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KNOWLEDGE AND ATTITUDE LEVEL ASSESSMENT OF GUTTA-PERCHA DISINFECTION/DECONTAMINATION PRIOR TO OBTURATION AMONG DENTAL STUDENTS AND INTERNS IN SAUDI ARABIA

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Abstract

Background: Endodontic treatment success is based on eliminating germs and preventing their recurrence in the root canal. Gutta-percha cones have been sterilized using a wide range of chemical disinfectants. In routine chairside disinfection, NaOCI proved to be the most effective antimicrobial solution for removing E.faecalis. The aims of this study to assess the knowledge, attitude level regarding gutta-percha disinfection prior to obturation among dental students and interns in Saudi Arabia and to evaluate their behaviors about sterilization techniques for gutta-percha cones. **Methodology:** This cross-sectional study was conducted in Saudi Arabia. An online survey was distributed among dental students and interns in Saudi Arabia. The study included 384 participants, and the sample size was estimated by Raosoft. Inc. The survey questions were about the participants' demographics, knowledge, and behaviors about sterilization techniques for gutta-percha. The collected data was exported to "Microsoft Office Excel Software". The statistical analysis was done through the (SPSS) Software. **Results:** The study enrolled 120 participants of whom 82.5% were females and 73.3% were in the age group 21-25. Regarding knowledge scores, only 19.2% of participants exhibited a high knowledge level, 24.2% at a medium level, and 56.7% at a low level. Regarding attitude scores, 10% of the sample exhibited a positive attitude, 40% displaying a neutral attitude, and 50% expressing a negative attitude. **Conclusion:** In conclusion, the assessment of knowledge and attitude level of gutta-percha disinfection/decontamination among dental students and interns in Saudi Arabia is an important step towards ensuring the highest standards of endodontic treatment in the country. As in our study most of participants seemed to exhibit low knowledge scores and negative attitude score.

Keywords: Gutta percha, Disinfection, Before obturation, knowledge.

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Introduction:

Endodontic therapy successfully attempts to eliminate germs detected in the root canal and prevent their recurrence [1]. Gutta-percha is one of the most biocompatible dental materials, as it does not interfere with the tissue repair process that occurs after root canal filling. As a result, they are the most popular material for root canal filling [2]. Even if gutta-percha cones are created under aseptic circumstances and have some antibacterial qualities due to their zinc oxide component. They can be contaminated by handling, even if carefully removed from their packages therefore disinfection of GP material is required, gutta percha cones have been sterilized using a wide range of chemical disinfectants [3]. NaOCI proved to be the most effective antimicrobial solution to remove E. faecalis from gutta percha cones when used as routine chair side disinfection followed by CHX. However, Listerine showed stronger results when incubated for longer periods of time [4].

Due to its malleability and biocompatibility, gutta-percha cones have been the most widely utilized root canal filing material for more than 100 years when it comes to disinfection of the root canal [5]. Due to the presence of zinc oxide in gutta-percha cones, some antibacterial action exists in them [6]. Gutta-percha is not suited for sterilizing using wet or dry heat since it is thermolabile [7]. Therefore, quick chemical disinfection at the chair side is advised. A wide range of chemical disinfectants, such as sodium hypochlorite (NaOCl), glutaraldehyde, alcohol, chlorhexidine (CHX), hydrogen peroxide, polyvinylpyrrolidone iodine, and a mixture of tetracycline citric acid and detergent (MTAD), have been used to sterilize gutta percha cones prior to root canal filling [8]. However, there was disagreement at the time on the solution and the duration of exposure (several authors recommended a minimum of 20 to 30 minutes or greater without providing any supporting data) [9]. Evaluation of the antibacterial effectiveness of two herbal extracts by improper storage, aerosols, and physical handling by Kulkarni and Desai. According to several studies, the Staphylococcus genus is the most frequent microbial contaminant of gutta-percha cones when they are handled with gloves. Guimaraes et al. and Mukka et al. found the incidence to be around 15.7% [10]. In 2021, a research has been conducted about contamination of GP cones before and during clinical use and the result has shown that there are a significant difference in contamination of packages before and after clinical use (P=0.02) [11]. A structured questionnaire has been used IN 2023, 76.6% of the participants did not disinfect the cones before obturation whereas the rest of the participants 23.4% did [12]. A self-structured questionnaire in an online survey used in 2023 and it showed that 13.25% of interns responded positively to the disinfection of new unused gutta-percha points prior to use, 52% of respondents think that the root canal treatment without disinfection of GP has less than 80% success rate, on the other hand, 42% think it has 100% success rate [13].

Objectives:

Our study aims to assess the knowledge, attitude level and practices regarding gutta-percha disinfection prior to obturation among dental students and interns in Saudi Arabia and identify evaluate their behaviors about sterilization techniques for gutta-percha cones in the success of root canal treatment.

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Materials and Methods:

Study design: This cross-sectional study was conducted in Saudi Arabia. An online survey was distributed from August 2023 to October 2024 among dental students and interns at the dentistry department. The study's population consisted of dental students of all years, and dental interns in Saudi Arabia. Participants were recruited in August 2023 in Saudi Arabia from the dentistry department after receiving the questionnaire.

Inclusion and Exclusion criteria:

Dental students of all years, Dental interns, Live in Saudi Arabia and Male and female included. Dental students and interns not living in Saudi Arabia was excluded.

Method for data collection and instrument (*Data collection Technique and tools)*: The survey instrument was a self-administered anonymous questionnaire in English, containing questions regarding knowledge and attitude assessment toward gutta-percha disinfection prior obturation among dental student and interns in Saudi Arabia. Section one contained socioeconomic background characteristics questions. The second section includes information about knowledge regarding gutta-percha disinfection. The third section asked questions regarding attitude toward gutta-percha disinfection. Dental students collected the information using an online questionnaire.

Scoring system:

Part I: Knowledge Score

A total of 11 questions were used to assess the knowledge towards disinfection of gutta-percha cones before obturation, using yes**,** no, I don't know statements for each one. The score ≥ 9 considered as a high level of knowledge, 7-8 for a medium level of knowledge whereas 6 OR less considered as a low level of knowledge.

Part I: Attitude Score

A total of 9 questions were used to assess the attitude towards infection control during root canal treatment, using five statements for each one. A five-point scale was used and regarded from 0-4 as strongly agree to strongly disagree. The score ≥29 considered as a positive attitude, 22-28 considered as neutral, 21or less considered as a negative attitude.

Analyzes and entry method:

Data was entered on the computer using the "Microsoft Office Excel Software" program (2016) for windows. Data was then transferred to the Statistical Package of Social Science Software (SPSS)

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program, version 20 (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.) to be statistically analyzed.

Results:

It is evident from table (1) that the majority of respondents fall within the age range of 21-25, comprising 73.3% of the sample, followed by the 26-30 age group at 17.5%. Furthermore, the gender distribution indicates that 82.5% of the participants identify as female, with males constituting 17.5% of the sample. In terms of nationality, the data highlights a significant majority of Saudi nationals, accounting for 86.7% of the respondents, while non-Saudis represent 13.3% of the sample. Geographically, the participants are distributed across different regions, with the highest representation from the western region (47.5%) and the lowest from the northern region (0.8%). The majority of participants are interns (46.7%), followed by 6th-year students (24.2%), indicating a diverse mix of academic progression within the sample. The final parameter, the choice of GPA, reveals a diverse distribution, with the majority of respondents selecting a GPA in the range of (5-4.5) (40.8%) and (4.49-4.0) (30.8%).

Table (1): Sociodemographic characteristics of participants (n=120)

Parameter		No.	Percent
Age	19_20	9	7.5
	21_25	88	73.3
	26_30	21	17.5
	31_36	2	1.7
Gender	Male	21	17.5
	Female	99	82.5
Nationality	Saudi	104	86.7
	Non-Saudi	16	13.3
Location	Eastern region	18	15.0
	central region	10	8.3
	Northern region	1	.8
	Southern region	34	28.3
	Western region	57	47.5
Academic year	Intern	56	46.7
	2nd year	7	5.8
	3rd year	3	2.5
	4th year	2	1.7
	5th year	23	19.2
	6th year	29	24.2
University	Al Qussaim university	1	.8
	Ibn Sina National College	46	38.3
	Jazan university	2	1.7
	King Abdulaziz university	20	16.7
	King khalid university	33	27.5
	Majmaah university	1	.8
	Tabuk university	1	.8
	Taibah university	2	1.7

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	Other	14	11.7
GPA out of 5	Less than 3	3	2.5
	(3.49 - 3.0)	12	10.0
	(3.99 - 3.5)	16	13.3
	(4.49 - 4.0)	37	30.8
	(5 - 4.5)	49	40.8
	The GPA used in my university is out of 4	3	2.5
GPA out of 4	(3.49 - 3.0)	1	33.3
	(3.74 - 3.5)	1	33.3
	(4 - 3.75)	1	33.3

It is evident from table (2) that there is a significant percentage of respondents who do not practice any disinfection protocol for GP cones before obturation, with 62.5% responding "No" and 9.2% indicating "Don't know." Furthermore, the survey highlights that there is a lack of adequate knowledge about the disinfection of gutta-percha cones before obturation, with 32.5% of respondents indicating "No." The presence of microorganisms in freshly opened gutta-percha packs is also a notable finding, with 44.2% of respondents acknowledging this fact and 37.5% said they don't know. It is concerning that a significant percentage of respondents do not check the sterility status printed on the label of new dental instrument packages, with 42.5% indicating "No" and 13.3% didn't know. The survey also provides insights into the methods of disinfecting gutta-percha cones before obturation, with 69.2% of respondents agreeing that immersion of the cone in a 5.25% NaOCl solution for 1 minute is an effective method.

Table (2): Knowledge of Gutta-percha disinfection/decontamination prior to obturation among dental students and interns (n=120).

Parameter	Yes	No	Don't know
Do you practice any disinfection protocol for GP cones before obturation	75 62.5%	34 28.3%	11 9.2%
Do you have an adequate knowledge about the disinfecting of gutta-percha cones before obturation	67 55.8%	39 32.5%	14 11.7%
Disinfecting of gutta-percha cones is a MUST before the obturation	75 62.5%	12 10.0%	33 27.5%
Disinfection of gutta-percha cones before obturation plays an important role in the outcome of root canal treatment	85 70.8%	8 6.7%	27 22.5%
Usually, unused new gutta-percha packs that manufactured sealed are not sterile/not pre disinfect	48 40.0%	26 21.7%	46 38.3%
There are presence of microorganisms in freshly opened gutta-percha packs	53 44.2%	22 18.3%	45 37.5%
Do you check the sterility status printed on the label of the new dental instrument packages	53 44.2%	51 42.5%	16 13.3%
The clinical use of previously opened packs of GP cones lead to microbial contamination which necessities disinfecting them before obturation	81 67.5%	13 10.8%	26 21.7%

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Not pursuing any of the simple chairside disinfection protocols will increase the endodontic microbial flora causing contamination of GP cones	71 59.2%	14 11.7%	35 29.2%
Disinfecting of gutta-percha cones before obturation can be done by immersion the cone in 5.25% NaOCl solution for 1 minute	83 69.2%	9 7.5%	28 23.3%

Firstly, it is evident from table (3) that a significant proportion of respondents hold the belief that all new manufacturer-packed endodontic gutta-percha are sterilized and ready to use for obturation, with 45% expressing agreement and 29.2% being neutral on the matter. Similarly, the majority (40.8%) believe that they can use new endodontic gutta-percha on the patient soon after taking it out of the manufacturer's packaging. On the contrary, a noteworthy percentage of respondents (31.7%) express strong disagreement with the notion that endodontic gutta-percha can be infectious and spread microbial infections. Furthermore, a substantial portion of participants (33.3%) do not believe that endodontic gutta-percha is susceptible to microbial contamination during storage and manipulation. In terms of treatment outcomes, the data suggests that there is a lack of consensus regarding the relationship between using disinfected and sterile gutta-percha for obturation and successful endodontic treatment outcomes. While 31.7% strongly disagree with this association, 23.3% are neutral, and 15% disagree. Moving beyond gutta-percha, the overwhelming majority (69.2%) strongly agree that isolation with rubber dam is a must during root canal treatment (RCT). Similarly, half of the respondents (50%) strongly believe that disinfecting the operative field is a must before initiating RCT. Moreover, a considerable proportion (29.2%) believe that endodontic files must be disposed after single use. Lastly, the survey reveals varying opinions regarding the necessity of changing gloves before obturation, with 25.8% strongly agreeing, 27.5% agreeing, and 26.7% being neutral on this matter.

Table (3): Attitude of Gutta-percha disinfection/decontamination prior to obturation among dental students and interns (n=120).

Parameter	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I believe that All New manufacturly packed endodontic gutta-percha are sterilized and ready to use for obturation	22 18.3 %	45 37.5 %	35 29.2 %	17 14.2 %	1 .8%
I believe that I can use New endodontic gutta-percha on the patient soon after i take it out of the manufacturer's packaging	21 17.5 %	49 40.8 %	30 25.0 %	17 14.2 %	3 2.5%
I Do Not believe that endodontic gutta-percha can be infectious and can spread microbial infections	14 11.7 %	16 13.3 %	36 30.0 %	38 31.7 %	16 13.3%
I Do Not believe that endodontic gutta-percha are susceptible to microbial contamination during storage and manipulation	9 7.5%	16 13.3 %	37 30.8 %	40 33.3 %	18 15.0%
I Do Not believe that using disinfected and sterile gutta-percha for obturation can be related to	13 10.8	18 15.0	28 23.3	38 31.7	23 19.2%

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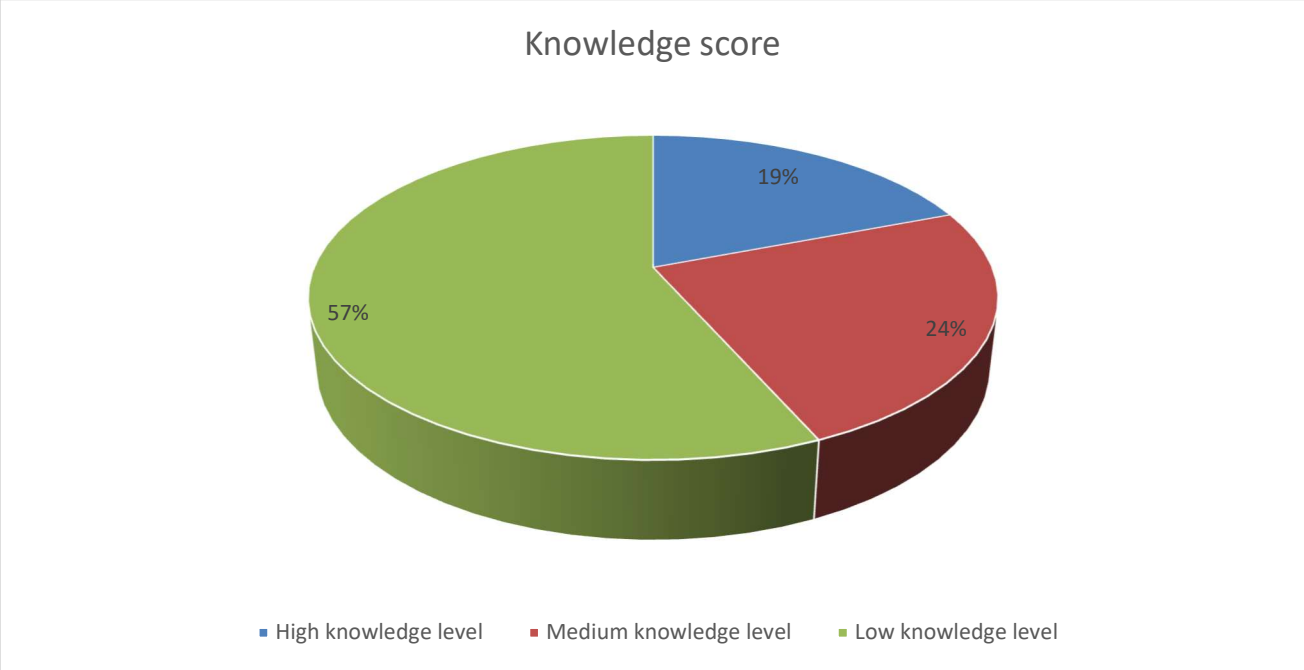
successful endodontic treatment outcomes	%	%	%	%	
I believe that Isolation with rubber dam is a MUST during RCT	83 69.2 %	18 15.0 %	14 11.7 %	4 3.3%	1 .8%
I believe that Disinfecting the operative filed is a MUST before initiating RCT:	60 50.0 %	35 29.2 %	21 17.5 %	3 2.5%	1 .8%
I believe that Endodontic files MUST be disposed after single use:	23 19.2 %	35 29.2 %	35 29.2 %	21 17.5 %	6 5.0%
I believe that Changing the gloves is a MUST before the obturation:	31 25.8 %	33 27.5 %	32 26.7 %	21 17.5 %	3 2.5%

The distribution of knowledge levels among the participants shown in figure (1) is a critical insight for our analysis. With 19.2% of participants exhibiting a high knowledge level, 24.2% at a medium level, and 56.7% at a low level

Figure (1): Knowledge score of Gutta-percha Disinfection/decontamination Prior to Obturation Among Dental Students and Interns:



The data presented in figure (2) indicated a notable distribution in attitudes, with 10% of the sample exhibiting a positive attitude, 40% displaying a neutral attitude, and 50% expressing a negative attitude.

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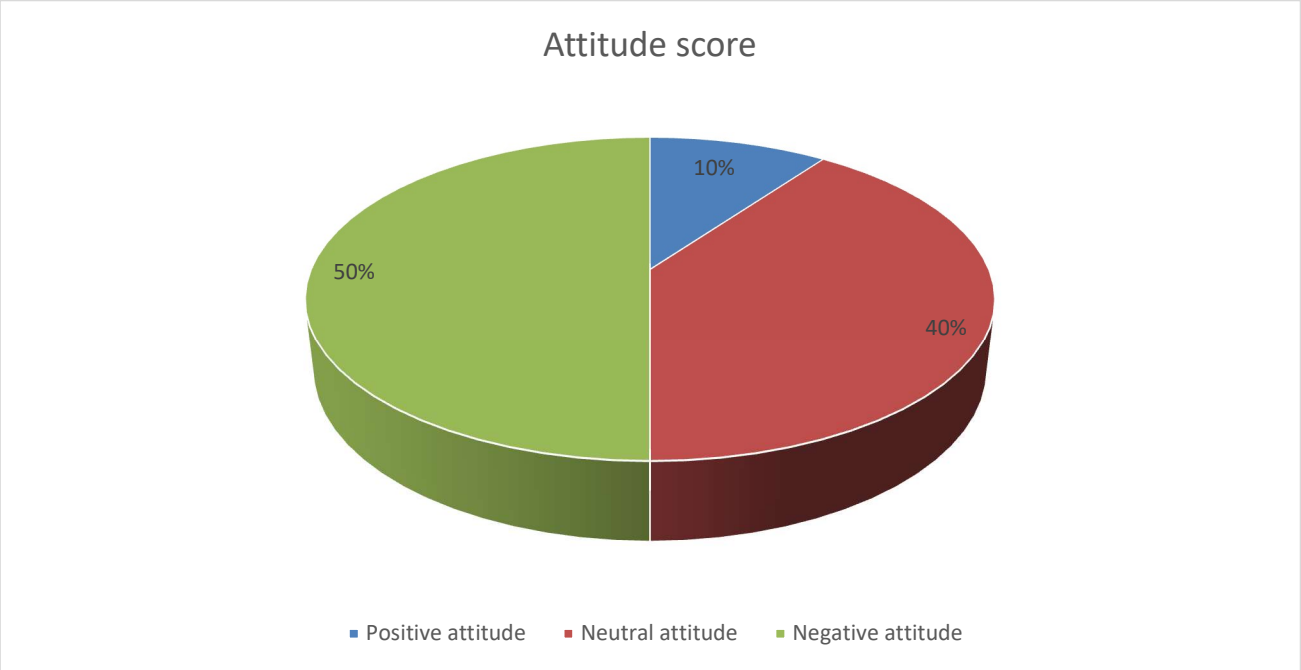
Figure (2): Attitude score of Gutta-percha Disinfection/decontamination Prior to Obturation Among Dental Students and Interns



Firstly, table (4) highlighted the distribution of knowledge scores among participants based on their age groups. It is evident that the percentage of individuals with high knowledge is highest in the 21-25 age group, accounting for 41.7% of the total participants in this category. In contrast, the 31-36 age group has the lowest percentage of individuals with high knowledge at 1.7%. The p-values associated with these distributions provide statistical significance to these observations, with a p-value of 0.625 for the 19-20 age group and a p-value of 0.221 for the intern academic year, indicating no significance in these categories. Furthermore, the data reveals that females have a higher percentage of individuals with high knowledge (15.8%) compared to males (3.3%), with a p-value of 0.999 indicating no significant difference between the two genders. Additionally, the table demonstrates the impact of academic year on knowledge scores, with the 6th year students showing the highest percentage of high knowledge individuals at 17.5%, and a p-value of 0.221 also suggesting no significance in this category. Moreover, the table sheds light on the association between university and knowledge scores, with varying percentages across different universities. Notably, individuals with from King Khalid University have a higher percentage of high knowledge individuals at 8.3% compared to other institutions. The associated p-value of 0.144 suggests no significance association. Lastly, the table provides insights into the relationship between GPA and knowledge scores. It is evident that individuals with a GPA between 4.49 and 5 have the highest percentage of high knowledge individuals at 10.8%. The p-values associated with these distributions also showed no significance association.

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Table (4): Association between sociodemographic characteristics and knowledge of Gutta-percha disinfection/decontamination (n=120).

Parameter		Knowledge score			Total (N=120)	P value
		High knowledge	Moderate knowledge	Low knowledge		
Age	19_20	2	3	4	9	**0.625**
		1.7%	2.5%	3.3%	7.5%	
	21_25	19	19	50	88	
		15.8%	15.8%	41.7%	73.3%	
	26_30	2	7	12	21	
		1.7%	5.8%	10.0%	17.5%	
	31_36	0	0	2	2	
		0.0%	0.0%	1.7%	1.7%	
Gender	Male	4	5	12	21	
		3.3%	4.2%	10.0%	17.5%	0.999
	Female	19	24	56	99	
		15.8%	20.0%	46.7%	82.5%	
Nationality	Saudi	21	24	59	104	**0.666**
		17.5%	20.0%	49.2%	86.7%	
	Non-Saudi	2	5	9	16	
		1.7%	4.2%	7.5%	13.3%	
Location	Northern region	0	0	1	1	**0.933**
		0.0%	0.0%	0.8%	0.8%	
	central region	2	2	6	10	
		1.7%	1.7%	5.0%	8.3%	
	Eastern region	3	4	11	18	
		2.5%	3.3%	9.2%	15.0%	
	Southern region	9	9	16	34	
		7.5%	7.5%	13.3%	28.3%	
	Western region	9	14	34	57	
		7.5%	11.7%	28.3%	47.5%	
Academic year	Intern	8	17	31	56	**0.221**
		6.7%	14.2%	25.8%	46.7%	
	2nd year	1	2	4	7	
		0.8%	1.7%	3.3%	5.8%	
	3rd year	2	0	1	3	
		1.7%	0.0%	0.8%	2.5%	
	4th year	1	0	1	2	
		0.8%	0.0%	0.8%	1.7%	
	5th year	7	6	10	23	
		5.8%	5.0%	8.3%	19.2%	
	6th year	4	4	21	29	

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		3.3%	3.3%	17.5%	24.2%	
Annual Income (in Saudi Riyals)	Al Qussaim university	0	0	1	1	**0.144**
		0.0%	0.0%	0.8%	0.8%	
	Ibn Sina National College	7	13	26	46	
		5.8%	10.8%	21.7%	38.3%	
	Jazan university	2	0	0	2	
		1.7%	0.0%	0.0%	1.7%	
	King Abdulaziz university	2	4	14	20	
		1.7%	3.3%	11.7%	16.7%	
	King khalid university	10	8	15	33	
		8.3%	6.7%	12.5%	27.5%	
	Majmaah university	1	0	0	1	
		0.8%	0.0%	0.0%	0.8%	
	Tabuk university	0	0	1	1	
		0.0%	0.0%	0.8%	0.8%	
	Taibah university	0	1	1	2	
		0.0%	0.8%	0.8%	1.7%	
	Other	1	3	10	14	
		0.8%	2.5%	8.3%	11.7%	
GPA out of 5	Less than 3	0	0	3	3	**0.315**
		0.0%	0.0%	2.5%	2.5%	
	(3.49 - 3.0)	4	3	5	12	
		3.3%	2.5%	4.2%	10.0%	
	(3.99 - 3.5)	2	5	9	16	
		1.7%	4.2%	7.5%	13.3%	
	(4.49 - 4.0)	4	8	25	37	
		3.3%	6.7%	20.8%	30.8%	
	(5 - 4.5)	13	13	23	49	
		10.8%	10.8%	19.2%	40.8%	
	The GPA used in my university is out of 4	0	0	3	3	
		0.0%	0.0%	2.5%	2.5%	
GPA out of 4	(3.49 - 3.0)	0	0	1	1	**0.885**
		0.0%	0.0%	0.8%	0.8%	
	(3.74 - 3.5)	0	0	1	1	
		0.0%	0.0%	0.8%	0.8%	

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	(4 - 3.75)	0	0	1	1	
		0.0%	0.0%	0.8%	0.8%	

Upon analyzing the data in table (5), it is evident that the distribution of attitude scores varies significantly across different parameters. For instance, when considering age, individuals within the 21-25 range exhibit the highest percentage of negative attitudes at 37.5%, followed by the 26-30 age group at 9.2%. In contrast, the 31-36 age group shows the lowest percentage of negative attitudes at 1.7%. The p-value associated with age is 0.387, indicating a lack of statistically significant differences in attitude scores across age groups. Similarly, when examining gender, females demonstrate a higher percentage of positive attitudes at 8.3% compared to males at 1.7%. However, the p-value for gender is 0.459, suggesting that the differences in attitude scores between genders are not statistically significant. Moving on to the parameter of academic year, interns display the highest percentage of positive attitudes at 5%. The p-value for academic year is 0.011, signifying statistically significant differences in attitude scores across academic years. Moreover, individuals in the Western region demonstrate the highest percentage of positive attitudes at 6.7%, while those in the Southern region exhibit the lowest percentage at 0.0%. The p-value for location is 0.029, indicating statistically significant differences in attitude scores across regions.

Table (5): Association between sociodemographic characteristics and attitude of Gutta-percha disinfection/decontamination (n=120).

Parameter		Attitude score			Total (N=120)	P value
		Positive attitude	Neutral attitude	Negative attitude		
Age	19_20	2	5	2	9	**0.387**
		1.7%	4.2%	1.7%	7.5%	
	21_25	7	36	45	88	
		5.8%	30.0%	37.5%	73.3%	
	26_30	3	7	11	21	
		2.5%	5.8%	9.2%	17.5%	
	31_36	0	0	2	2	
		0.0%	0.0%	1.7%	1.7%	
Gender	Male	2	6	13	21	0.459
		1.7%	5.0%	10.8%	17.5%	
	Female	10	42	47	99	
		8.3%	35.0%	39.2%	82.5%	
Nationality	Saudi	10	41	53	104	**0.850**
		8.3%	34.2%	44.2%	86.7%	
	Non-Saudi	2	7	7	16	
		1.7%	5.8%	5.8%	13.3%	
Location	Northern region	1	0	0	1	**0.029**
		0.8%	0.0%	0.0%	0.8%	

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	central region	2	5	3	10	
		1.7%	4.2%	2.5%	8.3%	
	Eastern region	1	6	11	18	
		0.8%	5.0%	9.2%	15.0%	
	Southern region	0	14	20	34	
		0.0%	11.7%	16.7%	28.3%	
	Western region	8	23	26	57	
		6.7%	19.2%	21.7%	47.5%	
Academic year	Intern	6	21	29	56	**0.011**
		5.0%	17.5%	24.2%	46.7%	
	2nd year	2	3	2	7	
		1.7%	2.5%	1.7%	5.8%	
	3rd year	2	1	0	3	
		1.7%	0.8%	0.0%	2.5%	
	4th year	1	0	1	2	
		0.8%	0.0%	0.8%	1.7%	
	5th year	0	9	14	23	
		0.0%	7.5%	11.7%	19.2%	
	6th year	1	14	14	29	
		0.8%	11.7%	11.7%	24.2%	
Annual Income (in Saudi Riyals)	Al Qussaim university	0	0	1	1	**0.045**
		0.0%	0.0%	0.8%	0.8%	
	Ibn Sina National College	6	20	20	46	
		5.0%	16.7%	16.7%	38.3%	
	Jazan university	1	0	1	2	
		0.8%	0.0%	0.8%	1.7%	
	King Abdulaziz university	3	11	6	20	
		2.5%	9.2%	5.0%	16.7%	
	King khalid university	1	9	23	33	
		0.8%	7.5%	19.2%	27.5%	
	Majmaah university	0	0	1	1	
		0.0%	0.0%	0.8%	0.8%	
	Tabuk university	0	7	7	14	
		0.0%	5.8%	5.8%	11.7%	

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	Taibah university	1	0	0	1	
		0.8%	0.0%	0.0%	0.8%	
	Other	0	1	1	2	
		0.0%	0.8%	0.8%	1.7%	
GPA out of 5	Less than 3	0	1	2	3	**0.160**
		0.0%	0.8%	1.7%	2.5%	
	(3.49 - 3.0)	3	6	3	12	
		2.5%	5.0%	2.5%	10.0%	
	(3.99 - 3.5)	1	6	9	16	
		0.8%	5.0%	7.5%	13.3%	
	(4.49 - 4.0)	5	19	13	37	
		4.2%	15.8%	10.8%	30.8%	
	(5 - 4.5)	3	14	32	49	
		2.5%	11.7%	26.7%	40.8%	
	The GPA used in my university is out of 4	0	2	1	3	
		0.0%	1.7%	0.8%	2.5%	
GPA out of 4	(3.49 - 3.0)	1	0	0	1	**0.673**
		0.8%	0.0%	0.0%	0.8%	
	(3.74 - 3.5)	1	0	0	1	
		0.8%	0.0%	0.0%	0.8%	
	(4 - 3.75)	0	0	1	1	
		0.0%	0.0%	0.8%	0.8%	

Discussion:

Gutta-percha is a commonly used material in endodontic treatment, and its disinfection or decontamination prior to obturation is crucial for the success of the treatment. Therefore, assessing the knowledge and attitude level of dental students and interns in Saudi Arabia towards gutta-percha disinfection/decontamination is essential to ensure the quality of endodontic treatment in the country [1]. The assessment of knowledge and attitude level among dental students and interns can provide valuable insights into the current practices and understanding of gutta-percha disinfection/decontamination in the field of endodontics. It can help identify any gaps in knowledge and attitudes that need to be addressed through targeted educational interventions [3].

One of the key aspects of assessment would be to evaluate the understanding of the importance of gutta-percha disinfection/decontamination in preventing the spread of infection and ensuring the success of endodontic treatment. Additionally, the assessment also explored the attitudes of dental students and interns towards gutta-percha disinfection/decontamination. This can involve understanding their perceptions of the importance of following proper disinfection/decontamination protocols, their willingness to adopt new techniques and technologies for gutta-percha disinfection/decontamination, and their overall commitment to ensuring the highest standards of infection control in endodontic practice [6].

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Although no manufacturer asserts that their gutta-percha cones were sterile, 18.3% and 37.5% strongly agree and agree that all new manufacturly packed endodontic gutta-percha are sterilized and ready to use for obturation, and 17.5% and 40.8% strongly agree and agree that they can use new endodontic gutta-percha on the patient soon after taking it out of the manufacturer's packaging. In another survey conducted in India 34% of the postgraduate students believed that the cones were devoid of any living organisms in the packaging [8]. Moreover, another study conducted in India showed that 23.7% of the postgraduate students thought the cones were sterile in the package [3].

As 70.8% of participants believed that disinfection of gutta-percha cones before obturation plays an important role in the outcome of root canal treatment, only 62.5% practice any disinfection protocol for GP cones before obturation. On the other hand, a study showed that 86% of postgraduate students specializing in endodontics believed that disinfecting gutta-percha cones was crucial. Although aware of the lack of sterility in cones and the different chair-side techniques available for disinfection before to obturation, 75% of individuals did not adhere to any disinfection protocols. Just 25% adhered to the disinfection protocol for gutta-percha cones [8]. Another study revealed that 73.8% of postgraduate students specializing in endodontics considered the disinfection of gutta percha cones to be a crucial factor in determining the success of root canal treatment. However, 35.5% of individuals did not adhere to any disinfection protocols. Just 65.7% adhered to the disinfection protocol for gutta percha cones [3].

The fundamental idea of reducing the presence of microorganisms in endodontic procedures and preventing additional contamination appears to have been disregarded by neglecting to implement any of these straightforward chair-side disinfection methods [14].

Knowledge scores shown in our study were not adequate, as only 19.2% had high knowledge score and 56.7% got low knowledge score. On the other hand another study showed that participants had adequate knowledge where 66% of participants were aware that gutta-percha cones were neither sterile nor predisinfected, but 54% believed that a 1-minute immersion in a 5.25% NaOCl solution would effectively disinfect them [8]. Regarding attitude scores, our study showed also inadequate attitude scores as 50% had negative attitude score while only 10% had positive attitude score. Another study showed that 85% of the participants believed that disinfecting gutta-percha is crucial for the success of root canal therapy, while 15% held a different opinion [8]. Another study showed that out all the participants, 65% did not adhere to any disinfection standards and only 35% adhered to the disinfection protocol for gutta-percha cones [3]. The findings of this assessment can have several implications for dental education and practice in Saudi Arabia. Firstly, it can help in the development of targeted educational programs that address the specific knowledge gaps, attitudes, and practices towards gutta-percha disinfection/decontamination among dental students and interns. This can include incorporating relevant topics into the curriculum, providing hands-on training in disinfection/decontamination techniques, and promoting a culture of adherence to best practices in infection control [7]. Furthermore, the assessment can also serve as a basis for quality improvement initiatives in dental clinics and hospitals, where the findings can be used to implement standardized protocols for gutta-percha disinfection/decontamination and to promote a culture of continuous learning and improvement among dental professionals [3]. This study provided valuable insights into the understanding and perceptions of this important aspect of dental practice. However, it is important to acknowledge the limitations of the study. One limitation is the potential for response bias, as participants may have provided socially

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desirable answers. Additionally, the study's findings may not be generalizable to all dental students and interns in Saudi Arabia, as the sample size and demographics may not be representative of the entire population. Furthermore, the study's cross-sectional design may limit the ability to establish causality or changes in knowledge and attitudes over time. Despite these limitations, the study offers important implications for dental education and practice in Saudi Arabia.

Conclusion

In conclusion, the assessment of knowledge and attitude level of gutta-percha disinfection/decontamination among dental students and interns in Saudi Arabia is an important step towards ensuring the highest standards of endodontic treatment in the country. As in our study most of participants seemed to exhibit low knowledge scores and negative attitude score. By identifying and addressing any knowledge gaps and attitudes that may hinder the proper disinfection/decontamination of gutta-percha, this assessment can contribute to the overall improvement of infection control practices in dental care and ultimately, to the betterment of patient outcomes.

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Ethical approval:

After fully explaining the study and emphasizing that participation is optional, each participant gave their informed consent. The information gathered was safely stored and utilized exclusively for study.

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Conflict of interests:

The authors declare no conflict of interest.

Informed consent:

Written informed consent was acquired from each individual study participant.

Data and materials availability:

All data associated with this study are present in the paper.

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References:

1. Disinfection of gutta- percha cones. Their effects on apical adjustment. H e a l t h S c i e n c e s. 2013;Volume 01.
2. Drudi CSB, Castro HBCL de, Érnica F, Garcia, Drudi AJC, Oliveira JR de, et al. Effect of Time on Disinfection of Gutta-Percha Cones with Sodium Hypochlorite: Experimental Research. Oral Health Dent Manag. 2018;17(12).
3. Deshmukh P, Sahu Y, Jain A, Mishra P, Daga P, Jain D. Disinfection of Gutta-Percha "A Cross Sectional Study on Knowledge, Awareness and Practice (KAP) Among General Dental Practitioners, Post Grad Students and Endodontic Specialists in Chhattisgarh State, India [Internet]. Vol. 4, ~ 13 ~ International Journal of Applied Dental Sciences. 2018. Available from: www.oraljournal.com
4. Al-Jobory AI, Mahdee AF, Alhashimi RA, Suliman SA. Immediate and delay antimicrobial activity of three disinfection solutions on gutta-percha cones as routine chair-side procedure. Int Med J. 2021;28(1):3–5.
5. Rai N, Shetty S, Gupta R, Shetty A, Shetty A, Jacob B. Comparing the Efficacy of Berberine against Sodium Hypochlorite and Chlorhexidine Cetrimide as a Chairside Disinfectant of Gutta Percha Cones. J Clin Diagnostic Res. 2019;(January 2019).
6. Angami N, Yaduka P, Kataki R, Khalo P. Assessment of MicrobialContamination of Gutta-Percha Cones after opening a SealedPackage. IOSR J Dent Med Sci e-ISSN [Internet]. 2019;18(3):58–61. Available from: www.iosrjournals.org
7. Bracciale F, Marino N, Noronha A, Manso MDC, Gavinha S, Lopes Cardoso I, et al. Bacterial Contamination of Gutta-Percha Points From Different Brands and the Efficacy of a Chairside Disinfection Protocol. Eur Endod J. 2020;5(3):282–7.
8. Panuganti V, Vivek V, Jayashankara C, Anilkumar S, Girish S, Nanjundasetty J. Gutta-percha disinfection: A knowledge, attitude, and practice study among endodontic postgraduate students in India. Saudi Endod J. 2016;6(3):127–30.
9. Gutmann JL, Manjarrés V. Disinfection of gutta-percha cones prior to obturation: a smattering of historical perspectives with a focus on contemporary considerations. Endo EPT. 2019;13(3):191–206.
10. Kulkarni MU, Desai N. An in vitro evaluation of antimicrobial efficacy of 5% sodium hypochlorite, 2% chlorhexidine, and herbal extracts of neem and Aloe vera in disinfection of gutta-percha cones. Saudi Endod J. 2019;9(3):181–5.
11. Razeghi H, Sadeghi M, Iranmanesh F. Contamination of gutta-percha cones before and during clinical use Effect of Pretreatment with Fluoride, Chlorhexidine, and Mixed Fluoride-Chlorhexidine Gels on Shear Bond Strength of Orthodontic Brackets View project Shear bond strength of an etch-and-ri. 2021; Available from: https://www.researchgate.net/publication/357975032
12. Merdad K, Alnaffaie M, Balbaid R, Nakity A, Alghamdi F, Sabbahi D, et al. Dental health-care

ISSN:1624-1940
http://magellanes.com/

professionals' awareness and knowledge of sterilization and disinfection practices for new, unused endodontic files and gutta-percha in Jeddah, Saudi Arabia. 2023; Available from: www.saudiendodj.com

13. Jalan RS, Sandeep H. Knowledge Attitude And Practice Of Disinfection Of Gutta Percha Among Post Graduate Dental Students. In: 2023 International Conference on Business Analytics for Technology and Security (ICBATS). 2023. p. 1–7.

14. Da Motta PG, de Figueiredo CB, Maltos SM, Nicoli JR, Ribeiro Sobrinho AP, Maltos KL, et al. Efficacy of chemical sterilization and storage conditions of gutta - percha cones Int Endod J. 2001; 34: 435-9.