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Factors Predicting Patient Satisfaction and Use of Complete Dentures

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ABSTRACT

Patients' satisfaction with their complete dentures is considered the ultimate goal of complete denture therapy. Therefore, our objective was to identify possible influence of patient related and denture quality related factors on the use as well as on the satisfaction with new complete dentures in Sri Lankan patients. Seventy one patients were recruited after obtaining socio-demographic and examination details. "Eyesenck short scale Personality Questionnaire" was completed by the participants. Complete dentures were assessed at one-year post insertion. A self-administered questionnaire on satisfaction and use of dentures was used. Chi square analysis revealed that general satisfaction with new set of dentures were not significantly dependent with patient's age, sex, education level, occupation, income, medical or drug history, experience with previous dentures, presence of habits and clinical factors. Hierarchical regression analysis revealed that the patients' perception regarding dentures (perception score) was not significantly predicted by patients' factors, clinical factors or technical quality of dentures. However, associations explored with Kendall's tau-b coefficient revealed that use of dentures had significant positive correlations with clinical factors ($r=0.3$, $P<0.05$) and technical quality of dentures ($r=0.2$, $P<0.05$). Patients who are generally satisfied with their dentures showed higher perception scores in terms of patient perceived denture retention, comfort, masticatory efficiency and esthetics of dentures. In conclusion, patient factors, clinical factors or technical quality of dentures do not predict the patients' general satisfaction with dentures after one year. Clinical factors and technical quality of dentures show significant positive co-relations with use of dentures by the patients. Personality factors are neither associated with use nor perception of the dentures.

1. Introduction

Despite a downward trend in edentulism seen both globally and locally, conventional complete denture therapy continues to remain an important treatment option for the elderly people especially in developing countries like Sri Lanka. State of the art replacement options like implant supported overdentures may not be considered as a possible option for the regular patients mainly due to prevailing economic constraints [1, 2]. Patient perception is fundamental to improve quality of health care. Therefore, patients' satisfaction with their complete dentures may be considered the goal of complete denture therapy [1]. Although conventional complete denture therapy is the commonest treatment option, it has its own limitations in patient satisfaction and perceived

quality of life. Dissatisfaction with complete dentures is a common phenomenon among denture wearers mainly due to its nature of mucosa support. [3-6]

Patient satisfaction with complete dentures could be basically related to technique related factors such as the denture quality, patient related factors and the dentist related factors [7]. Technique related factors include the kind of therapy chosen for replacement such as conventional complete dentures and implant supported dentures. Further, factors related to different techniques relevant to complete denture fabrication include variations in impression techniques, materials used for the fabrication of record block bases, types of occlusal records, articulators, occlusal schemes, designs of

artificial teeth, denture maintenance and follow up and overall denture quality. Patient-related factors include many variables including age, gender, educational level, socioeconomic status, personality and psychological factors, previous denture experience, patients' high expectations and oral conditions [7]. Dentist-related factors include dentist's experience, patients' perception of the dentist and dental care and methods of communication with the patient [7].

Many of these factors have been investigated in different studies with variable results. Thompson et al. in 2007 had reported that the maxillary complete dentures were rated similar to maxillary implant-retained over dentures, whereas mandibular implant-retained over dentures were rated higher than mandibular conventional complete dentures [8]. It has been reported in several studies that there is not a significant difference in patient satisfaction when a "simplified" technique is adopted as compared to a more "comprehensive" technique for the construction of complete dentures [9, 10]. There is no consensus regarding beneficial effect of different impression techniques, occlusal schemes or surface designs of artificial teeth on improved patient satisfaction with complete dentures.

Overall denture quality has demonstrated controversial impact on patient satisfaction with complete dentures [7]. Van Waas found a positive association between the denture quality and patient satisfaction three months after the insertion [6]. Wimaladharm et al. [11] concluded that the patients' satisfaction regarding removable partial dentures is strongly related to the technical quality of dentures in Sri Lankan patients. In contrast, Fenlon et al. concluded that the initial clinical quality of complete dentures is not a significant factor in determining patients' satisfaction and use of the dentures when they were assessed two years after first insertion [12].

Many patient related factors have also been investigated in previous studies. These include variables such as age, gender, educational level, socioeconomic status, personality traits and the variations in the ridge anatomy. Despite the common belief on the ability of younger patients to develop an adaptive experience, many studies found no association among patients' age, and patient satisfaction with complete dentures [13, 14]. Contrasting findings have been shown with regard to the impact of gender on patient satisfaction with complete dentures. Females wearing complete dentures were found to be less satisfied regarding esthetics and ability to chew [15]. In contrast, some other studies [13, 16, 17] have identified no significant difference between gender in patient

satisfaction with complete dentures. Van Waasin 1990 and others [6, 12] have shown that some personality traits can adversely affect the denture satisfaction. Fenlon et al. concluded that patients with neurosis were significantly less satisfied with their complete dentures but stated that personality has not influenced use of complete dentures [19]. Marinus et al. concluded that personality to be an unimportant factor to determine individual satisfaction with new complete dentures [20]. Compromised oral conditions such as resorbed denture bearing area may create special challenges in denture fabrication, resulting in reduced patient satisfaction. Many authors identified a significant relationship between patients' mandibular condition and satisfaction with use of complete dentures [13, 18]. In contrast, some authors have concluded that the correlations are weak and often statistically not significant [17]. Marinus et al. stated that the attitude towards dentures and the number of previous dentures used are prospective tools to determine patients' satisfaction with new dentures. In the same study, they concluded that satisfaction with dentures is individually determined and is often unpredictable [20].

Previous studies have also shown that the experience of the clinician, patient's perception of the clinician and the communication skills of the clinician influence patient satisfaction with complete dentures. When patients were randomly assigned to an experienced dentist (>10 years of experience) or an inexperienced dentist (<3 years of experience), the experienced dentist received higher satisfaction ratings from the patient [21].

While most of the studies have investigated the association between the patient and denture factors with patient's satisfaction [6, 21, 22], only a few have explored the influence of these factors on denture use [12]. There seems to be no consensus among clinicians regarding causal relationships of such factors which will support predictable patient satisfaction and use of complete dentures. If a patient becomes unsatisfied with the complete dentures, he would be a regular attendant in a practice demanding adjustments. It is obvious that this accounts for a considerable amount of time. Despite the measures taken, sometimes it may not be possible to make the patient satisfied with the denture. Thus, it is important to find out prognostic indicators for patient satisfaction with complete dentures.

Therefore our aim was to investigate the possible influence of patient related factors and the denture quality factors on patients' use and satisfaction with new complete dentures in Sri Lankan patients.

2. Materials and Methods

Study sample consisted of 71 patients registered at the Department of Prosthetic Dentistry, Faculty of Dental Sciences, University of Peradeniya to obtain complete dentures. They were randomly picked using a chart and were recruited with their informed consent. Those patients who requested immediate dentures were excluded. This study was approved by Ethical review committee of Faculty of Dental sciences, University of Peradeniya.

Following recruitment, the patients were given an index number and were allocated to the clinicians. All three clinicians who were involved in the study had more than ten years of clinical experience as prosthodontists. Once a case was allocated, all the clinical procedures up to the denture insertion stage were carried out by the same clinician.

After obtaining the informed consent; socio-demographic data, medical, social, dental and denture history of each patient were recorded. Patients were asked to complete the validated Sinhalese or Tamil version of Eyesenck short scale Personality Questionnaire (EPQ-R) [23, 24] to determine the personality traits. EPQ-R yields scores on a scale from 0-12 for each of the three personality traits: psychoticism, extrovertism, and neurotism. The questions were mixed with another 12 questions which are known as Lie scale.

Oral examination was undertaken to classify the edentulous ridges according to Cawood and Howell's method [25]. This was done by noting the relationships of the height of genial tubercles to anterior mandibular ridge and height of mylohyoid ridge to the posterior mandibular ridge. Ridge forms were classified into either of Class 3 - 6 depending on the ridge resorption. This method classifies edentulous ridges into four categories namely; class 3 well rounded ridge form; class 4 knife edge ridge form; class 5 flat ridge form and class 6 depressed ridge form.

Two staff grade senior dental technicians who had more than ten years of working experience carried out all the laboratory procedures of denture construction. Codes assigned for the two technicians were WJ and HE. They were advised to strictly adhere to the instructions provided by the clinician when carrying out the laboratory procedures. Patients who had odd numbers were allocated to WJ and the even numbers were allocated to HE. Once a case was allocated to a technician, all the laboratory procedures were undertaken by the same person.

Denture construction was done according to the standardized guidelines adopted by the Department

of Prosthetic Dentistry to minimize the technical errors and to ensure quality of the dentures. Following the trial stage, the dentures were flaked, packed and processed in the laboratory. Same polymerization unit and a long curing cycle were used for all the cases. All the materials used including acrylic teeth were of the same brand for all the patients. Processed dentures were then inserted and adjustments done as required. Patients received verbal and written instructions regarding denture-use and hygiene.

At the 1st post-insertion review at one -week, new dentures were examined using Woelfel's method [26] for retention and stability of upper and lower dentures and coincidence of retruded contact position with the maximum intercuspation. They were also evaluated for balanced articulation. The length of the freeway space and the appearance of the denture were also assessed. This yields 8 scores for each set of complete dentures. Patients were then interviewed by one of the investigators to find out whether the new dentures were worn and used while eating as well. Further, they were asked about the aesthetics of new dentures and whether they were satisfied.

Patients were recalled at the end of the 1st year for the second post-insertion review. Dentures were assessed for retention, stability and occlusion in centric and eccentric positions. Denture bearing area was also examined to assess the condition of the supporting tissues. Necessary adjustments were carried out if there was any complaint. Then the patients were asked to complete the questionnaire on "patient satisfaction and use of complete dentures". This consisted of three items which tested the use, six items which tested how the patient feels about the retention, stability and the comfort of each denture and one item to test their general satisfaction with the dentures.

3. Results

Scores were created for *presence of habits among patients* (betel chewing, smoking, alcoholism, bruxism), *clinical factors* (nature of ridge anatomy, presence of xerostomia, and nature of denture supporting tissues), *technical quality of dentures* (centric and eccentric occlusion, size of the freeway space, appearance, retention, stability of upper and lower dentures), *use of dentures by patients* (whether they use it, use during meals and time of the day of use) and the *patients' perception regarding their experience with new dentures* (this perception score was created as a proxy for the satisfaction with dentures and included their perception regarding retention, comfort, and

masticatory efficiency). Data were analyzed using SPSS version 18.0.

The sample included 71 patients (59.7% of males). It included 69% between 61 to 70 years of age. Chi square analysis revealed that general satisfaction with the new set of dentures were not dependent significantly with patient's age, sex, education level, occupation, income, contribution of medical or drug history, experience with previous dentures, presence of habits and clinical factors.(Table 1).

Table 1: General Satisfaction with the denture according to different variables

Variables	Level of general satisfaction with dentures %			P value
	2	3	4	
Age				0.583
50-59y	0	66.7	33.3	
60-69y	5.6	50.0	44.4	
70-79y	18	52	30	
Gender				0.241
Male	21.4	53.6	25	
Female	9.3	51.2	39.5	
Education level				0.685
Primary	10	60	30	
Secondary	16.2	48.6	35.1	
Tertiary	25	25	50	
Occupation				0.742
Unemployed	13	50	37	
Employed	16	56	28	
Income				0.784
10000/-Rs or less	15.4	53.8	30.8	
10000-20000/=	15.4	46.2	38.5	
20000 -30000/=	0	50	50	
Medical history				0.324
Not contributory	14	56.1	29.8	
Contributory	14.3	35.7	50.0	
Drug History				0.751
Not contributory	15.5	51.7	32.8	
Contributory	7.7	53.8	38.5	
Denture History				0.372
Not satisfactory	15.9	52.4	31.7	
Satisfactory	0	50	50	

Habits				0.663
Betel chewing	18.6	46.5	34.9	
Smoking	10	55	35	
Alcoholism	0	83.3	16.7	
Bruxism	0	50	50	
Upper ridge anatomy				0.256
C II	0	33.3	66.7	
C III	12.7	55.6	31.7	
C IV	40	20	40	
Lower ridge anatomy				0.094
C I1	50	0	50	
C II1	4.8	42.9	52.4	
C IV	14.3	61.9	23.8	
C V	33.3	33.3	33.3	
Xerostomia				0.437
No	14.7	52.9	32.4	
Yes	0	33.3	66.7	
Upper denture support tissue				0.239
Poor	0	100	0	
Satisfactory	25	25	50	
Good	19.2	34.6	46.2	
Very Good	10	65	25	

Table 2: Association of use and perception of complete dentures according to clinical factors, technical quality, habits and personality of the patient

Variables	Use of dentures	Perception of dentures
Clinical factors of patient	0.0139 (r=0.3)	0.920
Technical quality of dentures	0.035 (r=0.25)	0.897
Habits	0.686	0.741
Perception	0.068	-
Personality Factor N	0.754	0.895
Personality Factor P	0.539	0.777
Personality Factor E	0.907	0.797

Hierarchical regression analysis revealed that the patients' perception regarding dentures (perception score) was not significantly predicted by patients' factors, clinical factors or technical quality of dentures. However, associations explored with Kendall's tau-b coefficient revealed that use of dentures had significant positive correlations with clinical factors ($r=0.3$, $P<0.05$) and technical quality of dentures ($r=0.2$, $P<0.05$) (Table 2).

Patients had rated the general satisfaction as 1 for not satisfactory at all (0%); 2 for not satisfactory

(14.1%); 3 for satisfactory (52.1%) and 4 for completely satisfactory (33.8%). One-way Analysis of Variance revealed that the patients who expressed higher general satisfaction regarding dentures had significantly higher perception scores ($F=12.9$, $P<0.001$). Bonferroni post-hoc test revealed that perception scores of every general satisfaction level to be significantly different from each other ($P<0.05$) (Table 3).

Table 3: Comparison of perception scores for complete dentures among patients who expressed different levels of general satisfaction

(I) General Satisfaction	Mean Difference	Std. Error	P value	95% Confidence Interval	
				Lower Bound	Upper Bound
Unsatisfactory	-2.986*	1.018	.013	-5.43	-.55
	-5.333*	1.075	.000	-7.91	-2.76
Satisfactory	2.986*	1.018	.013	.55	5.43
	-2.347*	.749	.007	-4.14	-.55
Highly satisfactory	5.333*	1.075	.000	2.76	7.91
	2.347*	.749	.007	.55	4.14

4. Discussion

This study demonstrated that socio demographic factors such as age, sex, education level, occupation and income were not related to the patients' general satisfaction with the new set of dentures at one-year post insertion. Similarly, contribution of medical or drug history, experience with previous dentures, presence of habits, clinical factors such as presence or absence of xerostomia and the nature of the residual ridge anatomy were not related to their general satisfaction with the new set of dentures at one-year post insertion. This finding is generally in agreement with the results of the other investigators [13, 17]. Yet in the same study, Fenlon et al. [13] demonstrated a strong relationship between quality of mandibular residual ridges and the patient satisfaction; the clinical quality of mandibular denture and the patient satisfaction, even though he could not elicit the same for the maxillary denture.

In this study it was also revealed that the patients' perception regarding dentures was not significantly predicted by patients' factors, clinical factors or technical quality of dentures after one-year post insertion. The perception score was created as a proxy for the satisfaction with dentures and included the patients' perception regarding retention, stability, comfort, esthetics and masticatory efficiency. Thus it enabled exploration

of broader aspects regarding satisfaction as opposed to general satisfaction. One-way Analysis of Variance revealed that the patients who expressed higher general satisfaction regarding dentures had significantly higher *perception scores* ($F=12.9$, $P<0.001$). However, Bonferroni post-hoc test revealed that perception scores of every general satisfaction level was significantly different from each other ($P<0.05$). This further emphasizes the fact that satisfaction with the dentures is related to many factors including denture retention, stability, masticatory efficiency, comfort and esthetics. An opinion on general satisfaction would not necessarily mean that the patient is satisfied with all these factors leading to satisfactory denture wearing experience.

The relationship between the technical quality of the dentures and the patient satisfaction has been widely explored in many studies. Yet only a few have explored the possible influence of the technical quality on the use of dentures. [12] Van Waas found a positive association between denture quality and patient satisfaction at three months after denture insertion in a group of 130 patients [6]. Wimaladharm et al. [11] in their study have suggested that the patients' satisfaction with removable partial dentures is strongly related to the technical quality of dentures. Even though Fenlon et

al. found a positive relationship at three months post insertion of dentures, a study done later has concluded that the initial technical quality of complete dentures is not a significant factor in determining patients' satisfaction with and use of dentures two years after first insertion [12]. It is possible that the initial denture quality to be a factor determining the patient satisfaction and use of the dentures during the initial period of post insertion. With time when patient develops the adaptive experience, it may not be as significant as during the immediate post insertion period.

However, associations explored with Kendall's tau-b coefficient revealed that the scores on clinical factors and technical quality showed significant positive correlations ($r=0.3$ and 0.25 respectively) with the score on the use of dentures by patients highlighting the importance of assuring good technical quality of the dentures during denture fabrication. Favorable clinical factors such as well-developed ridge anatomy, healthy denture supporting tissues and the absence of xerostomia seem to be beneficial in terms of denture use by patients.

A standard protocol was adopted for all the patients enrolled in this study both in the clinical and laboratory set up to ensure the same standard in the technical quality as much as possible. All the participants in this study were exclusively managed only by the authors in all the clinical stages. All three of them were qualified prosthodontists and had more than ten years of working experience as prosthodontists. Many participants of the study would have felt better realizing the fact that they are being treated by the experienced clinicians compared to the students. While this was designed in this manner to ensure the quality of the treatment outcome, it can be considered as a limitation considering the routine patients managed in the Department who would be exposed to clinicians and dental students with different levels of clinical and communication skills.

5. Conclusion

It can be concluded that the patient factors, clinical factors or technical quality of dentures do not predict the patients' general satisfaction with dentures at one-year post insertion stage. Clinical factors and technical quality of dentures show significant positive correlations with use of dentures by the patients. Clinical factors and the technical quality of the dentures are not associated with perception score. Personality factors are neither associated with use nor perception of the dentures. Patients who are generally satisfied with their dentures show higher perception scores in terms of

patient perceived denture retention, comfort, masticatory efficiency and esthetics of dentures.

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