



**SURVEY ON ENDODONTIC KNOWLEDGE AND AWARENESS OF TREATMENT,
ATTITUDE AND REFERRAL PATTERNS IN INDIAN GENERAL DENTAL
PRACTITIONERS**

DR. GEETIKA ARVIND YADAV , DR. SANJEEV TYAGI , DR. VARTUL DWIVEDI ,
DR. PARTHIVI SINGH, DR. YASH JAISWAL, DR. MALLADI SRISHA SHIVANGI

ABSTRACT

Introduction- Endodontics is dynamic, tremendously evolving discipline with considerable advances in techniques and materials and has witnessed some major developments over last decade. Challenges in root canal treatment are more likely if adequate knowledge and skills are lacking, or if the appropriate instruments and tools are not available, and hence GDP referrals of patients to an endodontist for management is common. Therefore, the aim of this study was to be understood the knowledge, awareness, attitude, referral pattern of general dentists regarding endodontics.

Material & methods- An online-based questionnaire survey was conducted and total 365 dentists were participated. For collection of data a pre-structured, close ended questionnaire consisting of 15 questions were shared. Statistical analysis was carried out using descriptive statistics in the SPSS software.

Results-76.4% GDPs were aware of all the procedures like root canal treatment, post and core, apexification.51.8% were somewhat confident in managing endodontic mishap. 56.1% of practitioners referred complex as well as general cases to endodontist.

Conclusion- Need of well-prepared practical based training programs and CDE programs for GDPs.

Keywords – Endodontist, Root canal treatment, referral pattern

Correspondence:

Dr. Geetika Arvind Yadav

PG Student ,

Department of Conservative Dentistry and Endodontics,

People's Dental Academy, People's University, Bhopal, Madhya Pradesh, India .

drgeetikayadav@gmail.com

Introduction-

Endodontics is a specialty that deals with the anatomy and function of the pulp and periradicular tissues surrounding a tooth's root canals¹. Identifying and treating the underlying causes is the main objective of endodontic therapy. Root canal debridement, irrigation, and biofilm removal are all part of the treatment plan for endodontic disease prevention and control².

Endodontics is dynamic, tremendously evolving discipline with considerable advances in techniques and materials and has witnessed some major developments over last decade. Various advances like warm obturation techniques, electronic methods of determining root canal length, appropriate disinfection techniques, etc. has resulted in more predictable results for the general practitioners at various levels³. The theoretical concepts and treatment protocols of endodontic practice have been changing since many years with various innovations and developments⁴.

Studies have revealed that greater number of general dental practitioners do not comply with the formulated guidelines for

quality of endodontic treatment^{5, 6}. Although during their graduation general dental practitioners (GDPs) are trained to complete endodontic procedures, including root canal treatment of molars, the provision of these services is often complex and can be frustrating and difficult.

Challenges in root canal treatment are more likely if adequate knowledge and skills are lacking, or if the appropriate instruments and tools are not available, and hence GDP referrals of patients to an endodontist for management is common⁷.

Referrals may occur prior to any treatment or following the commencement of treatment. In cases of difficulties with diagnosis, complex root canal anatomy, root resorption, retreatment or apical surgery, referral may occur before any clinical intervention, whereas perioperative procedural mishaps lead to referral after the commencement of treatment^{8,9}.

Therefore, the aim of this study was to better understand the knowledge, Awareness of general dentists and their attitudes regarding endodontics in general, and specifically (RCT), to highlight barriers

and referral pattern in the provision of endodontic care.

Material and methodology

Study design and study area

A descriptive cross-sectional survey was conducted among the dentist of India, for 3 months during the period of August to October 2022.

Ethical approval

Ethical approval for the conduction of the research was obtained from institutional ethical committee of People's Dental academy, Bhopal, India.

Study Population and Data collection

The current study was an online-based questionnaire survey. A total of 365 dentists were included in the survey using convenience sampling technique. Dentist who agreed to give their consent were included in the study. The Google survey app was used to construct the questionnaire and valid link was shared through social media. For collection of data a pre-structured, close ended questionnaire consisting of 15 questions were shared.

Most of the questions were pretested taken from previous studies and used with minor modifications. A pilot study was done using 10% of sample size to confirm validity and reliability of remaining questions.

The questionnaire was formulated which comprised of two parts: The first portion included the questions related to the demographic information of participants, such as age, gender, year of working experience, area of dental practice and affiliation. Age was further subdivided into three groups i.e. from 21-30, 31-40, and more than 40 years. Participant's affiliation was categorized as academician, private practitioner, both clinician and academician and their year of working experience was also categorized into four groups 1-5, 5-10, 11-20 and > 20 years. Area of practice was categorized as Urban, Sub urban and rural areas. The second portion of the questionnaire comprised 10 questions to assess the Knowledge, awareness, attitude and referral patterns among general dental practitioners (GDPs) in India.

Statistical analysis-

Data were entered in Microsoft Excel spreadsheet and statistical analysis was

carried out using descriptive statistics in the Statistical Package for the Social Sciences (SPSS) software, version 25.0, (IBM SPSS, Inc. Chicago, Illinois).for statistical analysis Pearson's Chi-squared test was used. A cut off of $p \leq 0.05$ was considered to be statistically significant with a 95% confidence interval.

Result-

There were 365 respondents out of 700; obtaining a response rate of 52.14%. In the present study 30.7% Male and 69.3% Females were participated. The distribution of respondents according to age was as follows. 91.2% of participants were in the age range of 21 to 30 years. 5.2% of participants were in the age range of 31 to 40 years and 3.6% of participants were above the age of 40 years. According to affiliation 5.8% were Academician, 84.1% were Clinician and 10.1% of participants were both academician as well as clinician. The distribution of dentist according to area of dental practice is such that around 71.0% dentist practiced at urban areas, 22.2% dentist practiced at sub urban areas and only 6.8% dentist practiced at rural areas. The distribution of respondents according to year of working experience is such that around 57.5% of dentists had 1-5 years of

experience, 33.2% dentists had 5-10 years of experience, about 5.8% of them had 11-20 years of experience and only 3.6% of the practitioners had more than 20 years of experience. **(Table 1)**

When asked about the treatment plan general dental practitioners are aware of in endodontics. Most of the dentist (76.4%) were aware of all the procedures like root canal treatment, post and core, apexification. 21.6% GDPs were aware of only root canal treatment and 1.9% were aware of root canal treatment and post and core only. when we asked about the endodontic mishaps GDPs aware of majority of practitioners (83.3%) were aware of all the mishaps like Abscess and swellings, Flare-ups, Irrigant extrusions, Post treatment pain. Our results revealed that majority of GDPs strongly agreed (49.3%) and agreed (49%) that root canal treatment is important in improving the long term retention of a tooth and only 1.6 % Practitioners were disagreed. **(Table 2)**

When questioned about the confidence level, most of the practitioners (51.8%) were somewhat confident in managing endodontic mishap on their own.26.6% GDPs were not confident enough and 21.6% were reported that they were strongly

confident. Our results revealed that majority of practitioners were somewhat confident in providing endodontic treatment, 33.2% were strongly confident and 26.6% were not confident enough. When we asked about the level of confidence in providing other endodontic treatments apart from regular root canal treatment, 44.1% were somewhat confident, 28.8% were not enough confident and 27.1% reported that they were strongly confident. When asked about the barriers faced by GDPs in day to day endodontic general practice, majority (43.3%) reported Lack of specialized instruments, lack of thorough endodontic knowledge and complex root canal anatomies were the barriers. **(Figure 1)**

When we compared the level of confidence of GDPs according to the working experience, the majority (2.7%) of practitioners who had experience of more than 20 years were strongly confident in performing endodontic procedures. Those who had 11-20 years of experience were strongly (2.5%) and somewhat confident (2.5%). Those who had 5-10 years of experience were strongly (16.4%) and somewhat confident (15.9 %) and those who had less than 5 years of experience, majority of practitioners (30.4%) were

somewhat confident and 15.6% were not enough confident and the difference between the groups was statistically significant ($p=0.000$). according to age groups above 40 years, majority (1.9%) were strongly confident. between 31-40 years, majority (2.7%) were somewhat confident. Between 21-30 years, majorities (45.2%) were somewhat confident and the difference between the groups was statistically significant ($p=0.000$). According to gender most of the female GDPs were (35.6%) somewhat confident and most of the males (15.1%) were strongly confident and the difference between the groups was statistically significant ($p=0.000$). According to area of practice, most of the dentist practiced in urban (37.0%) and sub urban (11.5%) areas were somewhat confident and the dentist practiced in rural areas were reported (4.1%) strongly confident. **(Table 4)**

When asked about the referral pattern to endodontist, majority (42.7%) of GDPs were refer often, 29.9% referred rarely, 20.8% referred very often and only 6.6% were never refer. Our results revealed that majority (56.1%) of practitioners referred complex as well as general cases, 35.6% referred only complex cases and 8.2% never

referred. Our results revealed that majority important to refer to an Endodontist for (49.9%) of practitioners were strongly better treatment outcome in complex cases, agreed and 49.3% were agreed that it is and only 0.8% were disagreed.(Table 3)

Table1- Demographic distribution of study participants (n=365)

Demographic Variables		N	(%)
Gender	Male	112	30.7
	Female	253	69.3
Age group	21-30 years	333	91.2
	31-40 years	19	5.2
	Above 40 years	13	3.6
Affiliation	Clinician	307	84.1
	Academician	21	5.8
	Academician and clinician	37	10.1
Area of practice	Urban	259	71.0
	Sub Urban	81	22.2
	Rural	25	6.8
Working experience	1-5 years	210	57.5
	5-10 years	121	33.2
	11-20 years	21	5.8
	>20 Years	13	3.6
Total		365	100%

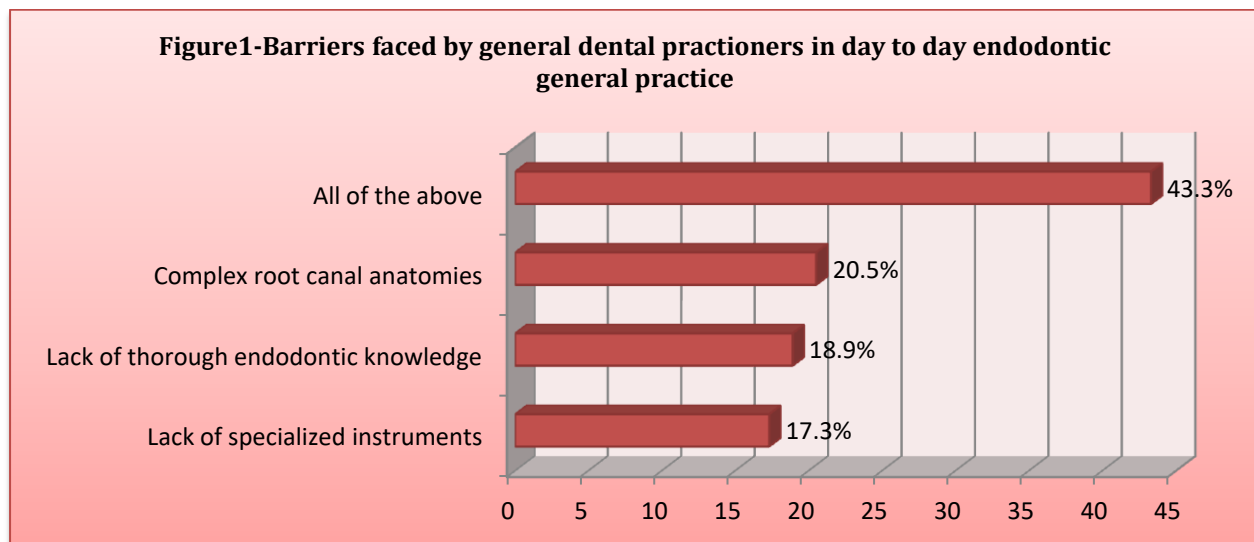


Table 2- Frequency distribution of responses according to knowledge, awareness and attitude towards endodontic treatment (n=365)

Questions		n	(%)
Which treatment plan are you aware of in Endodontics	Root canal treatment	79	21.6%
	Post and core	7	1.9%
	Apexification	0%	0%
	All of the above	279	76.4%
Which of the following endodontic mishaps are you aware of	Abscess and swellings	30	8.2%
	Flare-ups	6	1.6%
	Irrigant extrusions	3	0.8%
	majority	22	6.0%
	All of the above	304	83.3%
Do you believe RCT is important in improving the long-term retention of a tooth	Strongly agreed	180	49.3%
	Agreed	179	49.0%
	Disagreed	6	1.6%
How confident are you in managing endodontic mishaps on your own	Strongly confident	79	21.6%
	Somewhat confident	189	51.8%
	Not confident enough	97	26.6%
How do you find yourself in providing endodontic treatment	Strongly confident	121	33.2%
	Somewhat confident	181	49.6%
	Not confident enough	63	17.3%
Are you confident in providing other endodontic treatments apart from regular root canal treatment	Strongly confident	99	27.1%
	Somewhat Confident	161	44.1%
	Not confident enough	105	28.8%

Table 3-General dentists' reports about the frequency of referral patterns to Endodontist

Referral patterns		N	%
How often do you refer to an Endodontist	Very often	76	20.8%
	Often	156	42.7%
	Rarely	109	29.9%
	Never	24	6.6%
When do you refer to an Endodontist	In complex cases only	130	35.6%
	In complex as well as general cases	205	56.1%
	Never	30	8.2%
Do you think it is important to refer to an Endodontist for better treatment outcome in complex cases	Strongly agreed	182	49.9%
	Agreed	180	49.3%
	Disagreed	3	0.8%

Table 4- Factors impacting confidence in endodontic procedures

Factors		Strongly confident	Somewhat confident	Not confident enough	Total	p-value
Working experience	1-5 years	42(11.5%)	111(30.4%)	57(15.6%)	210(57.5%)	0.000*
	5-10 years	60(16.4%)	58(15.9%)	3(0.8%)	121(33.2%)	
	11-20 years	9(2.5%)	9(2.5%)	3(0.8%)	21(5.8%)	
	>20 Years	10(2.7%)	3(0.8%)	0(0.0%)	13(3.6%)	
Age group	21-30 years	108(29.6%)	165(45.2%)	60(16.4%)	333(91.2%)	0.381*
	31-40 years	6(1.6%)	10(2.7%)	3(0.8%)	19(5.2%)	
	Above 40 years	7(1.9%)	6(1.6%)	0(0.0%)	13(3.6%)	
Gender	Male	55(15.1%)	51(14.0%)	6(1.6%)	112(30.7%)	0.000*
	Female	66(18.1%)	130(35.6%)	57(15.6%)	253(69.3%)	
Area of practice	Urban	94(25.8%)	135(37.0%)	30(8.2%)	259(71%)	0.000*
	Sub Urban	12(3.3%)	42(11.5%)	27(7.4%)	81(22.2%)	
	Rural	15(4.1%)	4(1.1%)	6(1.6%)	25(6.8%)	

*statistically significant

Discussion –

The present study examined endodontic knowledge, awareness, attitudes and referral pattern in Indian general dental practitioners (GDPs). No study has been done to date that observes confidence in endodontic treatment amongst GDPs. Endodontic treatments especially root canal treatment (RCT) is considered as an

essential element in the dental services provided to the population. Total elimination of microorganisms from the root canal system is the goal of endodontic treatment. There is substantial evidence that the technical quality of RCT has a significant influence on endodontic therapy

outcomes¹⁰. Successful RCT depends not only on specific factors like root canal infection, complexity of root canal morphology, etc. but is also very much influenced by less specific, more distinct causes such as dentist's skills, confidence and attitudes. Majority of RCT in India is provided by general dental practitioner¹¹. A GDP's skill, knowledge, and confidence in root canal treatment ensures population equity in the provision of quality endodontic care, avoids unnecessary dental emergencies with resulting hospitalizations, especially in more rural areas, where immediate access to an endodontist may not be available¹².

The response rate for this study was 52.14% which was lower than the studies conducted by Mehta et al. in which out of 230 questionnaires, 152 completed responses were received, which is 67% response rate⁴. In this study more

(69.3%) Females GDPs were participated but in the studies conducted by Sharma d, male respondents (61.95%) were more than females. This is because the proportion of female students pursuing this course is much higher than their male counterparts and is increasing every year.

Regarding endodontic treatment and endodontic mishaps most of the GDPs were aware of all the treatment plans and mishaps. The reason behind this could be that the new advancement had come in the endodontics and more number of GDPs attends CDE programs in endodontics and also availability of online workshops and training programmes.

Regarding the confidence level of GDPs during endodontic treatment procedure and managing endodontic mishaps on their own most of dentist were somewhat confident. Confidence was clearly associated with working experience and

age. Similar findings were also reported in a study conducted by Bulmer J et al ¹³, this finding clearly indicates the need for well-prepared training for GDPs to overcome issues associated with undergraduate endodontic training, and to ensure the provision of endodontic care to patients is equitable, even in rural settings where specialist access may be limited.¹⁴

General dental practitioners (GDPs) have performed the vast majority of root canal treatments worldwide ¹⁵. Studies have shown that the success rate of root canal treatment in general dental practice is 60-85%, and the success rate of root canal treatment by endodontist is 98% ¹⁶. To avoid this complication, the GDPs should become more proficient at root canal treatment or refer the patient to an endodontist. In this present study majority of GDPs referred the patient to specialist. Majority of dentist referred

complex as well as general cases to endodontist. Referral of difficult cases to the endodontist who has advanced knowledge and skill is increases the success of root canal treatment¹⁷. The decision to refer to an endodontist is influenced by many patient- and dentist-related factors including clinical experience, confidence, training, working environment, etc.¹⁸ Several studies on endodontic referral have been published. Harty reported that most common reasons for endodontic referral were previous root fillings (19.8%), inability to control pain or swelling (13.7%) and diagnostic problems (12.8%). Management of pain (%24), blocked canals (17%) and endodontic retreatment (%15) were the most common reasons of endodontic referral ^{19,7}.

The present study has a response rate of 52.14% which is considered lower to be illustrative for the general dental

practitioners across the country. The larger sample size may better provide the true picture. However, a majority of GDPs surveyed were located in urban and suburban areas, hence the results of the present study may not necessarily reflect the current situation in more rural areas of India. Further studies covering all the dental practitioners registered under Dental Council of India should be surveyed to regulate and improve the quality of endodontic treatment in general dental practice.

Conclusion-

Present study revealed that most of the GDPs felt moderate confidence while providing endodontic treatment. This indicates need of well-prepared practical based training programs and CDE programs for GDPs which will improve their confidence and ensure the provision of endodontic care to patients is

equitable, even in rural settings where specialist access may be limited.

References

1. Loesche WJ: Chemotherapy of dental plaque infections. *Oral Sci Rev.* 1976, 9:65-107.
2. Usha HL, Kaiwar A, Mehta D: Biofilm in endodontics: new understanding to an old problem. *IJCD.* 2010, 1:44-51.
3. Sedani S, Thakkar A, Nikhade P. Ongoing Trends in Endodontic Practice, *Journal of Research in Medical and Dental Science* 2020;8(3): 110-117
4. Mehta N, Raisingani D, Gupta S, et al. Endodontic trends: Where we are and where we should be-A survey report peoples. *J Scientific Res* 2013; 6:30-37.
5. Kucukkaya S. A questionnaire survey on current endodontic practice of dental practitioners in Turkey. *Clin Dent Res* 2015; 39:101-109.

6. Al-Omari WM. Survey of attitudes, materials and methods applied in endodontic treatment by general dental practitioners in North Jordan. *Bio Medical Central Oral Health* 2004; 4:1
7. Abbott PV. Analysis of a referral-based endodontic practice: Part 1. Demographic data and reasons for referral. *J Endod* 1994;20:93-96.
8. Ree MH, Timmerman MF, Wesselink PR. Factors influencing referral for specialist endodontic treatment amongst a group of Dutch general practitioners. *Int Endod J* 2003;36:129-134.
9. Nejad PA, Fathi M, Nejad RK, Nejad MJ. Study Patterns of Referring to Root Canal Treatment Professionals by General Dental Practitioners. *J Res Med Dent Sci* 2018;6:36-42
10. Ricucci D, Gröndahl K, Bergenholtz G. Periapical status of rootfilled teeth exposed to the oral environment by loss of restoration or caries. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2000 Sep;90(3):354-359
11. Gaikwad A, Jain D, Rane P et al. Attitude of General Dental Practitioners toward Root Canal Treatment Procedures in India. *The Journal of Contemporary Dental Practice*, May-June 2013;14(3):528-531
12. Gardiner FW, Richardson A, Gale L, et al. Rural and remote dental care: Patient characteristics and health care provision. *Aust J Rural Health* 2020; 28:292-300.
13. Bulmer J, Currell SD, Peters CI, Peters OA. Endodontic Knowledge, Attitudes, and Referral Patterns in Australian General Dentists. *Australian Dental Journal*. 2022 May 3.
14. Sadr A, Rossi-Fedele G, Love RM, et al. Revised guidelines for the endodontic education of dentistry students in

Australia and New Zealand (FEBRUARY 2021). *Aust Endod J* 2021;47:327-331

15. de Moor RJG, Hommez GMG, De Boever JG, Delme KIM, Martens GEI. Periapical health related to the quality of root canal treatment in a Belgian population. *Int Endod J*. 2000;33(2):113-20.

16. Friedman S, Abitbol S, Lawrence HP. Treatment outcomes in endodontics: The Toronto Study. Phase 1: Initial Treatment. *J Endod*. 2003;29(12):787-93.

17. de Cleen MJH, Schuurs AHB, Wesselink PR, Wu MK. Periapical status and prevalence of endodontic treatment in an adult Dutch population. *Int Endod J*. 1993;26(2):112-9.

18. Bader JD, Shugars DA. Agreement among dentists' decisions for restorative treatment. *J Dent Res*. 1993;72(5):891-6.

19. Harty FJ. A survey of endodontic procedures performed by practitioners in

limited practice. *Int Endod J*. 1992 Jan; 25(1):25-8

Dr. Geetika Arvind Yadav , PG student , Department of Conservative Dentistry and Endodontics, People's Dental Academy, People's University, Bhopal, Madhya Pradesh, India

Dr. Sanjeev Tyagi , Professor and Head , Department of Conservative Dentistry and Endodontics, People's Dental Academy, People's University, Bhopal, Madhya Pradesh, India .

Dr. Vartul Dwivedi , Professor , Department of Conservative Dentistry and Endodontics, People's Dental Academy, People's University, Bhopal, Madhya Pradesh, India.

Dr. Parthivi Singh , Senior Lecturer, Department of Conservative Dentistry and Endodontics, People's Dental Academy, People's University, Bhopal, Madhya Pradesh, India.

Dr. Yash Jaiswal, PG student, Department of Conservative Dentistry and Endodontics, People's Dental Academy, People's University, Bhopal, Madhya Pradesh, India.

Dr. Malladi Srisha Shivangi, PG student, Department of Conservative Dentistry and Endodontics, People's Dental Academy, People's University, Bhopal, Madhya Pradesh