AG and White E. (1975). Hepatitis B virus infection in dentists. N Engl J Med. 293(15):729–734.

8. Scully C and Greenspan J. (2006). Human immunodeficiency virus (HIV) transmission in dentistry. J Dent Res. 85(9):794–800

9. Kohn WG, Harte JA, Malvitz DM, Collins AS, Cleveland JL and Eklund KJ. (2003). Cover story guidelines for infection control in dental health care settings. J Am Dent Assoc. 135(1):33–47.

10. Cleveland JL, Foster M, Barker L, Brown GG, Lenfestey N and Lux L. (2012). Advancing infection control in dental care settings: factors associated with dentists' implementation of guidelines from the Centers for Disease Control and Prevention. J Am Dent Assoc. 143(10):1127–1138.

11. AL-Essa NA and AlMutairi MA. (2016). To what extent do dental students comply with infection control practices? Saudi J Dent Res. 8(1–2):67–72.

12. Hazelkorn HM. (1989). The reaction of dentists to members of groups at risk of AIDS. J Am Dent Assoc.119(5):611–619.

13. Malhotra V, Kaura S and Sharma H. (2017). Knowledge, attitude and practices about hepatitis B and infection control measures among dental students in Patiala. J Dent Allied Sci. 6(2):65.

14. Mhngd A, Lopes-Terra MC, Braz LF, Rímulo AL, Paiva SM and Pordeus IA. (2009). Attitudes and behavior of dental students concerning infection control rules: a study with a10-year interval. Braz Dent J. 20(3):221–225.

15.Quality guidelines for endodontic treatment. (2006). Consensus report of the European Society of Endodontology. Int Endod J. 39:921–30.

16. Mala S, Lynch CD, Burke FM and Dummer PM. (2009). Attitudes of final year dental students to the use of rubber dam. Int Endod J. 42:632–8

17. Abdulrab S, Al-Maweri S, Doumani M, Mourshed B and Alaizari N. (2016). Attitudes and practices of senior dental students in Saudi Arabia. IOSR J Dent Med Sci. 15:79–83.

18. Iwatani K, Matsuo K, Kawase S, Wakimoto N, Taguchi A and Ogasawara T. (2013). Effects of open mouth and rubber dam on upper airway patency and breathing. Clin Oral Investig. 17:1295–9.

19. Ahmad IA. (2009). Rubber dam usage for endodontic treatment. Int Endod J. 42:963–72.

20. Stewardson DA and McHugh ES. (2002). Patients' attitudes to rubber dam. Int Endod J. 35:812–9.

21. Gilbert GH, Litaker MS, Pihlstrom DJ, Amundson CW and Gordan VV. (2013). DPBRN Collaborative Group. Rubber dam use during routine operative dentistry procedures. Tex Dent J. 130:337–47.

22. Cohen S and Schwartz S. (1987). Endodontic complications and the law. J Endod. 13:191–7.

23. Udoye CI and Jafarzadeh H. (2010). Rubber dam use among a subpopulation of Nigerian dentists. J Oral Sci. 52:245–9.

24. Al-Omari MA and Al-Dwairi ZN. (2005). Compliance with infection control programs in private dental clinics in iran. J Dent Educ. 69:693–8.

25. Senna M. I. B., Guimarães M. D. C and Pordeus I. A. (2005). Factors associated with dentists' willingness to treat HIV/AIDS patients in the National Health System in Belo Horizonte, Minas Gerais, Brazil. *Cadernos de saúde pública*. 21(1):217–225.