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A Survey of Endodontic Protocols Employed by General Dentists, Postgraduate Trainees and Endodontists in Pakistan

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ABSTRACT

Objective: The effectiveness of endodontic therapy is reliant upon maintaining treatment standards. The standard protocols improve the quality of treatment and reduce treatment failure. So, the current study is employed to explore the endodontic protocols, materials and methods used by general dentists, postgraduate trainees and endodontists.

Materials and Methods: The survey-based cross-sectional study was conducted among 160 participants through a well-constructed questionnaire through an online Google drive link distributed to general dentists, Postgraduate trainees and Endodontists. The study period was 1 month from 1-07-2022 to 31-07-2022. The individuals who do not give informed consent are excluded from the study. The response form has two main sections including the demographic details and protocols employed by general dentists, postgraduate trainees and specialists. Descriptive statistics were calculated as absolute frequencies and valid percentages. The chi-square test was used to evaluate the effects of education level and endodontic protocols. P value <0.05 is significant.

Results: Among 160 participants, 70 (43.8%) were male and 90 (56.2%) were female. The majority of participants were general dentists 98 (61.2%) with experience of <5 years. The use of Suctions was the most common isolation method 72 (42.4%) and 104 (61.4%) participants prefer NaOCl as an irrigant in the root canal. There was a significant association between education level and appropriate endodontic protocols employed in patient care (p<0.05).

Conclusion: The majority of Pakistani general dentists, postgraduate trainees and specialists surveyed in the current study do not comply with quality standards and guidelines of endodontic treatment.

Keywords: Endodontics, Standard Protocols, Dentists, Questionnaire Survey.

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INTRODUCTION

Endodontic treatment is one of the most technically difficult clinical procedures, and the quality of care delivered in regular dentistry practice has been called into doubt.[1] To enhance endodontic treatment outcomes significant efforts were made over the same period to develop new instruments and endodontic techniques that would facilitate treatment.[2] The success of root canal therapy can be ambiguous and can be assessed by measuring using both strict protocols and flexible criteria. Uncertainty regarding success in Endodontic therapy can be easily avoided by some defined goals and outcomes.[3] We can define Endodontic success as the preservation of radiographically sound periapical tissue as well as clinical normality free of disease signs and symptoms.[4]

Case selection in Endodontic therapy is a key factor that ultimately defines the prognosis of treatment.[5] However, if no favourable advantages are disclosed to the patient the endodontic therapy is weighted against the tooth extraction and replacement by the prosthesis.[6] Endodontic treatment success also is dependent on sufficient preparation of the root canal area and sealing of the root canal system with a suitable obturating material to prevent the inflow of bacteria and salivary fluid in the root canal space.[7] The quality of endodontic treatment highly depended upon the attitudes and protocols utilised by general dental practitioners, endodontists and specialists regarding endodontic therapy.[8]

The American Association of Endodontists has a standard set of protocols for pulpal and periapical diagnosis, treatment modalities, surgical and non-surgical root canal procedures, regenerative therapy and their outcome assessment.[9] Various factors determine the degree of difficulty and risk of endodontic therapy. Recognizing these aspects before treatment begins assists practitioners in understanding the difficulties that may be involved in specific instances and helps to prevent unfavourable outcomes owing to unnecessary procedural errors.[10]

Due to a lack of knowledge and practice with modern tools, materials, and techniques, or a fear of practising beyond the knowledge learned during undergraduate, the normal treatment approach may be jeopardized, affecting the therapy's prognosis.[11] Numerous research conducted in Asian countries revealed that the majority of dentists do not follow the established requirements for root canal treatment quality.[12] However very little data is available about the standard protocols employed by dental professionals in Pakistan. So, the current survey is conducted to evaluate the protocols employed by the general dentist, postgraduate trainees and endodontics in Pakistan to compare these findings with well-acknowledged international academic standards to evaluate and improve the quality of the practice of endodontic treatment.

MATERIALS AND METHODS

This cross-sectional survey-based study was conducted from 1-7-2022 to 31-7-2022. A well-structured self-administered questionnaire modified from previous research[13] compromises 15 multiple-choice questions with the option of 'Other' to address any additional treatment adjustment that was not available in the options. The questionnaires were circulated to the participants through the computer-generated Google drive link by a non-probability convenient sampling technique. The sample size of the study was 160 calculated through the WHO sample size calculator with a confidence level of 95%, population proportion of 11.6% absolute precision of 5%.[14] Institute ethical approval was taken and the research follows the institutional standard protocols.

The participants of the study include the general dentist, endodontist and postgraduate trainee who was willing to participate in the survey. The study excludes dental students, house officers and those who did not give consent. The informed consent of the study was taken before filling out the response form. The data was collected anonymously to maintain the confidentially of participants. Only a completely filled response form included in the final study results partially filled response was rejected. The questionnaire includes two main sections. The first part explores the demographic details of participants including their gender, qualification, skills and type of clinical setting. The other section discussed the protocols employed by the dental professional in Endodontic therapy including questions about the mode of isolation, canal preparation and obturation techniques, type of root canal irritants, type of intracanal medicaments, and a temporary restoration.

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The data was analyzed through the SPSS software (SPSS version 16.0, Chicago, IL USA). The descriptive statistics including frequency and percentage of all variables were determined. The chi-square and Fischer exact test of significance were performed to examine the influence of educational level on the materials and procedures used in endodontics and the significant level was <0.05.

RESULTS

The total number of participants included in the results was 160. Among the total participants, 98 (61.2%) of the participants were general dentists, 46 (33.1%) were postgraduate trainees and 16 (19.4%) were specialists/endodontics. The majority of responders 99 (61.9%) have less than five years of experience. Regarding practice 60 (37.5%) of the participants were in public practice and 58 (36.2%) practised in both the public and private sectors as shown in Table 1.

Table 1: Demographic details of the study participants

Variable	Frequency N=160 (%)
Gender	
Male	70(43.8%)
Female	90(56.2%)
Age	
<30 years	88(55.0%)
31-40 years	51(31.9%)
>40 years	21(13.1%)
Designation	
General Dentist	98(61.2%)
Post graduate trainee	46(33.1%)
Endodontist/specialist	16(19.4%)
Years of Experience	
<5 years	99(61.9%)
5-10 years	48(30.0%)
>10 years	13(8.1%)
Type of practice	
Public	60(37.5%)
Private	42(26.2%)
Both	58(36.2%)

According to 47 (29.4%) of the participants, cotton rolls are the effective method of isolation while most of the participants 72 (45%) use suction for isolation. Only 23 (14.4%) of the participants use a rubber- dam for isolation. Among various root canal preparation techniques, 79 (49.4%) of the participants use the standardized technique, 31 (19.4%) of the participants use the hybrid technique, 28 (17.5%) of the participants use the step-back technique, and 22 (13.8%) of the participants use the crown-down technique for canal preparation. Most responders 104 (65%) use sodium hypochlorite for irrigation, 26 (16.2%) of the participants use EDTA, 18 (11.2%) of the participants use Chlorohexidine, and 10 (6.2%) of the participants use normal saline for irrigation as shown in Table 2.

The most common intracanal medicament 62 (38.8%) is calcium hydroxide, 39 (24.4%) of the participants use triple antibiotic paste, 29 (18.1%) of the participants use Formocresole, and 21 (13.1%) of the participants use metapex as an intracanal medicament as shown in Figure 1

For temporary restoration during root canal 121 (75.6%) of the participants use Cavit. 76 (47.5%) of the participants use the lateral condensation technique, 58 (36.2%) of the participants use the single cone technique, 14 (8.8%) of the participants use the thermafil technique, 10 (6.2%) of the participants use a warm vertical technique, and only 2 (1.2%) of the participants use paste fill technique for obturation. A significant association was found between the endodontic techniques and the education level of study participants with a *p*-value <0.05 as shown in Table 2.

DISCUSSION

In the first round, a questionnaire was randomly sent to 160 participants out of which 150 were filled and fulfilled the sample size criteria additional 10 responses were sent to other participants. The response rate of this study is higher than in previous studies.[14] There were more female participants than males similar to other relevant studies. The response form has all all-necessary questions about the endodontic procedure including the relevant materials and techniques of endodontic therapy. In the study, most of the respondents were general dentists (GD). The current study aims to evaluate the protocols of endodontic therapy employed by general dentists, postgraduate trainees and

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Table 2: Preferable Method employed for Endodontic Treatment

Variables	Educational level	General Dentist	Postgraduate Trainee	Specialist	df	*p*-value
Isolation method	Rubber dam Cotton rolls Suction Other	9(9.2%) 33(33.7%) 38(38.8%) 18(18.4%)	12(26.1%) 6(13.0%) 28(60.9%) 0(0%)	2(12.5%) 8(50.0%) 6(7.2%) 0(0%)	6	0.000
Canal preparation technique	Step back technique Crown down technique Ni-Ti rotary Hybrid technique	18(18.4%) 6(6.1%) 63(64.3%) 11(11.2%)	12(26.1%) 4((8.7%) 11(23.9%) 19(41.3%)	6(37.5%) 3(18.8%) 5(31.2%) 2(12.5%)	8	0.000
Type of root canal irrigant	Saline NaOCl EDTA Chlorohexidine Other	10(10.2%) 61(62.2%) 15(15.3%) 12(12.2%) 0(0%)	0(%) 38(82.6%) 7(15.2%) 1(5.2%) 0(0%)	0(0%) 5(31.2%) 4(25.0%) 5(31.2%) 2(12.5%)	8	0.001
Obturation technique	Lateral condensation Warm Vertical Single cone Injectable and thermafil Paste filling	56(57.1%) 10(10.2%) 18(18.4%) 14(14.3%) 0(0%)	13(28.3%) 0(0%) 33(71.7%) 0 (0%) 0(0%)	7(43.8%) 0(0%) 7(43.8%) 0(0%) 2(12.5%)	8	0.001
Temporary restoration	Cavit Phosphate cement ZnO + IRM Other	88(89.8%) 0(0%) 10(10.2%) 0(0%)	26(56.5%) 8(17.4%) 12(26.1%) 0(0%)	7(43.8%) 0(0%) 3(18.8%) 6(37.5%)	6	0.001

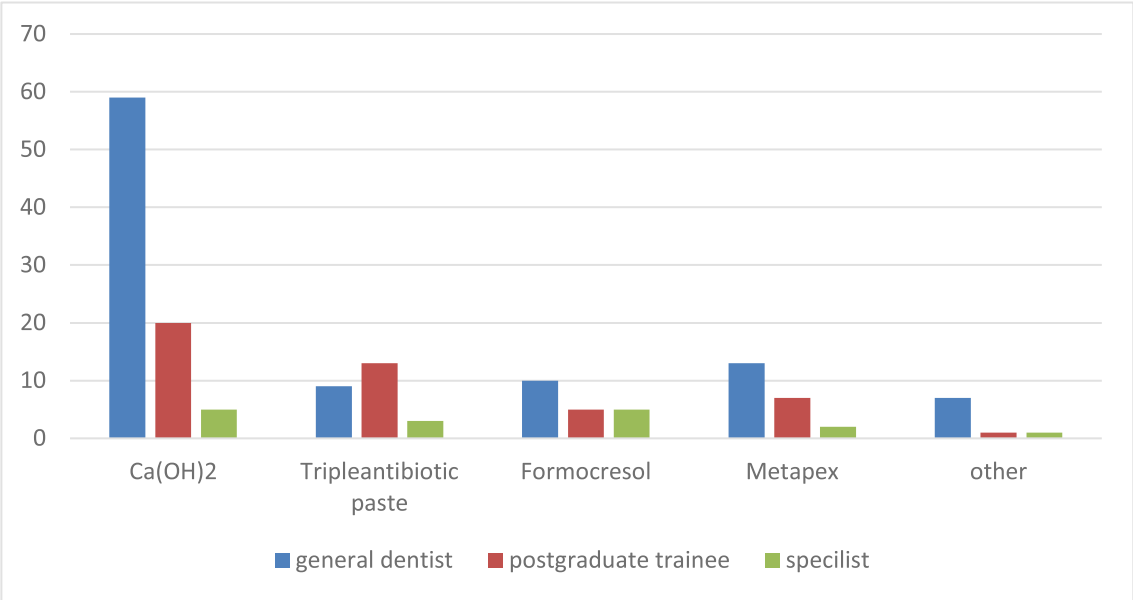

Figure 1: Use of intracanal medicament during endodontic treatment

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specialists and to compare them with the standardized recommendation of endodontic procedures to improve the quality of dental care. The fundamental goal of endodontic treatment is to avoid and halt pulpal/periarticular pathosis and to maintain natural dentition when pathosis exists. Endodontic treatment encompasses vital pulp therapy, root canal treatment and retreatment, surgical endodontic treatment, and treatment of pulpal trauma. The success of endodontic therapy is associated with the protocols used for the treatment.

The use of a rubber dam for endodontics has many clinical significances including the selection of root canal irritants, patient protection, increasing visibility of the operating field and overall treatment outcome. As per the European Society of Endodontology (ESE) recommendations, RCT treatments should be performed only when the tooth is isolated by a rubber dam.[15] Based on the results of the current study most of the participants used the cotton rolls as the standardized procedure of isolation. According to Palmer *et al*, only 30.3% of dental professionals used rubber dams in all dental procedures.[16] The number is very lower for the general dentist still dental specialists mostly utilized the rubber dam for endodontic isolation. In the results of our study, 9.2% of general dentists and 12.5% of specialists used it in their routine procedures the results are similar to the Ahmad A. Madarati survey where only 21.6% of GD was used in routine endodontic procedures.[17] Despite a lot of data available on the significance of rubber dams still very few numbers of dentists used them in their routine practice. It is surprising that they still hesitate to utilize rubber dams in their daily practice. The research data shows the lack of interest can be due to less emphasis on its importance, and misconceptions about its application like a time-consuming, inconvenient, painful and difficult place.[18] However, there is a significant relationship between the use of rubber dams and the qualification of dental professionals. The Endodontic mostly prefer to use rubber dams for endodontic therapy.

The canal preparation is the technique-sensitive step of endodontic procedures. It not only cleans the organic and inorganic debris from the canal system but also properly shapes the canals well prepared for obturation. There are various methods of canal preparation. The most popular technique since 1900 is the step-back technique for endodontic preparation. Most general dentists, dental trainees, and specialists still prefer its use. In our study, 17.5% of dentist use this technique, and the number are higher for general dentists. 49.4% of all the participants use the standardized technique for canal preparation. The other methods are the crown down and hybrid technique. Thus, according to the results of our study, the standardized technique is the most commonly used canal preparation technique, also supported by a study in KSA.[19] These results contradicted the results of a study in the institutes of Karachi, according to the results of this study the step-back is the most commonly used canal preparation technique.[20]

During endodontic procedures irrigation with suitable irrigants not only clean the root canals but also disinfect them. In addition, the irrigation also lubricates the root canals which makes the instrumentation during canal preparation easy for the operator. Sodium hypochlorite which dissolves the organic content of the root canal system and also acts as a broad-spectrum disinfectant is the most commonly used irrigant during endodontic procedures. It also facilitates instrumentation by lubricating the canals.[21] It supports the results of our study that the most commonly used irrigant among the participants is sodium hypochlorite.

There is a need for temporary filling during the endodontic procedure between the appointments of the patient. So that the prepared root canal system can be protected from contamination by saliva or food debris from the oral cavity. The most commonly used temporary filling among the participants of our study is Cavit. The same types of study in Nepal also support the result of our study that Cavit is the most commonly used temporary filling during endodontic procedures.[22]

The use of intracanal medicament to disinfect the canal is a crucial step in endodontic procedures. 38.8% of the participants use calcium hydroxide and 24.4% of the participants use the triple antibiotic paste as intracanal medicament. These results indicate that calcium hydroxide is the most commonly used medicament among the participants. The study by Raoof M et al. also supports our results that calcium hydroxide is the most commonly used intracanal medicament.[23]

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The last step in the endodontic treatment procedure is obturation. In which the completely clean, well-prepared, and properly shaped root canals are filled with suitable filling material like gutta-percha. Different techniques for obturation are used by the operators which depend on the choice of the operator based on his clinical assessment. Among the participants of our study, the most commonly used technique for obturation is the lateral condensation technique. 47.5% of the participants use this technique. This result is also supported by the results of a study in KSA, according to that lateral condensation is the most commonly used technique among the participants.[19] The study has certain limitations including the absence of consideration of the cofactors (physical health of the patient, medical history of the patient, acceptance or choice of the patient) which also affect the choice or selection of endodontic. The other limitation of this study is that its results can't be generalized to the whole population of the country as it is conducted among a limited number of Practitioners.

CONCLUSION

The study concluded that the endodontic treatment protocols used by general dentists, postgraduate trainees and specials are different from the clinical guidelines. Most dental professionals still utilize the traditional methods and this emphasizes the importance of conducting courses that will improve competency in endodontic therapy. There is a need to encourage the dental practitioner and introduce new recommended methods into regular practice.

DISCLAIMER

None to declare.

CONFLICT OF INTEREST

There is no conflict of interest among the authors.

ETHICAL STATEMENT

An ethical clearance letter was obtained from the Ethical Review Board of the School of Dentistry, Shaheed Zulfiqar Ali Bhutto Medical University, Pakistan Institute of Medical Sciences, Islamabad (SOD/ERB/2022/11).

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AUTHORS CONTRIBUTION

Conception and design of the study: S.A. Khokhar, N. Sarwar

Acquisition of data: S. Ansar, N. Sarwar, S.A. Khokhar, A. Waheed

Analysis and interpretation of data: N. Sarwar, S. Ansar, A. Waheed

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Critical review of the manuscript: N. Sarwar, S. Ansar, A. Waheed

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