



Community Medicine & Education Journal

Journal Homepage:

<https://hmpublisher.com/index.php/CMEJ>


Demand and Pattern for Endodontic Treatment in Jambi, Indonesia: Original Research Article

Rodiyah Azhar^{1*}, Prastuti Soewondo^{1,2}

¹Faculty of Public Health, Universitas Indonesia, Jakarta, Indonesia

²Endodontist- Conservative Dentistry Specialist, Dr. Bratanata Hospital, Jambi, Indonesia

ARTICLE INFO

Keywords:

Demand
Endodontic
Pattern
Root canal treatment
Tertiary referral

*Corresponding author:

Rodiyah Azhar

E-mail address:

rodiyahazhar@gmail.com

All authors have reviewed and approved the final version of the manuscript.

<https://doi.org/10.37275/cmej.v4i3.418>

ABSTRACT

There have been a growing number of patients demanding endodontic treatment to save their teeth. This study aimed to determine the pattern of demand and treatment need for root canal treatments at a tertiary healthcare facility in Jambi, Indonesia and update the dental literature with the demand and pattern of root canal treatments as seen in Jambi. This was a retrospective study. Data from 10.429 patients treated at conservative dentistry clinic, at top two tertiary referral hospital in Jambi. Data was taken from January through December 2022 were reviewed. Data were analyzed using IBM SPSS Version 26. The association between categorical variables was assessed using the Chi-square test. Significance level was set at $p < 0.05$. There were 5.940 patients age 15 to 70 years (Mean \pm SD 34,60 \pm 13,06) of which 3.564 (60.2%) were female and 2.376 (40%) male received root canal treatment. More female patients demanded for root canal treatment but treatment need was greater in female patients and increased with age. Demand for root canal treatment was more prevalent in those < 40 years of age. Central incisors were the most frequently root filled teeth in the maxilla and this was statistically significant ($p = 0.002$). Prevalence of teeth diagnosed Pulpitis Irreversible were the most frequently endodontic treatment. The finding in this study corroborate those of several other previous studies.

1. Introduction

The main goal of endodontic treatment is to save a tooth suffering from pulp diseases and its sequelae from being extracted.¹ Endodontic services include pulpotomy, pulp capping, conventional root canal treatment, apicectomy, repair of root perforation, implantation, re-implantation, hemisection, root amputation, and endodontic endo-osseous implant.² The frequency of demand for endodontic services is influenced by several factors, such as availability of dental facilities, cost of production of endodontic services, clinical fees for endodontic procedures, skill of dental practitioners, level of awareness of dental patients, and other related factors.³ In the past, the frequency of demand for root canal treatment had

been low, but in recent years, there has been a steady increase in the number of patients who demanded to save their teeth utilizing root canal treatment.^{3,4} This increase has been attributed to various reasons such as dental care awareness and education, better instrumentation, improved expertise of the dentists and endodontists through further advanced training and updates, improved dental facilities as well as cost-effectiveness as opposed to extraction of a tooth and subsequent replacement with implant or a fixed partial denture.⁴

The demand pattern for endodontic services has always been a subject of local and international studies.^{2,4} Some studies have shown that anterior teeth are the most frequently root-filled teeth

compared to posterior teeth.⁵ However, there were studies that reported that posterior teeth were the most frequently endodontically treated teeth.^{6,7} Furthermore, some of these studies also reported higher root canal treatment in the maxilla than in the mandible; maxillary anterior teeth were the most frequently root-filled teeth.^{7,8} Here in Lagos, a metropolitan city in Nigeria, there was a study on the frequency and demand pattern for endodontic services.⁷ That study found that the most frequently root-filled teeth were the molars while the least frequently root-filled tooth was the canines. In that same study, there were more root-filled teeth on the maxilla than on the mandible and more on the left than on the right side of the arch.⁷ A similar study was also conducted in PortHarcourt – a Metropolitan city in South-South Nigeria and reported that posterior teeth were more frequently treated endodontically than anterior teeth.⁹ However, yet another study conducted in IleIfe – a semi-urban city in the South-Western part of Nigeria reported a higher prevalence of root canal treatment in posterior teeth than in anterior when aggregated, although, from their study, the maxillary central incisors were the most commonly root-filled teeth.¹⁰ The main objective of this study was to determine the pattern and demand for endodontic treatments at a tertiary healthcare facility in Jambi, Indonesia and thereby update the dental literature with the demand and pattern of endodontic treatments as seen in Indonesia.

2. Methods

This was a retrospective study. The case files of 10,421 patients who attended the clinic of Conservative Dentistry at the top two tertiary hospitals in Jambi, Hospital of Haji Abdul Manap and Dr. Bratanata Hospital, from January through December 2022 were reviewed for the following information: age of patients, gender, teeth involved in endodontic procedures according to arch. The inclusion criteria were age, gender, and completion of endodontic

treatment. Endodontic services such as pulpotomy and pulp capping were excluded from this study. Reasons for demand for root canal treatment by patients were not included in this study, and case files with insufficient clinical data and incomplete biodata were also excluded. In this study, central and lateral incisors and canines were referred to as anterior teeth while premolars and molars were referred to as posterior teeth. Data were analyzed using IBM SPSS Version 26. Frequency and percentages were presented for categorical data while numeric variables were presented using mean and standard deviation. The association between categorical variables was assessed using the Chi-square test. The significance level was set at $p < 0.05$.

3. Results and Discussion

A total of 5,940 out of 10,421 patients (57%) who attended the Conservative Dentistry Clinic at the Hospital of Haji Abdul Manap and Dr. Bratanata Hospital Jambi demanded endodontic treatment during the period under review. The proportion was 5,940 patients, with more female patients 3,564 (60%) than male patients 2,376 (40%). Their ages ranged from 15 to 75 years (Mean \pm SD = 34,60 \pm 13,06). The age group with the most number of patients was the 15-24 years group, with 1,702 (29%) patients, while only 124 (2%) patients were seen in the 55-64 years age group (Table 1).

The most frequently root-filled teeth were the central incisors- 2,376 (40%). This was followed by the lateral incisors 1,366 (23%) and then the canines 832 (14%). The least root-filled teeth is the second molar 119 (2%) (Figure 1). There were more root-filled teeth in the maxilla, 2,317 (39%), than in the mandible, 3,623 (61%) (Figure 2).

There was a decrease in treatment needs with worse diagnoses; in other words, with worse diagnosis of patients in this study, the more severe the diagnosis, the fewer patients need to root fill (Table 2).

Table 1: Age and gender distribution of patients.

Variable	Frequency (n= 5.940)	Percentage (%)
Gender		
Male	2.376	40
Female	3.564	60
Age group		
15-24	1702	29
25-34	1423	24
35-44	1392	23
45-54	1114	19
55-64	124	2
65-75	186	3
Mean ± SD	34,60 ± 13,06	

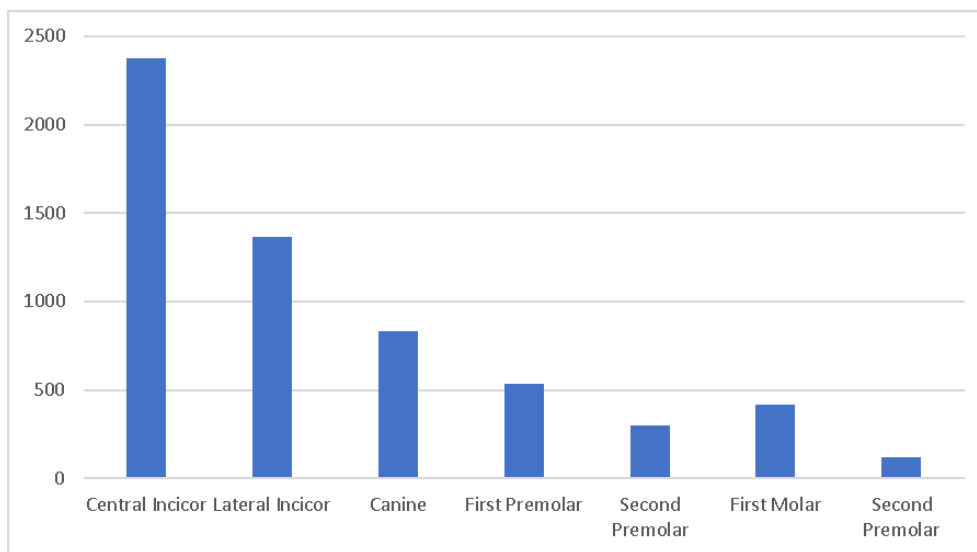


Figure 1. Distribution of root-filled teeth.

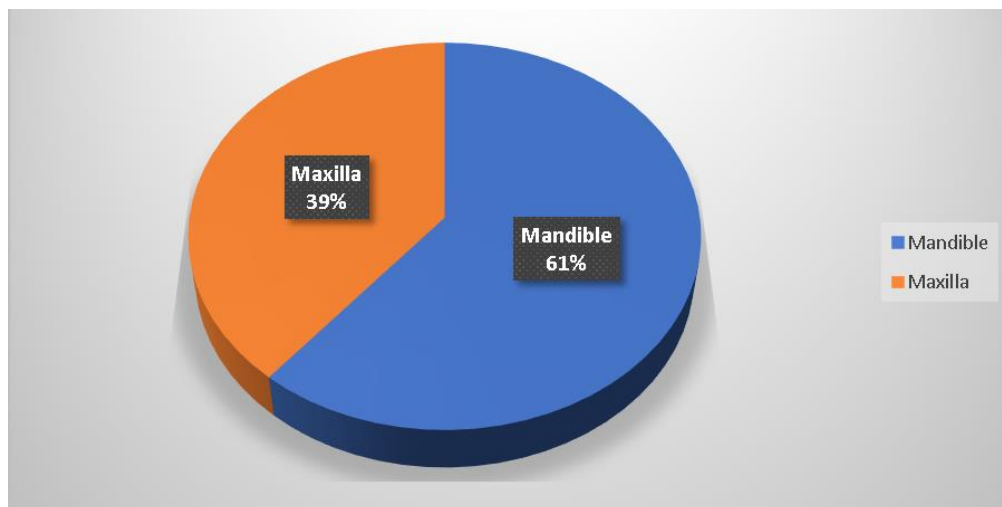


Figure 2: Distribution of root canal treatment according to the arch.

Table 2. Diagnosis prevalence of endodontic patients.

Diagnosis	Frequency
Pulpitis irreversible	2.554 (43%)
Pulp necrose	1.485 (25%)
Apical periodontitis	1.129 (19%)
Apical abscess	772 (13%)

This retrospective study was conducted on patients who had endodontic treatment in a tertiary referral centre. The prevalence of root canal treatment is increasing because more patients are choosing root canal treatment over-extraction.^{4,11} In this present study, there were more female (60%) than male (40%) patients, and this corroborates the findings from other similar studies.^{4,5,8,12} This could be a pointer to increasing demand for better oral health care by male patients⁴, indicating that female patients are now more enlightened and would rather demand root canal treatment than extraction.⁷ However, other studies have demonstrated a preponderance of female patients.^{5,7} Some reasons that can be adduced for more female patients seeking root canal treatment might be because females are more meticulous about their health and appearance, so they undergo regular dental check-ups and maintain good oral health.^{5,13} Although the 15-24 years age group in this present study had the highest prevalence (29%) of root canal treatment, the 55-64 years age group (2%) recorded the least prevalence of root canal treatment. However, it was noted in this present study that for patients aged 44 and below, the prevalence of root canal treatment was 76%. Similar findings were noted in other previous studies.^{7,13,14} This can be attributed to the high prevalence of dental caries and its sequelae in young adults.^{15,16}

The maxillary central incisors were the most frequently root-filled teeth in this present study. This observation corroborates findings in other studies.^{4,17} This could be attributed to the fact that although the maxillary central incisors are one of the first teeth to erupt, they have a high risk for rampant caries and are more prone to trauma, and because of their location in the mouth, the patients would therefore prefer to retain their central incisors for aesthetic purposes

rather than extract them.^{4,18,19} The maxillary central incisor teeth appear prominent during a smile; this is another reason why the patient may be more interested in preserving the central incisors.^{7,8} The lower molars were the most frequently root-filled teeth. This could be because of the pit and fissure present on its occlusal surfaces, which makes them more prone to dental caries, and when dental caries remain untreated, they are sequelae.^{20,21}

This present study demonstrated that there were more root-filled teeth in the maxilla than in the mandible; this was also seen in other studies.^{2,4,7,8,14} This finding could be due to a culmination of factors, such as the maxillary anterior being more prone to fracture and rampant caries when compared to the mandibular anterior.²¹ Even some studies that reported the highest prevalence of root-filled teeth in the mandible molars also noted that the next most frequently root-filled teeth occurred in the maxilla.²² This present study demonstrated a statistically significant association between root-filled tooth type and gender in the maxilla. However, the reason for this is unclear. According to this present study, the treatment needs to be increased with an increase in age and was more in the female than in the male patients, same as the female patients in this study were more than the males. Another study also noted a lower treatment need among male patients in their study.²³ This could be because more females seek treatment for issues related to pain and aesthetics.⁵ The prevalence of teeth diagnosed with Pulpitis was mostly frequent in this study. The reason is patients have acute pain in this case, and they need to find the treatment properly.²⁴ Another fact is that teeth with this diagnosis have a high rate of successful endodontic treatment.²⁵

4. Conclusion

This study showed that female patients had more demand for root canal treatment (RCT) linear to treatment need was greater in female patients and increased with age. Furthermore, the demand for RCT was more prevalent in younger adults, and maxillary central incisors were the most frequently root-filled teeth. The findings in this study corroborate those of several other previous studies. However, unlike other epidemiological studies of endodontics, this study noted a greater need for RCT in female patients compared to male patients.

5. References

1. Wigsten E, Kvist T, Jonasson P, Bjørndal L, Dawson VS, Fransson H, et al. Comparing quality of life of patients undergoing root canal treatment or tooth extraction. *J Endod* 2020; 46(1): 19-28.e1.
2. Osadolor OO, Egbonwonu F. Pattern of demand for endodontic treatment in a Nigerian Teaching Hospital. *International Journal Dental and Medical Sciences Research*. 2019; 3(6): 1-4.
3. Pattern of demand for endodontic treatment by adult patients in port-harcourt, South-South Nigeria Original Scientific Articles/Articles Originaux. 2014.
4. Joan E, Je E, Lo I. Evaluation of cases for root canal treatment in a Tertiary Hospital in Nigeria. *JSM Dent*. 2021; 9(1): 1135.
5. Abuzenada B, Syed GA, Pullishery F. Frequency and distribution of teeth requiring endodontic treatment in Jeddah subpopulation: a retrospective cross-sectional study. *Annof Med Health Sci Res*. 2021; 11(2021): 1428-30.
6. LO I. Retrospective analysis of reasons for conventional root canal treatment of permanent teeth in a Nigerian Tertiary Hospital. *Nigerian Journal of Dental Science*. 2019; 2(1 and 2 Dec 2019).
7. Umesi DC, Oremosu OA, Makanjuola JO, Nwachukwu NC. Frequency and distribution of teeth treated by single- and multiple- visit root canal treatment in a Nigerian population by differently skilled operators. *Odontostomatol Trop*. 2016; 39(153): 56-64.
8. Khan SQ, Khabeer A, Al Harbi F, Arrejaie AS, Moheet IA, Farooqi FA, et al. Frequency of Root canal treatment among patients attending a teaching dental hospital in Dammam, Saudi Arabia. *Saudi J Med Med Sci*. 2017; 5(2): 145-8.
9. Al-Madi EM, Al Saleh SA, Bukhary SM, Al-Ghofaily MM. Endodontic and restorative treatment patterns of pulpally involved immature permanent posterior teeth. *Int J Dent* 2018;2018.
10. Jain A. Incidence of root canal treatment in posterior teeth and its association with the gender - A retrospective study. *Journal of Research in Medical and Dental Science*. 2022; 10(5).
11. Bansal R, Jain A. An insight into patient's perceptions regarding root canal treatment: A questionnaire-based survey. *J Family Med Prim Care*. 2020; 9(2): 1020.
12. Panahandeh N, Parhizkar A, Bavandi MG, Asgary S. Attendance and distribution patterns of patients in a private dental clinic during the COVID-19 pandemic. *Journal of Iranian Medical Council*. 2023; 6(2): 321-7.
13. S P. Association of age, gender and tooth related study on patients undergoing endodontic retreatment. *Int J Dent Oral Sci*. 2021; 3976-80.
14. Louis I. Retrospective analysis of reasons for conventional root canal treatment of permanent teeth in a Nigerian tertiary hospital. *Nig J Dental Sci*. 2019; 2(December 2nd, 2019): 13-21.
15. García-Cortés JO, Medina-Solis CE, Loyola-Rodriguez JP, Mejia-Cruz JA, Medina-Cerda E, Patiño-Marín N, et al. Dental caries' experience,

- prevalence and severity in Mexican adolescents and young adults. *Revista de Salud Pública*. 2009; 11(1): 82–91.
16. Ndagire B, Kutesa A, Ssenyonga R, Kiiza HM, Nakanjako D, Rwenyonyi CM. Prevalence, severity and factors associated with dental caries among school adolescents in Uganda: a cross-sectional study. *Braz Dent J*. 2020; 31(2): 171–8.
 17. Sheikh-Nezami M, Mokhber N. Endodontic treatment of a maxillary central incisor with three root canals. *J Oral Sci*. 2007; 49(3): 245–7.
 18. Mahadevan M, Paulaiian B, Santhakumari RM, Kumar Alexander A, Neelamani Jaya N. Endodontic management of maxillary central incisor with two roots, and lateral incisor with a C-shaped canal; a case report. *IEJ Iranian Endodontic Journal*. 2023; 18(2): 104–9.
 19. Zhang B, Wang J, Zhou Z, Ge X, Cheng G, Chen Y, et al. Treatment of a young maxillary central incisor with two root canals: a case report. *Int J Gen Med*. 2021; 14: 419–23.
 20. Boushell LW, Sturdevant JR. Clinical significance of dental anatomy, histology, physiology, and occlusion. In: *Sturdevant's art and science of operative dentistry*. Elsevier; 2019; 1–39.
 21. Paiva MAA de, Leite DFBM, Farias IAP, Costa A de PC, Sampaio FC. Dental anatomical features and caries: a relationship to be investigated. In: *Dental Anatomy*. InTech. 2018.
 22. León-López M, Cabanillas-Balsera D, Martín-González J, Montero-Miralles P, Saúco-Márquez JJ, Segura-Egea JJ. Prevalence of root canal treatment worldwide: A systematic review and meta-analysis. *Int Endod J*. 2022; 55(11): 1105–27.
 23. Hebling E, Coutinho LA, Ferraz CCR, Cunha FL, Queluz D de P. Periapical status and prevalence of endodontic treatment in institutionalized elderly. *Braz Dent J*. 2014; 25(2): 123–8.
 24. Pinto ASB, Galvão N dos S, Dias LP da S, Mendes J de P, Lopes SLP de C, Costa ALF. Diagnosis and treatment of resistant periapical pathoses at the maxillary anterior region: a case report. *JORDI - Journal of Oral Diagnosis* 2016; 1(1).
 25. Hamedy R, Shakiba B, Pak JG, Barbizam J V., Ogawa RS, White SN. Prevalence of root canal treatment and periapical radiolucency in elders: a systematic review. *Gerodontology* 2016; 33(1): 116–27.