



Determinants of Oral Health-Related Quality of Life among Patients on Root Canal Treatment

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Authors' contributions

This work was carried out in collaboration among all authors. Authors MZI and SR designed the study, performed the initial statistical analyses and wrote the protocol. Authors MZI, SR and MSI wrote the first draft of the manuscript. Authors MZI and SR managed and refined the analyses. Authors MZI and MSI revised the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Several 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.

Methods: This cross-sectional study determining the OHRQoL of patients on RCT was conducted among patients visiting various dental clinics. A self-administered and validated questionnaire comprising of four OHRQoL themes was used to collect the data. Statistical Package for Social Science (SPSS) ver. 22.0 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

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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.

1. INTRODUCTION

RCT can also be known as endodontic treatment or endodontic therapy [1,2]. 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 [3,4]. 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 [5]. 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 [5,6].

Previous studies had shown that the most important cause that led to RCT is toothache [5]. From the study of Doumani M et al. [7], 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 [9,10].

Quality of life (QoL) can be defined with many definitions and carries different meanings based on the condition of an individual [11]. It can be divided into a few parameters to determine the consequences of treatment. The consequences of treatment can affect a patient physically, socially, and psychologically [12]. Evaluating OHRQoL among RCT patients showed how oral health affects patients' daily life which directly affects their overall QoL [13]. Few studies have been done to identify how oral health usually affects QoL [12-14].

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 [12,14]. 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 [12]. 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 [2,5-7,15] 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 [9]. To the best of our knowledge, this was the first study in Pakistan evaluating the sociodemographic determinants of overall OHRQoL among RCT patients.

2. MATERIALS AND METHODS

This study used a cross-sectional self-administered research instrument to assess the current level of OHRQoL among RCT patients. Data were collected from 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 by the participants. Each question had its respective score which calculated to have an estimate of 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 [12,16]. 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. SPSS23.0 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.

3. 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.

3.1 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.

3.2 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.

3.3 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.

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

Variables	N	%
Age (in years)		
18-30	26	45.6
31-40	6	10.5
41-50	17	29.8
> 50	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

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

Variables	No N (%)	Little N (%)	Moderate N (%)	SevereN(%)	P-value
Age (in years)					
18-30	16 (61.5)	8 (30.8)	2 (7.7)	0 (0.0)	0.566*
31-40	6 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	
41-50	12 (70.6)	4 (23.5)	0 (0.0)	1 (5.9)	
> 50	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)	

*Pearson Chi-Square / Fisher's Exact Test

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

Variables	NoN (%)	LittleN (%)	ModerateN (%)	SevereN (%)	P-value
Age (in years)					
18-30	21 (80.0)	2 (7.7)	2 (7.7)	1 (3.8)	0.810*
31-40	6 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	
41-50	15 (88.2)	0 (0.0)	2 (11.8)	0 (0.0)	
> 50	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

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

Variables	NoN (%)	LittleN (%)	ModerateN (%)	SevereN (%)	P-value
Age (in years)					
18-30	23 (88.5)	1 (3.8)	1 (3.8)	1 (3.8)	0.952*
31-40	6 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	
41-50	16 (94.1)	0 (0.0)	1 (5.9)	0 (0.0)	
> 50	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

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

Variables	NoN (%)	LittleN (%)	ModerateN (%)	SevereN (%)	P-value
Age (in years)					
18-30	14 (53.8)	9 (34.6)	3 (11.5)	0 (0.0)	0.188*
31-40	5 (83.3)	1 (16.7)	0 (0.0)	0 (0.0)	
41-50	11 (64.7)	5 (29.4)	0 (0.0)	1 (5.9)	
> 50	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

4. DISCUSSION

The major outcomes of dental care provision are improved OHRQoL and patients' satisfaction [17]. 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 [7]. Evaluation of OHRQoL after receiving RCT can help dental practitioners and patients to understand the impact of RCT better [14].

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. [18], 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.

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. [19], discoloration of the teeth can be observed in most of the root canal treated patients. 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 [20]. 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 Bhasare A et al. [17] as patients' social disability was improved after receiving RCT. However, no statistical significance was observed with the OHRQoL of patients.

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 JG and White SN [21] as the prevalence of post-treatment pain was found to be moderate or low while the prevalence of pre-treatment pain was very high. 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, 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 [22].

5. 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.

6. LIMITATIONS OF THE STUDY

This study only was done in selected dentists' clinics so the results cannot 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.

CONSENT

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.

ETHICAL APPROVAL

It is not applicable.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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