

Knowledge, Attitude and Practice of Dental Students Regarding Use of Rubber Dam during Clinical Procedures

Muaath Hussain Hassan Alzahrani¹, Abdullaziz Abdllah Alamri¹, Taher Safar Althagafi², Dr. Roshan Noor Mohamed^{3*}, Dr. Sakeenabi Basha³, Dr. Yousef Al-Thomali⁴, Dr. Fatma Salem Alzahrani³, Prashant Manjunath Battepati³

¹6th Year Dental Student, Faculty of Dentistry, Taif University, Taif, Saudi Arabia

²Intern, Faculty of Dentistry, Taif University, Taif, Saudi Arabia

³Assistant Professor, Preventive Dental Sciences (Pediatric Dentistry Division), Faculty of Dentistry, Taif University, Taif, Saudi Arabia

⁴Head of The Department, Preventive Dental Sciences, Faculty of Dentistry, Taif University, Taif, Saudi Arabia

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*Corresponding author: Dr. Roshan Noor Mohamed

Assistant Professor, Preventive Dental Sciences (Pediatric Dentistry Division), Faculty of Dentistry, Taif University, Taif, Saudi Arabia

Abstract

Objectives: Competency based clinical training in most of the dental schools in Saudi Arabia incorporates a clear rubrics for evaluation of clinical procedure where use of rubber dam is one of the criteria to be effectively fulfilled by the students. The present study aims to determine the knowledge, attitude and practice towards the use of rubber dam by dental students and interns of various dental schools in Saudi Arabia. **Methodology:** A cross-sectional study was conducted among the dental students of various Saudi university through google form during January 2022 to March 2022. A pretested questionnaire in a 5 point Likert scale ranging from strongly agree (score 5) to strongly disagree (score 1) containing three sections (each containing 10 questions) to measure knowledge, attitude and practice towards use of rubber dam was used. The questionnaire for barriers for rubber dam use included 5 items. The Chi-square test and One-way ANOVA followed by Tukey post hoc was used to compare the responses between the male and female students and dental students of difference academic levels. **Results:** Total of 273 valid responses were received (189 (69.23%) male and 84 (30.77%) female). The overall average Likert score for knowledge about rubber dam among dental students was 3.45 (± 1.2). The overall average Likert score for questionnaire items assessing attitude of dental students about rubber dam was 3.81 (± 0.9). The respective overall average score for male and female dental students for their attitude towards rubber dam was 3.32 (± 0.8) and 4.30 (± 0.11) with $p = 0.04$. The overall average Likert score for practice items was 3.73 (± 0.8) (Table 4, Fig – 2). The respective overall average score for male and female dental students for practice of rubber dam was 3.13 (± 1.1) and 4.33 (± 0.8) with $p = 0.03$. For the questionnaire items assessing the barriers for using rubber dam, the average score for unavailability of suitable rubber dam clamp and patient refuse both scored 4.3. **Conclusion:** The finding suggest that the dental students have adequate knowledge and training for rubber dam use. The attitude and practice towards consistent use of rubber dam should be reinforced through proper motivation. A future research with a larger sample size and patients feedback on rubber dam will be helpful.

Keywords: Rubber dam; dental students; Knowledge; attitude; practice.

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INTRODUCTION

Rubber dam is universally accepted as a most effective isolation method in dental practice for restorative and endodontic procedures [1]. Compared to other methods of isolation, rubber dam also provides good visualization, protection to the oral tissues, prevention of accidental ingestion of particles, comfort to the patient, and prevent cross infection [2-4].

Although rubber dam has several advantages, the reports on use of rubber dam by dental practitioners is inconsistent [5-7]. The training for using suitable isolation method including rubber dam begins during the undergraduate dental education through phantom and clinical training. The level of orientation of dental students during their clinical training towards importance of isolation and especially the routine use of rubber dam influences their attitude and future practice

[8, 9]. Competency based clinical training in most of the dental schools in Saudi Arabia incorporates a clear rubric for evaluation of clinical procedure where use of rubber dam is one of the criteria to be effectively fulfilled by the students [10-14]. This will influence the student’s motivation and places higher emphasis on quality dental treatment with rubber dam isolation [11].

With this background, the present study aims to determine the knowledge, attitude and practice towards the use of rubber dam by dental students and interns of various dental schools in Saudi Arabia.

MATERIAL AND METHOD

A cross-sectional study was conducted among the dental students of various Saudi university through google form during January 2022 to March 2022. The ethical clearance for the study was obtained from Institutional review Committee before the beginning of the study.

A pretested questionnaire (tested for validity and reliability on 20 dental students, Cronbach alpha 0.86 for revised questionnaire) in a 5 point Likert scale ranging from strongly agree (score 5) to strongly disagree (score 1) containing three sections (each containing 10 questions) to measure knowledge, attitude and practice towards use of rubber dam was used. The questionnaire for barriers for rubber dam use included 5 items (Table-1).

The dental students (both male and female) were invited for voluntary participation by filling the survey form. The informed consent was for voluntary participation was taken in the same Google form, which either ended upon denial or continued to next sections upon their agreement. No emails or names were collected for the responses to encourage honest and truthful responses. A time limit of 60 days was fixed for receiving the responses. The Dental students included in the study were ranging from third academic year until internship. All the responses received until the last day of March 2022 were included in the study.

Statistical analysis

The collected data was organized and analysed using Statistical Package for Social Science (SPSS) IBM 2020 Chicago: SPSS.Inc. The descriptive analysis of data was displayed in tables and figures. The

comparison for the responses to the questionnaire items by male and female dental students was performed using Chi-square test with 95 percent confidence interval with significance level set at $p \leq 0.05$. The One-way ANOVA followed by Tukey post hoc was used to compare the responses between the dental students of difference academic levels.

RESULTS

The total number of dental students who responded to the survey form were 287, among which 14 denied voluntary consent for participation. Total of 273 valid responses were received until the time set for receiving the responses following which the survey form was closed for receiving any more responses. Among the respondents 88 (32%) belong to 5th academic year. The least number of responses belonged to students in internship which was 36 (13 %). The Figure 1 shows the response rate according to the academic year of dental study. The overall male and female student responses were 189 (69.23%) and 84 (30.77%) respectively.

The overall average Likert score for knowledge about rubber dam among dental students was 3.45 (± 1.2) (Table 2). The comparison between male and female dental students for their overall score for knowledge was 3.41 (± 1.2) and 3.51 (± 0.09) respectively with $p=0.13$ (Fig-2). The overall average Likert score for questionnaire items assessing attitude of dental students about rubber dam was 3.81 (± 0.9) (Table 3, Fig – 2) . The respective overall average score for male and female dental students for their attitude towards rubber dam was 3.32 (± 0.8) and 4.30 (± 0.11) with $p=0.04$. The overall average Likert score for practice items was 3.73 (± 0.8) (Table 4, Fig – 2). The respective overall average score for male and female dental students for practice of rubber dam was 3.13 (± 1.1) and 4.33 (± 0.8) with $p=0.03$. For the questionnaire items assessing the barriers for using rubber dam, the average score for unavailability of suitable rubber dam clamp and patient refuse both scored 4.3 (Table 5, Fig-3). There was no statistically significant difference between male and female students regarding the scores for barriers for using rubber dam ($p \geq 0.05$). The comparison between overall averages scores for barrier items was statistically significant with $p=0.03$ (Table 5).

Table 1: Questionnaire for assessment of Knowledge, Attitude and Practice of Rubber dam use by dental students

Knowledge, attitude and practice towards use of rubber dam by dental students						
Gender: Male/ Female Academic Year: 3 rd / 4 th / 5 th /6 th / Internship						
		Likert scale				
Questionnaire items for Knowledge Assessment		Strongly agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
1	Rubber dam is the best method of isolation in dentistry					
2.	Rubber dam application is very easy					
3.	Rubber dam application do not take much time					

4.	Rubber dam application is very comfortable for the patient					
5.	Rubber dam application helps to provide the high quality treatment					
6.	Rubber dam increases the safety for the patient					
7.	Treatment under Rubber dam saves chair side time					
8.	Rubber dam can be applied for any tooth irrespective of its clinical condition.					
9.	There is no absolute contraindication for using rubber dam for a patient					
10	Rubber dam can be used for all/any patient who needs it.					
Questionnaire items for Attitude Assessment		Strongly agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
11	Performing dental treatment under rubber dam is easy, safe and convenient					
12	I apply rubber dam to provide quality treatment for my patient					
13	I apply rubber dam only to improve the grades of my clinical evaluation					
14	I remove rubber dam if patient complaints of discomfort					
15	Rubber dam improves the access to the operating area of the oral cavity					
16	I prefer using other method of isolation over rubber dam					
17	I feel rubber dam application is waste of time					
18	I always try rubber dam before switching to other method of isolation					
19	I always try to convince the patient who are hesitant to receive rubber dam					
20	I will continue to use rubber dam in my future dental practice					
Questionnaire items for Practice Assessment		Strongly agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
21	I have good training in application of rubber dam					
22	I apply rubber dam for both maxillary and mandibular tooth isolation					
23	I always apply rubber dam for all restorative procedures					
24	I always apply rubber dam for all endodontic procedures					
25	I always apply rubber dam for all pediatric patients					
26	I always find a suitable rubber dam clamp for my patients					
27	I face difficulty in applying rubber dam for child patient					
28	Supervisors always insist on performing dental treatment under rubber dam					
29	I lose my grades when I do not use rubber dam					
30	Sometimes I make excuses for not using rubber dam for a particular patient					
Questionnaire items for Barriers for rubber dam use		Strongly agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
31	Unavailability of suitable rubber dam clamp					
32	Unavailability of rubber dam sheet/ other rubber dam armamentarium					
33	Lack of time/ waste of time					
34	Patient refuse					
35	Not necessary					

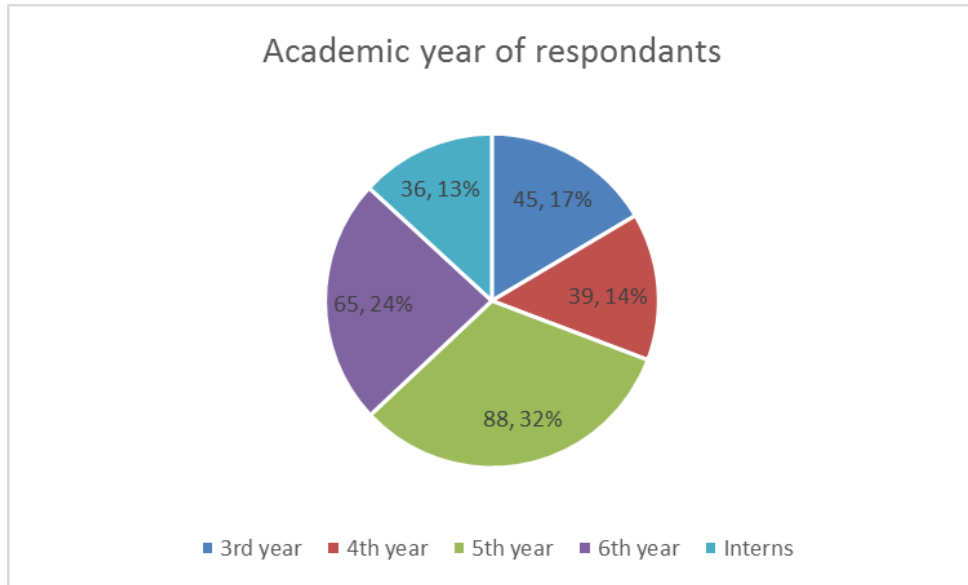


Figure 1: Rate of response according to academic year

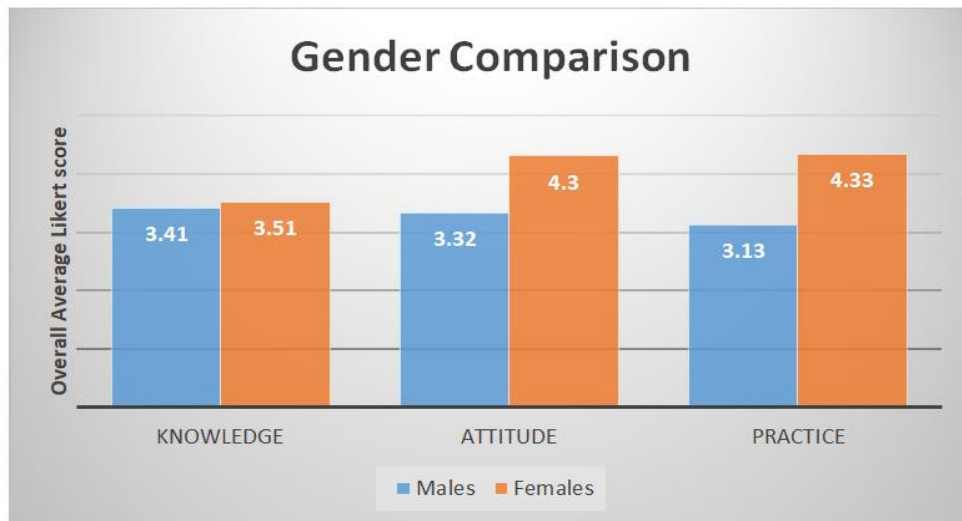


Figure 2: Gender comparison for knowledge, attitude and practice scores

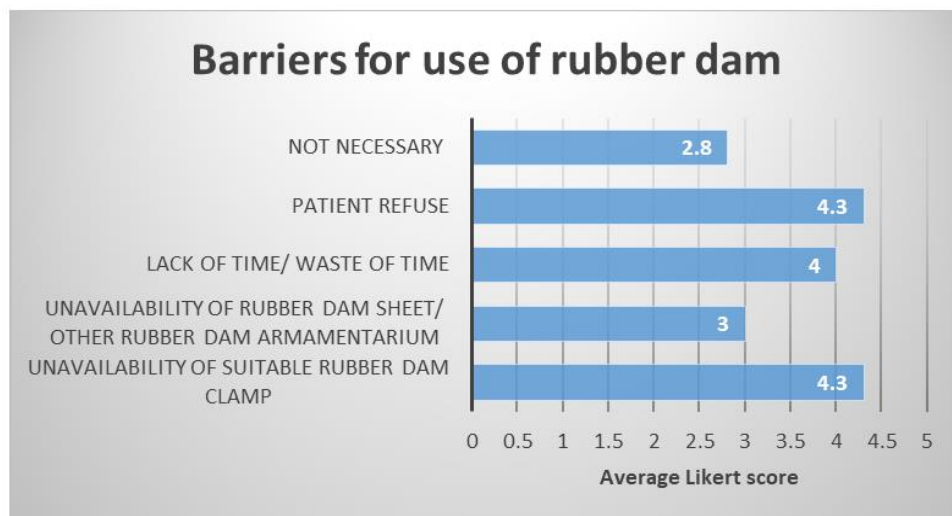


Figure 3: Comparison of average likert scores for barriers for rubber dam use

Table 2: Average Likert score for Knowledge about rubber dam at different academic level

Questions	Overall Mean (±SD)	3 rd year Mean (±SD)	4 th year Mean (±SD)	5 th year Mean (±SD)	6 th year Mean (±SD)	Interns Mean (±SD)	P value
1 Rubber dam is the best method of isolation in dentistry	4.1 (1.3)	4.1 (1.1)	4.2 (1.1)	4.0 (0.8)	4.3 (0.7)	4.0 (1.1)	0.12
2 Rubber dam application is very easy	3.5 (1.2)	3.2 (0.9)	3.4(1.2)	3.4(1.2)	3.9(1.1)	3.6(1.0)	0.16
3 Rubber dam application do not take much time	3.5 (1.1)	2.5 (0.7)	3.2 (0.9)	3.7 (0.9)	4.2 (0.8)	3.9 (0.8)	0.04
4 Rubber dam application is very comfortable for the patient	3.8 (1.0)	3.7 (0.9)	3.4 (1.0)	3.9 (1.1)	4.0 (0.8)	3.9 (1.0)	0.07
5 Rubber dam helps to provide the high quality treatment	4.2 (0.7)	4.1 (0.7)	4.2 (0.5)	4.3 (0.3)	4.4 (0.2)	4.1 (0.7)	0.14
6 Rubber dam increases the safety for the patient	4.0 (1.1)	4.1 (1.2)	3.7 (1.1)	3.9 (1.2)	4.2 (1.2)	4.1 (1.2)	0.07
7 Treatment under Rubber dam save chair side time	3.7 (1.1)	4.0 (0.9)	4.2 (0.5)	3.3 (0.9)	3.2 (1.1)	3.7 (1.4)	0.07
8 Rubber dam can be applied for any tooth irrespective of its clinical condition.	3.6 (1.2)	3.6 (1.1)	3.7 (1.1)	3.5 (1.1)	3.1 (1.3)	4.1 (0.6)	0.08
9 There is no absolute contraindication for rubber dam	3.8 (1.0)	3.9 (0.8)	4.0 (0.7)	3.9 (0.7)	3.6 (0.9)	3.7 (1.1)	0.08
10 Rubber dam can be used for all/any patient	3.8 (1.1)	3.9 (1.1)	3.7 (0.9)	3.9 (0.9)	3.6 (0.9)	3.9 (0.9)	0.14

Table 3: Average Likert score for Attitude about rubber dam at different academic level

Questions	Overall Mean (±SD)	3 rd year Mean (±SD)	4 th year Mean (±SD)	5 th year Mean (±SD)	6 th year Mean (±SD)	Interns Mean (±SD)	P value
11 For me performing dental treatment under rubber dam is easy, safe and convenient	4 (1.2)	3.7 (1.2)	3.9 (1.1)	4.0 (0.8)	4.3 (0.7)	3.9 (1.1)	0.10
12 I apply rubber dam to provide quality treatment for my patient	3.5 (1.1)	3.2 (0.9)	3.4(1.2)	3.4(1.2)	3.9(1.1)	3.6(1.0)	0.15
13 I apply rubber dam to improve the grades of my clinical evaluation	4.1 (0.8)	4.1 (0.7)	4.2 (0.9)	4.3 (0.9)	4.2 (0.8)	3.9 (0.8)	0.11
14 I remove rubber dam if patient complaints of discomfort	3.8 (0.9)	3.7 (0.9)	3.4 (1.0)	3.9 (1.1)	4.0 (0.8)	3.9 (1.0)	0.12
15 For me rubber dam improves the access to the operating area	4.2 (0.5)	4.1 (0.7)	4.2 (0.5)	4.3 (0.3)	4.4 (0.2)	4.1 (0.7)	0.18
16 I always prefer using rubber dam over other methods of isolation	3.5 (1.1)	3.5 (1.2)	3.4 (1.1)	3.6 (1.2)	3.5 (1.2)	3.6 (1.2)	0.13
17 I feel rubber dam application prevents wasting of operating time	3.7 (1.0)	4.0 (0.9)	4.2 (0.5)	3.3 (0.9)	3.2 (1.1)	3.7 (1.3)	0.06
18 I always try rubber dam application before switching to other isolation method	3.7 (1.3)	3.6 (1.1)	4.2 (1.1)	4.3 (1.1)	3.1 (1.3)	3.3 (1.6)	0.07
19 I always try to convince the patient who are hesitant to receive rubber dam	3.7 (0.9)	3.9 (0.8)	4.0 (0.7)	3.9 (0.7)	3.6 (0.9)	3.3 (1.1)	0.06
20 I will continue to use rubber dam in my future dental practice after graduation	3.9 (1.1)	4.3 (1.1)	4.0 (0.9)	4.1 (0.9)	3.6 (0.9)	3.7 (0.9)	0.11

Table 4: Average Likert score for Practice about rubber dam at different academic level

Questions	Overall Mean (±SD)	3 rd year Mean (±SD)	4 th year Mean (±SD)	5 th year Mean (±SD)	6 th year Mean (±SD)	Interns Mean (±SD)	P value
21 I have good training in application of rubber dam	4.2 (0.9)	4.2 (1.1)	4.2 (1.1)	4.1 (1.1)	4.0 (0.8)	4.3 (0.7)	0.17
22 I apply rubber dam for both maxillary and mandibular tooth isolation	3.5 (1.1)	3.4(1.2)	3.2 (0.9)	3.4(1.2)	3.4(1.2)	3.9(1.1)	0.11
23 I always apply rubber dam for all restorative procedures	3.7 (1.2)	4.2 (0.9)	3.5 (0.7)	3.9 (0.9)	3.8 (0.9)	3.2 (0.8)	0.08
24 I always apply rubber dam for all endodontic procedures	3.8 (1.2)	2.5 (1.0)	4.4 (0.9)	4.1 (1.0)	4.2 (1.1)	4.0 (0.8)	0.04
25 I always apply rubber dam for all pediatric patients	2.7 (1.2)	2.2 (0.6)	2.7 (0.6)	3.1 (1.6)	3.0 (1.1)	2.7 (1.2)	0.16
26 I always find a suitable rubber dam clamp for my patients	3.5 (1.1)	3.4 (1.1)	3.5 (1.2)	3.4 (1.1)	3.6 (1.0)	3.5 (1.1)	0.17
27 I apply rubber dam for geriatric (elderly) patient	3.7 (0.8)	3.7 (0.7)	4.0 (0.9)	4.2 (0.5)	3.3 (0.9)	3.2 (1.1)	0.06
28 Supervising faculty always insist on rubber dam use	4.1 (1.6)	4.2 (1.1)	4.4 (1.2)	4.1 (1.0)	4.3 (1.3)	3.3 (1.2)	0.08
29 I lose my grades when I do not use rubber dam	3.9 (0.8)	4.0 (0.7)	4.3 (0.8)	4.0 (0.7)	4.1 (0.8)	3.3 (0.9)	0.09
30 I make excuses for avoiding rubber dam for a some patient	4.2 (0.7)	4.0 (0.9)	4.3 (1.1)	4.0 (0.9)	4.1 (0.9)	4.4 (1.4)	0.14

Table 5: Average Likert score for Barriers for using rubber dam at different academic level

Questions	Overall Mean (±SD)	3 rd year Mean (±SD)	4 th year Mean (±SD)	5 th year Mean (±SD)	6 th year Mean (±SD)	Interns Mean (±SD)	P value
31 Unavailability of suitable rubber dam clamp	4.3 (0.8)	4.3 (1.1)	4.2 (1.1)	4.4 (1.1)	4.5 (0.8)	4.2 (0.7)	0.17
32 Unavailability of rubber dam sheet/ other rubber dam armamentarium	3.0 (1.2)	3.1(1.2)	3.2 (0.9)	3.1(1.2)	3.0(1.2)	2.8(1.1)	0.11
33 Lack of time/ waste of time	4.0 (1.1)	3.7 (0.9)	4.2 (0.7)	4.2 (0.9)	3.8 (0.9)	4.1 (0.8)	0.09
34 Patient refuse	4.3 (1.1)	3.9 (1.0)	4.4 (0.3)	4.4 (0.4)	4.4 (0.5)	4.5 (0.6)	0.07
35 Not necessary	2.8 (1.0)	2.5 (0.6)	2.7 (0.6)	3.0 (1.4)	3.2 (1.0)	2.7 (1.1)	0.16
	P=0.033						

DISCUSSION

The isolation procedure in dental restorative and endodontic procedure is one of the essential component for providing successful and quality treatment [15]. The rubber dam being the most effective isolation method, which additionally provides safety to patient and improves the quality of treatment provided [1].

The use of rubber dam isolation is reinforced to dental graduates during their under graduate training [15, 16]. The research related to the use of rubber dam among dental practitioners in various parts of the world has shown inconsistent results [18-20]. This inconsistency can be directly associated with the level of orientation and motivation towards consistent use of rubber dam during their undergraduate training [18-20].

In the present study, the dental students of various dental schools in Saudi Arabia were surveyed to know their knowledge, attitude and practice towards use of rubber dam. The students from third academic year were included in the study since the students enter clinical training and start performing dental restorative procedures from this year in majority of dental schools in KSA [12-14]. Most of the dental schools in Saudi Arabia follow competency based clinical training where in the isolation technique especially use of rubber dam is graded to achieve the competency level necessary for the intended dental restorative or endodontic procedure [10-14]. Unlike many pervious research assessing the knowledge, attitude and practice through responses such as Yes, No and Don't Know [12-14], the present study used uses 5 point likert scale for a pretested questionnaire for qualitative assessment.

In the present study, the dental students displayed adequate knowledge about rubber dam with average score of 3.45. Both male and female students were similar in their knowledge levels towards rubber dam. The dental students agree that the rubber dam is most effective method of isolation with average score of 4.1; helps provide quality treatment with score of 4.2 and provide safety to patient with score of 4 (Table -2). Various past researchers [7, 12, 17] mention similar reports of knowledge about rubber dam.

Regarding the responses for the questions assessing the attitude of dental students towards use of rubber dam, the present study shows statistically significant difference in average scores between male and female dental students with female students having more favourable attitude compared to male students (Table 3, Fig 2). A direct comparison of this result with other similar research may not be possible due to variations in survey pattern and the questions used for assessing the general attitude. However, some past researchers [16-19, 21] report favourable attitude towards rubber dam among both males and female dental students. The overall average score for having better clinical evaluation grades for procedures performed with rubber dam is 4.1 (Table 3).

The Practice items assessed in the present study showed that dental students agree for having adequate training for rubber dam use with average Likert score of 4.2. The students receive rubber dam training in their phantom courses before they enter clinical training [20]. Students responded that the clinical supervisors insisted for use of rubber dam isolation (Average score 4.1). However, the score for students making excuses to avoid rubber dam was also high at 4.2. The least score in practice items was for use of rubber dam for paediatric patients, which was 2.7. Consistently students of all academic years tried to avoided rubber dam for paediatric dental procedures. The practice scores were low for students in internship compared to other academic years, suggesting that the use of rubber dam diminished over the years. This may lead to limited of non-use of rubber dam isolation in general dental practice after graduation as noticed and reported by several past researchers [5-7, 22]. The score for practice items was higher for females (4.43) compared to male dental students (3.13). The authors could not find a similar past research to compare this finding.

In the current study, the main barriers for rubber dam usage were non-availability of suitable clamp and patient refusal (Table-5, Fig-2). There was no statistical significant difference between genders and between students of different academic levels for the responses assessing the barrier items (Table-5). However, there was statistically significant difference for comparison of average scores between the Barrier items ($p=0.03$). The least score was recorded for

responses stating the barrier being rubber dam not necessary, which was 2.7. Previous study by Boreak *et al.*, [23] have also reported a similar finding.

CONCLUSION

Within the limitations of present study, the finding suggest that the dental students have adequate knowledge and training for rubber dam use. The attitude and practice towards consistent use of rubber dam should be reinforced through proper motivation. A future research with a larger sample size and patients feedback on rubber dam will be helpful. For a continued, regular and consistent use of rubber dam even after graduation, the concept of quality dental treatment, patient safety and medico-legal issues should be emphasised during their graduate clinical training.

Conflict of Interest: None

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