Original Article

Knowledge, attitude, and practice of general dental practitioners toward following proper standards of endodontic practice and use of latest technology in Dehradun: A cross-sectional study

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Abstract

Background: Choosing latest technology for the treatment improves the chances of favorable prognosis and saves the time of the clinician; hence, the aim of the study was to explore their knowledge, attitude, and practice (KAP) toward following proper standards of endodontic practice and use of latest technology. **Materials and Methods:** The present study was a cross-sectional, descriptive questionnaire study conducted among general dental practitioners (GDPs). The survey was conducted among 156 GDPs. In the present study, a close-ended interview schedule was prepared to test the KAP of GDPs. **Results:** For diagnosis, most of the study participants (58 [37.08%]) relied on case history and radiograph. Apex locator was used by 71 (45.51%) of the study subjects. Among all the study participants, 58 (37.17%) dental practitioners used rotary nickel–titanium (NiTi) files with normal saline and preheated disinfectants for cleaning and shaping of root canal. It was observed that the knowledge of majority of the dental practitioners was fair (58 [37.17%]). However, the attitude and practice toward following proper standards of endodontic practice and use of latest technology were poor. **Conclusion:** It was concluded that very few general practitioners used the latest technology in endodontics. Knowledge was fair while attitude and practice regarding following proper standards of endodontic practice and use of latest technology were poor among study participants.

Keywords: Dental, dental technology, knowledge, practice

Introduction

The standard of practice in endodontics is characterized as the acceptable degree of execution or a desire for expert intercession, defined by expert associations dependent on current logical learning and clinical skill. The recent improvements in the innovative technology gives good prognosis, even though the innovative technology requires proper understanding of the disease process which is the basic prerequisite to conquer the art of learning the new standard of learning from the improved technology. The utilization of microscopy for apex locator

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Received: 09-09-2019 **Revised:** 31-10-2019
Accepted: 21-11-2019 **Published:** 28-01-2020

Access this article online

Quick Response Code:

Website: www.jfmpc.com

DOI: 10.4103/jfmpc.jfmpc_751_19

How to cite this article: Dogra M, Sawai DS, Ganapathy SK, Sharma U, Singh I, Gupta P. Knowledge, attitude, and practice of general dental practitioners toward following proper standards of endodontic practice and use of latest technology in Dehradun: A cross-sectional study. J Family Med Prim Care 2020;9:282-6.

with ultrasonic tips for retrofilling[1] represents improved innovation and the present standard of training in endodontics. In this manner, apical retrograde reclamations ought to be performed with biocompatible materials, for example, mineral trioxide total (MTA).[2] Nowadays root canal treatment (RCT) is considered as an exceptionally predominant treatment alternative in the quickly developing dental practice.[3] Fruitful endodontic treatment relies upon getting a liquid-tight seal that is accomplished by sufficient readiness and obturation of the root canal system.[4] The recent improvements in the innovative technology gives good prognosis, even though the innovative technology requires proper understanding of the disease process which is the basic prerequisite to conquer the art of learning the new standard of learning from the improved technology. For improved morale and standard clinical practice, a base degree of capability and an enthusiasm for continued learning must be empowered in the alumni during their preparation period in dental schools.[5] Systemic diseases like diabetes, hypertension, and coronary artery diseases (CADs) can complicate RCT results.[6,7] Moreover, the life threatening conditions like uncontrolled hypertension and diabetes can be detected by estimating the blood pressure and blood sugar levels and also at the time of root canal treatment also.[8,9] However, the significance of this appears to be overlooked in the dental field.[10,11] This inconsistency in the success rate may mirror a distinction in the specialized quality of the endodontic treatment performed. A few studies have explored the learning and demeanors of dentists toward RCT systems. All of the investigations referred here have detailed that the majority of general dental practitioners (GDPs) do not pursue the rules for standard RCT. Therefore, the present study was done among general dental specialists to investigate their insight, demeanor, and practice toward following legitimate guidelines of endodontic practice and utilization of most recent innovation.

Materials and Methods

The present study is a cross-sectional, descriptive questionnaire study conducted among GDPs working in private clinics in Dehradun city, India. The study was conducted from January to February 2019.

The city was divided into five directions, namely, north, south, east, west, and central. From each direction, 20 dental clinics were selected randomly. Only those GDPs, who performed RCT in their clinics by themselves, were included in the study. In selected clinics, consent was availed, and those who gave the consent were included in the study. If at the time of the survey because of patient appointment the practitioner did not take up the survey, the questionnaire was given to the assistant to be filled by the dentist and collected later. The survey was conducted in 100 dental clinics among 156 GDPs.

A pilot survey was conducted before the main survey on 20% of the total study participants to test the validity and reliability of questionnaire. The reliability of the questionnaire was determined by using Test–Retest reliability and the values measured came out to be Kappa (k) = 0.91 and weighted Kappa (k_w) = 0.88. The internal consistency of questionnaires was measured by applying Cronbach's Alpha (α) and the value of $\alpha = 0.89$ was measured.

In the present study, a close-ended interview schedule was prepared to test the knowledge, attitude, and practice (KAP) of GDPs. It consisted of four parts. The first part consisted of the demographic details of the dentists. The second part consisted of the use of various instruments and technology by study participants in various steps of RCT.

The third part consisted of questions related to knowledge regarding proper standards of endodontic practice, such as *what is standard care in endodontics, what is 3D radiography in endodontics is called, and which one of them is not the use of an operating microscope in endodontics.*

The fourth part consisted of questions regarding the attitude of GDPs toward following proper standards of endodontic practice and the use of latest technology, which included 10 questions and the answers were rated on a 5-point Likert scale ranging from "Totally Agree" to "Totally Disagree." *Taking case history in details is not much help in endodontic diagnosis, Every radiolucency at the apical region of any tooth can easily be treated by nonsurgical RCT.*

The fifth part of the questionnaire included questions regarding the practice of study participants toward following proper standards of endodontic practice and use of latest technology. It included seven questions and answer to these questions were divided according to 3-point Likert scale into "Disagree," "Partly Agree," and "Agree." *I always use apex locator and IOPA for determination of working length, A proper time and method with latest instruments were used by me for cleaning and shaping of root canal.*

Each correct answer to knowledge questions had 1 point and incorrect answer had 0 points; therefore, the knowledge score varied from 0–6 points. Answer to attitude questions held 1 point for each option on the Likert scale, with increase in score showing a more positive attitude. Attitude score ranged from 5–50. Positive practice scores increased with increase in scores, ranging from 3–21.

Statistical analysis

After entries of data in Microsoft Excel 2014, the IBM Statistical Package for the Social Sciences (SPSS) software version 21.0 was used to analyze the data. The descriptive statistics were used to determine the demographic details of the study participants. Correlation analysis was performed to find association between KAP and proper following of endodntic standards and Chisquare test was performed to determine the association between the use of various instruments and latest technology and demographic profile of the study participants.

Table 1: Demographic details of study participants (*n*=156)

Demographic Variables		Number (*n*)	Percentage (%)
Age in years	21-30	29	18.56
	31-40	68	43.58
	41-50	28	17.94
	More than 50	31	19.92
	Total	156	100%
Gender	Male	89	57.05
	Female	67	42.95
	Total	156	100%
Years of experience	1-5 years	35	22.43
	6-10 years	71	45.51
	11-15 years	32	20.51
	More than 15 years	18	11.55
	Total	156	100%
The average number of patients per month	1-20	43	27.56
	21-40	82	52.56
	41-60	21	13.46
	More than 60	10	6.42
	Total	156	100%
The average number of RCTs per month	1-10	65	41.66
	11-20	51	32.69
	21-30	38	24.35
	More than 30	02	1.30
	Total	156	100%

RCTs=Root canal treatments

Results

Most of the GDPs (71[45.51%]) were having experience ranging from 6 to 10 years [Table 1]. In most of the clinics' average number of patients per month was in the range of 21–40 patients and majority of the study participants (65 [41.66%]) performed an average of 1–10 RCTs per months.

Table 2 shows for the diagnosis most of the study participants (70 [44.87%]) used case history. For access cavity opening, most of the practitioners (91 [58.33%]) use airotor with normal light. Apex locator was used by 71 (45.51%) of the study participants for working length determination. Among all study participants, 58 (37.17%) dental practitioners used rotary nickel–titanium (NiTi) files with normal saline and preheated disinfectants for cleaning and shaping of the root canal. The single cone technique was the commonest technique (101 [64.74%]) used for the obturation of the root canal by most of the study participants.

Table 3 from this it was determined that knowledge of the majority of dental practitioners was fair [37.17%]) with score ranging from 2–4. Attitude scores (5-20) as reported poor among 39.1% participants and practice scores (3-9) was also reported poor among 39.10% majority of patients. Attitude toward following proper standards of endodontic practice and use of latest technology was poor among 61 (39.10%) dental practitioners. Among majority of the study participants (64 [41.02%]) practice was poor.

Table 4 on applying Pearson's correlation it was determined that the knowledge of the study participants was significantly ($P \leq 0.05$*) associated with the practice of study participants.

In Table 5 it was reported that the age group of study participants was significantly $P \leq 0.05$*, (Significant) associated with the attitude of dental practitioners while years of experience was significantly associated with knowledge $P \leq 0.01$**, (Highly Significant) and practice $P \leq 0.00$***, (Highly Significant) of the study participants.

Discussion

As mentioned in the previous study,[12] it was stated that the GDPs do not follow proper standards of endodontic practice, the present study was conducted to explore their KAP. In the present study, years of experience of majority of study participants were ranging from 6–10 years while in the study by Al-Nahlawi *et al.*[13] it was reported that work experience of dental practitioners was more than 10 years. Contrasting results were shown in a study by Bogari *et al.*[14] in which majority of the study participants were newly graduated.

About 44.87% of GDPs made the diagnosis by only recording case history and 37.08% of them also took radiographs while only 11.53% performed pulp vitality test along with case history and radiograph. In a study by Bogari *et al.*,[14] 82% of GDPs recorded case history while 89.9% took intra oral periapical radiograph (IOPA) and 42.8% performed a cold test. In a study by Al-Nahlawi *et al.*,[13] only 26.6% of GDPs recorded radiographs.

In the present study, 79% of GDPs used saliva ejector with cotton rolls isolation and only 14.10% used rubber dam while in a study by Al-Nahlawi *et al.*,[13] 93.1% of the study participants used saliva ejector with cotton rolls isolation and 6.9% of GDPs used rubber dam. In another study conducted by Shrestha *et al.*[15] among GDPs in Kathmandu, only 1.4% of the practitioners used a rubber dam. Contrasting results were reported in a study by Bogari *et al.*,[14] in which 56.3% of the participating dentists were applying rubber dam isolation when performing RCT. In the present study, 45.51% of the study participants used apex locator for determination of working length while 21.91% of study participants used both apex locator and radiograph for determining the same. In a study by Bogari *et al.*,[14] 33.1% of the study participants were using conventional radiographs, whereas 14.4% reported using electronic apex locators (EALs) and 52.1% were using a combination of both radiography and EAL. In a study conducted by Shrestha *et al.*,[15] the apex locator was used by 36.36% respondents while radiograph with instrument in the canal was used by 88 (80%) of the study participants. Contrasting results were seen in a study by Al-Nahlawi *et al.*,[13] in which both X-ray film and apex locator were used by only 8% of the GDPs and the apex locator was used by 10.6% of the GDPs.

In the present study, rotary NiTi files were used by the majority of the study participants, followed by hand ProTapers. While in study

Table 2: Use of various instruments and the latest technology by study participants in various steps of RCT

Phases of RCT	Instruments and latest technology	*n* (*n*)	Percentage (%)
Diagnosis	Case history	70	44.87
	Case history + radiograph	58	37.08
	Case history + radiograph + pulp vitality test	18	11.53
	Case history + radiograph + pulp vitality test + digital imaging	10	6.52
	Total	156	100%
Access cavity opening	Simple airotor, normal light, Saliva ejector with cotton rolls isolation	91	58.33
	Simple airotor, constant magnification, and lighting, Saliva ejector with cotton rolls isolation.	32	20.51
	Simple airotor, constant magnification and lighting and with rubber dam isolation	22	14.10
	Simple airotor, constant magnification, and lighting, with rubber dam isolation and operating microscope.	11	7.06
	Total	156	100%
Working length determination	Tactile sensation	18	11.53
	X-ray film	33	21.15
	Apex locator	71	45.51
	Both X-ray film and apex locator	34	21.91
	Total	156	100%
Cleaning and shaping	Stainless steel hand files with normal saline	08	5.12
	Hand ProTapers with normal saline and nonactivated disinfectants	58	37.17
	Rotary NiTi files with normal saline and preheated disinfectants	61	39.10
	In a combination of above	29	18.61
	Total	156	100%
Methods of Cleaning and shaping	Step-back technique	34	21.78
	Crown-down technique	39	25.00
	Combination of both	83	53.28
	Total	156	100%
Obturation	Normal gutta percha	11	7.05
	Single-cone technique	101	64.74
	Thermoplastic gutta percha with latest obturating material	30	19.23
	All the above	14	8.98
	Total	156	100%

RCT=Root canal treatment

Table 3: KAP scores toward following proper standards of endodontic practice and use of the latest technology

Variables	Number of subjects	Percentage of subjects *n* (%)
Knowledge	0-1 (poor)	41 (26.28%)
	2-4 (fair)	58 (37.17%)
	5-6 (good)	57 (36.55%)
	Total	156 (100%)
Attitude	5-20 (poor)	61 (39.10%)
	21- 35 (fair)	55 (35.25%)
	36-50 (good)	40 (25.65%)
	Total	156 (100%)
Practice	3-9 (poor)	64 (41.02%)
	10-15 (fair)	56 (35.89%)
	16-21 (good)	36 (23.09%)
	Total	156 (100%)

KAP=Knowledge, attitude, and practice

by Shrestha *et al.*,[15] most of the respondents were using stainless steel hand files followed by NiTi files. In a study by Al-Nahlawi *et al.*,[13] majority of the study participants were using ProTapers.

Majority of the respondents used a combination of both crown-down and step-back technique for cleaning and shaping of the root canal. Contrasting results were reported by Bogari *et al.* study,[14] in which most of the dentists were using traditional technique of root canal preparation.

Fair knowledge with poor attitude and practice were reported among participants, regarding proper standards of endodontic practice and use of latest technology among GDPs. Dissimilar results were reported by Bogari *et al.*,[14] which showed poor knowledge and attitude among the participants.

The utilization of most recent innovation and armamentarium has an advantageous impact on the anticipation of the treatment, these helps in avoiding disappointment and improving the life span of the treatment done, and avoiding post operative complication, hence helps in prevention of further cascade of complications associated.

Conclusion

From the present study, it was concluded that a very few GDPs use the latest technology in endodontics. Knowledge was fair while attitude and practice were poor among study participants regarding following proper standards of endodontic practice and use of latest technology.

Table 4: Correlation analysis of KAP toward following proper standards of endodontic practice and use of latest technology, among study subjects by using Pearson's correlation

	Knowledge		Attitude		Practice	
	r	*P*	*r*	*P*	*r*	*P*
Knowledge	-	-			0.045	0.04*
Attitude	1.003	1.01	-	-	1.001	0.23
Practice	-0.019	1.38	0.14	0.111	-	-

P≤0.05*. KAP=Knowledge, attitude, and practice

Table 5: Correlation analysis of demographic variables with following proper standards of endodontic practice and use of latest technology among study subjects by using Chi-square test

Demographic variables	Knowledge		Attitude		Practice	
	X^2	*P*	X^2	*P*	X^2	*P*
Age group	2.090	0.89	0.067	0.05*	1.102	0.78
Gender	0.121	1.22	0.190	0.24	3.700	1.10
Years of experience	1.223	0.00***	3.800	1.12	0.601	0.05*
Number of patients per month	2.210	0.11	1.005	0.98	1.900	0.01**
Number of RCTs per month	0.098	0.01**	0.230	0.11	0.710	1.69

P≤0.05*, *P*≤0.01**, *P*≤0.00***. RCTs=Root canal treatments

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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