The Relationship between Socio-demographics and the Location of Missing Teeth with Type of Prosthetic Treatment Decisions

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Abstract

Missing teeth can be replaced, either by a fixed bridge or removable partial denture. The objective of this study is to analyze the relationship between socio-demographic status, the location of missing teeth, and patients' decisions related to the type of prosthetic treatment.

This is a cross sectional study of 265 patients` medical records analyzed statistically using SPSS and the chi-square test. The study determined that gender had no significant relationship to the treatment decision (p=0.395). On the contrary, age (p=0.005), occupation (p= 0.000), patient`s motivation (p=0.038), and the location of missing teeth (p=0.000) had significant relationships to treatment decisions. Age, occupation, motivation, and the location of missing teeth have significant relationship with decisions patients make about their types of prosthetic treatment.

Clinical article (J Int Dent Med Res 2018; 11(3): 1002-1006)

Keywords: Missing teeth, fixed bridge, removable partial denture, socio-demographics, location of missing teeth.

Received date: 12 July 2018 **Accept date:** 25 August 2018

Introduction

In the case of missing teeth, the types of prosthetic treatments available include fixed bridges, partial dentures permanently bonded by cement in one or several abutments that have been prepared to replace single or multiple missing teeth.[1] Another treatment alternative is RPDs, wherein a patient can remove the denture that replaces one or more teeth (it is not cemented permanently in place).[1]

According to various studies, patients' treatment decisions may influenced by several factors, including socio-demographic factors, such as their gender, age, occupation, and motivation, and by clinical factors, including the location of the missing tooth or teeth.[2-6] According to study conducted by Al-Quran, Al-Ghalayini, and Al-Zu`bi, female patients reported greater aesthetic concerns than men and were more likely to choose a fixed bridge, compared RPDs, to comply the aesthetic needs.[2] According to Olaide and Joshua, however, male patients dominate the RPD market, because they are not as concerned with the aesthetic aspect of using dentures.[3] Based on these studies, aesthetic and functional considerations can both be said to affect a patient's decision on the type of prosthetic treatment.[2]

Besides gender, age is another socio-demographic factor associated with prosthetic treatment decisions. In Idris and Ghani's studies, younger patients, including those aged 45 years and younger, were more likely to choose a fixed bridge to replace missing teeth, while patients of older ages tend to replace missing teeth with RPDs.[4] The other socio-demographic factor associated with prosthetic treatment decisions is occupation.[3] A patient's occupation is often related to his or her income, thus affecting the ability to pay for dentures. Fixed bridges are relatively more expensive than RPDs, so we could anticipate preference differences between patients with larger and smaller incomes, in terms of their prosthetic treatment decisions. Other study shows that the financial aspect (economy) is one of the factors that influences denture treatment selection.[5]

Another factor that affects prosthetic treatment decisions is the motivation for using dentures, including aesthetics and functionality. Differences in this aspect of motivation will influence the treatment decision to comply with a

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patient's preferences. Patients with an aesthetic motivation will choose more aesthetic treatments, such as a fixed bridge, while patients who are more motivated by functionality and not as concerned with aesthetic may choose another treatment alternative, such as RPDs. A final influential factor is the location of the missing teeth.[3] The location of missing teeth causes a difference in patients' motivation for using dentures, because, in the anterior region, the aesthetic aspect is a major consideration and patients choose treatments that are considered most able to meet these needs. The University of Indonesia dental hospital is one of the largest prosthetic dental care services providers in Jakarta, yet there has been no study to date that analyzes the factors that influence its patients' denture treatment selections. Thus, the purpose of this study was to analyze the relationship between socio-demographics (gender, age, occupation, and patient motivation) and the location of missing teeth's influence on prosthetic treatment selections, such as fixed bridges and RPDs.

Materials and methods

This project is a cross-sectional study. Its subjects are patients who have been treated with fixed bridges and RPDs at the Universitas Indonesia teaching dental hospital. The study uses secondary data, the medical records of patients who had been treated with fixed bridges and RPDs, between 2005 and 2012. This study has a sample size of 265, which meets the minimum estimate sample number, 236.

The inclusion criteria for this study were patients aged ≥ 17 years and ≤ 70 years, patients with one to three teeth missing from one jaw who can be treated with a fixed bridge or RPD. The data taken from the patients' medical records include gender, age, occupation, location of missing teeth and their motivation for using a denture. Patients were classified into one of five groups based on the age groups used in the Basic Health Research by the Indonesian Ministry of Health, with adjustments for the study's inclusion criteria: 17–24, 25–34, 35–44, 45–54, 55–70 years.[6] Patients' occupations were stratified into three groups: student, employed (civil servants, private sector employees, and self-employed), and unemployed (housewives, pensioners, those currently without a job).

The sampling method used is consecutive sampling (non-probability sampling) and involves all subjects who fulfilled the study criteria, to comply with the number of samples needed to ensure an accurate representation of the population. The data were processed using SPSS software. We conducted a univariate analysis to determine the frequency distribution of sex, age, occupation, patient motivation, and location of missing teeth in patients who have been treated with fixed bridge or RPDs at a teaching dental hospital. Furthermore, a bivariate analysis was performed using the chi-square test to determine whether or not there was a relationship between these factors and the prosthetic treatment decision (fixed bridge or RPD).

Results

The results of the univariate analysis showed that female patients were more common than male patients; of the 265 patients, 161 were women. Based on age, among the five age cohorts, the most dominant was the 35–44 group; patients in that group accounted for 70 people. As Table 1 shows, the number of patients declined with age. Most patients, 148 out of 265, were employed. In terms of patient motivation, it appears that most (197 out of 265, or 74.3%) were more motivated by functionality than by aesthetics. As for the location of missing teeth, the posterior region was the most common site for tooth loss, accounting for 173 out of 265 cases. Independent and dependent variables in this study are categorical ones with nominal and ordinal scales, so the data are non-parametric. To analyze whether there is any relationship between socio-demographic factors and the location of patients' missing teeth and denture treatment decisions, the hypothesis was tested using a comparative categorical unpaired chi-square test. The results of the bivariate analysis are presented in Table 1 below.

The results of bivariate analysis showed that 155 of 265 patients were treated with RPDs. RPDs were preferred among both women and men. Based on age and the five cohorts, the preferred type of denture for all ages, except for those 25–34 years old, was RPDs. Those 25–34 preferred a fixed bridge. Based on employment status, the employed and student patients preferred a fixed bridge. Among the unemployed,

RPDs were the preferred treatment. Patients with the greatest aesthetic motivation preferred fixed bridges, whereas those motivated by function chose RPDs. Among those with missing posterior and antero-posterior teeth, the most common treatment was RPDs. The opposite occurs was true for missing teeth from the anterior region, where fixed bridges were more common. Based on the p-value data presented in Table 2, we can conclude that there is a statistically significant relationship between age (p = 0.005), occupation (p = 0.000), patients' motivation (p = 0.038), and the location of their missing teeth (p = 0.000) in terms of denture treatment decisions. In terms of gender (p = 0.395), there is no relationship with the patient's denture treatment decision.

Variables	Fixed Bridge		RPDs		Total	p-value
	n	%	n	%	n	
Gender						0.395*
Female	63	39.1	98	60.9	161	
Male	47	45.2	57	54.8	104	
Age						0.005**
17–24 years	28	48.3	30	51.7	58	
25–34 years	32	52.5	29	47.5	61	
35–44 years	32	45.7	38	54.3	70	
45–54 years	12	25.5	35	74.5	47	
55–70 years	6	20.7	23	79.3	29	
Occupation						0.000**
Student	19	57.6	14	42.4	33	
Employed	76	51.4	72	48.6	148	
Unemployed	15	17.9	69	82.1	84	
Motivation						0.038*
Aesthetics	36	52.9	32	47.1	68	
Function	74	37.6	123	62.4	197	
Location of missing teeth						0.000**
Anterior	35	63.6	20	36.4	55	
Posterior	74	42.8	99	57.2	173	
Antero-posterior	1	2.7	36	97.3	37	
TOTAL	**110**	**41.5**	**155**	**58.5**	**265**	

Table 1. Results of Bivariate Analysis of Socio-demographic Factors and the Location. *Chi-square test with n continuity correction; **Pearson chi-square test.

Discussion

The dominance of female patients in this study is in line with the results of the basic health research conducted in 2007 by the Indonesia Ministry of Health, which showed the proportion of denture users is greater among women than among men.[7] Similar results were found in studies conducted in China that aimed to determine the use of dentures, both of which indicated the predominance of women in the use of dentures.[8] This could be due to a greater awareness among women of the ability to replace missing teeth, and their generally greater concern for the appearance and aesthetics of their teeth.[2] The bivariate analysis showed that gender is not significantly related to the selection of a fixed bridge or an RPD. This was confirmed by the results of the univariate analysis, which showed that there is no tendency to choose one prosthetic treatment over another based on gender. More than half of all patients, 98 of 161 (60.9%) of females and 57 of 104 (54.8%) males, chose RPDs; this shows that both women and men alike have a greater tendency to be treated with an RPD. The results of this study contradict the research conducted by Al-Quran, Al-Ghalayini and Al-Zu`bi, which found no significance differences in denture treatment decisions by gender. In that study, among 121 women, 38 chose RPDs, 21 chose a fixed bridge, 29 chose implants, and 33 were the control group, which received no treatment. Meanwhile, among 79 men, 12 chose a fixed bridge, 29 chose RPDs, 21 chose an implant, and 17 were in the control group and received no treatment.[2] Their research showed that women prefer to be treated with a fixed bridge, compared to men, who prefer RPDs.[2] The discrepancies found in studies may be attributed to several conditions, such as the high cost of fixed bridge treatment, a lack of patient knowledge regarding fixed bridges, and the dental students as providers who performed the treatments based on their requirement be complete such procedures during their training period at the clinic.

This current study examined more patients in the 35–44 years cohort in both treatment groups. This matches the results of the basic health research by the Ministry of Health, wherein those between the ages of 35 and 44 had an average of 2.89 missing teeth, in accordance with the research inclusion criteria.[6] The univariate analysis results indicated that the number of patients treated with a fixed bridge decrease after that age range, and with a changing treatment preference toward RPDs. The results of the bivariate analysis found that there is a relationship between a patient's age and his or her prosthetic treatment decision. Olaide and Joshua's study in Nigeria regarding the reason for RPDs found that a patient's age correlates to his or her motivation for treatment.

Patients' aesthetic motivation decreases as their age increases.[3] The link between these patients' age and motivation may influence their denture treatment decision. Younger patients with high aesthetic requirements are inclined to choose the fixed bridge treatment, which is also clearly depicted in this study's results.[4,9]

The other factor that influences prosthetic treatment decisions is occupation, because financial constraints are important determinants for seeking treatment and selecting a specific prosthodontic treatment option.[5] According to a previous study, treatment cost is one of the biggest considerations when a patient chooses his or her type of denture.[10] This was confirmed by the results of our study's bivariate test, where occupation was related to the prosthetic treatment decision. The results of the univariate analysis showed that employed patients tend to be treated with a fixed bridge (51.4%), and that they tended to have the greater financial capacity than unemployed patients. The opposite was seen among unemployed patients, who are more likely to be treated with RPDs (82.1%). These results also confirm some studies that investigated the factors related to the use of dentures in other countries, which found that the main reason patients choose RPDs is based on economic considerations.[2,10] The location of missing teeth is another factor that influences prosthetic treatment decisions.[4] Our bivariate analysis showed a correlation between the location of missing teeth and prosthetic treatment decisions. A study by Augusti et al, in Italy, researched the indices of willingness to pay for denture care and found that missing teeth in the anterior region is a real concern for patients, because it affects their appearance. For this reason, patients are willing to pay more in order to get the best possible treatment.[10] Missing teeth in the posterior region are predominantly treated with RPDs.

The results of the univariate analysis showed that, for missing teeth in the anterior and posterior regions, the type of denture preferred is an RPD, as 36 of 37 patients (97.3%) were treated with one. This could be a result of the shorter amount of time required for this the treatment's procedures. Further, the presence of two types of artificial teeth in one jaw can lead to more complicated treatment procedures and increases in the frequency and duration of patient visits to the clinic. Fixed dentures are used to replace one or more missing teeth, because fixed dentures, in this case fixed bridges, are better than RPDs for complying with the aesthetic and functional needs for the replaced teeth.[2,10] Aesthetic and functional needs were the primary reasons patients cited for using dentures. Bivariate test results in this study indicate that patient motivation is related to prosthetic treatment decisions. The results of the univariate analysis show that, in patients who have an aesthetic motivation, 36 out of 68 (52.9%) chose to be treated with a fixed bridge, while patients who had a functional motivation, 123 of 197 (62.4%), chose RPD treatment. These facts support the explanations described previously in this paper, which indicated that aesthetic needs are better treated with a fixed bridge.[2,10] Studies conducted in developed countries found that the use of dentures is more influenced by aesthetic motivations than functional ones.[11] Therefore, in developed countries, the most desirable types of treatment for cases of missing teeth are fixed solutions, such as fixed bridges.[11] The present study found the opposite: 197 out of 265 patients (74.3%) cited a functional motivation as their main reason for using dentures. These results match those of other studies in other developing countries, such as India.[4]

Overall, it appears that RPDs are the type of denture preferred by patients, that is, 155 out of 265 cases (58.5%) in the present study. That study's results were also influenced by the interests of dental students as the provider, to comply with their requirement to provide such treatments during their period of education. One limitation of this study was the bias shown in the patients' occupation as one of the factors that influenced their treatment decisions. This bias was caused by the inability of the occupation to demonstrate the accurately patient's financial situation. In addition to the details provided above, it is important to know that subjects in this study were patients treated by dental students. This influences the kind of treatment provided to patients, so the type of denture patients finally select cannot be ruled completely as the desire of the patient. In the case of missing teeth in the anterior and posterior regions, under clinical conditions these can be treated with a combination of fixed dental bridge and RPDs. These could eventually be treated with an RPD, because the student dentist needed to meet the requirements of the case to complete during his or her period of education. Moreover, we found that the dental

students frequently paid for the patients' treatments, which could lead to a bias in the results as they relate to the patient's occupation and its relationship to denture treatment decisions. This study used medical records in which the records did not indicate definitely whether the patient was eligible for treatment with both types treatment fixed bridge and an RPD. During the medical records selection, the author had to reassess the number and location of missing teeth as indicated on the patient's odontogram, so the selection of medical records may not fully comply with the study inclusion criteria. The selected treatment decisions cannot be inferred to be the patient's desire alone, since the selected treatment was also strongly influenced by the clinical conditions and the ability of the provider, since the providers in this study were dental students with limited competencies and skills.

Conclusions

Overall, in cases of one to three missing teeth, more were replaced by RPDs than fixed bridges, both in female and male patients. The majority age cohort of all patients receiving both types of treatment was 35–44, and the majority of patients were employed. In the case of missing teeth in the anterior region, the patients preferred fixed dental bridge, while in the case of missing teeth in the posterior and antero-posterior regions, patients preferred treatment with RPDs. We also determined that the primary motivation of patients using dentures is a functional one. The results showed an association between age, occupation, motivation, and the location of missing teeth with denture treatment decision. The opposite was true for gender, where there is no relationship between a patient's gender and the type of denture he or she chose.

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