

Assessment of Dental Practitioners’ Knowledge, Attitude and Current Trends in Isolation of Operative Field amidst COVID-19 Pandemic in Central India

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Citation of this Article: Dr. Shriya Shahu , Dr. Pratima Shenoi, Dr. Rajesh Kubde , Dr. Gautam Badole , Dr. Himani Thawale , Dr. Sachin Bengal, “Assessment of Dental Practitioners’ Knowledge, Attitude and Current Trends in Isolation of Operative Field amidst COVID-19 Pandemic in Central India”, IJDSIR- December - 2020, Vol. – 3, Issue - 6, P. No. 443 – 451.

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Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Objective: The purpose of this study was to assess the knowledge, attitude, and current trends in isolation of dental operative field during covid-19 pandemic amongst dental practitioners in Central India

Material and methods: After Ethical approval, a web-based questionnaire was generated addressing the following aspects:

- a) Demographic details of respondents
- b) Awareness about Standard Operating Protocol (SOP) during COVID-19 pandemic situation
- c) Isolation techniques used in routine practice
- d) Usage, frequency, and modalities of rubber dam isolation during COVID-19 pandemic

The survey was mailed to 270 Dental practitioners including Endodontists, other dental specialists, and

General Dental Practitioners across Central India. Data were analyzed using the Chi Square test.

Results: Almost all endodontists (98.7%) were aware regarding the SOP for dental patients during COVID -19 followed by other specialty dentists (89.4%) and least in general dental practitioners (73.9%). Highly statistically significant difference ($p < 0.001$) was found regarding rubber dam usage for isolation of dental operative field during routine clinical practice amongst the three groups.

Conclusion: Rubber dam usage in contemporary clinical practice is less extensive in General Dental Practitioners despite adequate awareness of SOP laid during COVID-19 pandemic. Besides effective training, routine rubber dam use must be encouraged by convincing the dentist of its merits and value to enhance future clinical prospects.

Clinical Significance: Rubber dam isolation effectively reduces microbial content of bio-aerosols by creation of a barrier in the oral cavity, thus attenuating transmission of contagious diseases which is especially significant in COVID-19 pandemic. Thus, increasing its usage in contemporary dental practice by enhancing awareness and promoting efficient training may prove to be beneficial in reducing potential spread of Coronavirus via direct transmission in dental clinics.

Keywords: COVID-19, Rubber Dam, Isolation, Bio-aerosol, Standard Operating Protocol

Introduction

The outbreak of coronavirus disease 2019 (COVID-19) rapidly escalated into a global pandemic situation, creating worldwide health and economic crisis. The emergence of novel human pathogens and subsequent re-emergence of diseases are a major concern to health care professionals.

In the contemporary pandemic situation, Dental Health Care Professionals (DHCPs), auxiliaries as well as patients undergoing dental procedures are at high risk of cross-infection. Most dental procedures require close

contact with the patient's oral cavity, saliva, blood, and respiratory tract secretions and involve procedures that generate hazardous bio-aerosols.

This has significant implications in routine dental practices as aerosol transmission is possible under the conditions of long exposure to high concentrations of bioaerosols in a relatively closed environment.¹

Previous studies have shown that microorganisms in the mouth and respiratory tract can be transported in the aerosols and splatter generated during dental procedures and can contaminate the skin and mucous membrane of the mouth, respiratory passages, and eyes of dental personnel. In addition, they can spread contamination onto the inert surfaces found throughout the dental operator.²⁻⁵

Several guidelines and recommendations have been issued by various national dental organizations regarding standardization of dental operating protocols after the outbreak of COVID-19 pandemic in India.⁶⁻⁸ According to these guidelines, rubber dam usage when appropriate, has been recommended to decrease possible exposure to infectious agents.

Rubber dam (RD) isolation has been considered as a standard of care due to the various advantages it offers. RD facilitates patient protection by preventing accidental ingestion of endodontic instruments, retracting soft tissues, and contributing to efficient treatment. In addition to improving safety and saliva control, RD usage significantly reduces microbial contamination of the atmosphere during conservative and endodontic procedures, particularly in the vicinity of the operator and dental assistant.⁹

Even though RD is advocated as an isolation technique that promotes good clinical practice, its usage remains paradoxical in routine dental practice due to myriad of reasons. Madarati AA reported that negative attitudes towards RD usage were mainly attributed to poor decision

making, its unavailability at workplace, difficulties in placement, patient non-compliance and time considerations.¹⁰

Thus, the rationale of this study was to assess the awareness of current operating guidelines laid during COVID-19 pandemic and subsequent usage of rubber dam amongst DHCPs in Central India.

Materials and Methods

The designed research protocol was approved by Institutional Ethics Committee. A web-based survey consisting of both open and close-ended questions was generated, addressing the following aspects:

- a) Demographic details of respondents
- b) Awareness about standard operating guidelines (SOP) during COVID-19 pandemic situation
- c) Isolation techniques used in routine practice
- d) Attitudes, usage, frequency, and modalities of rubber dam isolation during COVID-19 pandemic

The participants comprised of total 270 DHCPs including General Dental Practitioners (GDP), Endodontists and Other Specialists working in government and private sector in Central India. The questionnaire did not disclose the identity of any participant.

The survey was sent via email and responses were collected in Google Database. An explanation was attached about the importance of their participation and the study purposes.

Reminders were sent at regular intervals to all the respondents to ensure maximum participation. Loss of participant was considered if the participants failed to respond within 30 days.

The data were statistically analyzed using Chi Square test.

Results

The response rate for the present study was 91.7% as 234 dentists participated from total of 255 DHCPs who received the survey. Out of the total study participants,

32.9% were endodontists, 28.6% were other dental specialists, whereas 38.5% were GDP. Most of the study participants worked at academic institutions (63.7%), followed by private dental clinics (38.9%) and government sectors (8.5%).

Almost all Endodontists (98.7%) were aware about the SOP for dental patients during COVID-19, followed by other dental specialists (89.4%) and least in GDP (73.9%), thus showing highly statistically significant difference ($p < 0.001$). [Table No. 1]

Cotton roll was found to be the most frequently used method of achieving isolation of operative field amongst GDP (82%) and other dental specialists (48%) followed by Endodontists (43%). However, RD isolation in present COVID-19 pandemic was mostly used by Endodontists (82%) and less frequently by other dental specialists (23%) and GDP (17%). [Figure No. 1]

There was a significant difference in RD training received by Endodontists (64.5%), other Specialists (42.4%), and GDP (34.8%). [Table No. 1]

The present study assessed the perspective of DHCPs about reduction in risk of disease transmission during COVID-19 by RD isolation. 80.3% Endodontists agreed that RD usage causes decreased aerosol contamination thereby reducing cross-infection, compared to 58.7% GDPs and 53% other specialists. When enquired about alternatives for RD isolation, 50% GDPs followed by 37.9% other specialists and only 17.1% Endodontists agreed that Dental aerosol reduction tent/dome can be currently used as barrier isolation in COVID-19 pandemic. There was a significant difference ($p < 0.006$) in opinions of DHCPs regarding paradigm shift in usage of rubber dam in routine dental practices post COVID-19 outbreak. [Table No. 2]

Discussion

The characteristic settings of dental clinics may potentiate the risk of cross-infection between dental practitioners and patients due to frequent exposure to aerosol contaminated environment. COVID-19 pandemic emerged as an emergent situation globally which led to development of standard operating protocols (SOP) to promote safe and cautious dental practice. The findings from this study indicate that there is a significant difference in levels of awareness about SOP laid during COVID-19 amongst DHCPs in Central India.

The COVID-19 guidelines recommend the use of pre-procedural mouth rinse with 10 ml of 0.5% solution of Povidone-Iodine to reduce oral bacterial load of the patient before initiating dental procedures.¹² According to meta-analysis by Marui¹³, pre-procedural mouth rinses including chlorhexidine, cetylpyridinium chloride and essential oils led to a mean reduction of 68.4% colony-forming units in dental aerosols. In our study, 76.5% DHCPs agreed that pre-procedural mouth rinse reduces bacterial load of oral cavity and eventually causes reduction of bio-aerosol contamination.

According to the Indian Ministry of Health and Family Welfare (MoHFW), the use of RD has been recommended as an effective barrier to reduce aerosol contamination.¹² The results of present study indicate that 80.3% Endodontists agreed that RD is effective in reducing aerosol contamination in comparison to 58.7% other specialists and 53% general dental practitioners. Despite this, this survey reported that the most commonly used method of isolation by GDP and other specialists was cotton rolls, followed by suction devices. Only 17% GDPs used RD for achieving isolation of operative field followed by 23% other dental specialists. 62% endodontists used RD for both operative as well as endodontic procedures, indicating that it is extensively

used for achieving isolation amongst the respective group (Figure no. 1).

More recently, Van Doremalen¹⁴ and colleagues reported that the SARS-CoV-2 virus could remain aerosolized for up to 3 hours. This implies that dental practitioners must be aware about precautionary measures to reduce bacteria-laden aerosols near the operator. Cochran et al. examined the adjunct use of an air-water syringe and high-speed rotary instrumentation, either with or without a rubber dam. Their results showed up to 90-98% efficacy of RD in preventing the spread of bio-aerosol during dental procedures.⁹ The present study reveals that 26.3% endodontists, followed by 7.9% GDPs and only 3.1% other specialists agree that RD usage can lower aerosol contamination more than 90%. [Figure no. 2]

There was a difference in opinion amongst the three groups regarding advantages of RD in various aerosol generating procedures including use of ultrasonic handpiece, air abrasion, air polishing and high-speed handpieces. Mostly, endodontists followed by other specialists and lastly GDPs stated that RD usage is beneficial for all types of aerosol producing procedures. [Figure no. 3]

43.6% DHCPs in the present survey stated that the greatest advantage of using RD isolation was reduction in contamination of operative field via salivary aerosols. However, the most prominent reason for non-usage of RD in this survey was reported to be lack of experience and knowledge about its placement; while economic reasons, technique sensitivity, patient non-compliance and time were other associated factors.

Thus, to overcome the demerits of RD, recently newer safety systems such as Dental Aerosol Reduction Tent (D.A.R.T) have increasingly become popular, especially during COVID-19 pandemic as they are technique insensitive and reduce cross-contamination. D.A.R.T.

mainly functions to reduce aerosols production in two ways, firstly by creating a physical barrier and second by creating negative pressure around the workspace. These devices are very similar to Aerosol Box used by hospitals treating Covid-19 patients.¹⁵

Highly significant difference was observed in the present study amongst the three study groups when asked about the alternative use of D.A.R.T for RD; only 17.1% endodontists agreed for the use of such alternative devices in bio-aerosol reduction in comparison to 37.9% other specialists and 50% GDPs. [Table No. 2]

However, most of DHCPs responded affirmatively that there would be a paradigm shift towards RD usage in COVID-19 era, and RD training in undergraduate teaching programs will enhance its future clinical usage.

Conclusions

The results of the present study indicate that there is a need to increase awareness regarding standard operating protocol laid for COVID-19 pandemic amongst general dental practitioners in Central India. The most common precautionary measure used for aerosol reduction by Endodontists is conventional rubber dam system that facilitates barrier protection from contaminated aerosols. Rubber dam usage in contemporary clinical practice is less extensive in General Dental Practitioners despite adequate awareness of SOP laid during COVID-19 pandemic. Increasing awareness about RD placement techniques and introduction of training at undergraduate teaching programs may increase its future prospects in routine dental practice.

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Legend Figure

Figure 1: Isolation methods used by DHCPs in routine dental practice

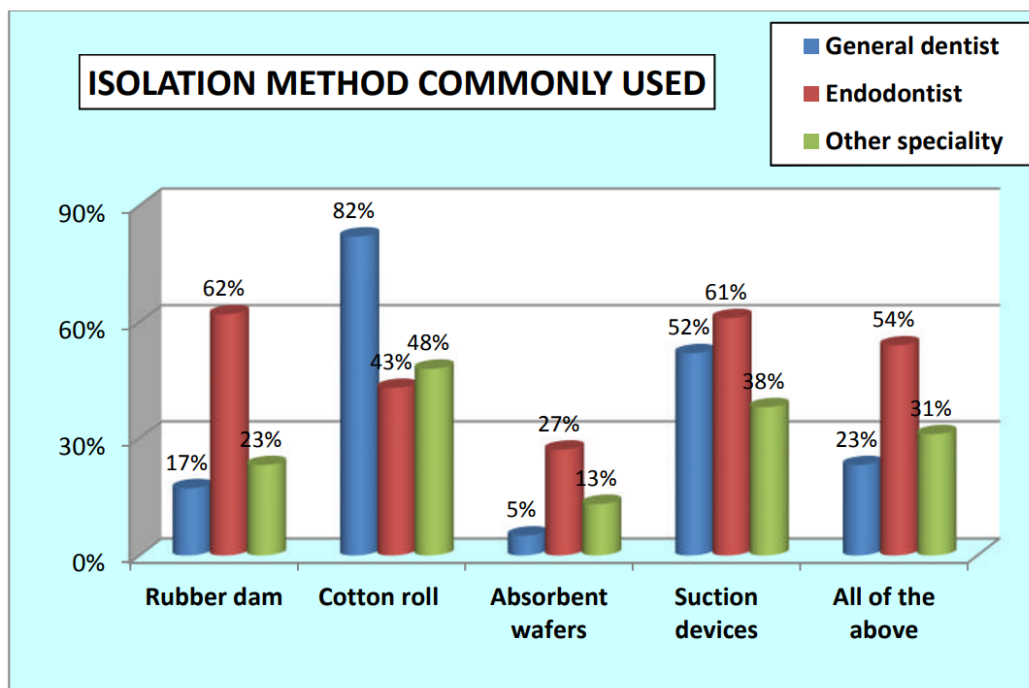


Figure 2: Opinion of DHCPs on Bio-aerosol reduction achieved by rubber dam isolation

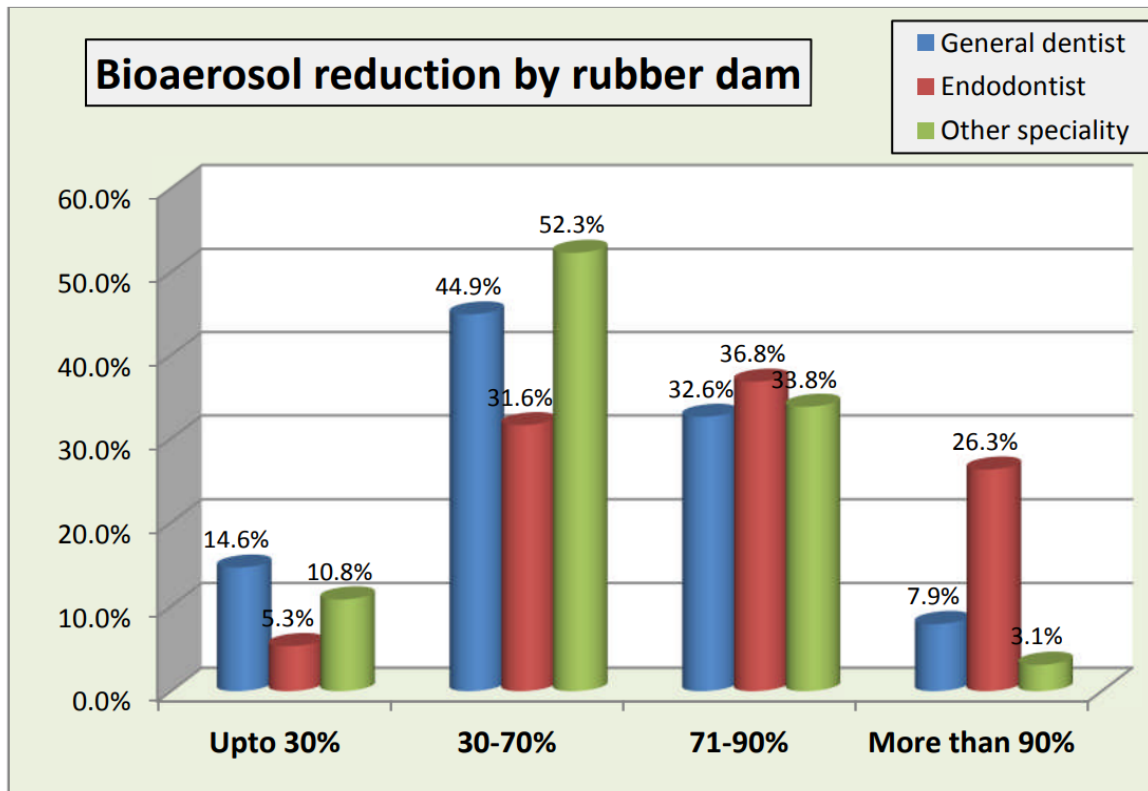


Figure 3: Clinical scenario(s) in which rubber dam isolation will be beneficial in COVID-19 situation

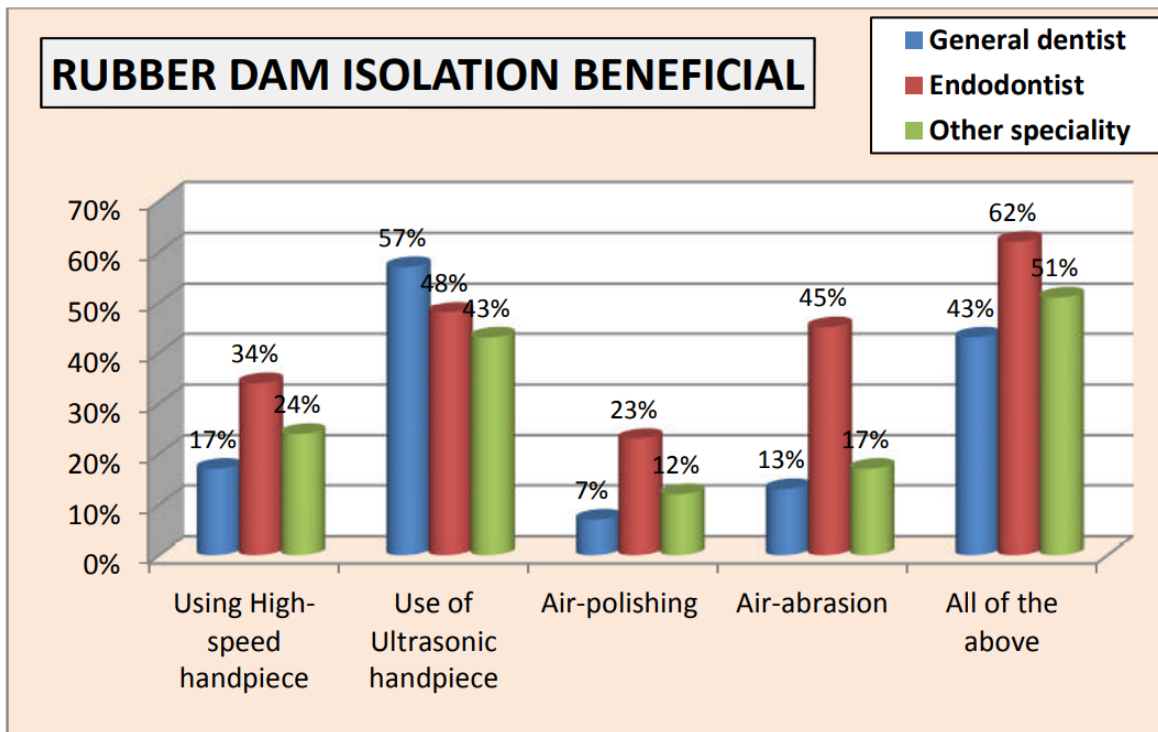


Table 1: Assessment of Dental Practitioners' knowledge, attitude in relation to isolation of operative field amidst COVID-19 pandemic in Central India between GDPs, Endodontists and Other specialists

	General dentist n =92 n (%)	Endodontist n = 76 n (%)	Other speciality n = 66 n (%)	p value
Aware about the SOP for dental patients during COVID-19	68 (73.9%)	75 (98.7%)	59 (89.4%)	p < 0.001**
Received training for rubber dam application in your under-graduate dental institute	32 (34.8%)	49 (64.5%)	28 (42.4%)	p<0.001**
Use rubber dam isolation while performing operative procedure	31 (33.7%)	62 (81.6%)	21 (31.8%)	p<0.001**
Use rubber dam isolation while performing endodontic procedure	32 (34.8%)	73 (96.1%)	27 (40.9 %)	p <0.001**

p >0.05 – no significance

*p<0.05 – significant

**p<0.001 – highly significant

Table 2: Assessment of Dental Practitioners' current trends in isolation of operative field amidst COVID-19 pandemic in Central India between GDPs, Endodontists and Other specialists

		General dentist n =92 n (%)	Endodontist n = 76 n (%)	Other speciality n = 66 n (%)	p value
Rubber dam usage reduce risk of transmission and cross-infection during COVID-19 by decreasing aerosol contamination	Yes	54 (58.7%)	61 (80.3%)	35 (53%)	p =0.003*
	No	4 (4.3%)	0 (0%)	1 (1.5%)	
	Not sure	34 (37%)	15 (19.7%)	30 (45.5%)	
Pre-procedural antiseptic mouth rinse will reduce the extent of contamination within dental aerosols	Yes	69 (75%)	68 (89.5%)	55 (83.3%)	p =0.145
	No	5 (5.6%)	1 (1.3%)	2 (3.1%)	
	Not sure	18 (20.2%)	7 (9.2%)	9 (13.85)	
Dental aerosol reduction tent/dome can be used as an alternative for rubber dam isolation in the present COVID-19 Scenario	Yes	46 (50%)	13 (17.1%)	25 (37.9%)	p <0.001**
	No	12 (13%)	26 (34.2%)	7 (10.6%)	
	Not sure	34 (37%)	37 (48.75)	34 (51.5%)	
Paradigm shift in usage of rubber dam in routine dental practices post COVID-19 outbreak	Yes	62 (67.4%)	74 (97.4%)	51 (77.3%)	p =0.006*
	No	7 (7.6%)	0 (0%)	2 (3%)	
	Not sure	23 (25%)	2 (2.6%)	13 (19.7%)	
Rubber dam training in undergraduate teaching programs will enhance its future clinical usage	Yes	77 (83.7%)	71 (93.4%)	54 (81.8%)	p =0.172
	No	5 (5.4%)	0 (0%)	3 (4.5%)	
	Not sure	10 (10.9%)	5 (6.6%)	24 (13.6%)	

p >0.05 – no significance

*p<0.05 – significant

**p<0.001 – highly significant