Factors influencing the treatment options for single missing tooth: A patient preference-based study

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ABSTRACT

Objective: To determine factors affecting the patients decision for selecting a particular treatment option for replacement of single missing tooth

Study Design: Descriptive analytical study.

Place and Duration: Department of Prosthodontics, Altamash institute of dental medicine, Karachi, from 15 June'2019 to 14 December'2019.

Methodology: All new patients attending dental OPD in the age group of 18-60 years with only single missing tooth were included in the study. A well-constructed and validated Performa was used to evaluate patient's decision for three different types of prosthesis against different influencing factors including, cost, pain and discomfort, duration, dental phobia, damage to the adjacent teeth and number of visits.

Results: Out of the total 397 patients mostly were from 40-50 years with 56.2% males and 43.8% were females. Majority of the participants preferred fixed partial dentures (59.2%) as compared to removable partial dentures (24.4%), dental implants (9.1%) and (7.3%) preferred no treatment option. Cost of treatment (90.9%) was the most common factor in choosing a particular prosthesis majorly with dental implants and fixed partial dentures.

Conclusion: The replacement of missing tooth is based on multiple factors amongst fixed partial denture, removable partial denture and dental implants, among which duration of treatment and cost are the most common influencing factors considered by the patient. Additionally, patient's education and awareness level did affect the choice of treatment options.

Keywords: Cost, Dental implants, Dental phobia, Fixed partial denture, Pain and suffer, Single missing tooth

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INTRODUCTION

Tooth loss is physically and psychologically a traumatizing experience and it has a serious impact on the quality of life of an individual. The two most common reported causes of tooth loss are dental caries and periodontal problems; others are accidental trauma, endodontic complications and congenitally missing teeth[1,2]. Maintenance of oral health is very important though neglected to the point where only emergency treatment is pursued for pain relief and by that point, the only option left is to extract that painful tooth, leaving a gap behind and making the individual partially edentulous. This is probably due to the lack of awareness of the consequences of missing teeth and financial constraints as restorative treatment is expensive[3,4]. This also corresponds to a study by Samuel AR et al in which the patients neglected treatment as 70% of them felt it was expensive and 94% were unaware of the consequences of missing teeth[5]. In a study by Shetty M et al, 33.5% reported treatment to be expensive, 24% reported lack of time and 22% did not feel any need to replace a missing tooth[6].

Several treatment options are available to restore a single missing tooth which are broadly categorized under two main domains: fixed and removable prosthodontics[7]. "Fixed

prosthodontic treatment includes conventional Fixed partial dentures, Cantilevered fixed dental prosthesis, resin bonded fixed dental prosthesis or implant supported fixed dental prosthesis. Each option has its merits and demerits along with particular indications[8].

Timely restoration of edentulous spaces is needed to prevent the adverse consequences of tooth loss. The choice of the prosthesis for replacing a single missing tooth is determined by various factors, such as; age, gender, socio economic status, individual patient's condition (medical or psychological), location of the tooth in the arch, quality of ridge and alveolar bone, empirical evidence of outcomes of treatment, experience and expertise of clinicians and patient's preference[7,9]. Usually, the bias of the dentist plays a role rather than objective assessment of the treatment modalities. Treatment decisions should be made in close consultation with the patients and their expectations should be addressed if they reflect reality[10]. Otherwise, the practitioner will face rejection in their proposed treatment plans as concluded by studies by Shrirao and Nayana, where 82% and 73% of patients rejected the proposed treatment plans in which their desires and requirements were not addressed[11,12]. Therefore, in a nutshell, it is very necessary to address the patient's requirements and desires to ensure the patient's satisfaction.

Various studies have been carried out in which investigators have evaluated the dentists' role in choosing different treatment modalities available for patients with complaints of a single missing tooth but investigators have been ignoring the importance of patients' perception on deciding the choice of treatment for the replacement of a single missing tooth as studies related to patient's decision are reported less in literature[11-14]. Hence, this study was conducted with an objective to determine the factors affecting the patient's decision for selecting a particular treatment option for replacement of single missing tooth.

METHODOLOGY

This descriptive analytical study was carried out from 15 June'2019 to 14 December' 2019 for a period of 6 months on the patients visiting outpatient department (OPD) of Altamash Institute of Dental Medicine and various dental institutes and hospitals of Karachi. The participants were informed about anonymous, voluntary, and non-compulsory nature of the study and prior consent was taken before their participation in the study. The simple random sampling technique was used in this study. All new patients attending dental OPD in the age group of 18-60 years with only single missing tooth were included in the study. Patients having periodontal diseases, smoking habits, debilitating diseases, pregnancy and edentulous spaces at the distal extension base or more than one missing tooth were excluded.

A well-constructed and validated proforma was used for data collection. The internal consistency of items analyzed through Cronbach alpha was (α=0.71). The proforma was divided into two sections; First section addressed the demographic details including age, gender, education level along with the preferred treatment option. The second section consisted of responses related to treatment options patient did not opt along with the factors or reasons that influenced their decision namely cost, pain and suffer, duration, phobia, damage to the adjacent teeth and the number of visits.

Data Analysis: The IBM SPSS version 21.0 was used for statistical analysis. Descriptive analysis was carried out for frequency and percentage calculation while independent T test and Paired T test was used to analyze the effects of age, gender and education with different treatment options. A p-value of (≤ 0.05) was considered statistically significant.

RESULTS

In this descriptive analytical study 397 patients participated. 223 (563.2%) were males and 174 (43.8%) females. Most of the participants, (57.9%) belonged to <40 years of age. Additionally, 207 (52.1%) were graduates and 197 (47.9%) undergraduates. Furthermore, out of 397 participants only 26 (6.5%) were using prosthesis for their missing tooth. When asked about a treatment option that they will opt for replacement, FPD were chosen by 235 (59.2%) participants, RPD by 97 (24.4%), Dental Implants by 36 (9.1%) candidates while no treatment was opted by 29 (7.3%) participants.

Moreover, cost or expense 361(90.9 %) was the most common reason of not choosing a timely and particular treatment option while pain and discomfort was recorded 230(57.9%), duration 64(16.1), compromised dental status such as weak abutment 80(20.1), phobia of dental treatment 96(24.1) and number of visits by 4(6.34%) participants as described in Table-I.

The gender based distribution of treatment options are presented in Table-II, the frequency of FPD, RPD, dental implant and no treatment; opted by male was n=126 (56.5%), n=57(25.5%), n=16(7.1%),n=24(10.7%) while in female n=109 (62.6%, n=40 (22.9%) , n=20(11.4%), n=5 (2.8%). Hence a significant difference was found (p = 0.053).

Table -I: Factors Affecting Treatment Options in Relation to Prosthesis type (N=397)

Reasons of not choosing a particular replacement option	Cost n (%)	Pain and suffer, n (%)	Duration n (%)	Number of visits, n (%)	Damage to the adjacent abutments, n (%)	Phobia n (%)
Fixed partial denture	70 (17.6%)	4 (1.0%)	4 (1.0%)	2 (0.5%)	76 (19.1%)	4 (1.0%)
Dental Implant	278 (70%)	8 (2%)	60 (15.1%)	2 (0.5%)	4 (1%)	5 (1.3%)
Removable partial denture	4 (1%)	214 (53.9%)	0	0	0	75 (18.9%)
Reason of opting No treatment	9 (2.30%)	4 (10%)	0	0	0	12 (3%)
Total	361(90.9%)	230(57.9%)	64(16.1%)	4(6.34%)	80(20.1%)	96(24.1%)

Table-II: Gender based distribution of Prosthetic treatment options, (N=397)

Type of prosthesis	Gender		Total (N)	p value
	Male n(%)	Female n(%)		
Fixed Partial Denture	126 (56.5%)	109 (62.6%)	235	0.05
Removable Partial Denture	57 (25.5%)	40 (22.9%)	97	
Dental Implant	16 (7.1%)	20 (11.4%)	36	
No treatment	24 (10.7%)	5 (2.87%)	29	
Total	223 (100%)	174 (100%)	397	

Similarly, when education level was compared with treatment options such as FPD, RPD, dental implants and no treatment: The frequency in undergraduate was n=100(52.5%), n=61(32.1%), n=4(2.1%) and n=25(13.15) while in graduates n=135(65.2%), n=36(17.3), n=32(15.4%) and n=4(1.9%). Hence, a significant difference (p = 0.020) was seen subsequently as mentioned in Table-III.

Table -III: Education level and treatment option consideration, (N=397)

Type of prosthesis	Education level		Total	P value
	Undergraduate n (%)	Graduate n (%)		
Fixed Partial Denture	100 (52.6%)	135 (65.2%)	235	0.020
Removable Partial Denture	61 (32.1%)	36 (17.3%)	97	
Dental Implant	4 (2.1%)	32 (15.4%)	36	
No treatment	25 (13.15)	4 (1.9%)	29	
Total	190	207	397	

The analysis of treatment options and age < 40 years was also carried out as depicted in Table IV, 40-50 years and > 50 years comparison revealed no significant difference (p= 0.75). The majority 235 participants chosen FPD while RPD by (97) and dental implant (36), no treatment by (29) subsequently.

Table -IV: Comparison of age groups and treatment options, (N=397)

Type of prosthesis	Age			Total (N)	p value
	< 40 years (n)	40-50 years (n)	> 50 years (n)		
Fixed partial denture	145	64	26	235	0.75
Removable partial denture	40	36	21	97	
Dental Implant	24	12	0	36	
No treatment	21	8	0	29	
Total	230	120	47	397	

DISCUSSION

Out of the total 397 patients, 93.5% were new and had no previous experience of any kind of prosthesis. For a single missing tooth, a number of different treatment modalities are present; with each having its own merits and demerits. As in this study, patients were evaluated for three different types of prosthesis against different influencing factors namely cost, pain and suffer, duration, number of visits, compromised abutments and phobias. Our study demonstrated that 59.2% of the participants preferred fixed partial dentures as compared to removable partial dentures (24.4%), dental implants (9.1%) and (7.3%) preferred no treatment option which is in correspondence with a common impression in restorative dentistry is to go for a fixed prosthesis whenever possible[15]. Pommer et al evaluated the advantages of fixed vs. removable dentures and concluded that the majority (54%) of the participants felt that Fixed prosthesis were less annoying in the mouth, 49% were convinced that they were better esthetically, 43% equated fixed dentures with natural teeth in terms of function and 38% said that they did not feel like foreign bodies[16]. Also, a patient rarely accept or desire a removable partial prosthesis as a replacement option for a single missing tooth[15] which is also in agreement with a study by Satpathy et al[17], in which 71.24 % of the total patients expressed discontent with a removable option as a replacement for missing tooth.

In our study, a significant difference was found (p = 0.05) suggesting that gender can be one of the patient factors affecting the decision for the selection of a particular treatment option. As females are more inclined towards their facial esthetics whereas males do not give importance to their appearance much, for them comfort and functionality are prime concerns. Also, it is difficult for them to take out time from their busy schedule as in our study striking 10.7% of the males opted for no treatment as an option which is in accordance with Natarajan et al[18] who concluded that 46.64% male reported lack of time as the primary reason for not opting any treatment. Our results were also in agreement with Al-Quran et al[19] who reported a significant difference (p=0.016) between both the gender in removable partial denture group. Also, in a study by Shrirao et al[11], males opted for the reason "do not feel the need of treatment" more than females; 11.6% as opposed to 5.5%. Ahmed et al[20] also concluded that esthetic rather than functional factors determine an individual's subjective need for the replacement of missing teeth.

In addition to this, the level of education also played a role in opting for a treatment modality. In our study, a significant difference (p = 0.020) was found between education levels in regard to treatment modality chosen which is in accordance with Al-Quran et al[19] who also found significant differences between levels of education with treatment modality chosen (p = 0.024). Acceptance of RPD was also decreased with the level of education (p = 0) in another study by Pommer et al[16]. In our study 42.2% of the undergraduate group either opted for a removable prosthesis or no treatment as an option; a merely 2% opted for implant as an option as compared to graduate ones where only 19% opted for removable or no treatment suggesting the role of education could affect the patient's awareness regarding the options and importance of tooth replacement[17].

On the other hand the analysis of treatment options and age <40 years and 40-50 years and > 50 years the comparison revealed no significant difference (p= 0.75) which is in contrast with a study in which significantly higher percentage of young participants rejected removable dentures (P =0)[18]. Whereas Al-

Quran et al[19] reported no statistically significant differences between age groups and preferred treatment option ($p < 0.05$). When patients were asked about factors affecting their choice of treatment modality overall, cost or expense of the treatment was the most common deciding factor for choosing a particular treatment option (90.9 %), which is in accordance with the research carried out by Samuel et al[5], Shetty et al[6], Nayana et al[12] and Mohapatra et al[21]where 70%, 33.5%, 43.2% and 52% of the participants cited high expenditure as the most determining factor for a particular choice of prosthesis.

Moreover in our study pain and discomfort was accounted as the second most important factor (57.9%) followed by phobia of dental treatment (24.1%), damage to the adjacent abutments (20.1%), duration (16.1%) and the number of visits by (6.34%) participants. These findings corroborated with other studies including Kvale et al[22], who found that 40% of the adult population has been reported to be afraid of dental treatment. Similarly, Shrirao ND et al[11] reported fear of dental treatment as the second most common deciding factor (17.1%) in their study.

Additionally, as far as Fixed dental prosthesis is concerned, damage to the adjacent teeth (19.1%) and cost (17.6%) were reported as the common reasons for not choosing Fixed Partial denture which is in accordance with Mohapatra et al[21] who concluded that 52% of participants in his study had an objection to the cost of FDP. It is a proven fact that fixed dental prosthesis is associated with the risk for additional endodontic treatment and discomfort because of hypersensitivity and difficult access for plaque control[15].

In the case of implant supported prosthesis 70% of the participants reported cost as the most influencing factor affecting its selection followed by duration (15%) which is corroborated in other studies including; Tepper et al[23] who reported that 80% of the participants felt implants were too expensive, whereas 15% complained the time for healing and prosthodontic management was too long. In other investigations conducted by Pommer et al[16] and Satpathy et al[17], high costs were mentioned by 83% and 59% of the total subjects while long treatment time by 16% and 26%. Hence these two factors along with need for surgical procedure are major disadvantages of implant therapy as reported in literatute[16,17,23,24]. Similarly Bragger et al found that the required time span for FPD reconstruction was (3.23±2.64) months though more time was needed for the reconstruction with dental implants (5.94±3.29) months and also concluded that implant reconstruction is cost effective in cases of single-tooth replacement compared with conventional FPD[24,25].

Furthermore, in this study 24% of the participants opted removable dentures as a replacement option for single missing tooth which is in accordance with Al-Quran et al[19] in which 34% of the subjects preferred RPD due to its cost-effectiveness. Contrarily, 53.9% participants reported pain and discomfort while 18.9% reported phobia as a major concern for not selecting removable dentures this prosthesis which is also supported by other from Shetty et al[6], who reported 42.4% subjects with discomfort and pain and Satpathy et al[17] reported 71.24 % participants experiencing pain while wearing single tooth replacing removable dentures.

In our study, only 7.3% opted no treatment, and they reported pain and suffer (10%) as one of the leading cause for it followed by phobia (3%) and high cost of treatment (2.3%) which in contrast with Trepper et al[23] in which 25% felt that replacing missing teeth was only necessary if the gap was visible and with by Shetty et al[6], in which 33.5% reported treatment to be expensive, 24% reported lack of time and 22% did not feel any need to replace the missing tooth[6].

Therefore, in a nutshell it is stated that there are multiple factors that influence the selection of single tooth replacement restorative options which must be put into Consideration during the treatment planning phase as they directly affect the patient's acceptance of a particular option. In addition, patient's knowledge and awareness about the merits and demerits of different treatment options also play an important role in outcome of restoration.

CONCLUSION

The replacement of missing tooth is based on multiple factors amongst fixed partial denture, removable partial denture and dental implants, among which duration of treatment and cost are the most common influencing factors considered by the patient. Additionally, patient's education and awareness level did affect the choice of treatment options.

AUTHOR'S CONTRIBUTION

Ahmed N: Data analysis, Data interpretation, Critical review
Shakoor M: Conceived idea, Designed methodology, Manuscript writing, Literature review
Alavi FB: Manuscript writing, Literature review
Naz A: Critical review, Final review
Masood S: Manuscript writing
Irfan AB: Data collection and Compilation

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