Relationship Between the Satisfaction of Removable Denture Patients and Nutritional Status

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Abstract

The success of prosthodontics treatment is affected by the dentist's assessment and patient satisfaction. This study aims to analyze the relationship between the satisfaction of removable denture patients and nutritional status in the pre-elderly and elderly patients.

Eighty-eight subjects (27 males and 61 females) aged 45 years and older who wear removable dentures participated in this cross-sectional study. Data collection of subjects, oral examination, and interviews were conducted using Turker's Patient's Perceptions-ID and Mini Nutritional Assessment–Short Form(MNA-SF) questionnaire. Univariate and bivariate data analysis, specifically the Kendall correlation hypothesis test, Chi-square, Mann-Whitney, and Kruskal Wallis, was performed using SPSS software version 25 to determine a correlation between variables. Statistical significance was set at $p<0.05$.

There was a significant relationship with a strong positive correlation between the patient satisfaction level of removable denture and nutritional status with a p-value of Mann-Whitney test <0.001 and Kendall correlation value of 0.907. Furthermore, the satisfaction of patients and nutritional status had a significant relationship with age and level of education($p<0.05$). In Conclusion, there is a relationship between satisfaction of removable denture patients and nutritional status. The higher the satisfaction of patients with the denture they use, the better their nutrition. Age and level of education also contribute to the satisfaction of removable denture patients and their nutritional status.

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Introduction

Based on the World Health Organization (WHO) data, between 2015 and 2050, the population aged over 60 will double from 12% to 22%.[1] Half of the elderly (>59 years old) population experiences health complaints, including oral health problems, and tooth loss is experienced in 55% of the 45 years and older age group.[2,3] Loss of teeth can cause drifting of the adjacent teeth and tooth extrusion, change in speaking ability, loss of self-confidence, discomfort in personal appearance, and reduction of mastication ability.[4,5] From the

previous study, it was suggested that the occlusal state affected the masticatory efficiency of elderly patients.[5] The change in mastication ability will impact the nutrition intakes and status, therefore missing teeth need to be replaced.[6]

One of the treatment plans for someone with a tooth loss condition is to utilize removable dentures.[6-8] An excellent removable denture treatment should be able to restore missing teeth and structures, masticatory function, and aesthetic aspect.[5,9] The success criteria of denture treatment are based not only on the dentist's assessment but also on the patient's assessment.[10] The treatment is considered successful if the denture has good retention and stabilization, adequate supports, harmonious occlusion, and pleasing aesthetic aspects.[8] On the other side, patients will evaluate success from their personal satisfaction.[11]

Previous research has stated that prosthodontic treatment can affect nutritional status as the mastication ability improves. Whether this nutritional status is only influenced by the dentist's

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assessment of what is considered successful treatment or the patient's perception also affects the nutritional status is not yet known. Therefore, this study aims to analyze the relationship between satisfaction of removable dentures patients and nutritional status in pre-elderly and the elderly.

Materials and methods

This study was approved by the Faculty of Dentistry University of Indonesia ethics committee number 78/Ethical Approval/FKGUI/VIII/2019. Data collection was conducted for over three months using a consecutive sampling method (non-probability sampling). Participants who met the inclusion criteria (above 45 years and using a removable denture made by a dentist) were included. This study is a cross-sectional study. The sample size was calculated using an unpaired categorical analysis formula for cross-sectional analytic research, and it was found that the minimum number of samples for this study was 54 subjects. A total of 88 subjects were willing to participate in this study and signed the informed consent. Data were collected at a community health center and dental clinic located in Jakarta, Depok, and Tangerang. Subject's personal information and oral examination data were collected, and interviews using Turker's patient's perceptions-ID and MNA-SF were conducted.

The Turker's patient's perceptions questionnaire covering various important factors related to the removable dentures treatment. The questionnaire consists of 11 questions covering six clinical aspects (tasting, ease of chewing, ease of cleaning, comfort, the effect of denture speech, and general patient satisfaction).[12] The first 10 question has a 1-7 score and the eleventh question has 1-10 score. A total score of <56 was considered not satisfied with their denture, whereas a score of 56-80 was considered satisfied with their denture. Meanwhile, the MNA-SF questionnaire consists of six questions with 14 as its maximum score. A total score of 0-7 was considered malnutrition, 8-11 at risk of malnutrition, and a score of 12-14 was deemed to be normal nutritional status.[13, 14]

In this study, subjects were also categorized by age (Pre-elderly and elderly), gender, educational level, and duration of denture usage (0-3 years and >3 years). The Educational level variables were divided into three groups of education, including low (not finished elementary school), middle (elementary and junior high school), and high (high school, bachelor's education, and beyond).

Statistical Analysis

All data were analyzed using SPSS software version 25. Univariate data analysis was conducted to determine the frequency distribution and percentage of each variable on the subjects. A Kendall bivariate analysis was used to determine the correlation between the satisfaction of removable denture patients and nutritional status. Chi-Square was then used to compare and describe the relationship between categorical variables. Kruskal Wallis and Mann-Whitney post-hoc analyses were used to determine the relationship between groups on the educational level with the satisfaction of removable denture patients and nutritional status. Statistical significance was set at $p < 0.05$.

Results

The distribution of research subjects can be seen in Table 1, Whereas the majority of subjects were in the 45-59 years old (pre elderly) group and the rest were above 60 years old (elderly) group. Subjects were also grouped based on gender, educational level, duration of denture usage, patient satisfaction, and nutritional status.

Variables	N	Frequency
Age		
– 45-59	53	60.2%
– ≥ 60	35	39.8%
Gender		
– Male	27	30.7%
– Female	61	69.3%
Education Level		
– - Low	2	2.3%
– - Basic	9	10.2%
– - High	77	87.5%
Duration of denture usage		
– -0-3 year	17	19.3%
– ->3 year	71	80.7%
Satisfaction of patient		
– Not Satisfied	32	36.4%
– Satisfied	56	63.6%
Nutritional Status		
– Malnutrition	3	3.4%
– At-Risk of Malnutrition	26	29.5%
– Normal	59	67.0%

Table 1. Distribution of Subjects.

	Nutritional Status						P-value
	Malnutrition		At Risk of Malnutrition		Normal		
	n	%	n	%	n	%	
Not Satisfied	3	9.4%	26	81.3%	3	9.4%	<0.001
Satisfied	0	0%	0	0%	56	100%	
Total	3	3.4%	26	29.5%	59	67%	

Table 2. Mann-Whitney Test on Satisfaction of patient and nutritional status.
*Mann-Whitney Test: Average rank Not satisfied 19.13; satisfied 59.

Mann Whitney test showed (Table 2) patient satisfaction of removable denture users with nutritional status showed significant results (p = <0.001). This means that there is a relationship between the satisfaction of removable denture patients and their nutritional status. A correlation test was performed to determine the strength of the relationship between satisfaction of removable denture patients and nutritional status. Kendall correlation test was used because the variables tested are categorical. The correlation between patient satisfaction level and nutritional status can be seen in Table 3.

		Nutritional Status Level
Satisfaction of patient	R	0.907
	p	**0.000**
	n	88

Table 3. Correlation of patient satisfaction level and nutritional status.
*Kendall Correlation Test.

		Patient's satisfaction				
		Satisfied		Not Satisfied		P
		N	%	N	%	
Age	45-59	42	79.2%	11	20.8%	0.000*
	>59	14	40.0%	21	60.0%	
Gender	Male	19	70.4%	8	29.6%	0.526
	Female	37	60.7%	24	39.3%	
Education Level	Low	0	0.0%	2	100%	0.019*
	Basic	3	33.3%	6	66.7%	
	High	53	68.8%	24	31.2%	
Duration of Denture Usage	0-3 year	10	58.8%	7	41.2%	0.858
	>3 year	46	64.8%	25	35.2%	

Table 4. The relationship between sociodemographic status factors and duration of removable dentures usage on patient satisfaction.
*: P value <0.05, there is a significant relationship.

There is a significant correlation between patient satisfaction and nutritional status (p = 0.000). Kendall Correlation value of 0.907 shows that the correlation between the satisfaction level of removable denture patients to the nutritional status level has a positive correlation with a very strong correlation. This illustrates, the higher the patient satisfaction level, the better their nutritional status is.

The relationship between the sociodemographic factors and duration of removable denture usage on patients satisfaction are shown in Table 4. The bivariate test showed that age and level of education have a statistically significant relationship towards satisfaction of removable denture patients (p<0.05) (Table 4). A post-hoc test was performed to determine which groups of levels of education have statistically significant differences in the satisfaction level towards removable denture usage. After a post-hoc test was performed, it was shown low and high education levels have a statistically significant relation to the satisfaction of patients (p = 0.036).

The next step in the current study was to look at the relationship between sociodemographic status factors (age, gender, education), duration of removable denture usage, towards nutrition status using bivariate analysis, Chi-square test, which can be seen in Table 5.

		Nutritional Status						P
		Normal		At risk of malnutrition		Malnutrition		
		N	%	N	%	N	%	
Age	45-59	44	83.0%	8	15.1%	1	1.9%	0.000*
	>59	15	42.9%	18	51.4%	2	5.7%	
Gender	Male	21	77.8%	5	18.5%	1	3.7%	0.000*
	Female	38	62.3%	21	34.4%	2	3.3%	
Education Level	Low	0	0.0%	2	100%	0	0.0%	0.008*
	Basic	3	33.3%	5	55.6%	1	11.1%	
	High	56	72.7%	19	24.7%	2	2.6%	
Duration of Denture Usage	0-3 year	11	64.7%	5	29.4%	1	5.9%	0.648
	>3 years	48	67.6%	21	29.6%	2	2.8%	

Table 5. The relationship between sociodemographic status factors and duration of removable dentures usage to nutritional status.
*: P value <0.05, there is a significant relationship.

Bivariate analysis test showed the age, gender, and level of education have a significant relationship with nutritional status using the MNA-SF questionnaire (p<0.05). Post-hoc tests were performed to determine which groups of level of education that have statistically significant differences in patient's nutritional status. The post-

hoc test showed that low and high education groups (p = 0.033) and basic and higher education (p = 0.014) groups have a statistically significant relation to patient's nutritional status.

Discussion

In achieving denture treatment success, conducting a patient satisfaction assessment of denture treatment has an important role. Dentures that function properly can optimize the function of mastication so that nutrient intake can be fulfilled.[6,15] The MNA-SF was used in this study because it is a valid and reliable tool for the assessment of nutritional status. The use of this questionnaire is also easy and only requires a little time.

This study indicates that the satisfaction of using dentures can be directly related to nutritional status. Of 88 study subjects, 63.6% were satisfied with their dentures and had normal nutritional status; however, 36.4% others were dissatisfied with their dentures and had varying levels of nutritional status, with 81.3% of subjects included in the risk of malnutrition group. Several other factors related to patient dissatisfaction with dentures were not examined in this study, such as patient's psychological factors.[12, 16] This may explain why some of the subjects of this study were dissatisfied with the denture.

Patient's perceptions can be different in receiving treatment. Some patients can tolerate poor quality care, and other patients might be dissatisfied with the treatment even though it is the best treatment that can be given.[12] The different perceptions between patients and doctors related to the results of their treatment explain why there are variations in nutritional status in dissatisfied subjects in this study. It is possible that the subjects in this study stated they were not satisfied with their dentures but had good nutritional status because the quality of their dentures was actually good; however, still, the subjects considered them as not suitable.

This study analyzed the relationship between sociodemographic factors and duration of removable dentures usage on patient satisfaction. This study found a relationship between age and patient satisfaction, in which older patients are more challenging to be satisfied than the younger patients. Previous studies have different results of the relationship between age and patient satisfaction. Some studies stated both have a significant relationship, and some do not.[17, 18] The age classification used will likely affect the results of each study.

The results of this study indicate that gender does not have a significant relationship with the level of patient satisfaction. Research has stated that women are known to have a lower level of satisfaction with appearance than men.[17] The difference in these results may be caused by more factors being assessed on the Turker's Patient's Perceptions questionnaire. Duration of removable dentures usage also has no relationship with patient satisfaction. The large percentage of subjects who have used dentures for more than three years is likely to influence the results of this study. Each person needs time to adapt to their dentures. Someone who uses dentures for more than three years will be familiar with their dentures. Generally, individual denture users will be able to adapt well within 6-8 weeks from the first insertion of dentures.[19]

In the previous study, it was reported that higher education attainment was associated with higher scores on the health literacy aspects, appraisal of health information, and navigating the healthcare system.[20] The result of this study is in accordance with that statement, where significant differences were found in the basic and higher education groups. Good health literacy allows one to understand better and be critical of the treatment that they do. So that during the treatment process, they can be more critical and give an opinion and contribute to the treatment process.

This research also analyzed the relationship between sociodemographic factors and duration of removable dentures usage on nutritional status. The results indicate a relationship between age and gender with nutritional status using the MNA-SF questionnaire. As we get older, there will be some changes in body condition. In the aging process, muscle strength and the amount of saliva will be reduced, so it takes longer to chew food.[21] Changes in taste can also cause changes in food choices that might affect nutritional intake and food quality.[21] Some of these changes that occur will affect nutritional status.

This study showed that there are differences in nutritional status in the comparison between basic and high education groups, followed by a comparison between low and high education groups. The result of this study was in line with

previous studies done by El Helou *et al.* that revealed lack of education is significantly associated with a nutritional deficit.[22]

In this study, there was no significant difference in nutritional status between low and basic education groups. The Asian Development Bank in "Analysis of Trends and Challenges in the Indonesian Labor Market" book found that the majority of the Indonesia population with junior high school education and below still work as farm laborers, production workers, or service sector workers with low skills and limit their career advancement hence lower their income. That might explain why in this study, nutritional status in low and basic education has no significant difference because income can affect one's ability to meet their nutritional needs.[23]

The limitation of this study is that it does not evaluate successful denture treatment criteria from the dentist's side, so that the comparison of treatment success assessments between dentists and patients is not illustrated in this study. The sample size of this research is also limited, originating from Jakarta, Depok, Tangerang in Indonesia, precluding its generalizability to other populations.

Conclusions

The results of the present study demonstrated that there is a very strong positive correlation relationship between satisfaction of removable denture patients and nutritional status of pre-elderly and elderly patients. The higher the satisfaction level of patients, the better their nutritional status is. This study also showed relationships between patient satisfaction of removable dentures and nutritional status with age and level of education.

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Declaration of Interest

The authors declare that they have no conflict of interest.

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