

ASSESSMENT OF RUBBER DAM USAGE AMONG DENTIST IN INDIA

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ABSTRACT

Rubber dam was introduced by Dr. Barnum in the 1860 s, the main advantage of using rubber dams in endodontics include patient protection from medicaments, aspiration of endodontic instruments, tooth debris, and irrigating solutions. The aim of the study to determine the prevalence and frequency of rubber dam usage during endodontic procedures among dentists in the state of TamilNadu, India. A survey was conducted among 101 dentists in the state of Tamil Nadu, India by preparing a set of questions, and the answers were collected through an online survey method. In this survey, 82.2% feel comfortable to use a rubber dam, 36.6% never use a rubber dam to pediatric patients, 89% always use a rubber dam to adult patients, 61.4% not using rubber dam for all cases of RCT, 73.8% need to gain knowledge about rubber dams through training programs, 23.8 % told patients discomfort was a reason for not using a rubber dam, 80.2% not using rubber dam while taking X- rays, 45.5% take more than 5 mins for applying a rubber dam to patients, 63.4% told it is easily available for clinical usage. The present survey shows there is a low prevalence of its usage during endodontic treatment. Greater emphasis should be placed on the advantages of using rubber dams in clinical dentistry at dental school and through continuing dental education for practitioners to update their knowledge.

Keywords: Infection control, Prevalence, Rubber dam, Root canal treatment.

INTRODUCTION

The American Association of Endodontics advised tooth isolation using the dental dam as an integral and essential part of any nonsurgical endodontic treatment (European Society of Endodontology, 2006), (Ramamoorthi et al., 2015). The rubber dam was introduced by Dr. Barnum in the 1860s, the use of rubber dams is considered the standard of care by professional organizations. The Australian Dental Association also recommended the use of RD, where possible, for restorative work to reduce exposure of dental practitioners and clinical support staff to potentially infected aerosols (Maslamani and Mitra, 2018).

Similarly, the European Endodontic Association recommended the use of RD in endodontic treatment (Marić et al., 2015). In 1962 Ireland summed up this poor acceptance rate of rubber dam by saying, "Probably no other technique, treatment or instrument used in dentistry is so universally

accepted (IRELAND and L, 1962). This statement holds true even today as the rubber dam technique now gained recognition as an essential technique in dental treatment (Ramanathan and Solete, 2015).

The main advantages of using rubber dams in endodontics include patient protection from medicaments, aspiration of endodontic instruments, tooth debris, and irrigating solutions (Goultschin and Heling, 1971). It effectively protects patients and doctors and provides a more professional, safe, and comfortable medical experience (Savani et al., 2014), (Siddique et al., 2019), (Nandakumar and Nasim, 2018). A surgically clean operating field is isolated from saliva, hemorrhage, and other tissue fluids (Ahmad, 2009), (Rajendran et al., 2019).

The dam reduces the cross-contamination of the root canal system, and it provides an excellent barrier to the potential spread of infection (Kumar and Antony, 2018). Rubber dam provides an aseptic operating field and isolates the tooth from oral and salivary contamination. It cannot be stressed enough that contamination of the root canal with saliva introduces new microorganisms to the root canal which may prolong treatment and reduce prognosis (Carrotte, 2004), (Hussainy et al., 2018), (Ravinthar, 2018).

It improves treatment results by retracting soft tissues so it provides better access to the operating field, provides a dry field for improved visibility, and ingestion of small instruments used during treatment, minimizes patient conversations, and encourages them to keep their mouth open during treatment (G and Shashirekha, 2014), (R et al., 2019). Hence, we decided to (a) investigate the rubber dam usage frequency among dental practitioners in Tamil Nadu, India, (b) to determine the dental procedures, in which the rubber dam is frequently used, and (c) to find out difficulties and reasons for not using a rubber dam.

MATERIALS AND METHODS:

A cross-sectional questionnaire study was conducted with 11 close-ended questions distributed through the digital platform to know the prevalence of rubber dam usage during endodontic treatment and to correlate opinions among general populations. A total of 101 participants took part in the study. They gave their consent for the study and results were noted. SPSS software has been used for analysis and results are described in the form of pictorial graphs. The chi square test used for the analysis and p value < 0.05 was considered statistically significant.

RESULTS AND DISCUSSION

This study shows 82.2% feel comfortable to use a rubber dam (fig 1). 36.63% not using a rubber dam to pediatric patients (fig 3). (fig 5) 8.9% always using a rubber dam to adult patients, Jenas G et al (2014) reported 34.4% using a rubber dam to adult patients during the endodontic procedure (Noor et al., 2016), (G et al., 2014). (fig 7) 95% obtained their knowledge about the rubber dam technique in UG. (fig 9) 8.9% used rubber dams for premolars, Ivacson K et al (2015) reported 1.65% used rubber dams for premolars (Csinszka et al., 2015), (Manohar and Sharma, 2018). (fig 11) 80.2% not using rubber dams while taking multiple x-rays, Sanjeev Koshy et al (2002) - 42% routinely use rubber dams while taking radiographs (Koshy and Chandler, 2002). (fig 13) 61.4% do not use rubber dams during root canal treatment. Lynch et al (2007) - 39% never use rubber dams for all cases of RCT (Lynch and McConnell, 2007). (fig 15) 23.8% of patients feel discomfort so rubber dams are not used during treatment.

Marshall K et al (1990) - 50% of patients feel discomfort so rubber dams are not used during treatment (Marshall and Page, 1990), (Jose et al., 2020). (fig 17) 73.3% need to gain knowledge about rubber dams through training programs. Dent J et al (2018) 93.8% need training programs for primary care Dental practitioners in Endodontics (Anabtawi et al., 2013). (fig 19) 45.5% take more than 5 mins to apply a rubber dam. Prasad AL et al (2018) reported 27.08% need more than 10 minutes for placing a rubber dam (Al et al., 2018), (Teja and Ramesh, 2019). (fig 21) 63.4% reported it is easily available for clinical usage.

Huiru sounds et al (2014) reported 53.2% told about the easy availability of rubber dams in clinical usage (Zou et al., 2016).

Various reasons have been cited for the low prevalence of rubber dam usage. These include patient acceptance, lack of skills, time consumption, comfortability, etc. Allergic reaction to rubber dams is also a concern by many practitioners. The incidence of rubber latex allergy has been reported to be 9.7% among patients and 6% among dental staff (Murray et al., 2001),(Hamann et al., 1998),(Ramesh et al., 2018). However, the latex-free rubber dam (Polyethylene or Polyvinyl chloride) can be used as alternative materials if an allergic reaction is a concern. Our limitation of this study is that other forms of isolation were not queried. We restricted the study to rubber dam isolation because this is the most accepted and effective method to enhance a dental procedure by allowing better access, visibility, and dry field isolation (Small, 1999), (Summitt et al., 2006),(Janani et al., 2020).

As per the study most dentists agree rubber dam is standard of care in endodontic treatment. Attitude of the dentist is another factor with usage of rubber dams. Many patients are afraid of rubber dam because they think they won't be able to breathe. If the dentist chooses a wrong size clamp it can damage the gingiva. So there is a need for dentists to update the knowledge and practice with current techniques.

CONCLUSION

Dentists believe that rubber dams are essential in clinical dentistry to provide treatment of a recognized standard. So greater emphasis should be placed on the application of rubber dam; a) at dental school level and b) in clinical practice. As per the present survey most of the dentists feel comfortable in using a rubber dam but majority of the dentists reported patients' discomfort is the main reason for not using the rubber dam. Discrepancies such as patients' discomfort and time consuming exist so there is a need for research to upgrade the rubber dam to make it more comfortable for adult and paediatric patients. Hence, the study concluded there was a low prevalence of rubber dam usage during RCT and a high range of willingness observed by practitioners to update the modern techniques about usage of rubber dams through training programs.

AUTHORS CONTRIBUTION

Kaviya.L, contributed to the data acquisition and drafting of manuscript. Dr, Anjaneyulu K contributed to the design, editing and critical revision of the manuscript. Dr. Jayalakshmi Somasundaram, contributed to the supervision and proof reading of the manuscript.

CONFLICT OF INTEREST Nil

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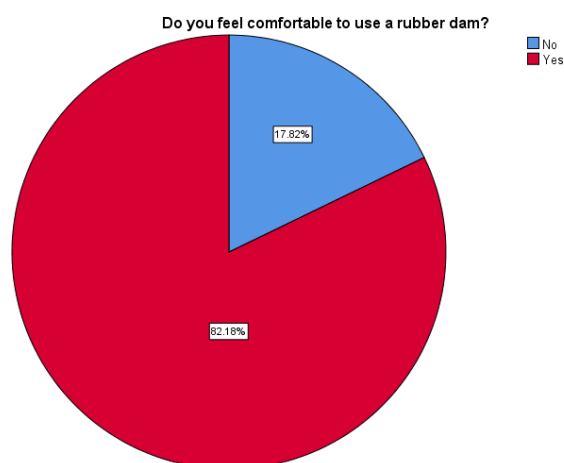


Figure 1 : Pie chart represents the percentage for the comfortability in using rubber dams. Red colour in the pie chart denotes “Yes” and blue colour denotes “No”. Higher percentage of responses were Yes (82.18 %).

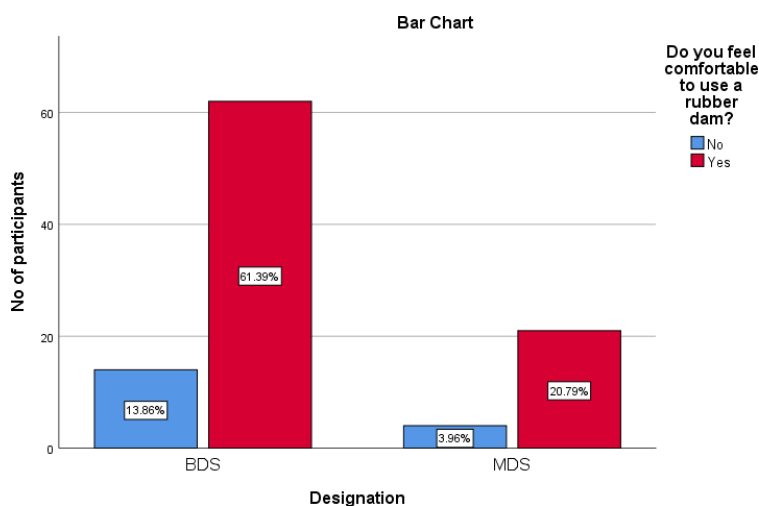


Figure 2 :Bar charts showing the comparison of responses based on the question “Do you feel comfortable to use rubber dam” between MDS and BDS professionals. The X axis represents the designation of dentist and Y axis represents the number of participants of which red colour denotes “Yes”and blue colour denotes “No”. Majority of the Bds professionals felt comfortable while using a rubber dam . However the difference is not statistically significant (Chi square value - 0.75 , p value = 0.784 (>0.05-indicating statistically not significant) .

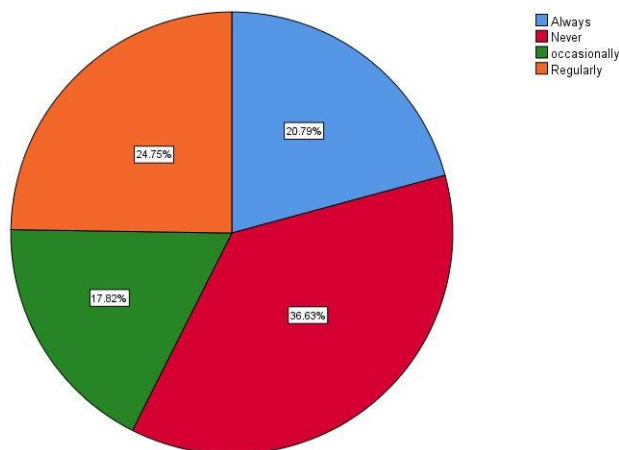


Figure 3 : Pie chart represents the usage of rubber dams to paediatric patients. Red colour in the pie chart denotes “never” use rubber dam ,Orange colour in the pie chart denotes “regularly” use,bluecolour in the pie chart denotes “always”, green colour in the pie chart denotes“occasionally”use.Higher percentage of responses were never use rubber dam to paediatric patients (36.63%).

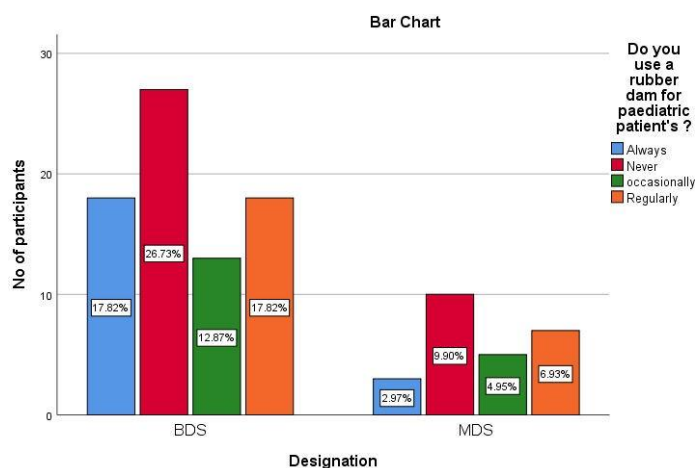


Figure 4 :Bar charts showing the comparison of responses based on the question “ Do you use rubber dam for paediatric patients” among BDS and MDS professionals .The X axis represents the designation of dentist and Y axis represents the number of participants.Redcolour in the bar chart denotes “never” use rubber dam ,Orange colour in the bar chart denotes “regularly” use,bluecolour in the bar chart denotes “always”, green colour in the bar chart denotes “occasionally” use. Majority of the Bds professionals never use rubber dam to paediatricpatients.However the difference is not statistically significant (Chi square value - 1.568, p value = 0.667 (>0.05-indicating statistically not significant) .

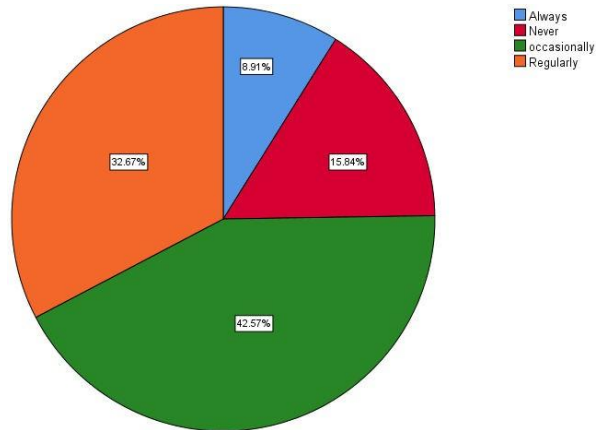


Figure 5 : Pie chart represents the usage of rubber dams to adult patients. Green colour in the pie chart denotes “occasionally” use, red colour denotes “never” use rubber dam, orange colour denotes “regularly” use, blue color denotes “always”. Higher percentage of responses were occasionally use rubber dam to adult patients (42.57%).

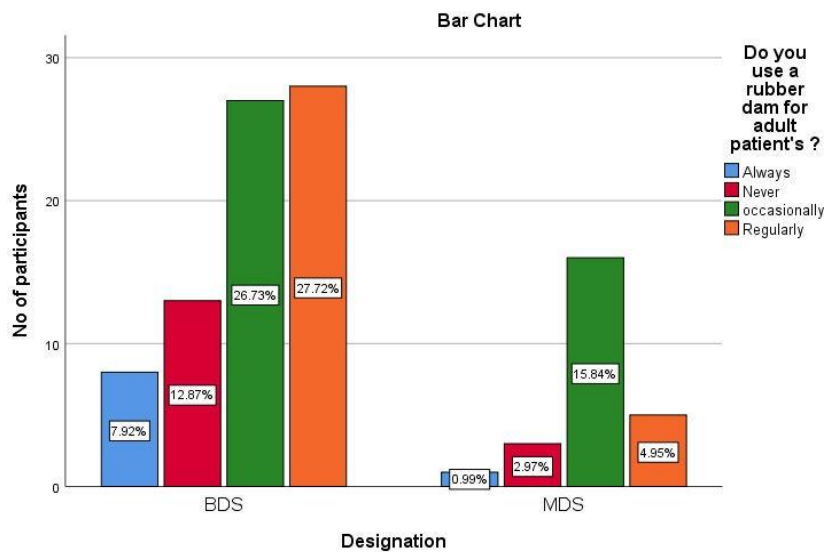


Figure 6 : Bar charts showing the comparison of responses based on the question “Do you use rubber dams for adult patients” among BDS and MDS professionals .The X axis represents the designation of dentist and Y axis represents the number of participants. Green colour in the bar chart denotes “occasionally” use , red colour denotes “never” use, orange colour denotes “regularly” use, blue color denotes “always”. Majority of the Bds professionals regularly use rubber dams to paediatric patients. However the difference is not statistically significant (Chi square value - 6.424, p value = 0.093 (>0.05-indicating statistically not significant)).

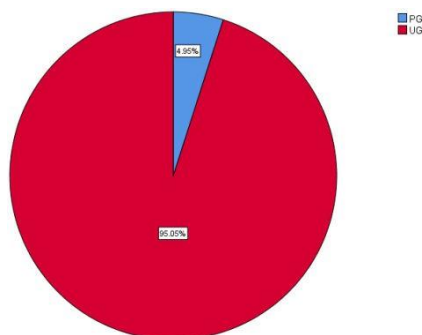


Figure 7 : Pie chart represents the knowledge about the application of rubber dam technique. Red colour in the pie chart denotes the dentists know the application in “UG” and blue colour denotes the application in “PG”.Higher percentage of responses were known the application of rubber dam in UG (95.05%).

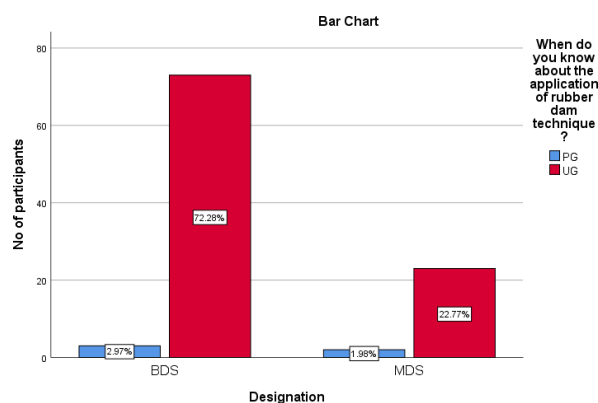


Figure 8 :Bar charts showing the comparison of responses based on the question “ When did you know about the application of rubber dam technique”among BDS and MDS professionals .The X axis represents the designation of dentist and Y axis represents the number of participants.Redcolour in the bar chart denotes the dentists knew the application in “UG” and blue colour denotes the dentist knew the application in “PG”.Majority of the Bds professionals knew about the rubber dam technique in UG. However the difference is not statistically significant (Chi square value - 0.657, p value = 0.418 (>0.05-indicating statistically not significant) .

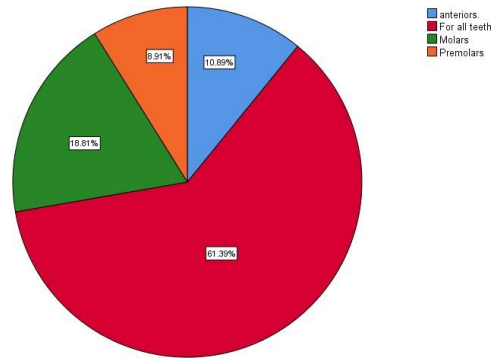


Figure 9: Pie chart represents the tooth preference while using rubber dam. Red colour in the pie chart denotes the use “for all the teeth”, green colour denotes for “molars”, blue colour denotes for “anteriors”, orange colour denotes for “premolars”. Higher percentage of responses use the rubber dam for all the teeth (61.39%).

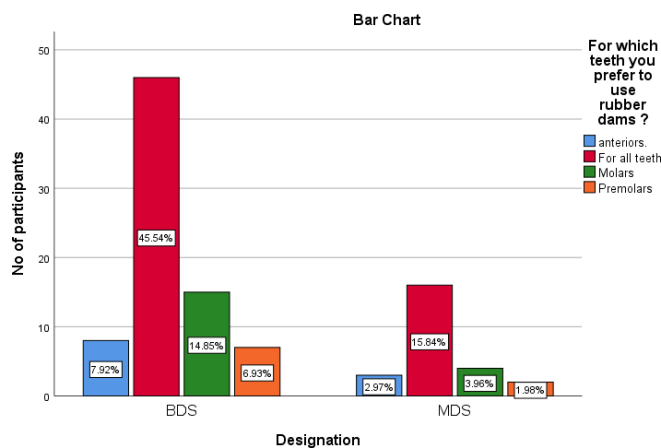


Figure 10 :Bar charts showing the comparison of responses based on the question “ For which teeth you prefer to use rubber dam” among BDS and MDS professionals .The X axis represents the designation of dentist and Y axis represents the number of participants. Red colour in the pie chart denotes “for all the teeth”, green colour denotes for “molars”, blue colour denotes for “anteriors”, orange colour denotes “premolars”. Majority of the Bds professionals use rubber dams for all teeth. However the difference is not statistically significant (Chi square value - 0.245, p value = 0.970 (>0.05-indicating statistically not

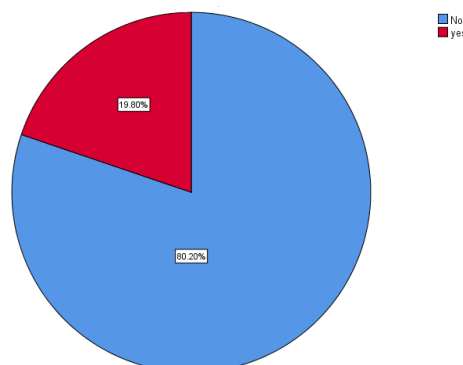


Figure 11: Pie chart represents the rubber dam usage during X Ray procedure .Blue colour in the pie chart denotes “not using rubber dam” , red colour denotes “use rubber dam” during X Ray procedure .Higher percentage of responses were not use rubber dam (80.20%).

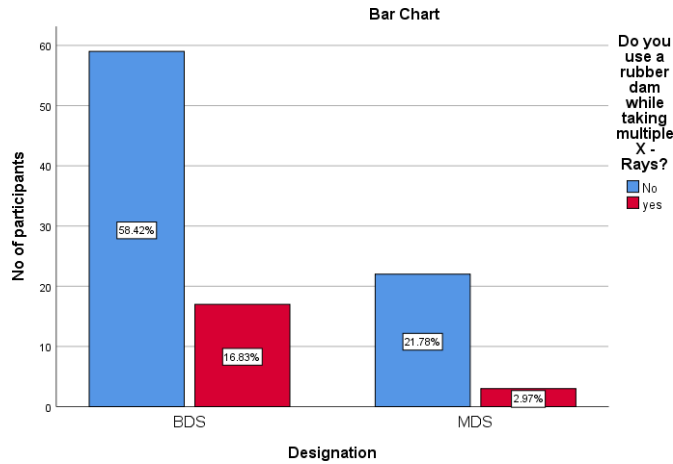


Figure 12 :Bar charts showing the comparison of responses based on the question “ Do you use a rubber dam while taking multiple xray”among BDS and MDS professionals .The X axis represents the designation of dentist and Y axis represents the number of participants..Bluecolour in the bar chart denotes “not using rubber dam” , red colour denotes “use rubber dam” during X Ray procedure. Majority of the Bds professionals not use rubber dam during X Ray procedure.However the difference is not statistically significant (Chi square value -1.273, p value = 0.259 (>0.05-indicating statistically not significant) .

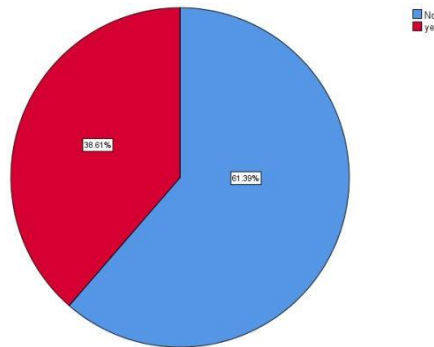


Figure 13: Pie chart represents the rubber dam usage during RCT .Red colour in the pie chart denotes “use of rubber dam” , blue colour denotes “not use” rubber dam during RCT .Higher percentage of responses were No (61.39%).

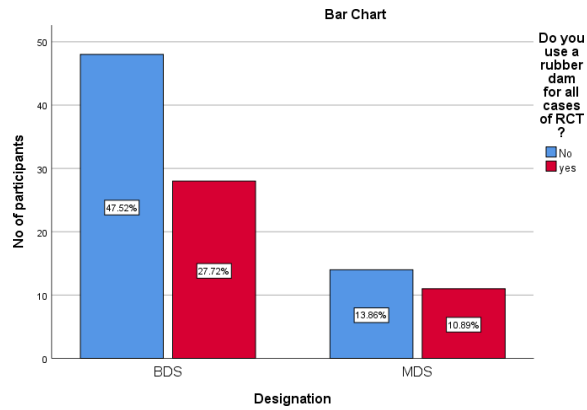


Figure 14 :Bar charts showing the comparison of responses based on the question “ Do you use rubber dam for all cases of RCT”among BDS and MDS professionals .The X axis represents the designation of dentist and Y axis represents the number of participants.Redcolour in the pie chart denotes “use” of rubber dam , blue colourdenotes“not use” rubber dam during RCT .Majority of the Bds professionals not use rubber dam during RCT .However the difference is not statistically significant (Chi square value - 0.407, p value = 0.524 (>0.05-indicating statistically not significant) .

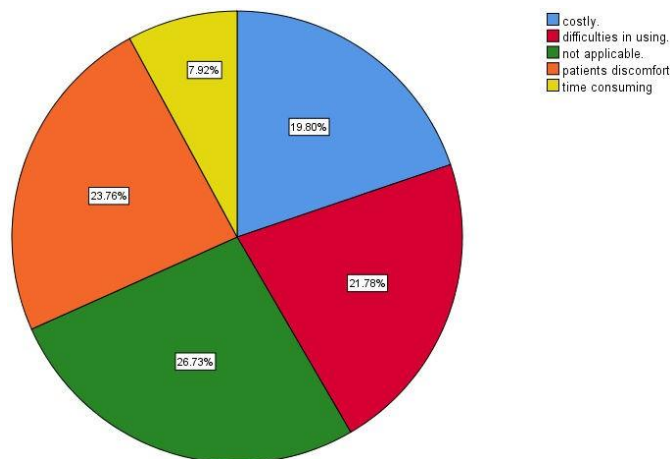


Figure 15: Pie chart represents the reasons for not using a rubber dam .Green colour in the pie chart denotes “not applicable” to dentist ,orange colour in the pie chart denotes “patients discomfort”,redcolour in the pie chart denotes “difficulty in using” , blue colour denotes “costly”,yellowcolour denotes “time consuming”.Higher percentage of responses were not applicable (26.73%).

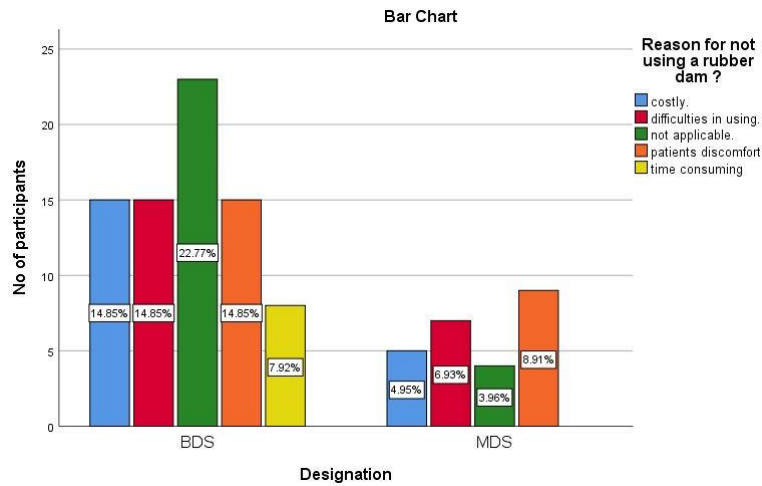


Figure 16 :Bar charts showing the comparison of responses based on the question “ Reason for not using a rubber dam”among BDS and MDS professionals .The X axis represents the designation of dentist and Y axis represents the number of participants.Green colour in the bar chart denotes “not applicable” to dentist ,orange colour in the bar chart denotes “patients discomfort”,red colour in the bar chart denotes “difficulty in using” , blue colour denotes “costly”, yellow colour denotes “time consuming’.Majority of the Bds professionals told it is not applicable to them .However the difference is not statistically significant (Chi square value - 6.747, p value = 0.150 (>0.05-indicating statistically not significant) .

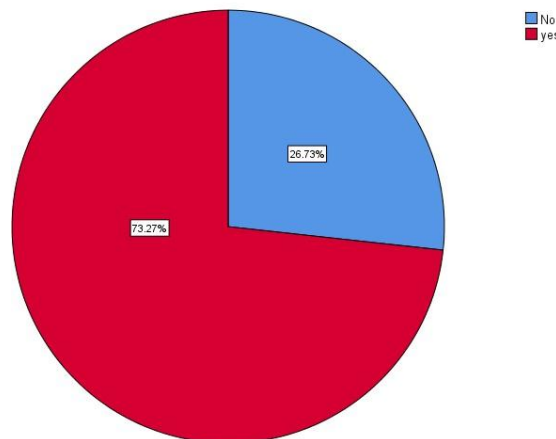
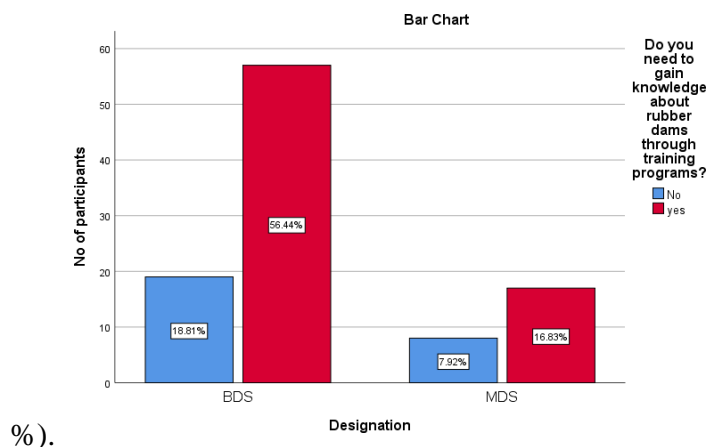


Figure 17: Pie chart represents the need for training programs about rubber dams .Red colour in the pie chart denotes “need for training programs”, blue colour denotes “do not need training programs”.Higher percentage of responses were yes(73.27



%)

Figure 18 :Bar charts showing the comparison of responses based on the question “ Do you need to gain knowledge about rubber dams through training programs”among BDS and MDS professionals .The X axis represents the designation of dentist and Y axis represents the number of participants.Red colour in the bar chart denotes the “need for training programs”, blue colour denotes “do not need training programs”.Majority of the Bds professionals need training program. .However the difference is not statistically significant (Chi square value - 0.471, p value = 0.493 (>0.05-indicating statistically not significant)).

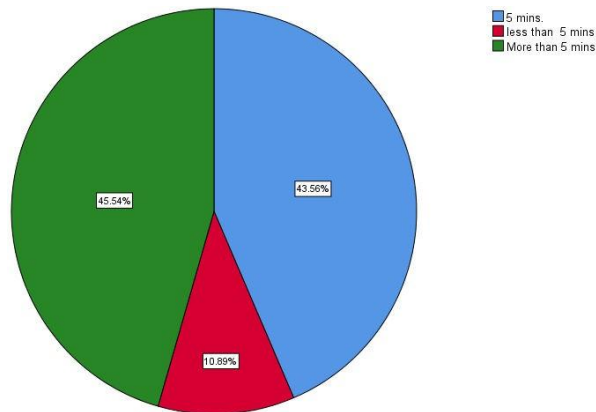


Figure 19: Pie chart represents the time consumption to apply a rubber dam.Green colour in the pie chart denotes need “more than 5 minutes” ,blue colour denotes “5 minutes”,red colour denotes “less than 5 minutes”.Higher percentage of responses were more than 5 minutes (45.54%).

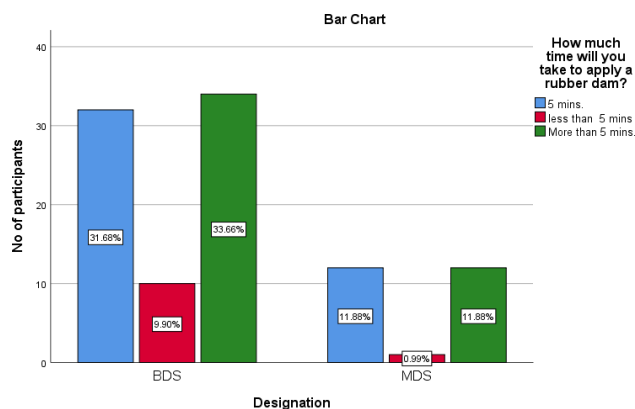


Figure 20:Bar charts showing the comparison of responses based on the question “How much time will you take to apply a rubber dam”among BDS and MDS professionals .The X axis represents the designation of dentist and Y axis represents the number of participants.Green colour in the bar chart

denotes need “more than 5 minutes” ,blue colour denotes need “5 minutes”,redcolour denotes need “less than 5 minutes’.Majority of the Bds professionals take more than 5 minutes to apply a rubber dam.However the difference is not statistically significant (Chi square value -1.643, p value = 0.440 (>0.05-indicating statistically not significant) .

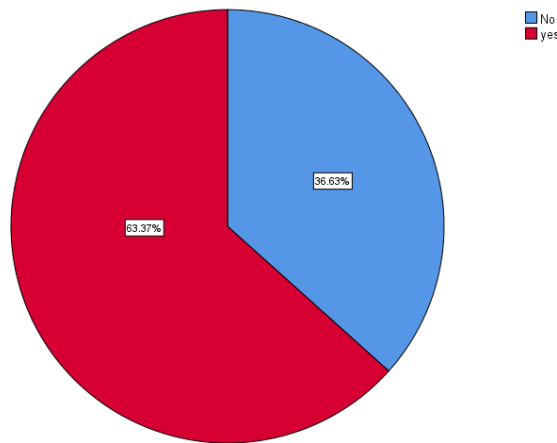


Figure21: Pie chart represents the clinical usage availability .Red colour in the pie chart denotes it is “easily available” for clinical use , blue colour denotes it is “not easily available”. Higher percentage of responses were yes (63.37%).

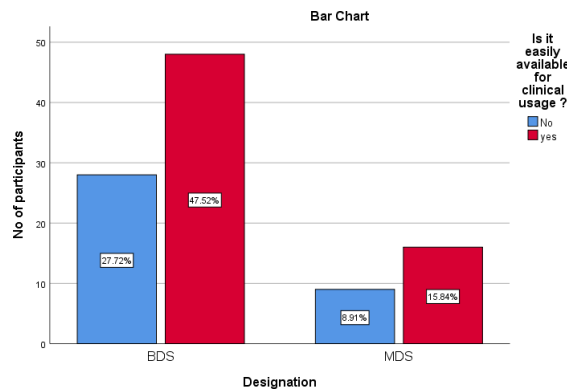


Figure 22:Bar charts showing the comparison of responses based on the question“Is it easily available for clinical usage” among BDS and MDS professionals .The X axis represents the designation of dentist and Y axis represents the number of participants.Redcolour in the bar chart denotes it is “easily available” for clinical use , blue colour denotes it is “not easily available”. Majority of the Bds professionals told it is easily available .However the difference is not statistically significant (Chi square value - 0.006, p value = 0.940 (>0.05-indicating statistically not significant) .