

Sociodemographic determinants of Oral Health-Related Quality of Life among patients on root canal treatment

Running Title: OHRQoL among RCT patients

ABSTRACT

Introduction

Several factors (sociodemographic determinants) directly affect the Oral Health-related Quality of Life (OHRQoL) of root canal treatment (RCT) patients like knowledge, attitude, perceptions, age, gender, marital status, smoking and pre-exposure history of RCT. This study determined the sociodemographic determinants of OHRQoL among patients underwent RCT.

Method

This cross-sectional study determining the OHRQoL of patients on RCT was conducted among patients visiting various dental clinics. A self-administered prevalidated questionnaire comprising of four OHRQoL themes was used to collect the data. Statistical Package for Social Science (SPSS) ver. 23.0 was used to analyze the data. One-way ANOVA and independent t-test were used to determine the p-value.

Results

For each theme of the OHRQoL research tool, its association was statistically significant with at least one demographic determinant of the RCT patients. A total of 26.3% of the participants were males and 73.7% were females. Among the RCT patients, 38.5% were single whereas 61.5% were married.

Conclusion

In conclusion, a moderately-good level of OHRQoL was observed among the patients on RCT.

Keywords: Oral Health-related Quality of Life, OHRQOL, root canal treatment, RCT, dentists

INTRODUCTION

RCT can also be known as endodontic treatment or endodontic therapy [4, 8]. It is a procedure done by removing infected, inflamed or damaged dental pulp of a tooth (the core of a tooth) and filling the cleaned (empty) space (root canal) using sterile and antibacterial material. This treatment is done to restore the overall function of the teeth and improve the outer looking of the teeth [3, 6]. The need for RCT is affected by the patient's overall conditions, the severity of the patient's tooth decay and facilities available to the dentist [14]. Many studies have proved that the decision of patients receiving RCT is affected by their level of knowledge, awareness, attitude and general perceptions about RCT [9, 14].

Previous studies had shown that the most important cause that led to RCT is toothache [14]. From the study of Doumani M *et al.* 2017 [15], more than half of the respondents in both genders felt that toothache is the greatest impact factor leading to the need for RCT. Around 68% of the total respondents visited the dentist for proper treatment to relieve toothache. RCT is also needed when the patients have poor oral hygiene care [8]. When there is the presence of a multi-rooted tooth, RCT can be done to reduce the negative effect may happen to the pulp after root amputation [11].

RCT can be done to manage the discoloration of teeth caused by tetracycline staining and calcific metamorphosis. It is considered when there are psychological needs from patients or when external bleaching of teeth is unresponsive [11]. Sometimes, RCT can also be done when there is a presence

of over-denture to prevent abutment teeth [16]. Over-dentures can usually be found in patients above 55 years old [11].

Quality of life (QoL) can be defined with many definitions and carries different meanings based on the condition of an individual [2]. It can be divided into a few parameters to determine the consequences of a treatment. The consequences of a treatment can affect a patient physically, socially and psychologically [24]. Evaluating OHRQoL among RCT patients showed how oral health affects patients' daily life which directly affects their overall QoL [25]. Few studies have been done to identify how oral health usually affects QoL [24-26].

There are some instruments prepared for this purpose like oral health impact profile (OHIP) is an instrument that usually used to identify the impact of oral disease on OHRQoL and geriatric oral health assessment index (GOHAI) which is used as an instrument to measure the patients' oral functional problems [24, 26]. Other than this, the child perceptions questionnaire (CPQ11-14) can also be used as an instrument to measure the impact on children aged from eleven to fourteen years old [24]. Based on the literature review, there is no similar study conducted in Pakistan yet. The studies conducted on RCT are mostly about the perception and awareness of the patients based on this therapy [8, 9, 14, 15, 19] not the determination of overall OHRQoL. Numerous factors directly affect the OHRQoL of RCT patients like knowledge, attitude, perceptions, and various demographic characteristics of the RCT patients like age, gender, marital status, smoking and pre-exposure history of RCT. These all factors certainly affect their OHRQoL causing them to choose a less reliable treatment like teeth extraction and dental implants [11]. To the best of our knowledge, this was the first study in Pakistan evaluating the sociodemographic determinants of overall OHRQoL among RCT patients.

MATERIALS AND METHODS

This was a cross-sectional study used self-administered research instrument to assess the current level of the OHRQoL among RCT patients. Data were collected from the RCT patients visiting registered dentists' clinics who had a license to practice. The convenience sampling method was used and the study instrument was distributed and collected. The study tool was developed after an extensive literature review and purely based on the study objectives. The study tool was tested for face and content validity. All information gathered was strictly confidential. For the demographic characteristics data, questions regarding age, gender, marital status, and smoking history were asked. Each question had its respective score which calculated to have an estimate of overall OHRQoL.

The OHRQoL research tool was comprised of four themes (statements). Like a few previous studies, patients OHRQoL was determined on four different aspects such as physical, psychological, social and pain feelings [24, 32]. Like a Likert scale, four choices such as "Never", "Little", "Moderate" and "Severe" were given to the participants to choose which option best represented their OHRQoL. The study information sheet and consent (either verbal or written) forms were obtained from each participant that agreed to participate, before providing the study tool. Those who were not willing to provide consent were not included in the study and those who had not any pre-exposure to RCT were also excluded from the study.

For parametric data, One-way ANOVA and independent t-test were used and for non-parametric data Pearson Chi-Square / Fisher's Exact Tests were used to determine the p-value. Descriptive data were expressed as frequencies and percentages. SPSS 23.0 with significance set at a *p*-value of ≤ 0.05 was used to analyze data. Internal consistency and reliability of the research tool were determined using Cronbach alphas.

RESULTS

The OHRQoL among RCT patients was measured after they received RCT. This helped in the better determination of the RCT efficiency and effectiveness and the outcome produced after the treatment which could affect overall OHRQoL.

Table 1 represents the demographic information included age, gender, marital status, smoking status, and RCT history.

Table 1. Demographic characteristics of the RCT patients (n=57)

Variables	N	%
Age (in years)		
18-30 years	26	45.6
31-40 years	6	10.5
41-50 years	17	29.8
> 50 years	8	14.1
Gender		
Male	15	26.3
Female	42	73.7
Marital status		
Single	22	38.5
Married	35	61.5
Smoking status		
No	56	98.2
Yes	1	1.8

PHYSICAL THEME

Table 2 represents the OHRQoL among RCT patients against the physical theme. A high percentage of dental patients 40 (70.2%) with RCT history mentioned that they had no problem in eating, speech, and breath after receiving RCT. Their responses are described below.

Table 2. Responses of RCT patients for the physical theme of OHRQoL

Variables	No	Little	Moderate	Severe	P-value
	N (%)	N (%)	N (%)	N (%)	
Age (in years)					
18-30 years	16 (61.5)	8 (30.8)	2 (7.7)	0 (0.0)	
31-40 years	6 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0.566*
41-50 years	12 (70.6)	4 (23.5)	0 (0.0)	1 (5.9)	
> 50 years	6 (75.0)	2 (25.0)	0 (0.0)	0 (0.0)	
Gender					
Male	9 (60.0)	4 (26.7)	1 (6.7)	1 (6.7)	0.294*
Female	31 (73.8)	10 (23.8)	1 (2.4)	0 (0.0)	
Marital status					
Single	10 (45.5)	9 (40.9)	2 (9.1)	1 (4.5)	0.008*
Married	30 (85.7)	5 (14.3)	0 (0.0)	0 (0.0)	
Smoking status					
No	39 (69.6)	14 (25.0)	2 (3.6)	1 (1.8)	0.933*

Yes	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
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*Pearson Chi-Square / Fisher's Exact Test

PSYCHOLOGICAL THEME

Table 3 depicts the OHRQoL among RCT patients against the psychological theme. A high percentage of dental patients 49 (86.0%) with RCT history agreed that they had no problem in confidence, mood, and personality after receiving RCT. Their responses are described below.

Table 3. Responses of RCT patients for the psychological theme of OHRQoL

Variables	No	Little	Moderate	Severe	P-value
	N (%)	N (%)	N (%)	N (%)	
Age (in years)					
18-30 years	21 (80.0)	2 (7.7)	2 (7.7)	1 (3.8)	
31-40 years	6 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0.810*
41-50 years	15 (88.2)	0 (0.0)	2 (11.8)	0 (0.0)	
> 50 years	7 (87.5)	1 (12.5)	0 (0.0)	0 (0.0)	
Gender					
Male	11 (73.3)	2 (13.3)	2 (13.3)	0 (0.0)	0.220*
Female	38 (90.5)	1 (2.4)	2 (4.8)	1 (2.4)	
Marital status					
Single	18 (81.8)	1 (4.5)	3 (13.6)	0 (0.0)	0.396*
Married	31 (88.6)	2 (5.7)	1 (2.9)	1 (2.9)	
Smoking status					

No	49 (87.5)	2 (3.6)	4 (7.1)	1 (1.8)	<0.001*
Yes	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	

*Pearson Chi-Square / Fisher's Exact Test

UNDER PEER REVIEW

SOCIAL THEME

Table 4 demonstrates the OHRQoL among RCT patients against the social theme. A high percentage of dental patients 53 (93.0%) with RCT history agreed that RCT did not cause intimacy and communication problems. Their responses are described below.

Table 4. Responses of RCT patients for the social theme of OHRQoL

Variables	No	Little	Moderate	Severe	P-value
	N (%)	N (%)	N (%)	N (%)	
Age (in years)					
18-30 years	23 (88.5)	1 (3.8)	1 (3.8)	1 (3.8)	0.952*
31-40 years	6 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	
41-50 years	16 (94.1)	0 (0.0)	1 (5.9)	0 (0.0)	
> 50 years	8 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	
Gender					
Male	13 (86.7)	1 (6.7)	1 (6.7)	0 (0.0)	0.281*
Female	40 (95.2)	0 (0.0)	1 (2.4)	1 (2.4)	
Marital status					
Single	20 (90.9)	1 (4.5)	1 (4.5)	0 (0.0)	0.504*
Married	33 (94.3)	0 (0.0)	1 (2.9)	1 (2.9)	
Smoking status					
No	52 (92.9)	1 (1.8)	2 (3.6)	1 (1.8)	0.994*
Yes	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	

*Pearson Chi-Square / Fisher's Exact Test

PAIN/DISCOMFORT THEME

Table 5 illustrates the OHRQoL among RCT patients against the pain/discomfort theme. A high percentage of dental patients 32 (56.1%) with RCT mentioned that they had no feelings of pain and discomfort after receiving RCT. Their responses are described below.

Table 5. Responses of RCT patients for the pain/discomfort theme of OHRQoL

Variables	No	Little	Moderate	Severe	P-value
	N (%)	N (%)	N (%)	N (%)	
Age (in years)					
18-30 years	14 (53.8)	9 (34.6)	3 (11.5)	0 (0.0)	0.188*
31-40 years	5 (83.3)	1 (16.7)	0 (0.0)	0 (0.0)	
41-50 years	11 (64.7)	5 (29.4)	0 (0.0)	1 (5.9)	
> 50 years	2 (25.0)	6 (75.0)	0 (0.0)	0 (0.0)	
Gender					
Male	6 (40.0)	6 (40.0)	2 (13.3)	1 (6.7)	0.037*
Female	26 (61.9)	15 (35.7)	1 (2.4)	0 (0.0)	
Marital status					
Single	10 (45.5)	9 (40.9)	2 (9.1)	1 (4.5)	0.324*
Married	22 (62.9)	12 (34.3)	1 (2.9)	0 (0.0)	
Smoking status					
No	32 (57.1)	20 (35.7)	3 (5.4)	1 (1.8)	0.627*
Yes	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	

*Pearson Chi-Square / Fisher's Exact Test

DISCUSSION

The major outcomes of dental care provision are improved OHRQoL and patients' satisfaction [44]. The positive impact of RCT on patients' OHRQoL was noticeably obtained without affecting their own cultural backgrounds. The important OHRQoL domains (themes) that improved after receiving RCT were the physical feeling of pain, psychological discomfort, and disability and relaxing in pain [15]. Evaluation of OHRQoL after receiving RCT can help dental practitioners and patients to understand the impact of RCT better [26].

Physical problems that patients might experience after receiving RCT were difficulty in eating, talking or breathing. From this study, a very high percentage of patients, 70.2% with RCT history mentioned that they did not face any problem physically. In most married patients, 85.7% mentioned that they had no problem in the physical aspects as compared to single patients, 45.5%.

Patients' demographic information such as marital status showed the presence of a relationship with the physical theme of OHRQoL. The *p-value* obtained from the result was found to be 0.008. A statistically significant association was observed. However, other demographic information like age, gender, and smoking status did not show any significance with the physical domain as all the *p-values* found were greater than 0.005.

Another study done by Pasqualini D *et al.* 2016, determined the impact of RCT on the daily activities of the patients. Impairment found in eating, talking and sleeping were measured. Based on the result of their study, no speaking problem was reported by the patients received RCT. The difficulty in eating was found to be affected by the painful feeling experienced by the patient after the treatment. The greater the pain experienced, the more difficult for the patient to eat. [54]

Patients' confidence, mood, and personality may be affected after receiving RCT. However, a very high percentage, 86.0% of patients with RCT history mentioned that they did not face any problem in this psychological aspect. Patients' demographic information like smoking status showed the presence of significance with the psychological domain of OHRQoL as the *p-value* obtained from the results was < 0.001 . Other demographic information such as age, gender, and marital status showed no significance with the psychological domain as the *p-values* were greater than 0.050.

From the study of Krastl G *et al.* 2013, discoloration of the teeth can be observed in most of the root canal treated patients [55]. It was caused by the types of materials used during the procedures of RCT. Although non-staining materials were used, discoloration of the teeth can still be observed. This can greatly affect the patients' psychological theme as the appearance of the discolored tooth may lead to the reduction of confidence level or bad mood [56]. The results of the current study were in contrast with the result of their study.

In our study results, 93.0% (53) of the patients with RCT history agreed that they have no problem in social aspects like intimacy and communication after receiving RCT. However, there was no significant association observed between all the patients' demographic information and the social domain of OHRQoL. The *p-values* found were all greater than 0.050. A similar result was observed in a study of Bhaisare *et al.* 2017 as patients' social disability was improved after receiving RCT. However, no statistical significance was observed with the OHRQoL of patients. [44]

In this study, more than half of the total patients with RCT history, 56.1% (32), mentioned that they did not experience any pain or discomfort after receiving RCT. Significance was seen between patients' gender and the pain/discomfort theme of OHRQoL as the *p-value* obtained was 0.037. However, other demographic information like age, marital status, and smoking status were not showing any significant association as *p-values* found were greater than 0.050.

The result was supported by a study done by Pak and White in 2011 as the prevalence of post-treatment pain was found to be moderate or low while the prevalence of pre-treatment pain was very high. [57] Based on their study results, the severity of pain was greatly reduced just one day after patients received RCT as compared to their pre-treatment conditions. The feeling of pain was further reduced over the days.

In the current study, most female patients, 26 (61.9%) had shown that they did not experience any pain or discomfort after RCT as compared to male patients which only 6 (60.0%) agreed. The result was supported by a study of Richardson and Holdcroft in 2009 as females can tolerate pain better as compared to males. The level of pain threshold in females was believed to be higher when compared to males [58].

CONCLUSION

This study provides insights into the relationship between sociodemographic determinants and overall OHRQoL among RCT patients in Pakistan. Each theme of the OHRQoL research tool was having a significant relationship with some of the sociodemographic variables. Dentists are supposed to take part in more professional activities regarding oral hygiene education and promotion to further improve the overall OHRQoL among RCT patients.

LIMITATIONS OF THE STUDY

This study only was done in selected dentists clinics so the results can not be projected to the entire country. A detailed follow-up study can be done to evaluate the overall OHRQoL and its sociodemographic determinants among RCT patients in Pakistan.

REFERENCES

1. Priya S, Chowdhary D. Knowledge, attitude and practice towards endodontic treatment among patients visiting to a private dental college in patna. *International Journal of Scientific Research*. 2018 Aug;7(8):37-9.
2. Aarthi Iyer A, Nair R, Gupta P, Tavane P.N., Pawar P. Dental patient's knowledge, awareness and attitude towards root canal treatment: a survey based research. *Int J Recent Sci Res*. 2018;9(1):23214-23218.
3. Sisodia N, Yadav S, Nangia T, Singh P, Yadav M, Singh HP. Dental Patients' Knowledge and Attitude towards Endodontics–A Survey. *Journey of Pharmaceutical and Biomedical Science*. 2015;5(01):80-3.
4. Lim KC, Sum CP. Guidelines for root canal treatment. *Singapore dental journal*. 2004 Dec;26(1):60-2.
5. Habib AA, Dormant MD, Al saysd T, Shams E, Heskul M, Abdulrab S et al. Dental patient's knowledge and awareness about root canal treatment in Syrian population: Survey-based research. *IJRSR*. 2017;8:20583-6.
6. Purra AR, Sajad M, Ahangar FA, Farooq R. Patient's Awareness and Knowledge of the Root Canal Treatment in Kashmiri Population: A Survey-based Original Research. *International Journal of Contemporary Medical Research*. 2018;5(7):G12-G15.
7. Doumani M, Habib A, Qaid N, Abdulrab S. Patients' awareness and knowledge of the root canal treatment in Saudi population: survey-based research. *Pain*. 2017;44(52):47.
8. Aarthi Iyer A, Nair R, Gupta P, Tavane P.N., Pawar P. Dental patient's knowledge, awareness and attitude towards root canal treatment: a survey based research. *Int J Recent Sci Res*. 2018;9(1):23214-23218.

9. Ahmed HM, Mohamed H. Elective root canal treatment: A review and clinical update. *ENDO (Lond Engl)*. 2014;8(2):139Y44.
10. Ettinger RL, Krell K. Endodontic problems in an overdenture population. *Journal of Prosthetic Dentistry*. 1988 Apr 1;59(4):459-62.
11. Nuca C, Amariei C, Rusu DL, Arendt C. Oral health-related quality of life evaluation. *OHDMBSC*. 2007;6(1):6-7.
12. Alzoubi EE, Hariri R, Attard NJ. Oral Health Related Quality of Life Impact in Dentistry. *J Dent Health Oral Disord Ther*. 2017;6(6):00221.
13. Hollister MC, Weintraub JA. The association of oral status with systemic health, quality of life, and economic productivity. *Journal of dental education*. 1993 Dec 1;57(12):901-12.
14. Llanos AH, SILVA CG, Ichimura KT, Rebeis ES, Giudicissi M, Romano MM, Saraiva L. Impact of aggressive periodontitis and chronic periodontitis on oral health-related quality of life. *Braz. Oral Res*. 2018;32:e0006.
15. Janczarek M, Cieszko-Buka M, Bachanek T, Chałas R. Survey-Based Research on Patients' Knowledge About Endodontic Treatment. *Polish Journal of Public Health*. 2014 Dec 10;124(3):134-7.
16. Slade GD, editor. *Measuring oral health and quality of life*. Department of Dental Ecology, School of Dentistry, University of North Carolina; 1997.
17. Bhaisare A, Patil A, Warhadpande M, Kalbande A. Evaluation of Oral Health Related Quality of Life and Satisfaction Outcome of Endodontic Treatment in Central India – A Cross Sectional Study. *IOSR-JDMS*. 2017 June;16(6):43-50.
18. Pasqualini D, Corbella S, Alovisi M, Taschieri S, Del Fabbro M, Migliaretti G, Carpegna GC, Scotti N, Berutti E. Postoperative quality of life following single- visit root canal

treatment performed by rotary or reciprocating instrumentation: a randomized clinical trial.

International endodontic journal. 2016 Nov;49(11):1030-9.

19. Krastl G, Allgayer N, Lenherr P, Filippi A, Taneja P, Weiger R. Tooth discoloration induced by endodontic materials: a literature review. Dental traumatology. 2013 Feb;29(1):2-7.
20. Ibiyemi O, Taiwo JO. Psychosocial aspect of anterior tooth discoloration among adolescents in Igbo-Ora, southwestern Nigeria. Annals of Ibadan postgraduate medicine. 2011;9(2):94-9.
21. Pak JG, White SN. Pain prevalence and severity before, during, and after root canal treatment: a systematic review. Journal of endodontics. 2011 Apr 1;37(4):429-38.
22. Richardson J, Holdcroft A. Gender differences and pain medication. Women's Health. 2009 Jan;5(1):79-88.