

ORIGINAL RESEARCH REPORT

Undergraduate dental students' perception, educational satisfaction, and attitude regarding the use of rubber dam

Olubukola Olamide Olatosi, Chioma Love Nzomiwu, Olufemi Akinwunmi Erinoso¹, Atony A. Oladunjoye²

Department of Child Dental Health, Faculty of Dental Sciences, College of Medicine, University of Lagos, Departments of ¹Oral and Maxillofacial Surgery and ²Child Dental Health, Lagos University Teaching Hospital, Lagos, Nigeria

ABSTRACT

Background and Objective: The rubber dam is used in dentistry to create saliva-free working environment during operative procedures. Despite its numerous advantages, utilization is poor in dental schools. We sought to determine undergraduate dental students' perception, educational satisfaction, and attitude regarding the use of rubber dam. **Materials and Methods:** This cross-sectional survey was carried out among 5th and 6th year undergraduate dental students. A structured questionnaire was developed that sought their perception, educational satisfaction, and attitude regarding the use of rubber dam. Data collected were analyzed using IBM SPSS version 21.0. $P < 0.05$ was considered statistically significant. **Results:** One hundred and nine students participated in the study; 66 (60.6%) females and 43 (39.4%) males with a mean age of 23.4 ± 2.02 . Most of the students, i.e., 73 (67%) were satisfied with their classroom experience with regard to the use of rubber dam but were least satisfied with their laboratory and clinical training. There was a statistically significant association between the students' satisfaction with their training in the use of rubber dam and the confidence to use the rubber dam on their patients ($P = 0.001$). **Conclusion:** The students agreed to the importance of rubber dam but were not satisfied with their hands-on clinical training. The use of rubber dam postgraduation may be influenced by the dental educator's method of training, motivation, and consistency in its use. Students who acquire competence and are confident in the use of rubber dam during their undergraduate training are more likely to continue to use the skills following graduation.

Key words: Education, rubber dam, satisfaction, undergraduate students

Address for correspondence:

Dr. Olubukola Olamide Olatosi,
Department of Child Dental Health,
Faculty of Dental Sciences,
College of Medicine, University
of Lagos, Lagos, Nigeria.
E-mail: bukkyolatosi@yahoo.com

INTRODUCTION


The rubber dam was first introduced to dentistry in 1864 by Dr. Sanford Barnum, a New York dentist. Since then, it has been used as an ideal tool for tooth isolation during dental operative procedures thereby creating a dry, clean, saliva-free working environment.^[1] There are many advantages of the rubber dam isolation technique which have been reported and they include provision of a surgically clean operating field, isolation from hemorrhage and other tissue fluids, prevention of saliva contamination;^[2] patient protection from ingesting or aspirating endodontic instruments, tooth debris, medicaments, and irrigation solutions; retraction and protection of soft tissues from

the cutting edge of the bur;^[3] improved properties of dental materials;^[4] reduction of cross contamination of the root canal system thereby controlling the spread of infection; better access and visibility in the working area;^[5] modification of patient behaviour;^[6] improved operating efficiency and patient management simplified by avoiding need to rinse out debris.^[4] Despite all these advantages, some dentist still do not make use of the rubber dam; some of the reasons reported include time factor, contention that a dry field can be obtained without its use,^[7,8] difficulty in placement, high cost, lack, or insufficient training.^[9-11] Undergraduate, postgraduate training, gender, year of

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Olatosi OO, Nzomiwu CL, Erinoso OA, Oladunjoye AA. Undergraduate dental students' perception, educational satisfaction, and attitude regarding the use of rubber dam. *J Clin Sci* 2018;15:13-7.

Access this article online	
Quick Response Code:	Website: www.jcsjournal.org
	DOI: 10.4103/jcls.jcls_93_17

qualification, and interest in endodontics have also been reported to influence the use of rubber dam.^[12-14] A study by Madarati^[14] showed that place of work and pattern of usage of rubber dam during undergraduate training are important factors that can determine its use and also better undergraduate education can be the most effective measure to increase its use in dental practice. Another recent study also reported that students who acquire competence and efficiency in certain skills during their undergraduate training are more likely to continue to use those skills following graduation.^[10] Therefore, the aim of this study was to determine the undergraduate dental students' perception, educational satisfaction, and attitude regarding their training with regard to the use of rubber dam.

MATERIALS AND METHODS

Study location, design, and population

A cross-sectional study was carried out among 5th year (500 Level) and 6th year (600 Level) dental students of the College of Medicine, University of Lagos. The College of Medicine University of Lagos is one of the oldest medical schools in Nigeria. It was founded in 1962 and has admitted students annually into a 6-year course degree in many courses including dentistry.

Approval for the study was obtained from the Health Research Ethics Committee of the Lagos University Teaching Hospital. Participation was voluntary, and the students were free to withdraw from the study at any point in time.

Sampling method

Purposive sampling method was used. All 500-level and 600-level undergraduate dental students were invited to participate in the study. One hundred and twenty-nine students were eligible to participate in the study. Of the 129 questionnaires distributed, 109 were returned giving a response rate of 84.5%. All returned questionnaires were analyzed.

Data collection

Data were collected with the aid of a structured self-administered questionnaire. The questionnaire was modified from a previous study.^[10] Face and content validation of the questionnaire was done by experts in pediatric dentistry. All but two questions were close ended. The questionnaire contained no identifiers and the questionnaire was distributed by the coinvestigator immediately after scheduled class lectures and retrieved after 15 min. The participating students completed a 17-question survey that included four sections. The first part contained questions on sociodemographic characteristics (age, gender, and class). The second part assessed the students' satisfaction with their classroom, clinical, laboratory training, and teaching resources with

regard to the use of rubber dam. The third part assessed the student's knowledge on use of rubber dam. The fourth part of the questionnaire assessed the students' attitude toward the use of rubber dam currently and also postgraduation.

Data management and statistical analysis

The data collected were entered into excel worksheet for cleaning and imported into Statistical Package for Social Sciences (SPSS) (IBM SPSS Statistics for Windows, Version 21.0. IBM Corp., Armonk, NY, USA) for analysis. Continuous variables were expressed as means with standard deviation or frequencies with accompanying percentages. Chi-square test was used to determine association. Statistical significance was set at $P < 0.05$.

RESULTS

A total of 109 dental students were included in the study, 66 (56%) of the students were in their 5th year (500 level) while 48 (44%) were in their 6th year (600 level) at the time of the study. The mean age of the students was 23.39 ± 2.019 years. More than half of the respondents were females (61%) while 39% were males.

Majority of the students, i.e., 107 (98.2%) reported that they had received training in the use of rubber dam isolation technique.

When the students were asked about their satisfaction with the various aspects of their training with regard to the use of rubber dam isolation technique, majority of them, i.e., 75 (68.8%) were satisfied with their classroom didactic lectures, followed by the available teaching resources 56 (51.4%); the students were least satisfied with their hands-on laboratory training 33 (30.3%) [Table 1]. Overall level of satisfaction after combining the various aspects of the training was set at $\geq 50\%$ to reflect satisfaction and $< 50\%$ to reflect dissatisfaction. More than half of the students, i.e., 73 (67%) were satisfied with the various aspects of their training.

Twenty-six percent of the respondents reported that rubber-dam was never used at their school, while 66% and 8% detailed occasional and frequent uses, respectively. In addition, 95% of students reported they had never used the rubber dam to treat their patients. Reasons for not using the rubber dam were reported by the students, the most common reasons given were the unavailability of rubber dam (74%) and it being only meant for resident doctors and consultants (11%) [Figure 1].

The respondents identified the advantages of rubber dam as follows: improved visibility (99%), reduction of microbial contamination (98%), protection from ingestion of foreign body (100%), moisture control (98%), retraction of soft tissue (88%), behavior modification (62%), and time efficiency (88%) as shown in Figure 2. Forty-one

Olatosi, *et al.*: Dental students' perception, satisfaction and attitude regarding rubber dam use

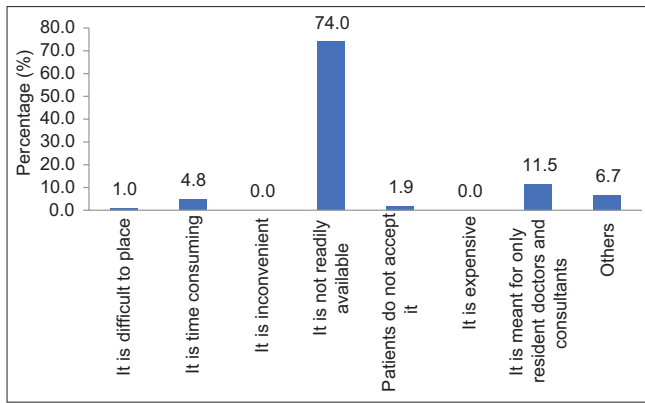


Figure 1: Students' reasons for not using the rubber dam

percent of the respondents stated they can confidently place a rubber dam on their patients. Furthermore, 51.4% of respondents stated they could achieve moisture control without the rubber dam, while 40.4% stated they could not. Furthermore, the respondents indicated that they will use rubber dam postgraduation to carry out procedures such as amalgam restorations (82.6%), anterior composite (67.9%), posterior composite (89%), endodontic procedures (91.7%), and crowns/bridges (53.2%).

In addition, while 62% stated that they do not have adequate training in the use of the rubber dam, 98% reported that they would like to have more training in its use in the following areas: classroom teaching (12%), hands on in the laboratory (55%), and clinical demonstration/practice (86%).

There was a statistically significant association between the students' satisfaction with their training in the use of rubber dam and the confidence to use the rubber on their patients; those who were satisfied with their training had more confidence to use the rubber dam isolation technique, $P = 0.001$ [Table 2].

DISCUSSION

The study was conducted among penultimate year and final year dental students. A study by Madarati^[14] reported that 20.7% of the dentists in his study did not have rubber dam training in their undergraduate curriculum; he also reported a significant positive correlation between the use of rubber dam during undergraduate study and its use after graduation. The use of the rubber dam is encouraged in undergraduate dental education and is mandatory for most restorative treatment in children and adults. European Society of Endodontology advises the use of the rubber dam in its quality guidelines.^[15] Although the use of rubber dam is being taught in dental schools in Nigeria, there are reports on deficiency in training, low level of utilization, and poor motivation for its use among dental students and dentists.^[16,17] This survey highlighted that most of the students (67%) believed that they received satisfactory

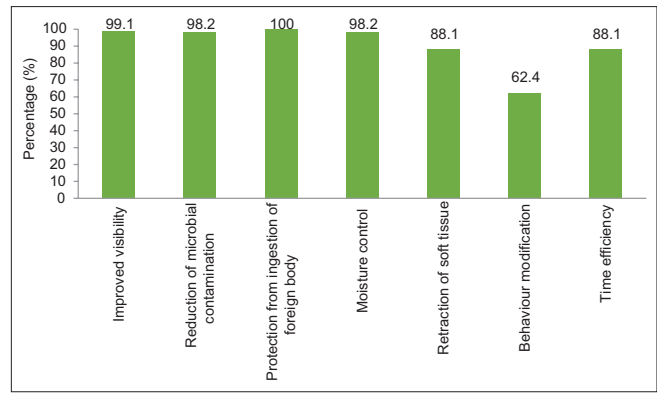


Figure 2: Advantages of rubber dam as perceived by the students

Table 1: Students' satisfaction with various aspects of their training in the use of rubber dam

	Satisfied, frequency (%)	Dissatisfied, frequency (%)
Classroom experience	75 (68.8)	34 (31.2)
Hands on in the laboratory	33 (30.3)	76 (69.7)
Clinic experience	53 (48.6)	56 (51.4)
Teaching resources	56 (51.4)	53 (48.6)

Table 2: Association of students' educational satisfaction with the use of rubber dam with age, class level, and confidence to use the rubber dam technique

Variable	Level of satisfaction regarding the use of rubber dam			χ^2	P
	Satisfied	Dissatisfied	Total		
Gender				0.842	0.359
Female	42 (63.6)	24 (36.4)	66 (100.0)		
Male	31 (72.1)	12 (27.9)	43 (100.0)		
Total	73 (67.0)	36 (33.0)	109 (100.0)		
Level				0.004	0.952
500	41 (67.2)	20 (32.8)	61 (100.0)		
600	32 (66.7)	16 (33.3)	48 (100.0)		
Confidence in the use of rubber dam				10.577	0.001
Yes	38 (84.4)	7 (15.6)	45 (100.0)		
No	35 (54.7)	29 (45.3)	64 (100.0)		

education regarding rubber dam usage. This is similar to other studies where they reported high satisfaction among the study population.^[10,18] In our study, although the students reported satisfaction with their training in general, majority were not satisfied with their hands-on laboratory training with regard to rubber dam placement. This stresses the need to investigate the impact of different methods of undergraduate education in better implementation of the rubber dam use after graduation.^[19]

The students were aware of the advantages of rubber dam, this is similar to another Nigerian study,^[16] these findings suggest that the importance of rubber dam is sufficiently stressed at the dental schools. It is therefore not surprising



Figure 3: Rubber dam isolation technique

that almost all the students agreed to the importance of rubber dam use. Joynt *et al.*^[20] in their report stated that there should be greater emphasis on explaining the importance and the reason for rubber dam usage rather than placement techniques.^[20] Udoye and Jafarzadeh reported in their study that despite the observed knowledge of the importance of rubber dam exhibited by the participants, this does not correlate with the clinical utilization of the device.^[17] This is contrary to a previous study where they reported that those who had intensive training tend to use the rubber dam.^[14] It is important to provide proper training in the use of rubber dam, whether during undergraduate or postgraduate studies. Previous studies stated that dentists are most likely to use the rubber dam if they are able to place it.^[14,20,21] There is a need for better education with more emphasis on both the importance of rubber dam usage and its placement; this may likely improve its usage. The major advantages identified by the students were protection of patient from ingestion of foreign body and improved visibility and access. This is contrary to the study by Tanalp *et al.*^[18] where the students identified the major advantages of rubber dam to be provision of isolation and an aseptic field.

There is a need to further investigate the use of rubber in the government and private settings.

In this study, more than half of the students reported that the rubber dam is used occasionally in the clinics and 11% of them opined that it is meant for consultants and residents. It is possible to deduce from this that students are motivated by what they see being done by trainers; this may possibly influence their practice whether in the present or future. A study by Soldani and Foley^[23] reported that the nonuse of rubber dam by dentists was as a result of being taught by trainers who could not use it or did not use it. It is important for dental educators to be in the position to motivate their students and also be consistent in the use of the rubber dam. Therefore, the dental schools and trainers have a huge responsibility in

ensuring that students apart from classroom teaching, have the opportunity and materials to practice and become proficient in the use of rubber dam.^[16] The ability to place rubber dam successfully in any clinical situation comes with practice and clinical experience and can be taught. Students require more practical hands-on experience to efficiently carry out this technique.

More than half of the students reported that they can achieve adequate moisture control without the use of rubber dam although this finding is difficult to justify as many of the students have not used the rubber dam and were only used to using other methods of isolation such as cotton roll. Ryan and O'Connell^[10] also reported a similar finding where students reported that isolation can be adequately achieved without a rubber dam in a number of clinical situations. This was surprising since dental students rarely have one-to-one nursing support as the rubber dam is used for many procedures particularly when there is no assistance. Although the use of other methods of moisture control may protect the lips, cheeks, and intraoral soft tissues, they cannot prevent accidental ingestion, inhalation, or aspiration of endodontic instruments and also their efficacy in providing complete isolation is questionable.^[14]

The students agreed that the rubber dam should be used for different clinical procedures such as endodontic procedure, posterior composite, restoration, amalgam filling, and anterior composite restoration, respectively, but when asked about the use of rubber dam for the same procedures following graduation, the percentages of the students reduced. This is not surprising as some literature have suggested that there may be a disconnect between what students are taught and how they practice following graduation. A study by Whitworth *et al.* reported that fresh graduates were more likely to use rubber dam routinely in their practice than older practitioners.^[24] This was corroborated by a more recent study which showed that dental interns agreed to the importance of rubber dam and used it frequently and were also enthusiastic about its usage in the future.^[25] However, some authors reported a decrease in the use of rubber dam after graduation. The question now is how do trainers ensure what is taught during undergraduate training is practiced after graduation? While some authors suggested that the use of rubber dam be made compulsory during undergraduate training, others have suggested strict government policies to enable its use. It may be important to consider self-motivation as well. The more rubber dam is used during undergraduate training, the greater the sustainability of using it after graduation.

CONCLUSION

Within the limits of this study, the following can be concluded:

- The students perceived rubber dam to be an important adjunct for isolation during operative dental procedures

Olatosi, *et al.*: Dental students' perception, satisfaction and attitude regarding rubber dam use

- The study highlighted shortcomings in the teaching of the use of rubber dam, especially in the practical aspect
- Availability of the rubber dam in the clinics and its regular use by trainers/tutors are some factors that can influence its use among the students
- The use of rubber dam postgraduation may be influenced by the dental educator's method of training, motivation, and consistency in its use
- Students who acquire competence and efficiency in the use of rubber dam during their undergraduate training are more likely to continue using the skills after graduation.

We recommend increase in laboratory training on phantom heads and hands-on training in the clinics.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Elderton RJ. A modern approach to the use of rubber dam 3. Dent Pract Dent Rec 1971;21:267-73.
2. Cohen S, Schwartz S. Endodontic complications and the law. J Endod 1987;13:191-7.
3. Lambrianidis T, Beltes P. Accidental swallowing of endodontic instruments. Endod Dent Traumatol 1996;12:301-4.
4. Ballal NV, Khandeelwal D, Saraswathi MV. Rubber dam in endodontics-An overview of recent advances. Int J Clin Dent 2013;4:391-30.
5. Shashirekha G, Jena A, Maity AB, Panda PK. Prevalence of rubber dam usage during endodontic procedure: A Questionnaire survey. J Clin Diagn Res 2014;8:ZC01-3.
6. Glickman GM, Pettiette MT. Preparation for treatment. In: Cohen S, Hargreaves KM, Keiser K, editors. Pathways of the Pulp. 9th ed. St. Louis, MO: Mosby; 2006. p. 120-32.
7. Smales RJ. Rubber dam usage related to restoration quality and survival. British Dent J 1993 174 9:330-333.
8. van Dijken JW, Hörstedt P. Effect of the use of rubber dam versus cotton rolls on marginal adaptation of composite resin fillings to acid-etched enamel. Acta Odontol Scand 1987;45:303-8.
9. Ahmad IA. Rubber dam usage for endodontic treatment: A review. Int Endod J 2009;42:963-72.
10. Ryan W, O'Connell A. The attitudes of undergraduate dental students to the use of the rubber dam. J Ir Dent Assoc 2007;53:87-91.
11. Mala S, Lynch CD, Burke FM, Dummer PM. Attitudes of final year dental students to the use of rubber dam. Int Endod J 2009;42:632-8.
12. Marshall K, Page J. The use of rubber dam in the UK. A survey. Br Dent J 1990;169:286-91.
13. Palmer NO, Ahmed M, Grieveson B. An investigation of current endodontic practice and training needs in primary care in the North West of England. Br Dent J 2009;206:E22.
14. Madarati AA. Why dentists don't use rubber dam during endodontics and how to promote its usage? BMC Oral Health 2016;16:24.
15. European Society of Endodontology. Quality guidelines for endodontic treatment: Consensus report of the European society of endodontology. Int Endod J 2006;39:921-30.
16. Umanah AU, Akadri OA. Knowledge and motivation of Nigerian dental students towards the use of rubber dam. Niger Dent J 2014;22:72-6.
17. Udoye CI, Jafarzadeh H. Rubber dam use among a subpopulation of Nigerian dentists. J Oral Sci 2010;52:245-9.
18. Tanalp J, Kayataş M, Can ED, Kayahan MB, Timur T. Evaluation of senior dental students' general attitude towards the use of rubber dam: A survey among two dental schools. ScientificWorldJournal 2014;2014:290101.
19. Ahmed HM, Cohen S, Lévy G, Steier L, Bukiet F. Rubber dam application in endodontic practice: An update on critical educational and ethical dilemmas. Aust Dent J 2014;59:457-63.
20. Joynt RB, Davis EL, Schreier PH. Rubber dam usage among practicing dentists. Oper Dent 1989;14:176-81.
21. Hagge MS, Pierson WP, Mayhew RB, Cowan RD, Duke ES. Use of rubber dam among general dentists in the United States air force dental service. Oper Dent 1984;9:122-9.
22. Lin HC, Pai SF, Hsu YY, Chen CS, Kuo ML, Yang SF, *et al.* Use of rubber dams during root canal treatment in Taiwan. J Formos Med Assoc 2011;110:397-400.
23. Soldani F, Foley J. An assessment of rubber dam usage amongst specialists in paediatric dentistry practising within the UK. Int J Paediatr Dent 2007;17:50-6.
24. Whitworth JM, Seccombe GV, Shoker K, Steele JG. Use of rubber dam and irrigant selection in UK general dental practice. Int Endod J 2000;33:435-41.
25. Al-Abdulwahhab BM, Al-Thabit H, Al-Harhi A, Shamina R, Al-Ashgai A, Al-Qabbani F, *et al.* The attitudes of dental interns to the use of rubber dam at Riyadh dental college. Saud Endod J 2012;2:75-9.