FACTORS INFLUENCING PATIENTS' CHOICE OF TREATMENT FOR A TOOTH WITH IRREVERSIBLY DAMAGED PULP.

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ABSTRACT

Dental caries is a post eruptive pathologic process of bacterial origin involving the dissolution of dental hard tissues with resultant cavity formation and it may progress to irreversible pulpitis and apical periodontitis. The options for managing involved teeth include pulp therapy and tooth extraction. Despite the high success rates recorded in endodontically treated teeth however, some patients still opt for extraction of such teeth rather than retain them. The aim of this study was to determine the factors that influencethe patient's decision to extract or retain their teeth as well as to determine what influenced the dentist's decision to extract or retain these teeth.

This cross-sectional study was conducted at the Lagos University Teaching Hospital, Surulere, Lagos State University Teaching Hospital, Ikeja, Federal Medical Centre, Ebute Metta and Randle General Hospital, Surulere, Lagos state. The subjects for the study were recruited from patients attending the oral diagnosis clinic of each of the hospitals after a diagnosis of irreversible pulpitis or acute apical periodontitis was made. A structured interviewer administered questionnaire was used for data collection. Less than half (43.8%) of the sample were males. About 66% of participants had a tertiary level of education while only 27.69% of them were in a highly skilled occupation.

Most of the respondents opted for extraction (75.4%) rather than root canal treatment (RCT) and the main reason for treatment choice was the instruction given by the Dentist. Over 26% of the participants stated that the attending Dentist did not inform them about the treatment option of RCT. Male respondents, patients with tertiary education and those with health insurance were more likely to opt for root canal treatment even though the association was not significant. The condition of the tooth at diagnosis was the only significant factor that influenced the choice of treatment selected by the dentist. (p=0.000) Adequate education of the populace on the procedure and prognosis of root canal is required to reverse this trend. Patients should be actively involved in their treatment planning process.

Key Words: Dental Caries; Root Canal Treatment; Tooth Extraction.

INTRODUCTION

Dental caries is a post eruptive pathologic process of bacterial origin involving the dissolution of dental hard tissues with resultant cavity formation.

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It is a dynamic process involving both de-mineralization and re-mineralization. If left unattended dental caries could involve pulpal tissues in affected teeth causing pain. This is the point at which most patients present at the dental clinic complaining of toothache and wanting a lasting solution to alleviate the pain. There are several options for managing such teeth including pulp therapy and tooth extraction. Routine extraction is inexpensive and fast with an excellent prognosis for healing. Other reasons given to account for such extractions include periodontal disease, orthodontic treatment, trauma, and prosthetic procedures.[1-3] However, there are possible aesthetic and functional concerns associated with extraction such as adjacent tooth migration and an interrupted or shortened dental arch, [4,5] impact on the quality of life, [6] as well as the added costs and time for replacement. Preservation of teeth has been the treatment of choice and a fundamental principle of dentistry. In contrast, the extraction of natural teeth has been considered undesirable because of the often limited long-term success of the alternate prosthodontic replacements.[7]

Endodontics is the branch of clinical dentistry concerned with the prevention, diagnosis and treatment of diseases of the dental pulp and their sequelae. Root canal therapy (RCT) also known as endodontic treatment is the complete removal of an irreversibly damaged pulp, cleaning, shaping and finally obturation of the root canal space. The objective of endodontic treatment is to preserve the tooth as a functional unit within a functioning dentition. The concept of treating the dentition as a functioning unit is in conflict with traditional dental practice in which the tooth, rather than the dentition, is often the focus of concern.[8]Root canal therapy has gained popularity since the 1960's and is an alternative to extraction of teeth with irreversibly damaged pulp. The decision to extract, versus endodontically restore, a natural tooth depends on the quality of support the tooth will provide for planned restorations, predicted longevity, and its role in the overall rehabilitation, functionally, aesthetically, and financially.[11] The prognosis of endodontic therapy for apical periodontitis is good- the chances for complete healing are reasonably high, and the chances for the tooth remaining

asymptomatic and functional over time are truly excellent, provided that the tooth is promptly and well restored. [10]

Despite the high success rates recorded in endodontically treated teeth however, some patients still opt for extraction of such teeth rather than retain them. Patients may be unaware of the procedure and may not be adequately informed about the process by the attending dentist. Similarly, some patients may decline to undergo this procedure even though they are aware of it if they believe it is significantly more expensive than routine extraction. In addition, some dentists would rather extract than retain such teeth and thus influence the patient's choice of treatment. An understanding of the reasons why teeth are extracted is essential to improve oral health outcomes.By recognising the main causes and predictors for tooth loss, it may be possible to limit future extractions and highlight the crucial role of prevention.

There is a dearth of published literature in Nigeria exploring the factors that make patients to opt for extraction rather than root canal treatment. The aim of this study therefore, was to determine what influences the patient's decision to extract or retain their teeth and to determine what influenced the dentist's decision to extract or retain these teeth.

MATERIALS AND METHODS

This cross-sectional study was conducted at the Lagos University Teaching Hospital, Surulere, Lagos State University Teaching Hospital, Ikeja, Federal Medical Centre, Ebute Metta and Randle General Hospital, Surulere, Lagos state.

Sample size

The sample size (n) calculation was based on the size of the population (N), the proportion of the population expected to choose one of two responses (P= 0.5 to allow for the maximum variance), the assumed sampling error (C= 0.05), and the Z statistic of the confidence interval (Z = 1.96 for 95% confidence level):

$n = ((N)(P)(1-P)) / ((N-1)(C/Z)2 + (P)(1-P))$

$= 94.$

A total of 130 respondents were however recruited from all the centers.

Sample selection

The subjects for the study were recruited from patients attending the oral diagnosis clinic of each of the hospitals after a diagnosis of irreversible pulpitis or acute apical periodontitis had been made. A simple random sampling technique was utilized using the attendance register as the sampling frame and patients that met set inclusion and exclusion criteria were recruited into the study. The dentists who attended to the subjects at the Oral diagnosis unit were also interviewed. A total of 130 questionnaires were administered during the study on subjects and the dentists who attended to them.

Inclusion and exclusion criteria

Included in the study were patients who had a clinical and radiographic diagnosis of either irreversible pulpitis or periapical periodontitis.

-Patients who were 18 years old and above and were willing to give their informed consent.

-Patients who were scheduled for RCT

-Patients who were scheduled for tooth extraction.

Those who were unwilling to give their informed consent, paediatric patients, those who had any severe medical condition that contraindicated RCT were excluded.

Data collection

A structured interviewer administered questionnaire was used for data collection. The questionnaire consisted of questions on socio-demographic items including sex, age, and level of education, as well as their dental history. The dental history of the respondents and their clinical diagnosis was also obtained as well as the reasons why they opted for the treatment choice they selected. Demographic data as well as the reasons for the treatment plan of the attending dentist was similarly documented.

Data analysis

Data collected was analyzed using SPSS (Statistical package for social sciences) for Windows (version 18, Chicago, IL) statistical software package. Frequency distribution tables were generated for all variables and measures of central tendency and dispersion were computed for numerical variables. Likewise, descriptive statistics including

means, standard deviations, and percentages were used to summarize the demographic variables and health-related behavior of the study sample. The Chi square test was used to determine the level of association between variables. A 95% confidence interval and a 5% level of significance was adopted.

RESULTS

Of the questionnaires administered to the 130 selected patients and the dentists who attended to them, less than half (43.8%) of the sample were males. About 66% of participants had a tertiary level of education while only 27.7% of them were in a highly skilled occupation. **(Table 1).**

Table 1: Socio-demographic and clinical characteristics of the patients.

		Frequency	Percentage (%)
Age range (years)	10-19	14	10.8
	20-29	52	40.0
	30-39	26	20.0
	40-49	17	13.1
	50-59	13	10.0
	60-and above	8	6.2
Gender	Male	57	43.8
	Female	73	56.2
Tribe	Hausa	5	3.8
	Others	25	19.2
	Ibo	39	30.0
	Yoruba	61	46.9
Education	None	0	0.0
	Primary	12	9.2
	Secondary	32	24.6
	Tertiary	86	66.2
Occupation	Highly Skilled	36	27.7
	Semi-Skilled	50	38.5
	Unskilled	44	33.8
Total		**130**	**100.0**

Table 2 shows that a greater percentage (63.8%) had previously visited the dentist and that the major reason for their present dental visit was toothache. (86.9%) Most of the respondents opted for extraction (76.9%) rather than root canal treatment and the main reason for treatment choice was the instruction given by the Dentist (53.1%). Over 26% of the participants stated that the attending Dentist did not inform them about the option of RCT.

Table 2: Dental history of respondents.

		n	%
Have you ever visited a Dentist?	Yes	83	63.8
	No	47	36.2
Why did you visit the dentist today?	Toothache	103	86.9
	Routine check up	3	2.3
	Swelling	7	5.4
	Others**	7	5.4
Clinical Diagnosis	Irreversible pulpitis/Apical periodontitis	99	76.2
	Localised Periodontitis	17	13.1
	Dento-alveolar abcess	7	5.4
	Others	7	5.4
What treatment did you opt for?	Root canal	30	23.1
	Extraction	100	76.9
Mode of payment	Health insurance	6	4.6
	Employer pays	4	3.1
	Self-payment	120	92.3
Were you told of other treatment options?	Yes	95	73.1
	No	35	26.9
Why did you choose this treatment option?	Cost	37	28.5
	Dentist told me	69	53.1
	Convenience	18	13.8
	Similar past experience	6	4.4
Total (each Subsection)		**130**	**100.0**

**Other Reasons included fractured teeth or tooth wear.

Table 3 shows the association of between some of the socio-demographic characteristics of the respondents and their clinical diagnosis. Irreversible pulpitis and apical periodontitis was significantly more prevalent in theyounger respondents than in the elderly. (p=0.001) There was however no significant association between the gender and educational qualification of the respondents and their clinical diagnosis.

Table 3. Reasons for dental treatment by age, gender and education level.

		Irreversible pulpitis/Apical periodontitis	Periodontitis	Dento-alveolar Abcess	Other Reasons	χ^2	P value
		n (%)	n (%)	n (%)	n (%)		
Gender	Male	40 (30.8)	7(5.4)	4(3.1)	6(4.6)	4.852	0.088
	Female	59(45.4)	10(7.7)	2(1.5)	2(1.5)		
Age group in year	10-19	10(7.7)	0 (0)	0 (0)	1(0.77)	28.555	0.001*
	20-29	45(34.6)	2(1.5)	2(1.5)	3(2.3)		
	30-39	18(13.8)	5(3.8)	2(1.5)	1(0.77)		
	40-49	15(11.5)	1(0.77)	1(0.77)	0 (0)		
	50-59	6(4.6)	5(3.8)	1(0.77)	1(0.77)		
	60-and above	2(1.5)	4(3.1)	0 (0)	2(1.5)		
Education level	Primary	7(5.4)	4(3.1)	1(0.77)	0 (0)	7.515	0.111
	Secondary	23(17.7)	3(2.3)	4(3.1)	2(1.5)		
	Tertiary	69(53.1)	10(7.7)	1(0.77)	6(4.6)		
	Total (each Subsection)	**99**	**17**	**6**	**8**		

*Significant

**Other Reasons included fractured teeth or toothwear.

Table 4 displays the association between some demographic and dental characteristics of the patients and their choice of treatment. Female respondents, patients with tertiary education and those with health insurance were more likely to opt for root canal treatment even though the association was not significant. There was however a significant association between the adequacy of information received from the dentist (p=0.004) and the type of treatment received. Likewise, history of previous dental treatment (p=0.044); the treatment the dentist recommended (p=0.000); and the option of RCT was offered (p=0.004) were significantly associated with treatment choice. There was no significant association between treatment option and the level education, gender and the mode of payment.

Table 4: Factors that influence patient's choice of dental treatment.

		Extraction	Root Canal Treatment	X^2	P value
		n (%)	n (%)		
Gender	Male	45(34.6)	12(9.2)	0.234	0.628
	Female	55(42.3)	18(13.9)		
Education	Primary	10(7.7)	2(1.5)	1.930	0.381
	Secondary	27(20.8)	5(3.8)		
	Tertiary	63(48.5)	23(17.7)		
Adequate Information from Dentist	Yes	67(51.5)	28(21.5)	8.134	0.004*
	No	33(25.5)	2(1.5)		
Previous Dental Treatment	Yes	14(10.8)	9(6.9)	4.057	0.044*
	No	86(66.2)	21(16.1)		
Dentist Recommended treatment	Yes	59(45.4)	3(2.3)	22.210	0.000*
	No	41(31.5)	27(20.8)		
Option of RCT was given	Yes	67(51.5)	28(21.5)	8.134	0.004*
	No	33(25.5)	2(1.5)		
Payment option	Health Insurance	3(2.3)	3(2.3)	5.363	0.147
	Employer	4(3.1)	0 (0)		
	Out of pocket	93(71.5)	27(20.8)		
Total (each Subsection)		**100**	**30**		

Table 5 shows some the factors that influence the dentist's recommended choice of treatment. The dental professional's recommended treatment was not significantly influenced by the location of his practice, the doctor's age and the patients underlying medical condition even though dentists aged 46 years and above and working at Randle GH or LASUTH were more likely to recommend RCT.The condition of the tooth at diagnosis was the only significant factor that influenced the choice of treatment selected by the dentist. (p=0.000) Teeth deemed to have poor prognosis by the attending dentist as well as patients who were deemed to be unable to afford RCT were referred for extraction.

Table 4: Factors that influence patient's choice of dental treatment.

		Extraction	Root Canal Treatment	X^2	P value
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	No	86(66.2)	21(16.1)		
Dentist Recommended treatment	Yes	59(45.4)	3(2.3)	22.210	0.000*
	No	41(31.5)	27(20.8)		
Option of RCT was given	Yes	67(51.5)	28(21.5)	8.134	0.004*
	No	33(25.5)	2(1.5)		
Payment option	Health Insurance	3(2.3)	3(2.3)	5.363	0.147
	Employer	4(3.1)	0 (0)		
	Out of pocket	93(71.5)	27(20.8)		
Total (each Subsection)		**100**	**30**		

DISCUSSION

The present study describes the treatment choice of patients that require extraction or root canal treatment and the factors that influence the decision. The study subjects were a group of patients who were deemed to require either treatment based on their clinical presentation. Majority of the study participants were females, with tertiary education and aged between 20-29 years. Most of the respondents presented in the dental clinic with toothache. This corroborates the report of Ekanayake et al[12] that dental pain is a significant predictor of the utilization of dental services. Regrettably, toothache, whether of periodontal or of carious origin is a symptom of advanced dental disease and is a pointer to poor access to dental care, either for preventive care or therapeutic management.

Dental caries and its sequelae was reported to be the most frequent reason for tooth extraction. Majority of the respondents in this study, who were below 40 years of age had more teeth extracted due to dental caries compared to those who were above 40 years of age. This is consistent with a study conducted in Scotland where the proportion of extractions attributed to periodontal disease increased from age 31–60years.[13] Likewise, this finding was is in agreement with similar studies in developing countries which show that dental caries accounts for a greater proportion of teeth extracted. [14,15] Surveys from developed countries however report a decline in tooth extraction due to dental caries.[16,17] In countries where there are adequate preventive measures, periodontal disease has been observed to be the main reason for extraction in the elderly age group while extractions for orthodontic reasons is common in young populations. This could possibly be due to access to fluoride and qualitative preventive dental services. The concept of dental home should be widely adopted in developing countries while part of the limited resources available for oral health should be appropriately channelled towards health promotion and preventive services.

In this study, only 23.1% of the participants opted for RCT. This was despite the fact that a greater percentage of teeth extracted were due to irreversible pulpitis/periapical periodontitis

indicating that there was no absolute indication for tooth extraction. This shows that a high percentage of teeth are still being extracted due to dental caries and its sequelae when they could have undergone RCT. An exploration of the factors that make patients to choose tooth extraction rather than RCT shows that this choice was significantly associated with adequate information by the attending dentist.

Most patients offered the option of RCT chose the procedure. Meanwhile, researchers had reported that patients usually opt for extraction of teeth due to inadequate information on the time involved in root canal treatment, misinformation on the details of the procedure, lack of confidence that root canal treatment is likely to be successful and the total cost involved.[18] As a result of these, adequate education of the populace on the procedure and prognosis of root canal is required to reverse this trend. Likewise, patients should be actively involved in their treatment planning process. On the other hand, dentists should update their skills in RCT so that they can have a higher success rate thereby improvingtheir patient's confidence.

Similarly, patients that have had a previous dental procedure were more likely to opt for RCT. Positive interactions with patients in a painless and friendly environment may likely improve the confidence and trust of the patient in the practitioner and to undergo RCT which they view as a lengthy and more costly procedure. Even though the payment option was not significantly associated with the choice of treatment, the fewer number of patients that had health insurance preferred RCT to extraction. Locker et al [19] had reported that patients with a low income level and those without dental insurance were more likely to report financial barriers to dental care.Improved access to dental care through the provision of primary oral health care services and universal health insurance coverage for basic dental care could aid in removing this crucial barrier to dental services. However, since the sample of respondents that had health insurance was not large enough, conclusive inferences cannot be made from this variable.

This study also explored the factors that influenced the dentist's choice of dental

treatment for their patients. There was no significant influence of the dentist's age and location of practice on the treatment recommended. Practitioners were however more likely to recommend teeth for extraction if they deemed the patient was unable to afford RCT or if they believed the tooth had a poor prognosis. This was however at variance with the reasons given by the patients including the treatment being expensive because they were not presented with a proper cost-benefit analysis. Adequate information on the long term benefit of an endodontically retained toothcompared with the additional cost of prosthetic replacement of extracted teeth may have motivated patients that opted for extraction to retain their teeth.

There are some limitations associated with this study. It was exclusively done in public hospitals and thus its findings cannot be widely applied to patients that attend private clinics. Similarly, there were few patients in this study that had access to health insurance. This important variable could possibly have resulted in a higher percentage of respondents opting for RCT. Extraction of the tooth is a valid treatment if endodontic therapy is not applicable or where endodontics would succeed, but successful completion of the treatment plan is impossible because of periodontal or restorative issues.[20] With proper case selection however, there will be a significant reduction in the number of salvageable teeth that are extracted.

CONCLUSION

Within the limitations of this study, the responses of surveyed patients reflected that patients opted more for tooth extraction rather than root canal treatment. Patients decision was based on the adequacy of information received from the dentist, option of RCT was given and experience from previous dental treatment. Dentists were also likely to refer patients for extraction if they felt that the patient could not afford RCT. The findings emphasised the need to reverse the trends in the number of extractions carried out.There should be a strategy change to a focus on health promotion and prevention and patients should be adequately informed on the benefits of RCT after offering them the choice. There is also a need to empower patients to overcome the cost barrier possibly through adequate coverage of health insurance for oral health services.

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