



Teaching, learning and usage of Rubber Dam in Clinical Practice

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Abstract

Introduction: The teaching, learning and practice of rubber dam use are incorporated into dental schools' curricula all over the world. Its usage in operative dentistry and endodontics is highly recommended. Its merits include moisture control and soft tissue retraction leading to better access and visualization of teeth. It also enhances cooperation among children. However, previous studies had shown very low usage of rubber dam by post doctoral dentists. The aim of this study was to determine the effects of teaching, learning and usage of rubber dam during undergraduate studies on the frequency of use of rubber dam post-graduation.

Materials and methods: This survey was a descriptive cross-sectional study carried out amongst dentists working with private, federal and state governments' hospitals in Lagos State. A convenient simple random sampling was used to select the participants.

Newly structured self administered questionnaires were used. They were mostly closed with a few open ended questions. The questionnaires contained fifteen questions based on biodata, knowledge and usage of rubber dam in clinical practices. These were fully completed and returned by consented respondents. Data collected were analyzed by Statistical Package for Social Science (SPSS) 20 edition. Univariate analysis was done using frequency, percentages, and chart while bivariate analysis was carried out by cross tabulation of categorical variables with Chi-square, p-value 0.05 was accepted as statistically significant.

Results: The total number of respondents was 135 consisting of 50 males and 85 females. Of the 135 respondents, only 8(5.9%) routinely used rubber dam, which is in contrast to 120 (88.9%) and 127(94.1%) that had high knowledge on rubber dam and its merits respectively. Reasons for non-usage included non availability of rubber dam kit in hospital 120(94.5%) and lack of skills 11(8.7%). Test of association showed that knowledge of rubber dam system was significantly affected by age of respondents (p-value =0.001), designation (p-value=0.008) and years of experience (p-value= 0.010). In addition, use of rubber dam was significantly different based on respondents designation.

Conclusion: The usage of rubber dam amongst dentists working with the federal and state governments in Lagos State was very low in spite of their high knowledge on its merits. Therefore, there is the need to develop a culture of rubber dam use in clinical practice amongst dentists.

Key words: Learning, rubber dam, post graduation, teaching

Introduction

Rubber dam (RD) is described as a thin square latex or non latex rubber used for the isolation of teeth prior to operative and endodontic procedures¹. Its use in dentistry provides a dry operating field, gives a better access and visibility, increases operating efficiency, improves the properties of dental materials indirectly^{2,3,4,5} and provides transposition of the oral privacy whereby the patient feels that his teeth are being

treated outside of his/her mouth^{6,7}. Skills for the use of the rubber dam is acquired through training in most undergraduate dental education^{8,9,10} programmes. Its use is mandatory during restorative and endodontic treatment procedures in children and adults⁴.

Notwithstanding, the aforementioned benefits, the use of rubber dam could be perceived as time-consuming and objectionable to some patients. The attitude of dentists and dental students to rubber

dam use also impacts on its regular and routine use in the clinic. Findings have shown that having confidence in one's ability to use the rubber dam impacts on its use¹¹. Many more young dentists are confident with the use of rubber dam in adults than in children, and a significant number of young dentists feel they needed further training to be proficient with its use^{11,12}.

Post doctoral training study reports showed a decline in the use of rubber dam post school graduation^{13,14} and when used it is often limited to endodontic procedures^{15,16,17}. The use of rubber dam is also reportedly higher among dentists in the public practice when compared with its use by private dental practitioners¹⁸. When in private practice, those in sole practice use it less than those in group practice¹⁹. A relationship between attendance of refresher courses and the regular use of rubber dam was also established, with those who use rubber dams attending more refresher courses²⁰.

While past studies showed a sharp drop in the use of rubber dam post graduation, little is known about pre-doctoral training factors that are linked to the use of rubber dam post-graduation. This study was to determine the effects of teaching, learning and usage of RD during undergraduate studies on the frequency of its use post graduation amongst dentists practising in both the private and public hospitals in Lagos State, Nigeria.

Materials and methods

This survey was a descriptive cross-sectional study carried out amongst qualified dentists in Lagos State. A convenient simple random sampling technique was used to select the participants. This involved fully qualified dentists, working with private, federal and state dental hospitals within Lagos state, who agreed to take part in the study and completed their questionnaires. Each questionnaire contained mostly closed and a few open ended, newly structured questions. These were self-administered to dentists

whose consent was initially obtained. These questionnaires were fully completed and returned by the consented respondents. The questions were pilot tested using 20 dentists to determine the appropriateness of the questions; thereafter the ambiguous questions were modified. The questionnaires contained 15 questions based on biodata, knowledge and usage of rubber dam in clinical practices.

The following sample size formula (Daniel, 1999) was used:

$$n = \frac{Z^2 P(1-P)}{d^2}$$

where n= sample size= 138

Z= Z statistic at 95% confidence interval= 1.96

P= Prevalence or proportion= 10%

d= precision =5%(0.05)

Plus 5% attrition= 142

Data entry and analysis were carried out using Statistical Package for Social Science (SPSS) 20 edition. Univariate analysis was done using frequency, percentages, and chart while bivariate analysis was carried out by cross tabulation of categorical variables with Chi-square p-value 0.05 was accepted as statistically significant.

Results

Of the one hundred and forty-two (142) questionnaires administered, one hundred and thirty-five (135) were fully completed and returned by respondents giving a response rate of 95.1%. The participants consisted of fifty (50) males and eighty five (85) females (Table1). The average age of the respondents was 36.07 ± 8.45 while the age range was between twenty-four (24) years and fifty-eight (58) years (Table1). The mean year of practice of dentists was 10.05 ± 7.76 (Table 1). Respondents designation is shown in Figure 1.

Table 1: Respondent's biodata

		Sex of respondents Male (%) n= 50	Female (%) n=85	Total (%) n= 135
Age of respondents (years)	21 - 30	10(20.0)	33(38.8)	43(31.9)
	31 - 40	24(48.0)	35(41.2)	59(43.7)
	41 - 50	12(8.0)	8(9.4)	20(14.8)
	51 - 60	4(8.0)	9(10.6)	13(9.6)

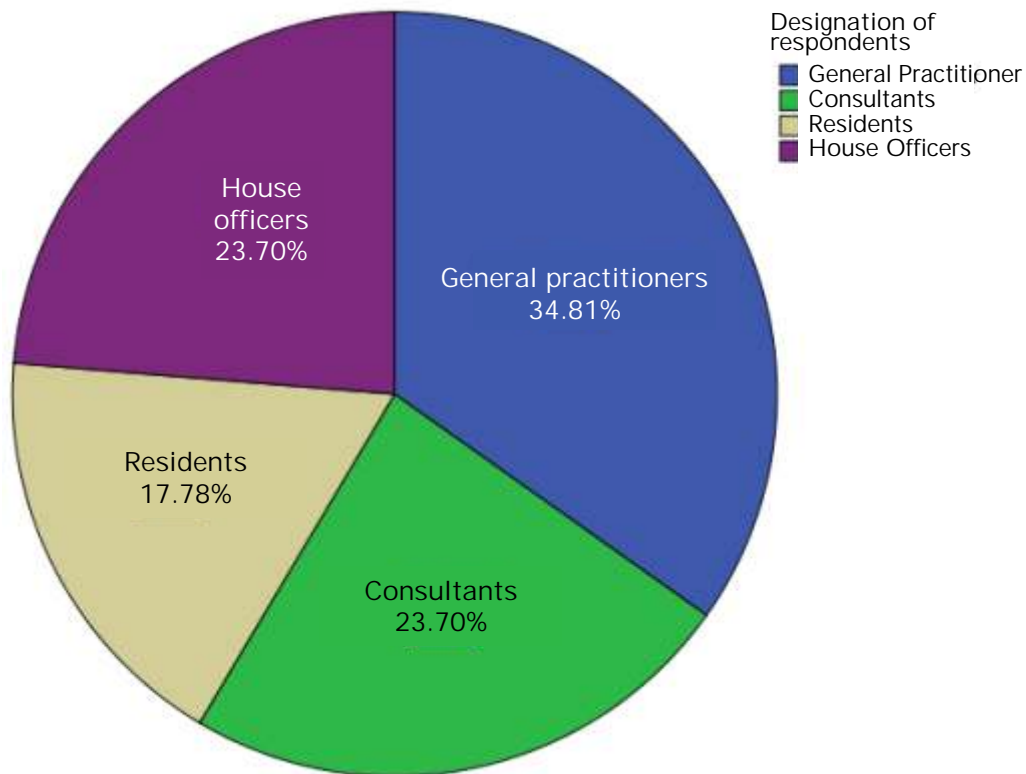


Figure 1: Pie chart showing respondents designation

One hundred and twenty (88.9%) and 127(94.1%) possessed high knowledge on rubber dam items and merits respectively (Table 2).

The most commonly cited reason for non-usage of rubber dam was lack of equipment in the hospital 120(94.5%).

Bivariate analysis showed that age, designation and years of practice had significant effect on knowledge of rubber dam items (P-value 0.05) while designation also had significant effect on rubber dam usage (p-value 0.05).

Table 2: Knowledge on rubber dam items and merits

Variable	n=135	Frequency (%)
Knowledge on rubber dam items	Poor	1(0.7)
	Moderate	14(10.4)
	High	120(88.9)
Knowledge on advantage of rubber dam	Poor	2(1.5)
	Moderate	6(4.4)
	High	127(94.1)

Table 3: Reasons for non-use of rubber dam

(Multiple response)	n=127	Frequency (%)
Non availability in hospital	Yes	120(94.5)
	No	7(5.5)
Lack of skills	Yes	11(8.7)
	No	116(91.3)
Never been taught the use of it	Yes	9(7.1)
	No	118(92.9)
Was taught the use but forgot	Yes	9(7.1)
	No	118(92.9)

Table 4: Test of association on knowledge on items and age, designation and years of practice

		n=135			statistic
		Poor	Moderate	High	
Age group of respondents (years)	20-30	0(0.0)	0(0.0)	43(31.9)	$\chi^2= 22.006$ df=6 p=0.001*
	31-40	0(0.0)	5(3.7)	54(40.0)	
	41-50	1(0.7)	6(4.4)	13(9.6)	
	51-60	0(0.0)	3(2.2)	10(7.4)	
	Total	1(0.7)	14(10.4)	120(88.9)	
Designation of respondents	General Practitioner	1(0.7)	11(8.1)	35(25.9)	$\chi^2=17.298$ df= 6 p= 0.008*
	Consultants	0(0.0)	3(2.2)	29(21.5)	
	Resident doctors	0(0.0)	0(0.0)	24(17.8)	
	House officer	0(0.0)	0(0.0)	32(23.7)	
	Total	1(0.7)	14(10.3)	120(88.9)	
Years of practice	? 5	0(0.0)	2(1.5)	55(40.7)	$\chi^2= 16.716$ df=6 p= 0.010*
	6-10	0(0.0)	1(0.7)	28(20.7)	
	11-15	0(0.0)	2(1.5)	12(8.9)	
	? 16	1(0.7)	9(6.7)	25(18.5)	
	Total	1(0.7)	14(10.4)	120(88.9)	

*p-value sig 0.05

Table 5: Test of association between rubber dam use and designation of respondents.

		N=135		statistic
		Yes	No	
Designation of respondents	General Practitioner	0(0.0)	47(34.8)	$\chi^2= 9.060$ df=3 p= 0.028
	Consultants	3(2.2)	29(21.5)	
	Resident doctors	4(3.0)	20(14.8)	
	House officer	1(0.7)	31(23.0)	
	Total	8(5.9)	127(94.1)	

*p-value sig 0.05

Discussion

Teaching of rubber dam is done by dental schools all over the world. Its use is mandatory in most schools at both preclinical and clinical practices. However, its use is not mandatory in most dental schools in the developing countries. Rubber dam increases the operating efficiency and improves the properties of the dental material indirectly. It provides transposition of oral privacy whereby the patient feels that his/her teeth are being treated outside his/her mouth. This present study showed that most dentists 127 (94.1%) are knowledgeable in the use of rubber dam in the course of their studies. However, knowledge of respondents is affected by age, designation and year of practice. It was observed that consultants and residents have the highest knowledge. The consultants, being the highest authorities, are expected to have the maximum knowledge on rubber dam (RD) while resident

dentists are also expected to have good knowledge of RD because they are undergoing post-graduate dental training.

In spite of this high knowledge of RD, only a small percentage 8(5.9%) used it. This low usage can be attributed to the teaching methodology in which more emphasis is placed on the technical procedure of placement of rubber dam rather than the advantages or benefits of its use. Likewise many schools in Nigeria do not make the use of RD mandatory and in most cases the learning and teaching is mainly theoretical.

Several studies have shown that compliance with the use of rubber dam is comparatively higher during pre-doctoral training than post-doctoral period^{4, 11,12,13}. This study corroborates these previous studies. However, the fact that resident dentists used it more, in this study, compared to general dental practitioners could be an indication that the residents

were compelled to use it as part of their requirements for operative procedures while the higher usage by consultants could be due to the demonstrations they offered to residents and dental students in the course of their training. The low usage among general dental practitioners could be due to the fact that they were not under supervision, hence, they were not compelled to use it. The development of culture of rubber dam use has to do with the training obtained during pre-clinical and clinical operative dentistry as well as endodontic courses in which many schools make the usage of rubber dam mandatory for pre-doctoral students.

In this study, a major reason given for non-compliance with the usage of rubber dam during clinical practice was non-availability of rubber dam kits. 11 dentists (8.7%) claimed that they lacked skills. However, it should be noted that all dental schools (from which most of the dentists graduated) in Nigeria engage in teaching of rubber dam use but its usage is not mandatory.

In most of the hospitals in Nigeria, rubber dam kits are not readily available i.e. not amongst the essential devices and this could partly account for the low percentage of usage of rubber dam. This low percentage in the use of rubber dam amongst dentists can be largely attributed to lack of culture of use of rubber dam during their training period.

Therefore, in the teaching, learning and practice of rubber dam usage, emphasis should be placed on its advantages, particularly medico-legal implication of its non-usage. In advanced countries, patients are now aware of the importance of use of rubber dam and they even demand or request for its use during clinical procedures.

The use of rubber dam is mandatory according to American Society of Endodontics as well as European Society on treatment guidelines⁴. Consequently, the usage of rubber dam in clinical procedures can be enhanced by changing the methodology of teaching and learning of rubber dam through changing of the focus of both the learner and the teacher to the need for greater emphasis on the overriding benefits of rubber dam use.

Conclusion

The usage of rubber dam amongst dentists working with the Federal and State Governments' establishments in Lagos State was very low. Therefore, the culture for the compliance and adherence to the use of rubber dam during post

graduation period must be developed during the pre-clinical and clinical periods of the undergraduate training.

Consequently, there is the need to change the methodology of teaching rubber dam use by laying more emphasis on the medico-legal reasons as well as other benefits rather than technicalities of placement of rubber dam so as to increase its usage by dental practitioners.

Recommendations

Based on the findings of this study, rubber dam kits should be mandatory components of the students' restorative kits. A minimum clinical practice requirement should be stated to ensure adherence to good practice of the rubber dam technique for all restorative procedures during pre-doctoral training. Finally, a working protocol should be enforced in restorative clinics with respect to rubber dam use.

References

1. Wikipedia the free Encyclopedia modified on 1 march 2012. Registered trademark of Wikimedia Foundation, Inc
2. Bruce W. Small Sharon Clawges. Using the Rubber Dam for Operative Dentistry. Inside Dental Assisting. 2011 May / June; vol 7, Issue 3. Published by Aegis Communications
3. Ahmad I. A Rubber dam usage for endodontic treatment : a review. *Int Endod J* 2009 Nov; 42(11): 963 – 972
4. European Society of Endodontology. Concesus report of the European Society of Endodontology on Quality Guidelines for Endodontic treatment. *Int Endod J* 1994; 27: 115 – 124.
5. Summit JB, Robbins JW, Hilton TJ, Schwart RS. *Fundamentals of Operative Dentistry: a contemporary approach*. 3rd ed. Chicago. Quintessence, 2006
6. Hill EE, Rubel B. A practical review of prevention and management of ingested/aspirated dental items. *Gen Dent* in press
7. Heling I, Sommer M, Kot I. Rubber dams: an essential safeguard. *Quintessence Int* 1988; 19(5):377-378
8. Small BW, The rubber dam: a step toward clinical excellence. *Compendium Continuing Educ Dent* 2002; 23(3): 276-280
9. Terry DA. An essential component to adhesive



- Dentistry: the rubber dam. *Pract Proc Aesthetic Dent* 2005; 17(2):106 - 108
10. Smales RJ. Rubber dam usage related to restoration quality and survival. *Br Dent J* 1993; 174 (9): 330-333
 11. Ryan W, O' Connel A. Attitudes of undergraduate dental students to the use of rubber dam. *J Ir Dental Assoc.* 2007; Vol 53(2) : 87 – 91
 12. Mala S, Lynch CD, Burke FM, Drummer PM. Attitudes of final year dental student to the use of rubber dam in Wales and Ireland. *Int Endod J* 2009 July; 42(7) : 632 – 638
 13. Stewardson DA. Endodontics and new graduates: part 1, practice versus training. *Eur J Prosthodont Rest Dent* 2002, 10(3) : 131 – 137
 14. Jenkins SM, Hayes SJ, Drummer PMH. Study of endodontic treatment carried out in the dental practice in the UK. *Int Endod J* 2000; 33: 435 – 441
 15. Cohen S. Endodontics and litigations: an American perspective. *Int Dent J* 1989; 39:13
 16. Cohen S, Schwartz S. Endodontic complications and the law. *J Endod* 1987; 13(4): 191-197
 17. Lynch CD, Mc Connel RJ. Attitudes and use of rubber dam by Irish general dental practitioners *Int Endod J* 2007 June; 40(6): 427 – 432.
 18. Udoye CL, Jafarzadeh H. Rubber dam use among a subpopulation of Nigerian dentists. *J Oral Sci* 2010 June; 52(2) : 245 – 249.
 19. Koshy S, Chandler NP. Use of rubber dam and its association with other endodontic procedures in New Zealand. *NZ Dent J* 2002 March; 98(431): 12 – 16.
 20. Peciuliene V, Maneliene R, Drukteinis S, Rimkuviene J. Attitude of general dental practitioners towards endodontic standards and adoption of new technology: literature review. *Stomatologija* 2009; 11(1):11-14