

FACTORS INFLUENCING THE TYPE OF PROSTHETIC RESTORATION FOR PARTIALLY DENTATE ADULTS

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ABSTRACT

Objective: In developed countries, patients' factors and esthetic concerns have predominantly influenced prosthodontic treatments. The objective of this investigation was to see if such factors in local partially dentate patients influenced the clinicians' decision regarding the prostheses planned.

Material & Methods: This was a descriptive study carried out in Khyber College of Dentistry, Peshawar from March to October 2007. Using a structured data collection-sheet, patient's data including gender, age, socio-economic status, educational level, oral-hygiene status, main concern of patients for consultation and the number, location and type of saddles in the jaws were all recorded. The type of prosthodontic service planned for each patient was also recorded. One investigator collected the required data from each of the 206 partially dentate patients by the method of direct interviewing.

Results: Acrylic removable dental prostheses (RDPs) were more frequently provided than fixed dental prostheses (FDPs). No precision-retained or implant-supported prosthesis were planned. Irrespective of the type of prosthesis, the restoration of chewing function was the major concern of patients for consultation. Age, socioeconomic status, educational level and type of saddle in the maxilla influenced patients' treatment with RDPs. In comparison, better socioeconomic status and educational level were the reasons in case of planned FDPs. The reason for the planned FDPs in the maxilla was esthetics as compared to improvement in chewing function in case of the mandible.

Conclusion: Acrylic RDPs were the most frequently planned prostheses. Patients; socioeconomic status and educational level and the type and location of saddle influenced the type of prosthesis planned for patients.

Key Words: Partial dental prostheses, Removable dental prostheses, Fixed dental prostheses, Prosthodontic treatment patterns, Prosthodontic services provision.

INTRODUCTION

The need and reason for the prosthodontic replacement of missing natural teeth has been well highlighted¹⁻³. In case of few or some missing teeth, this need for tooth replacement by a fixed or removable dental prostheses, in addition to the preferences of the care-giver, is influenced by several patients' factors. Important among the patients' factors include age, gender, socio-economic status (SES), educational level, local intra-oral and extra-oral factors, and wish, concern and preferences⁴⁻¹³. The pattern of tooth loss and the consequent pattern of prosthodontic treatments have been noted to be widely differing not only within the populace of the same country but also between those from different countries sharing

similar developmental, cultural and social set-ups⁹. Within this context, a general declining trends for the provision or utilization of removable dental prostheses (RDPs) as compared to fixed dental prostheses (FDPs) has been observed in countries of the developed world¹⁴⁻¹⁵. Even the utilization or provision of newer treatment approaches such as implant-supported dental prostheses (ISDPs) have gained considerable popularity during the current decade or so¹⁶. This shift in service provision or utilization over the time, in fact, is a reflection of the realization of importance of oral health, better socio-demographics of the population and improvement in the delivery and provision of dental health-care services and training¹⁷.

The pattern of provision of dental-care

services in general and of prosthodontic and restorative dental services in particular would appear even more complex when the influence of factors and preferences of dental practitioners are also included. This is because they usually not only think of extreme expectations during the provision of prosthodontic treatments, but they also have their own perceptions of the way in which different groups of patients should be cared for^{4,11,12}. In case of RDP provision, it became evident that dentists focused on physical functions of teeth as compared to patients who preferred focusing on the social meaning of mouth¹³.

During the process of selection from the available prosthodontic treatment options, dental practitioners consider the age, gender, socio-economic status, educational level, oral health status and local dento-alveolar conditions as well as the patients' concerns and wishes^{3,5,6,18-23}. The treatment by RDPs has become a clear routine for elderly patients in contrast to FDPs for younger patients having better socio-economic, educational and oral health levels. Similarly, enhancement of esthetics, with dental prostheses, has been an overriding reason among patients in developed countries and that generally their primary concern regarding prosthodontic replacement is different than that of their dentist. Similarly, the edentulous span and its types as well as the concurrent soft and bony deficit usually determine which prostheses (FDP or RDP) would be more applicable and relevant. The influence of so many factors on the pattern of prosthodontic service provision has implications of public health importance in terms of appropriateness of care and social inequality and need for continued investigations^{24,25}. Though not comprehensive, some local studies have shown diverse trends in tooth conservation related dental-care services^{26,27}. These findings as well as a US based study may suggest the existence of similar trends in the provision and pattern of prosthodontic care^{26, 28} and thus highlight the need for a local study of the kind. The available data on the topic is mostly from developed countries having very marked differences in educational, socio-economic and oral health status. This might have little local relevance and applicability. A local research effort could help in documenting the various influencing factors for partial prostheses selection. The gathered information could serve as guiding points for use by health care authorities, dental educators, dental practitioners and even patients.

MATERIAL AND METHODS

From March to October 2007, a descriptive study involving 206 partially dentate patients visiting the Department of Prosthodontics,

Khyber College of Dentistry Peshawar Pakistan was conducted. A convenience sampling technique for participation in the study was used. Patients who fulfilled the inclusion and exclusion criteria were recruited. Patients were included if their age was between 20-65 years, were partially dentate, had no previous prosthodontic treatment experience. Patients were excluded if medically compromised, mentally and physically handicapped; uncooperative, had congenital / acquired dento-alveolar defects and those who were completely edentulous.

Using a structured data collection sheet, patients' gender, age, socio-economic status (SES), educational level, oral hygiene status, main concern for consultation and the number, location and type of saddles in the dental arches were all recorded. Socioeconomic status of patients was considered poor when patient's income was below Rs.3000 per month, satisfactory when the income was between Rs. 3000-10000 per month and good when the patient's income was more than Rs.10000 per month. Regarding education, the primary level for the patient was considered when having no or below five years of school education, secondary when patient had six to twelve years of school education while for patients having above 12 years of school education were considered as educated. Regarding oral hygiene status, it was taken as unsatisfactory when one or more teeth required extraction (because of problems with their restoration including endodontic treatment, severely malposed teeth, broken down roots, severe periodontally compromised and loosed teeth), considered satisfactory when the teeth could be treated by periodontal, restorative and orthodontic treatment and good when none of the above therapeutic procedures were necessary and simple home practice measures for oral hygiene (regular daily tooth brushing, use of floss and mouth washes) were sufficient to maintain their healthy condition.

The type of prosthodontic service planned for each patient was also recorded. After planning and selection of the type of prosthodontic treatment by the concerned clinician, one investigator collected the required data from each patient by the method of direct interviewing.

Data was analyzed using SPSS version 11.0 for windows. Results were expressed as mean \pm SD for patients' age and as numbers and frequencies (percentage) of all other variables. Data analyses were performed by using Pearson's chi-square test to check the association among categorical variables of patients' influencing the type of prosthesis. P-value of less than 0.05 was considered as statistically significant.

RESULTS

The number and percentages of patients in the various age groups are shown in Table 1. The mean age of the 206 patients was 37 ± 13 years with some 87% falling within the age range of 20 – 50 years. The male patients were 81(39%) as compared to 125 (61%) females with a male to female ratio of 1:1.6. It can be seen that the majority of patients had poor SES and educational level. Table 2, shows the data for the patients concern for seeking prosthodontic consultation, need for tooth extraction and missing teeth locations in each jaw. It can be seen that in great

majority of cases, prostheses, irrespective of their type, were requested for the restoration of the function of chewing. The data for the distribution in the arches, of the numbers, locations and the types of saddles are given in Table 3. It can be seen that a great majority of patients had up to two bounded saddles mostly located in the posterior segments of the jaws.

Details of the restoration of partially edentulous arches with the RDP and FDP are given in Table 4. These show that many of these were RDPs (71%) as compared to FDPs (29%). The data for the patients' ages, gender, patients concern and

Table 1: Demographic characteristics of the patients

Variable	Category	No. (%)
Age	20-35 (*26)	105 (51)
	36-50 (*44)	74 (36)
	51-65 (*58)	27 (13)
	Total: *37 \pm 13	206 (100)
Gender	Male	81 (39)
	Female	125 (61)
Socioeconomic Status	Poor	107 (52)
	Satisfactory	66 (32)
	Good	33 (16)
Educational level (Yrs)	Up to 5	102 (50)
	6-12	61 (30)
	> 12	43 (20)
Oral hygiene status	Unsatisfactory	49 (24)
	Satisfactory	149 (72)
	Good	8 (4)

*Mean age for the respective age group.

Table 2: Patients' concern, teeth requiring Extraction & missing teeth location

Factor	Variable	No. (%)
Patient's Main concern	Esthetic	86 (42)
	Chewing	113 (55)
	Speaking	7 (3)
Teeth requiring extraction	None	157 (76)
	One	25 (12)
	More	24 (12)
Missing teeth location	Mandibular arch	41 (20)
	Maxillary arch	62 (30)
	Both	103 (50)

Table 3: Number, location and type of saddles in jaws

Saddle	Category	Maxilla No. (%)	Mandible No. (%)	Total No. (%)
Number	One	80 (49)	45 (30)	125 (40)
	Two	43 (26)	57 (39)	100 (32)
	More	40 (25)	45 (31)	85 (28)
	Total	163 (100)	147 (100)	310 (100)
Site	Anterior	40 (25)	10 (7)	50 (16)
	Posterior	69 (42)	89 (60)	158 (51)
	Combination	54 (33)	48 (33)	102 (33)
	Total	163 (100)	147 (100)	310 (100)
Type	Distal extension	4 (3)	16 (11)	20 (6)
	Bounded	125 (76)	85 (58)	210 (68)
	Both	34 (21)	46 (31)	80 (26)
	Total	163 (100)	147 (100)	310 (100)

Table 4: RDPs and FDPs planned in the arches

Prostheses planned	Sub-type of prostheses	Maxilla No.	Mandible No.	Total No. (%)
RDP	Acrylic	98	87	185 (63)
	Cast	1	13	14 (8)
	Precision / Implant retained	0	0	0 (0)
FDP	Tooth - supported	49	36	85 (29)
	Implant - supported	0	0	0 (0)

Table 5: Age, gender, patients' concern and type of planned prosthesis

Factor	No. (%) of RDPs			No. (%) of FDPs		
	Maxilla	Mandible	Total	Maxilla	Mandible	Total
Age group (Years)						
20 -35	45 (41)	33 (33)	78 (38)	28 (57)	22 (61)	50 (59)
36 -50	49 (45)	48 (48)	97 (46)	13 (26)	9 (25)	22 (26)
51 -65	15 (14)	19 (19)	34 (16)	8 (17)	5 (14)	13 (15)
Total	109 (100)	100 (100)	209 (100)	49 (100)	36 (100)	85 (100)
Gender						
Male	39 (36)	36 (36)	75 (36)	22 (45)	13 (36)	35 (41)
Female	70 (64)	64 (64)	134 (64)	27 (55)	23 (64)	50 (59)
Total	109 (100)	100 (100)	209 (100)	48 (100)	36 (100)	85 (100)
Pt's concern						
Esthetic	48 (44)	23 (23)	71 (34)	29 (59)	11 (31)	40 (47)
Chewing	58 (53)	72 (72)	130 (62)	19 (39)	25 (69)	44 (52)
Speaking	3 (3)	5 (5)	8 (4)	1 (2)	0 (0)	1 (1)
Total	109 (100)	100 (100)	209 (100)	49 (100)	36 (100)	85 (100)

type of planned prosthesis are given in Table 5. It can be seen that RDPs were planned for patients having their ages between 20 – 50 years and that many of these were for female patients. Similarly,

a great majority of both the RDPs and FDPs were planned for patients concerned with the improvement of their chewing function. Table 6 shows data for the type of planned prostheses

Table 6: Socioeconomic Satus (SES), education level, oral hygiene status (OHS) and type of planned prosthesis

Factor	No. (%) of RDPs			No. (%) of FDPs		
	Maxilla	Mandible	Total	Maxilla	Mandible	Total
SES						
<i>Poor</i>	84 (77)	76 (76)	160 (77)	1 (2)	2 (6)	3 (4)
<i>Satisfactory</i>	21 (19)	19 (19)	40 (19)	29 (59)	15 (42)	44 (52)
<i>Good</i>	4 (4)	(5)	9 (4)	19 (39)	19 (52)	38 (44)
Total	109 (100)	100 (100)	209 (100)	49 (100)	36 (100)	85 (100)
P-value	0.000	0.000		*	*	
Education Level						
<i>Up to 5</i>	71 (65)	72 (72)	143 (68)	12 (24.5)	10 (28)	22 (26)
<i>6-12</i>	31 (28)	22 (22)	53 (25)	12 (24.5)	10 (28)	22 (26)
<i>> 12</i>	7 (7)	6 (6)	13 (7)	25 (51)	16 (44)	41 (48)
Total	109 (100)	100 (100)	209 (100)	49 (100)	36 (100)	85 (100)
P-value	0.000	0.047		*	*	
OHS						
<i>Poor</i>	40 (37)	39 (39)	79 (38)	5 (10)	2 (6)	7 (8)
<i>Satisfactory</i>	67 (61)	61(61)	128 (61)	42 (86)	30 (83)	72 (85)
<i>Good</i>	2 (2)	0 (0)	2 (1)	2 (4)	4 (11)	6 (7)
Total	109 (100)	100 (100)	(209 (100)	(49 100)	36 (100)	85 (100)
P-value	0.679	0.61		*	*	

*No test is used to find the P-value as FDP (in both arches) is a single category (only bridges were advised among FDPs but not a single case of implant is planned) and have no pair for comparison.

Table 7: Number, location and type of saddles and planned prostheses

Saddles	No. (%) of RDPs			No. (%) of FDPs		
	Maxilla	Mandible	Total	Maxilla	Mandible	Total
One	41 (38)	19 (19)	60 (29)	36 (74)	19 (52)	55 (65)
Two	32 (29)	40 (40)	72 (35)	10 (20)	13 (37)	23 (27)
More	36 (33)	41 (41)	77 (36)	3 (6)	4 (11)	7 (8)
Total	109 (100)	100 (100)	209 (100)	49 (100)	36 (100)	85 (100)
Anterior	24 (22)	6 (6)	30 (14)	16 (33)	4 (9)	20 (24)
Posterior	39 (36)	51 (51)	90 (43)	26 (53)	27 (77)	53 (62)
Combined	46 (42)	43 (43)	89 (43)	7 (14)	5 (14)	12 (14)
Total	109 (100)	100 (100)	209 (100)	49 (100)	36 (100)	85 (100)
DE *	3 (3)	11 (11.)	14 (7)	1(2)	2 (6)	3 (4)
B **	76 (70)	46 (46)	122 (58)	45 (92)	30 (83)	75 (88)
DE & B	30 (27)	43 (43)	73 (35)	3 (6)	4 (11)	7 (8)
Total	109 (100)	100 (100)	209 (100)	49 (100)	36 (100)	85 (100)

* Distal Extension, ** Bounded

(RDP or FDP) in relation to SES, Educational levels, oral hygiene status of patients. The association between the data for the SES and educational level was highly significant ($\chi^2 = 56.2$, $df=4$, $P\text{-value} = 0.000$), but not for the oral hygiene (Table 6). Furthermore, because of absence of pairs for comparison, chi-square test could not be applied for the data for FDPs (table 6). It can be seen that FDPs were predominantly planned for patients with satisfactory to good SES and for those having educational levels. The data for the number, location and type of saddles recorded in patients and the details of planned prosthesis are given in Table 7. It can be seen that FDP planning was done for patients having up to 2 bounded saddle. It is also very interesting to see the planning of many RDPs for saddle types where normally clinicians would have otherwise preferred the provision of FDPs.

DISCUSSION

In a dental hospital setting, there is usually little influence of the clinicians' personal preference and persuasion for a particular type of prosthesis. In contrast, in a private practice setting, a practitioner might be biased towards selecting the one that would be more rewarding to him in terms of monetary gain. Therefore, the public sector hospital setting as is the case in this study has possibly better facilitated the collection of reliable information about the true effect of the patients' factors on the type of prosthesis planned by clinicians. Despite this good aspect of the study, there are certain limitations of this work. These include the use of a small and non probability sampling technique, confinement of the study to single center. These make the present findings of limited value for generalizing them to local population.

There were more females (61%) as compared to males (39%). This may indicate a relatively higher incidence of tooth loss and / or increased awareness of females for the prosthodontic replacement of missing teeth. Similarly, a great majority of patients were not only poorly and less educated but they were also socio-economically less secure. The association of these two factors was significant. A possible reason for the majority of patients belonging to the less educated and less socio-economically secure categories in this study is that it is mainly this class of people utilizing dental care services within the public sector hospitals. It may also indicate an increased prevalence of tooth loss in this group of patients.

Another finding of this study was that the reason for replacement of missing teeth in a great majority of patients was to improve their chewing

function. While this finding may confirm the findings of a previous local study by Memon and Ghani²⁹ showing that in developing countries, people eat foods that are relatively harder and requiring vigorous chewing effort as compared to the well-cooked soft diet used by people in developed countries. It has been said that the main reason of seeking improvement of esthetics among people in developed countries is their frequent exposure to media portraying people having extraordinary beautiful faces and teeth that stimulate them towards the esthetic value and importance of having intact, sound or restored dentition. Nevertheless, the finding of the present study of the need of prostheses for the improvement of mastication is in contrast to those of others^{21-22,30}. However, caution should be exercised when generalizing this aspect to the local population as the present sample of patients is in no way reflective of the general population.

A substantial proportion (71%) of the prostheses planned, were in the form of RDPs as compared to 29% FDPs (Table 4). This is also a contrasting finding as is the case elsewhere where the frequency of FDP provision was not only far much higher but it was also on the rising trend than that for the RDP services^{4,7,8,28}. The present finding of the greater prescription of RDPs and especially of acrylic RPDs for patients in this study is supported by many including a local study^{9,10,31,32}. As is the case in this study (Table 1), an explanation for this was also the poor SES of local patients^{33,34}. This finding, certainly, has an educational and training implication for the continued need and emphasis / focus on enhancement of RDP designing and making skills of both undergraduate and post graduate level trainees. The differences in the figures for the RDPs among male and females were insignificant. However, in case of FDP provision, more were planned for females as compared to males (Table 5). As the co-variables of SES and educational level as well as the many others were not controlled for the effect of the gender, the observed effect of gender should be interpreted with caution. Also in this table, more FDPs were planned for patients who were relatively younger or middle-aged. This has also been the finding of other studies^{2,4,34}.

The data Table 3 show that the saddles seen in the jaws were predominantly posterior and bounded. However, the data in Table 7 indicate that some 88% bounded saddles out of the total 85 edentulous areas were considered for restoration with FDPs. This Table also shows very interesting finding of the so many other bounded saddles that were planned for restoration with RDPs. In fact the preferred option of the FDP should have been

considered for these by the clinician. The reason for not having done so could be simply explained by the poor SES and lower educational levels of most patients in the study (Table 6).

FDPs were planned mainly (68%) for the restoration of bounded saddles in the posterior segments of the jaws. This finding is in support of that of previous local studies^{32, 35}. The number of saddles has an influence on the selection of FDP for patients. For a majority of cases of single saddle situation, FDP was the prostheses of choice as compared to RDP when the numbers of saddles were multiple. Similarly, bridges (FDPs) were mainly planned for the restoration of missing posterior teeth primarily for the restoration of the chewing function. An anterior saddle in the maxillary arch was also more frequently restored with FDP as compared to the one in the mandibular anterior region. In general, RDPs were the preferred prostheses planned for patients who had poor SES, Poor educational level, poor oral hygiene status and multiple edentulous areas (saddles). These are obviously among the factors indicating poor level of motivation and awareness of patients towards the importance of teeth and factors for reduced utilization of dental-care services.

Tooth loss induces considerable impairment of different oral functions. The diagnosis of the consequent impairment should form the basis for decision making in prosthodontic treatments³⁶. A better decision is taken if the dentist made cooperation with the patient and when patient generated aspects of therapy were incorporated. All the information that help in making a better decision should be obtained through traditional history taking and investigating aspects of quality of life (QoL) of the patient. This will facilitate information including concerned consultation and dentist issues, psychological aspects and treatment preferences.

CONCLUSION

Within the limitations of this study, it is concluded that in a public sector hospital setting, the patients' factors have predominantly influenced the clinicians' decision regarding type of planned prosthesis. Mostly patients with poor SES and low educational level utilized the treatment services in public sector hospital. Edentulous areas were predominantly located in the posterior segments of the jaws. Irrespective of the type of prostheses, patients mainly requested them for the restoration of chewing function. FDPs were mainly planned for patients with better SES, educational level and those who had short span saddles. Many planned RDPs were of the acrylic variety. For this decision,

the age, SES, education level, type of saddle were more important determinants as compared to oral hygiene status and location of missing teeth and saddles. The predominant utilization of the acrylic RDPs by patients necessitates emphasis on the need and focus on educational strategies that enhances the theoretical and practical clinical skills, knowledge and competence of trainees for the practice of removable dental prosthesis.

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