Dentist-Patient Communication and Denture Quality Associated with Complete Denture Satisfaction Among Taiwanese Elderly Wearers

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Purpose: The aim of this study was to explore individual (ie, sociodemographic characteristics, patient personality) and clinical factors (ie, dentist-patient communication, denture quality) associated with complete denture satisfaction among the Taiwanese elderly population. ***Materials and Methods:*** A multistage sampling and cross-sectional design was used to collect data. A total of 387 fully edentulous citizens, aged 65 years and older and who had received new sets of complete dentures, were selected. The participants completed clinical dental examinations and questionnaires by personal interview to collect information on denture satisfaction and associated variables. The relationship among three groups of these participants (satisfied, neutral, and dissatisfied) and potential factors were simultaneously examined using polytomous logistic regression analysis. ***Results:*** Overall, 36.7% of the participants were dissatisfied with their dentures. Living status (crude odds ratio [COR] = 2.04), personality (COR = 4.86), dentist-patient communication (COR = 7.46), and denture quality (COR = 5.02) were associated with complete denture satisfaction. The multivariate regression model showed that dentist-patient communication (adjusted odds ratio [AOR] = 6.41) and denture quality (AOR = 4.40) were significant complete denture satisfaction factors that diluted the effect of living status and personality. ***Conclusions:*** Inadequate dentist-patient communication and low denture quality were associated with the dissatisfaction of patients with dentures. To increase complete denture satisfaction, the importance of training programs aimed at enhancing dentist-patient communication and denture quality cannot be overemphasized. *Int J Prosthodont 2015;28:531–537. doi: 10.11607/ijp.4223*

Despite the development of dental implant therapy over the last few decades, conventional complete dentures remain the most common treatment choice for fully edentulous patients. The growing population of elderly adults worldwide and the extended edentulism state have increased the need for successful denture fabrication.

Previous studies have indicated that denture satisfaction is strongly correlated with quality of life.[1,2] However, investigations of patient satisfaction in wearing dentures show that more than 30% of wearers report dissatisfaction with their dentures.[3,4] Several factors are considered important in determining patient satisfaction and have gained substantial attention. The effect of sociodemographic variables such as sex, age, and education level on denture satisfaction is inconsistent among various studies.[5–7] Investigations of the influence of living status on denture satisfaction are still rare. However, living status reflects patients' social support systems and may affect denture satisfaction. Carlsson[8] has suggested that psychological factors are extremely crucial in the acceptance of and adaptation to removable dentures, but the relative importance of personality type on denture satisfaction is still nebulous.[6,9,10]

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De Van[11] indicated that a dentist should meet the mind of the patient before meeting the mouth in the oral care of edentulous elderly people. Sufficient dentist-patient communication is considered an essential tool in helping older people understand the fabrication and wearing of dentures.[12,13] Poorly fitting dentures may affect masticatory function, speaking ability, and esthetics. Previous research has indicated a significant association between denture satisfaction and denture quality.[14,15] However, De Lucena et al[3] and Wolff et al[16] observed that denture satisfaction was unassociated with denture quality.

Unfortunately, some of the studies examining the association among these factors and denture satisfaction were performed using relatively small population samples. And so far, the research that has addressed the interrelationships among those factors has been scant. Thus, the purpose of this study was to investigate the individual (ie, sociodemographic characteristics, patient personality) and clinical factors (ie, dentist-patient communication, denture quality) associated with complete denture satisfaction, and their interrelationships in the Taiwanese elderly population.

Materials and Methods

The participants were randomly selected from a large group of patients who received dentures free of charge from the Kaohsiung Department of Health. The inclusion criteria included living independently in a community and having the ability to communicate with others. Stratified random sampling methods were used based on the proportion of the elderly population in 11 districts of Kaohsiung City, in which 5 districts were first chosen and then 23 villages were randomly selected from 114 villages. Among the population pool, 440 participants were randomly selected, 387 of which (88.0%) provided complete data on the variables of interest used in this study. All participants had worn complete dentures for at least 3 months and exhibited no signs or symptoms of temporomandibular joint disorders.

The participants were assessed using structured questionnaires and clinical examinations. The structured questionnaires were administered by well-trained dental hygiene students from Kaohsiung Medical University. Personality characteristics and denture quality evaluations were conducted by prosthodontic specialists or graduates with extensive training in prosthodontics. This study was approved by the Institutional Review Board of Kaohsiung Medical University.

Instrument

An anonymous questionnaire was used to collect data via face-to-face interview. The questionnaire was based on recent literature[7,13,15] and reviewed by a panel of clinical experts for face and content validity. To ensure that participants understood the content, the questionnaire was piloted in a convenience sample of 10 edentulous citizens. Items were revised as needed according to the results of the pilot test. An additional 30 edentulous citizens completed the revised questionnaire to determine the test-retest reliability of the scales over a 2-week interval.

Outcome Variable: Denture Satisfaction

Participants were asked to assess their level of general satisfaction with their dentures using a 5-point Likert-type scale (very satisfied, satisfied, neutral, dissatisfied, and very dissatisfied). Perceived denture satisfaction was subsequently classified into three groups—satisfied, neutral, and dissatisfied—for analysis purposes. The Cohen's kappa for assessing test-retest reliability was 0.95.

Independent Variables

Sociodemographic data included participant age, sex, education level, and living status.

The House classification system[17] was used to rate patient personality characteristics because it allowed easy assessment of elders in dental offices without risk of legal ramifications.[18] Personality characteristics were divided into four groups: philosophical, exacting, hysterical, and indifferent. Based on the suggestion provided by House and our clinical experience, which indicated that exacting, hysterical, and indifferent groups are difficult to manage, we combined these three groups into a nonphilosophical group. An examiner comparison was performed. The Cohen's kappa was 0.84. The test-retest reliability for a 2-week interval was 0.87.

Dentist-patient communication was assessed by asking participants, "Did you perceive sufficient communication from the dentist during the treatment course?" The response choices were never, rarely, seldom, often, and always. To facilitate statistical analysis of the effect of dentist-patient communication on denture satisfaction, participants who answered with never, rarely, or seldom were classified as the no group, and those who answered always and often were classified as the yes group. This item was scored using no (0 points) and yes (1 point). The Cohen's kappa was 0.93.

Table 1 Crude Odds Ratio (COR) and 95% Confidence Intervals (CIs) for Patients' Complete Denture Satisfaction Associated with Denture Quality (FAD Criteria) in Polytomous Logistic Regression Models

Parameter	Satisfied n (%)	Neutral n (%)	COR (95% CI)	Dissatisfied n (%)	COR (95% CI)
1 Freeway space (FWS)					
Adequate	91 (67.4)	73 (68.2)	1.00	99 (69.7)	1.00
Wrong	45 (32.6)	34 (31.8)	0.96 (0.56, 1.65)	43 (30.3)	0.90 (0.54, 1.49)
2a Occlusion					
Balanced	112 (81.2)	92 (86.0)	1.00	93 (65.5)	1.00
Slide	26 (18.8)	15 (14.0)	0.70 (0.35, 1.40)	49 (34.5)	2.27 (1.31, 3.93)*
2b Articulation					
Minimal displacement	99 (71.7)	84 (78.5)	1.00	76 (53.5)	1.00
Excessive displacement	39 (28.3)	23 (21.5)	0.70 (0.39, 1.26)	66 (46.5)	2.20 (1.34, 3.62)*
3a Maxillary retention (resistance to vertical pull)					
Adequate resistance	108 (78.3)	83 (77.6)	1.00	82 (57.7)	1.00
No resistance	30 (21.7)	24 (22.4)	1.04 (0.57, 1.91)	60 (42.3)	2.63 (1.56, 4.45)**
3b Maxillary retention (tongue control, incision test)					
Denture stabilized by tongue	125 (90.6)	96 (89.7)	1.00	107 (75.4)	1.00
Tongue remains in mouth floor	13 (9.4)	11 (10.3)	1.10 (0.47, 2.57)	35 (24.6)	3.15 (1.58, 6.25)**
4a Maxillary stability (lateral displacement)					
No lateral displacement	116 (84.1)	87 (81.3)	1.00	96 (67.6)	1.00
Lateral displacement	22 (15.9)	20 (18.7)	1.21 (0.62, 2.36)	46 (32.4)	2.53 (1.42, 4.49)*
4b Maxillary stability (pronounced rocking)					
No pronounced movement	113 (81.9)	84 (78.5)	1.00	92 (64.8)	1.00
Pronounced movement	25 (18.1)	23 (21.5)	1.24 (0.66, 2.33)	50 (35.2)	2.46 (1.41, 4.27)**
5a Mandibular stability (displacement)					
Mandibular denture stays in place	104 (75.4)	90 (84.1)	1.00	83 (58.5)	1.00
Noticeably displaced	34 (24.6)	17 (15.9)	0.58 (0.30, 1.10)	59 (41.5)	2.17 (1.30, 3.63)*
5b Mandibular stability (pronounced movement)					
No pronounced movement	119 (86.2)	98 (91.6)	1.00	91 (64.1)	1.00
Pronounced movement	19 (13.8)	9 (8.4)	0.58 (0.25, 1.33)	51 (35.9)	3.51 (1.94, 6.35)**
5c Mandibular stability (anteroposterior movement)					
No movement	91 (65.9)	73 (68.2)	1.00	62 (43.7)	1.00
Movement	47 (34.1)	34 (31.8)	0.90 (0.53, 1.55)	80 (56.3)	2.50 (1.54, 4.05)**

*$P < .01$; **$P < .001$.

We evaluated denture quality following the Functional Assessment of Dentures (FAD) criteria that were validated and modified by Anastassiadou et al[19] and initially reported by Corrigan et al[20] (Table 1). The evaluations were scored dichotomously and were equally weighted to produce an overall assessment of complete dentures, in which good interrater reliability with a Kappa coefficient range of 0.87 to 0.93 was achieved. The intraclass Kappa coefficient for a 2-week interval was 0.82 to 0.90. Denture quality was classified as high or low based on the median FAD scores.

Statistical Analysis

No collinearity was observed among variables. The association between satisfied, neutral, and dissatisfied elderly adults and their individual and clinical factors were simultaneously examined using polytomous logistic regression. To assess the unadjusted and adjusted association, both univariate and multivariate regression models were estimated. Only those factors that were determined to be significant using univariate regression were included in the multivariate regression models. The relationship between independent and dependent variables was evaluated using odds ratio (OR) and confidence interval (CI) (95%).

Results

As shown in Table 2, 36.7% (n = 142) of participants were dissatisfied with their dentures. The mean age of participants was 74.39 ± 5.60 years with 231 (59.7%) participants aged 65 to 74 years and 156 (40.3%) aged 75 years or older. Concerning education level, 249 (64.4%) participants were illiterate or had completed elementary school and 138 (35.6%) had completed junior high or above. The majority (81.9%) of the participants lived with their spouse or children. Most (92.2%) of the participants were philosophical, and approximately 60% perceived sufficient communication with

Table 2 Distribution of Individual Factors, Clinical Factors, and Complete Denture Satisfaction

	Total (N = 387)	
Variables	n	%
Complete denture satisfaction		
Very satisfied	31	8.0
Satisfied	107	27.6
Neutral	107	27.6
Dissatisfied	116	30.0
Very dissatisfied	26	6.7
Sex		
Male	248	64.1
Female	139	35.9
Age (y)		
65–74	231	59.7
≥ 75	156	40.3
Education level		
Illiterate	66	17.1
Elementary	183	47.3
Junior high	52	13.4
High school or above	86	22.2
Living status		
Alone	65	16.8
With spouse	125	32.3
With children	192	49.6
With relatives	2	0.5
With others	3	0.8
Personality		
Philosophical	357	92.2
Indifferent	11	2.8
Hysterical	4	1.0
Exact	15	3.9
Dentist-patient communication		
Yes	235	60.7
No	152	39.3
FAD scores*		
High (≥ 8)	230	59.4
Low (< 8)	157	40.6

*Classification of denture quality as high or low was based on the median FAD score.

the dentist. The mean FAD score was 7.29 ± 0.12 and the median FAD score was 8, so we classified FAD scores ≥ 8 as high and scores < 8 as low.

The univariate analysis revealed that the significant factors associated with complete denture dissatisfaction were living alone (crude odds ratio [COR] = 2.04), nonphilosophical personality (COR = 4.86), perception of insufficient communication with the dentist (COR = 7.46), and low FAD scores (COR = 5.02) (Table 3).

We further explored complete denture satisfaction with each FAD criterion in univariate regression models, as shown in Table 1. Improper occlusion, improper articulation, inadequate maxillary retention, inadequate maxillary stability, and inadequate mandibular stability carried a higher risk of complete denture dissatisfaction than the other criteria.

Table 4 shows individual and clinical factors of complete denture dissatisfaction in the multivariate regression models. Patients who did not receive sufficient communication from their dentist were 6.41 times (95% CI = 2.63–15.61) more likely to be dissatisfied with their dentures than were other patients. Furthermore, patients with low FAD scores were 4.40 times (95% CI = 1.76–11.02) more likely to be dissatisfied with their dentures than were other patients. The interaction term of dentist-patient communication and FAD scores was not associated with patients' complete denture dissatisfaction. Dentist-patient communication was unable to moderate the effect of denture quality on complete denture satisfaction, and vice versa.

Discussion

The major results of this study indicated that elderly adults who received sufficient dentist-patient communication and better-quality dentures exhibited satisfaction with their dentures. We also found that dentist-patient communication and denture quality diluted the effect of the personality factor and living status; this finding contradicts the previous concept that personality characteristics affect denture satisfaction.[6,8,9]

The results regarding the effect of denture quality on denture satisfaction were consistent with findings of previous studies.[14,15] Furthermore, the study results indicated that dentists could increase denture satisfaction by improving all FAD domains except freeway space. The nonsignificant effect of freeway space on general denture satisfaction is related to patient adaptation to a slight vertical dimension discrepancy. Development of effective clinical skills and technical procedures to improve denture occlusion, articulation, maxillary retention, maxillary stability, and mandibular stability contributed to improving complete denture satisfaction. The effect of factors such as denture-bearing anatomical conditions and patient arch relationships on denture quality are not included in this investigation and should be studied in the future.

As previously stated[11,13] we confirmed that management of patients requiring complete denture treatment depends on optimal dentist-patient communication. Several studies regarding the emotional effects of tooth loss among elderly adults have shown that more than 20% of elderly people have experienced difficulty in accepting tooth loss and adapting to their prostheses.[21,22] Dentist-patient communication might play a crucial role in consoling patients and helping them rebuild confidence while managing their edentulism.

Table 3 Crude Odds Ratio (COR) and 95% Confidence Intervals (CIs) for Patients' Complete Denture Satisfaction Associated with Individual and Clinical Factors in Polytomous Logistic Regression Models

Parameter	Satisfied n (%)	Neutral n (%)	COR (95% CI)	Dissatisfied n (%)	COR (95% CI)
Individual factors					
Sex					
Men (reference)	93 (67.4)	66 (61.7)	1.00	89 (62.7)	1.00
Women	45 (32.6)	41 (38.3)	1.28 (0.76, 2.18)	53 (37.3)	1.23 (0.75, 2.01)
Age (y)					
< 75 (reference)	83 (60.1)	65 (60.7)	1.00	83 (58.5)	1.00
≥ 75	55 (39.9)	42 (39.3)	0.98 (0.58, 1.63)	59 (41.5)	1.07 (0.67, 1.73)
Education level					
Illiterate (reference)	24 (17.4)	18 (16.8)	1.00	24 (16.9)	1.00
Elementary school	56 (40.6)	58 (54.2)	0.70 (0.31, 1.61)	69 (48.6)	0.86 (0.41, 1.81)
Junior high school	22 (15.9)	12 (11.2)	0.73 (0.29, 1.85)	18 (12.7)	0.82 (0.35, 1.90)
High school or above	36 (26.1)	19 (17.8)	1.38 (0.68, 2.82)	31 (21.8)	1.23 (0.63, 2.40)
Living status					
With someone (reference)	122 (88.4)	88 (82.2)	1.00	112 (78.9)	1.00
Alone	16 (11.6)	19 (17.8)	1.65 (0.80, 3.38)	30 (21.1)	2.04 (1.06, 3.95)*
Personality					
Philosophical (reference)	134 (97.1)	99 (92.5)	1.00	124 (87.3)	1.00
Nonphilosophical	4 (2.9)	8 (7.5)	2.71 (0.79, 9.24)	18 (12.7)	4.86 (1.60, 14.77)**
Clinical factors					
Dentist-patient communication					
Yes (reference)	110 (79.7)	76 (71.0)	1.00	49 (34.5)	1.00
No	28 (20.3)	31 (29.0)	1.60 (0.89, 2.89)	93 (65.5)	7.46 (4.34, 12.80)***
FAD score					
High (≥ 8) (reference)	101 (73.2)	79 (73.8)	1.00	50 (35.2)	1.00
Low (< 8)	37 (26.8)	28 (26.2)	0.97 (0.55, 1.72)	92 (64.8)	5.02 (3.02, 8.37)***

*$P < .05$; **$P < .01$; ***$P < .001$.

The results suggest that developing effective dentist-patient communication skills is an excellent strategy for improving denture satisfaction. Promoting dental professionalism and creating a supportive relationship with patients via dentist-patient communication includes providing sufficient information at the treatment-planning stage and throughout the treatment course. Patients should be completely informed regarding the denture fabrication procedures used, denture-wearing episodes and after-care concerns, individual follow-up schedules, and instructions related to nutrition, speech, nocturnal wear, and denture hygiene.

We observed that good dentist-patient communication alone could not compensate for the effect of poor denture quality. By contrast, denture quality did not modify the effect of dentist-patient communication. In other words, ameliorating denture quality did not alleviate the effect of poor dentist-patient communication on denture satisfaction. Because dentist-patient communication and denture quality exert distinct effects on denture satisfaction, intervention programs aimed at promoting denture satisfaction should include methods for enhancing dentist-patient communication and improving denture quality.

We observed no significant difference in denture satisfaction related to sex, age, or education level. Our findings concur with other studies.[4,5,23] Living status and personality were not statistically significant factors after controlling for the effects of other individual and clinical factors. This means enhanced dentist-patient communication and good denture quality may help reduce complaints about dentures from nonphilosophical elders who live alone. This finding could support Goldstein's[18] suggestion that dentists should establish better communication with patients, particularly when cues of psychological problems emerge. It also might explain why complaints come from some complete denture patients who require more comprehensive care.[24]

A cross-sectional design was used in this study, which precluded exploring the causal associations between the factors considered and denture satisfaction. Prospective longitudinal studies examining these causal relationships are needed. Other questionnaires should be used to increase the integrity of the personality assessment. The denture satisfaction scores obtained in this study relied on a single item; however, the reliability was acceptable. The sample was selected from the population of southern Taiwan, which

Table 4 A Multivariate Polytomous Logistic Regression Analysis of Patient's Individual and Clinical Factors Related to Complete Denture Dissatisfaction

	Neutral vs Satisfied		Dissatisfied vs Satisfied	
Parameter	AOR†	(95% CI)	AOR†	(95% CI)
Individual factors				
Sex				
Male (reference)	1.00		1.00	
Female	1.23	(0.69, 2.21)	1.19	(0.64, 2.21)
Age				
< 75(reference)	1.00		1.00	
≥ 75	1.03	(0.61, 1.75)	0.96	(0.55, 1.67)
Educational level				
Illiterate (reference)	1.00		1.00	
Elementary school	0.84	(0.34, 2.07)	1.50	(0.60, 3.76)
Junior high school	0.77	(0.29, 2.05)	0.72	(0.27, 1.96)
High school or above	1.56	(0.73, 3.35)	1.41	(0.63, 3.14)
Living status				
With someone	1.00		1.00	
Alone	1.62	(0.77, 3.37)	1.69	(0.80, 3.54)
Personality				
Philosophical	1.00		1.00	
Nonphilosophical	2.53	(0.68, 9.35)	1.95	(0.58, 6.54)
Clinical factors				
Dentist-patient communication				
Yes (reference)	1.00		1.00	
No	1.27	(0.42, 3.90)	6.41	(2.63,15.61)*
FAD score				
High (reference)	1.00		1.00	
Low	0.84	(0.27, 2.60)	4.40	(1.76,11.02)**
Dentist-patient communication × FAD score	1.09	(0.29, 4.08)	0.97	(0.30, 3.14)

†AOR was adjusted for covariates in the table.
*P < .001; **P < .01.
AOR = adjusted odds ratio; CI = confidence interval.

limited the generalizability of the study results to other areas. We suggest that future studies be conducted in heterogenous populations to confirm the validity of these results.

Conclusions

The findings of this study show that dentist-patient communication and denture quality independently and strongly influence the denture satisfaction of elderly adults who wear complete dentures. The importance of training programs for dentists and oral health care providers aimed at enhancing dentist-patient communication should be emphasized. Additional efforts should be made to improve denture quality through development of clinical skills and technical procedures for enhancing denture occlusion, articulation, retention, and stability to increase the satisfaction of patients with their dentures.

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Literature Abstract

Bioactive and thermally compatible glass coating on zirconia implants

Zirconia dental implants are an alternative to titanium dental implants, and their healing time can be reduced by the use of bioactive glass coatings. Bioglass 45S5 is considered the gold standard but is thermally incompatible with zirconia. A novel glass (PC-XG3) was made substituting CaO with MgO and Na_2O with K_2O in Bioglass 45S5 to more closely match the coefficient of thermal expansion (CTE) of zirconia. Smooth and microstructured coatings were sprayed onto zirconia. Bioactivity, using simulated body fluid (SBF), was measured. Insertion and removal tests were done using bovine rib. Cytocompatibility was tested using mouse fibroblasts. The results indicated both smooth and microstructured coating stability were good as a result of the more closely matched CTE with zirconia. Similar silica-rich and Ca/P layers were found after storage in SBF compared with the 45S5 control. The coating survived insertion torques of 60 Ncm and removal torques of 140 Ncm. PC-XG3 was cytocompatible, satisfying a basic requirement for clinical use. The potential for accelerated healing is promising, although observations based on SBF results alone should be interpreted with caution.

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