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Endodontic Treatment: An Analysis of Demand by Adult Patients in a Tertiary Hospital in Southern Nigeria

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ABSTRACT

Objective: An increase in dental awareness and need to maintain good oral health, in a growing population will necessitate an increased demand for root canal treatment (endodontic treatment). In emerging economies like Nigeria, the trend appears similar to what obtains in more developed economies where patients are keen on retaining their teeth. The objective was to determine the reasons for endodontic treatment and pattern of demand for treatment among adult patients attending the Endodontic unit of a tertiary hospital in Southern Nigeria.

Methods: A retrospective review of all clinical records of adult patients who attended the Endodontic unit of the Department of Restorative Dentistry, University of Benin Teaching Hospital (UBTH) Edo State, Nigeria from January 2012 to December 2014 for root canal treatment (RCT). The demographic and clinical data were retrieved from the patients' records and analyzed using SPSS version 20.

Results: A total of 485 patients, comprising 226(46.6%) males and 259(53.4%) females (a ratio of 1:1.4) underwent endodontic treatment during the study period. The age range of patients was 18-68 years. In the studied population, the highest demand for endodontic treatment 219(45.2%) was among the 20-29 years age range. The commonest indication for RCT was irreversible pulpitis (48.4%). The total number of teeth treated was 522. More posterior teeth 338(64.8%) were treated than anteriors 184(35.2%). The mandibular first molar 96(18.4%) was the most frequently treated tooth. More maxillary teeth 332(63.6%) underwent RCT than mandibular teeth 190(36.4%).Endodontic treatment was mostly completed in multiple visits 439(84.1%). A total of 279 (57.5%) patients had their treatments covered by the National Health Insurance Scheme (NHIS). Out of pocket payments accounted for 40.2% of patients who had endodontic treatment.

Conclusion: There was a greater demand for root canal treatment among female and young adult patients. Most of the procedures were performed on maxillary teeth while the mandibular first molar was the most frequently treated tooth.

Keywords: Endodontic treatment, root canal treatment, pattern, demand.

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INTRODUCTION

Increase in dental awareness and the need to maintain good oral health[1] in a growing population will necessitate an increased demand for endodontic treatment.[2] In Nigeria, the trend appears similar to what obtains in more developed economies where patients are keen on retaining their teeth.[3] The preservation of a functional dentition is a key aspect of modern dental care[4] and root canal treatment also known as endodontic treatment is an invaluable treatment option in the quest to retain teeth that would otherwise have been extracted.

Root canal treatment (endodontic treatment) is a highly specialized area of restorative dentistry[4-6] whose main goal is to prevent or heal apical periodontitis.[7]Despite being a very technically demanding procedure; conventional root canal treatment has been shown to be highly successful. Success rates of 70-98% have been reported.[8-10] The most common indications for endodontic treatment are complications arising from dental caries and trauma[5,11-14] whilst pain and dental abscess were the commonest complaints given by patients seeking endodontic treatment.[6,12]

Studies on endodontic treatment have been reported either by tooth type, jaw or a combination of both.[4-6,10-16] From these studies, the most frequently treated teeth were the maxillary incisors, molars and premolars while the mandibular incisors were the least treated. In addition, social demographics of patients studied report a higher demand for endodontic treatment amongst female patients with most

patients being within the 20-29 age range.[4,16]
Determination of treatment needs and demand of patients is an integral component of healthcare delivery[17,18]. Data obtained from epidemiologic studies are useful in this regard. However, there are limited studies on the demand for endodontic treatment in Nigeria, and in particular in the Niger Delta region. The aim of this study therefore is to determine reasons for endodontic treatment and the pattern of demand of treatment among adult patients attending the Endodontic unit of a Tertiary hospital in Southern Nigeria. Data obtained from this study will provide an insight into the desire of patients' to retain their teeth.

MATERIALS AND METHODS

The study was carried out at the Endodontic unit of the Department of Restorative Dentistry University of Benin Teaching Hospital (UBTH), Benin City, Nigeria. Ethical approval for this study was obtained from the Ethics and Research Committee of the University of Benin Teaching Hospital.
A retrospective study of endodontic treatment was carried out in adult patients in the Endodontic unit of the Department of Restorative Dentistry University of Benin Teaching Hospital within a 3year period (January 2012- December 2014). The clinical records of patients seen within this period constituted the sample. Only clinical records of patients aged 18 and above were used in the study. Patients below the age of 18 as well as clinical records with incomplete data were excluded from the study. Patient's names and record numbers were omitted to preserve confidentiality. A proforma was used to record the demographic and clinical data extracted from patient's clinical records. This included: the age of patient, sex, individual tooth treated, number of treatment visits and reason for pulp disease in teeth indicated for endodontic treatment.

Data was entered into a computer and analyzed using Statistical Package for Social Sciences Inc. (SPSS version 20.0 for Windows, Illinois, USA). The results are presented in form of tables, charts, graphs, and cross tabulations as appropriate. Frequency and percentage were calculated for the study variables.

RESULTS

During the study period, 485 patients underwent endodontic treatment comprising 226(46.6%) males and 259(53.4%) females, giving a male to female ratio of 1:1.4 (Table1). There was noted increase in the number of patients demanding endodontic treatment during the study period (Figure 1).

Table 1: Gender distribution of treated patients related to number of teeth treated.

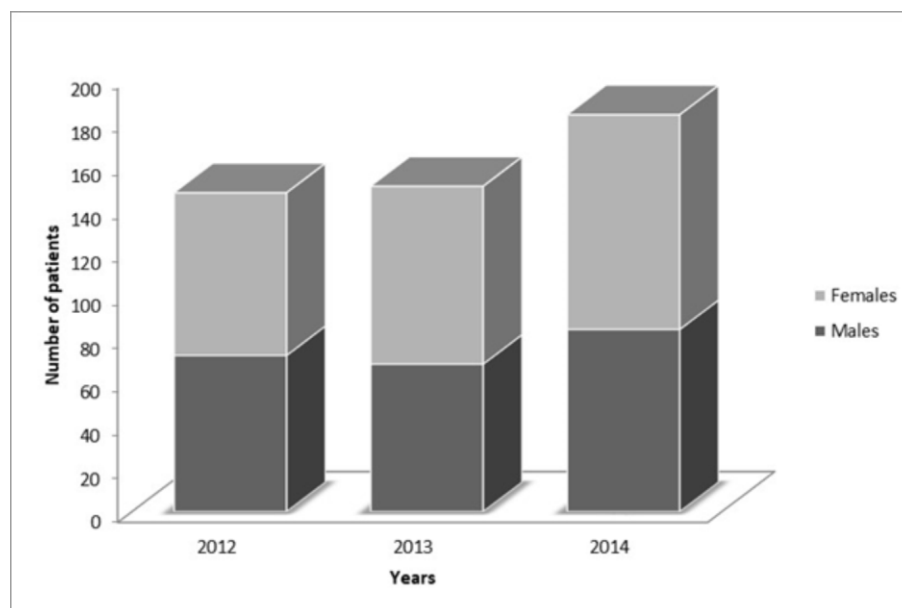| Sex	Patients n(%)	Endodontically treated teeth n(%)
Male	226(46.6)	247(47.3)
Female	259(53.4)	275(52.7)
Total	485(100.0)	522(100.0)

Figure 1: Mode of treatment finance by patients

DISCUSSION

It was observed that the number of patients that underwent root canal treatment was significantly higher than previously reported in Nigeria [4,16]. Also noted was a progressive increase in the number of patients demanding endodontic treatment year on year under review; an indication of patients' desire to retain their teeth in a disease free and functional state.

Over half of the patients encountered in this study were females 259 (53.4%). This is in agreement with most similar studies which also reported a higher demand for endodontic treatment by females.[4,17,19-22] Also, studies suggest that females are more concerned about their oral health and appear to be more motivated to demand oral health care.[4,17,18] However, Oginni et al., reported a higher demand for endodontic treatment by males (54%) in an earlier study in South Western Nigeria.[16]

Majority of patients that underwent endodontic treatment during the study period were in the 20-29 year age range accounting for 219 patients (45.2%). This was followed by patients in the 30-39 year age range. Patients aged 60 and above constituted the least treated group accounting for only 10 patients (2.1%). This result is in agreement with Umanah et al[4] and Augusto et al.,[18] who also reported the highest number of root canal treatment among patients aged 21-29 years. This can be attributed to the high prevalence of dental caries and its complications reported in young adults[23]. Also important is the location of our hospital which is in close proximity to a University with a large student population.

The results showed that the complication of dental caries, notably, irreversible pulpitis was the most frequent indication for endodontic treatment. This is in agreement with the findings from other studies.[6,11,12] This pattern is however in contrast with a study by Saad et al.[24] where necrotic pulp was reported as the most frequent indication for RCT followed by irreversible pulpitis. This is perhaps due to late patient presentation. It has been reported that many patients present only after experiencing pain or in advanced stage of dental disease.[17] This highlights the need for more concerted efforts at oral health education and promotion. In addition, preventive measures especially in children and young adults need to be emphasized since caries and its sequelae appear to be more common in the younger age group[4].

In this study, posterior teeth 338 (64.8%) were more frequently treated than anterior teeth 184(35.2%). The mandibular first molar 96 (18.4%) was found to be the most frequently treated tooth followed by the maxillary central

incisor 91(17.4%) and second premolar 60(11.5%). This result is similar to findings in several studies[3,6,25,26].This pattern is however at variance with reports from previous Nigerian studies[4,16]where the maxillary central incisor was reported as the most frequently treated tooth. Oginni et al in their study found the maxillary central incisor to account for 29.5% of 234 cases[16]. Umanah et al reported that the maxillary central incisor accounted for 26.6% of 241 cases treated in their study[4]. The mandibular lateral incisors and canines were the least frequently treated teeth accounting for only 3 cases each (0.6%) in this study. This difference may be associated with increasing oral health awareness and the aesthetic importance of anterior teeth to the studied population. Results from our study also reflect the desire of patients to retain posterior teeth that are necessary for optimal masticatory efficiency. Another reason that could account for this pattern is the susceptibility to caries activityof the mandibular first molar due to early eruption and peculiar anatomical features.[6,25]

Endodontic treatment was more frequently carried out in maxillary teeth than mandibular teeth. This pattern is similar to other studies [4,16,26,27]. Umanah et al., and Al-Negrish reported that maxillary teeth were treated in 65.1% and 77.7% of patients treated in a Nigerian and Jordanian subpopulation respectively[4,27]. In contrast, a study at the Baltimore College of Dental Surgery, Baltimore, USA, demonstrated an approximately equal distribution between maxillary and mandibular teeth[24]. Treatments were mostly completed in multiple visits 439(84.1%) as opposed to single visits 83(15.9) in this study.

Although patterns seem to be changing in our environment with regards to health seeking behaviour, oral health awareness remains sub optimal[4]. In addition, financial reasons are one of the key barriers to receiving oral health care such as endodontic treatment.[28] These barriers contribute to avoidable tooth mortality.[28] In this study, a total of 279 (57.5%) patients had their treatments covered by the National Health Insurance Scheme (NHIS) (Table 6). This may account for the high demand for endodontic treatment in this study when compared to similar Nigerian studies. This scheme covers a variety of dental procedures including endodontic treatment. The NHIS serves as a means of limiting out of pocket payments which may constitute a heavy financial burden on patients requiring dental treatment. Although, there was a steady increase in the number of patients using the NHIS option rather than the out of pocket payment in
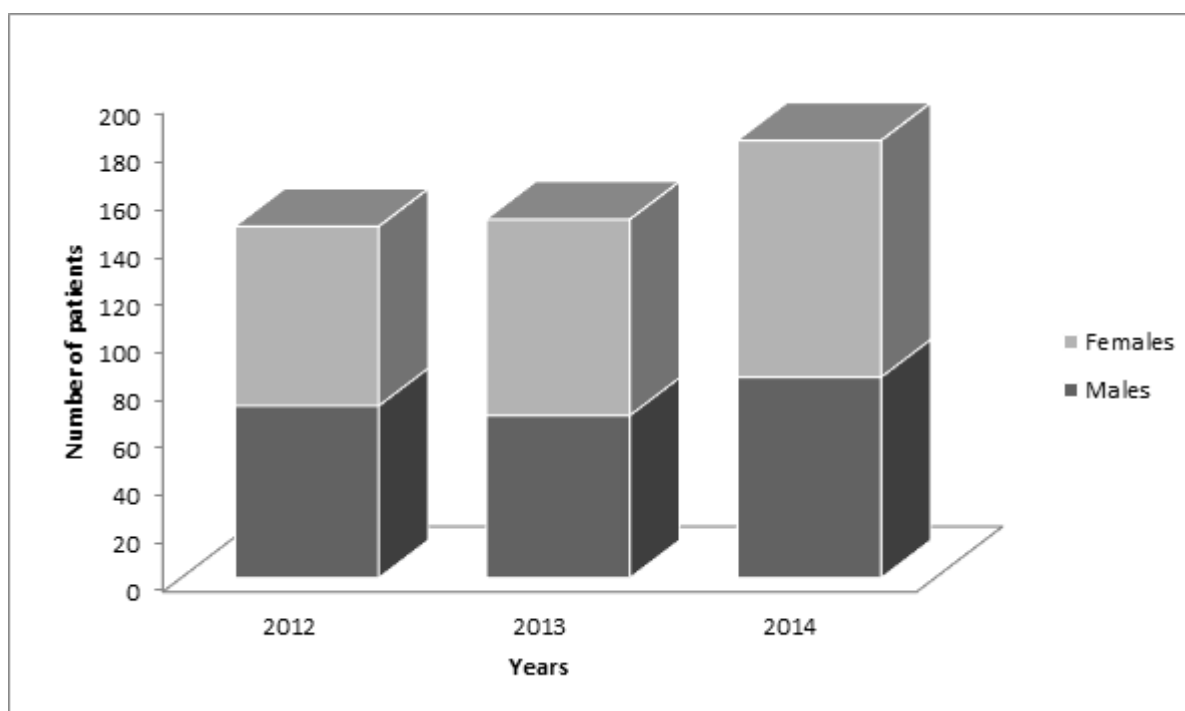
Figure 2: Gender distribution related to study period.

Table 2: Pattern of demand for endodontic treatment related to age and gender.

Age (years)	Male	Female	Total n (%)
10-19	27	13	40(8.2)
20-29	91	128	219(45.2)
30-39	57	62	119(24.5)
40-49	28	33	61(12.6)
50-59	17	19	36(7.4)
≥60	6	4	10(2.1)
Total	**226(46.6)**	**259(53.4)**	**485(100.0)**

Table 3: Indication for endodontic treatment

Diagnosis	Frequency (n)	Percent (%)
Trauma	62	11.9
Irreversible pulpitis	253	48.4
Acute apical periodontitis	139	26.6
Dento-alveolar abscess	25	4.8
Periapical cyst	11	2.1
Perio-endo lesion	2	0.4
Iatrogenic	3	0.6
Failed RCT	27	5.2
Total	**522**	**100.0**

Table 4: Endodontic treatment pattern in different age groups

Location/Tooth Type	Age (years)						Total n(%)
	10-19	20-29	30-39	40-49	50-59	≥60	
Maxillary							
Central incisors	13	40	21	11	5	1	91(17.4)
Lateral incisors	4	14	15	9	3	-	45(8.6)
Canines	-	13	5	3	4	-	25(4.8)
First premolars	-	16	14	8	6	2	46(8.8)
Second premolars	3	33	11	8	2	3	60(11.5)
First molars	4	13	12	6	3	-	38(7.3)
Second molars	2	13	6	2	4	-	27(5.2)
Total	**26(5.0)**	**142(27.2)**	**84(16.1)**	**47(9.0)**	**27(5.2)**	**6(1.1)**	**332(63.6)**
Mandibular							
Central incisors	-	10	3	3	1	-	17(3.3)
Lateral incisors	-	2	1	-	-	-	3(0.6)
Canines	-	1	1	1	-	-	3(0.6)
First premolars	-	8	4	2	3	-	17(3.3)
Secondpremolars	1	4	2	-	2	-	9(1.7)
First molars	15	45	20	9	4	3	96(18.4)
Second molars	6	19	9	5	4	2	45(8.6)
Total	**22(4.2)**	**89(17.0)**	**40(7.7)**	**20(3.8)**	**14(2.7)**	**5(1.0)**	**190(36.4)**

Table 5: Distribution of tooth type related to number of treatment visits

Location/Tooth Type	Single Visit n(%)	Multiple visits n(%)	Total n(%)
Maxillary			
Central incisors	22	69	91(17.4)
Lateral incisors	10	35	45(8.6)
Canines	7	18	25(4.8)
First premolars	9	37	46(8.8)
Second premolars	14	46	60(11.5)
First molars	1	37	38(7.3)
Second molars	-	27	27(5.2)
Total	**63(12.1)**	**269(51.5)**	**332(63.6)**
Mandibular			
Central incisors	6	11	17(3.3)
Lateral incisors	1	2	3(0.6)
Canines	2	1	3(0.6)
First premolars	5	12	17(3.3)
Second premolars	4	5	9(1.7)
First molars	2	94	96(18.4)
Second molars	-	45	45(8.6)
Total	**20(3.8)**	**170(32.6)**	**190(36.4)**

Table 6: Health financing of patients

Health Financing	Frequency (n)	Percent (%)
Self	195	40.2
NHIS	279	57.5
Retainer	11	2.3
Total	**485**	**100.0**

the years under review; it is important to expand the population currently covered by the NHIS to limit unnecessary tooth loss due to financial constraints.

CONCLUSION

More females and patients within the 20-29 age group demanded endodontic treatment in this study. Among the patients, irreversible pulpitis was the major indication for treatment while the maxillary teeth were the most frequently treated but the mandibular first molar was the most endodontically treated tooth. Along with patient education, prevention and early treatment of dental caries; the NHIS will limit the financial burden of patients seeking endodontic treatment.

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