

Quality of life related to oral health in adults with removable prosthetic rehabilitation.

Calidad de vida relacionada con la salud oral en adultos con rehabilitación protésica removable.

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Abstract: The evaluation of the oral health-related quality of life (OHRQoL) is important for clinical assessment and could be an indicator of the quality of the treatment received. **Objective:** To evaluate the OHRQoL in adults with removable prostheses in relation with patient characteristics such as age, sex, type and time of use of the prosthesis, previous experience and perception about the stability of the prosthesis. **Materials and Methods:** 217 patients from the Dental Clinic of the National University of San Marcos-Peru were evaluated after rehabilitation with a removable prosthesis. A structured questionnaire was applied by telephone interview. The evaluation of the OHRQoL was carried out using the General/Geriatric Oral Health Evaluation Index (GOHAI). For the statistical analysis, the Mann Whitney U test, the Kruskal-Wallis H test and the Spearman correlation were used. **Results:** The sample included 63 men (29%) and 154 women (71%) with an average age of 66.34. The average GOHAI score was 52.44+8.15. The GOHAI score was related to age ($p=0.241$), sex ($p=0.110$), type of prosthesis ($p=0.069$), previous experience ($p=0.293$), and perception of movement of the prosthesis ($p<0.001$). **Conclusions:** The GOHAI score indicates a moderate quality of life related to oral health after prosthetic rehabilitation. The GOHAI index can be considered effective for the evaluation of the OHRQoL.

Keywords: Quality of life; oral health; mouth rehabilitation; health status indicators; adult; Peru.

Resumen: La evaluación de la calidad de vida relacionada a la salud oral (CVRSO) resulta importante para la valoración clínica pudiendo ser un indicador de la calidad en el tratamiento recibido. **Objetivo:** Evaluar la CVRSO en adultos con rehabilitación protésica removable relacionándola con características de los participantes como edad, sexo, tipo y tiempo de uso de la prótesis, experiencia previa y percepción sobre la estabilidad de la misma. **Materiales y Métodos:** Se evaluaron 217 pacientes de la Clínica Odontológica de la Universidad Nacional Mayor de San Marcos-Perú, posterior a la rehabilitación con prótesis removable. Se aplicó un cuestionario estructurado mediante entrevista vía telefónica. La evaluación de la CVRSO se realizó mediante el índice de Evaluación de Salud Oral General/Geriátrica (GOHAI). Para el análisis estadístico se utilizaron las pruebas de U de Mann Whitney, H de Kruskal-Wallis y correlación de Spearman. **Resultado:** La muestra incluyó 63 hombres (29%) y 154 mujeres (71%) con una edad media de 66.34. La puntuación media del GOHAI fue de 52.44 + 8.15. Se relacionó la puntuación del GOHAI con la edad ($p=0.241$), sexo ($p=0.110$),

tipo de prótesis ($p=0.069$), experiencia previa ($p=0.293$) y percepción de movimiento de la prótesis ($p<0.001$).
Conclusion: La puntuación del GOHAI indica una moderada calidad de vida relacionada a la salud oral después

de la rehabilitación protésica. El índice GOHAI puede considerarse efectivo para la evaluación de la CVRSO.

Palabra Clave: Calidad de vida; salud bucal; rehabilitación bucal; indicadores de salud; adulto; Peru.

INTRODUCTION.

Oral health continues to be a problem in developing countries. The evolution of oral diseases such as caries and periodontal disease results in the loss of teeth, bringing about changes in the oral cavity that contribute to the emergence of eating disorders, loss of social contacts, low self-esteem, and difficulty in speaking. All of these factors negatively affect quality of life and oral health.¹

The World Health Organization considers edentulism as the result of inefficient public health that significantly alters the oral health status and, in turn, undermines people's overall health and reduces quality of life.² A systematic review of several studies reveals the impact of oral health on quality of life.

The Oral Health-Related Quality of Life (OHRQoL) is "a multidimensional construct that includes a subjective evaluation of the individual's oral health, functional well-being, emotional well-being, expectations and satisfaction with care, and sense of self".³ In recent decades, various instruments have been developed to assess the impact of oral diseases on the quality of life of the population.⁴ The Geriatric/General Oral Health Assessment Index (GOHAI)^{6,7} is one of the most widely used methods to measure oral health status, in addition to being one of the first to be designed and developed to measure the functional problems of the oral cavity, the psychosocial impact caused by oral diseases, and lately to assess the efficacy of dental treatment.⁵

Rehabilitative treatment leads to a change in oral health and the use of removable dentures shows a positive impact on OHRQoL, especially on the psychosocial function.⁸ Likewise, the perceived masticatory capacity is important in the assessment.⁹

Preliminary studies show that OHRQoL can be improved after prosthetic treatments.¹⁰ Kaushik *et al.*,¹¹ observed a better OHRQoL and an increase in the score of all GOHAI items 6 and 12 months after rehabilitation with a complete denture.

Likewise, Osman *et al.*,¹² and Ilhan *et al.*,¹³ reported moderate OHRQoL after treatment. Bonnet *et al.*,¹⁴ found a higher GOHAI index score in subjects without experience in the use of dentures.

Additionally, Yen *et al.*,¹⁵ reported a significant association between the perception of an unstable denture and the GOHAI, which indicates that it is an important factor in the assessment of oral health, with lower index scores being observed when patients perceive that their denture suffers from retention and stability problems.

The OHRQoL has important implications for research and clinical practice. Its approach springs from the perception of the individual about their needs, preferences, concerns and satisfaction of the treatment, allowing to modify clinical criteria for the general well-being of the patient, which goes beyond treating only the disease.¹⁶

Few studies evaluate OHRQoL after the insertion of removable dentures and consequently they do not assess the real success of the treatment from the patient's point of view. In preliminary studies, the population has consisted of older adults using complete dentures, with little data available in a younger adult population.

For this reason, the present study aims to evaluate the OHRQoL after rehabilitative treatment with conventional removable dentures in a sample made up of adult and elderly patients treated at a university clinic; relating it to the age, sex, type and length of use of the denture, previous experience and perception of its stability.

MATERIALS AND METHODS.

Study design

A descriptive cross-sectional study was conducted, following the ethical principles established in the Declaration of Helsinki. The study was approved by the Institutional Ethics in Research Committee of the "Daniel Alcides Carrión" Tropical Medicine Institute of Universidad Nacional Mayor de San Marcos, under registration number CIEI-2018-025.

Participants

The population consisted of 495 adult patients who attended the undergraduate clinic of the Faculty of Dentistry of the Universidad Nacional Mayor de San Marcos in Lima, Peru for a rehabilitative treatment with removable prostheses between 2016 and 2018.

The inclusion criteria were: patients who completed their rehabilitation treatment with removable dentures (partial and/or complete, removable, unitary or bimaxillary dentures) performed in the clinic, patients were using the dentures at the time of evaluation and voluntarily agreed to participate in the study.

Patients with some type of mental disability that prevented them from answering the questions in the interview, who had stated that they had not used their dentures in the last month, and those who did not have their telephone numbers registered in their medical history were excluded from the study.

Sample size was obtained with a confidence level of 95%, an expected proportion of 50%, and an accuracy of 5%, resulting in a total of 217 participants. The selection was made in a simple random way through computer generated numbers.

Data collection procedure

A telephone interview was carried out by a trained single interviewer. At the time of the survey, the surveyed patients had spent a minimum of 30 days using their dentures. The average interview length was 15 minutes. Medical records were manually reviewed; the patients' telephone numbers were obtained from them. Later, patients were called up and invited to participate in the study, and the objective of the study was explained to them. Patients gave their verbal informed consent to participate in the interview. Age and sex were registered. Information on their previous denture experience, the type of denture used, and the length of its use was collected from the patient's medical history and verified through the telephone interview.

In the case of those patients who reported not having used their dentures, the reason was stated, and the interview was concluded; they were not included in the present study. However, they were encouraged to return to the clinic for reevaluation. The perception of the mobility of the denture was evaluated through a question in which the interviewee indicated whether or not they perceived movement in their dentures.

To evaluate the oral-health-related quality of life (OHRQoL), a version of the GOHAI index validated in Spanish was used.¹⁷ It consisted of 12 items divided into three dimensions: physical function, including limitations to the intake of food, eating, speaking, chewing and swallowing; psychosocial function, including concern about oral health, dissatisfaction

with appearance, self-perception of oral health, and avoiding social contact due to oral problems; and pain or discomfort, including the use of medications to relieve mouth pain or discomfort.¹⁸

A Likert scale of five categories was used for each question ("Always", "Frequently", "Sometimes", "Seldom", "Never"). Numerical values were assigned between one (Always) and five (Never) according to the protocol established by this index.¹⁷

The sum of the responses for each patient was calculated, obtaining a range between 12 and 60 points. A higher score indicates a better self-perception of the individual's OHRQoL.

A score of 60-57 is considered "high" and corresponds to a satisfactory OHRQoL, 51-56 was considered "moderate", and 50 or less was considered "low", indicating poor OHRQoL.^{6,13}

Before data collection, the instrument's reliability analysis was performed using Cronbach's alpha, and obtaining a p -value of 0.86.

Statistical analysis

The statistical package SPSS version 25.0 (SPSS, Chicago, IL, USA) was used. Descriptive analysis was performed using frequency tables and measures of central tendency. The Kolmogorov-Smirnov test was performed, observing that the data did not present a normal distribution, so the non-parametric Mann-Whitney U test, Kruskal-Wallis H test and Spearman's correlation were used. A significance level of $p < 0.05$ was considered for this study.

RESULTS.

The sample consisted of 217 adult patients using removable dentures. The non-response rate was 6%, mainly due to the fact that the telephone number registered in the medical history was not valid or the patients did not answer the call. The mean age (\pm standard deviation) was 66.34 (± 11.46) years, with a minimum age of 33 and a maximum of 92.

Females were more prevalent (71%), as well as previous denture experience (72.80%), rehabilitation with PRD (49.3%), and non-perception of movement of the denture (68.7%). The average length of use of the evaluated dentures was 13.82 (± 13) months. (Table 1)

To assess the oral-health-related quality of life, the General Oral Health Assessment Index (GOHAI) was used. A moderate OHRQoL (52.44 ± 8.15) was obtained in the patients rehabilitated with a removable denture. It

was observed that pain or discomfort was the dimension of the GOHAI that had closest to the maximum score, and physical function was the dimension with the lowest score. (Table 2)

Sex, age, type of denture used by patients and previous experience with removable dentures were not

significantly associated with the GOHAI score ($p>0.05$). Patients who perceived movement in their removable dentures had a lower GOHAI index score compared to those who did not. A significant association between GOHAI and perception of denture mobility was observed ($p<0.001$). (Table 3)

Table 1. Characteristics of the participants.

Characteristics of the participants		N	%		
Sex	Female	154	71		
	Male	63	29		
Previous experience with dentures	Yes	158	72.80		
	No	59	27.2		
Type of denture	Partial removable dentures	107	49.3		
	Complete	64	29.5		
	Both	46	21.2		
Perception of movement of the denture	YES	68	31.3		
	NO	149	68.7		
		Mean	SD	Min.	Max.
Age		66.34	11.46	33	92
Length of use of the denture (months)		13.82	13.00	1	28

Min: Minimum. Max: Maximum. SD: Standard variation

Table 2. GOHAI Index Dimensions.

GOHAI Index	Mean	SD	Median	Lowest	Highest
Physical function	16.79	3.58	18	5	20
Psychosocial function	22.16	3.97	24	9	25
Pain or discomfort	13.50	1.66	14	6	15
General	52.44	8.15	55	24	60

Min: Minimum. Max: Maximum. SD: Standard variation

Table 3. Relationship between the GOHAI Index and the characteristics of the participants.

		GOHAI Index						p-value
		N	Mean	SD	Median	Lowest	Highest	
Sex*	Female	154	52.97	7.86	56.0	27	60	0.110
	Male	63	51.13	8.75	55.0	24	60	
Type of denture+	PRD	107	53.82	7.03	56.0	27	60	0.069
	Complete	64	51.45	8.87	54.0	27	60	
	Both	46	50.59	9.12	52.5	24	60	
Perception of movement of the denture*	Yes	68	46.50	9.49	49.0	24	60	<0.001
	No	149	55.15	5.72	57.0	34	60	
Previous experience*	Yes	158	52.06	8.33	55.0	24	60	0.293
	No	59	53.46	7.64	56.0	27	60	

Min: Minimum. Max: Maximum. SD: Standard variation. (*): U of Mann Whitney. (+): Kruskal wallis. PRD: Partial removable denture.

By relating the age and the length of denture use with the GOHAI score, Spearman's Rho coefficients of -0.08 , $p=0.241$ and 0.08 , $p=0.237$ respectively, were obtained. A statistically significant relationship between these variables was not found.

DISCUSSION.

Clinical assessment has been insufficient to carry out a comprehensive evaluation. It is important to consider various aspects that may affect oral health to improve clinical management, therefore the evaluation of the oral-health-related quality of life is relevant.

Dentists have been developing various instruments and scales that seek to evaluate OHRQoL.¹⁹ The GOHAI index is an instrument that allows to assess oral health status, dental treatments and detect care needs in the population.

The study was carried out by telephone interview after evaluating the technical feasibility of applying a face-to-face questionnaire, as many patients did not agree to return to the clinic due to time, distance and occupational concerns, which led to a less significant sample for the study.

However, it was considered that when the telephone interview was carried out, the possible effect of body language was controlled and, therefore, the answers provided by the subjects were felt to be significantly objective. Fluid communication was maintained with the patients who were in agreement with the performance of this type of study where information is collected from the patient after their care, evidenced by the high percentage of participation.

A moderate oral-health-related quality of life was observed after the insertion of the removable denture. A limitation of the study, taken into account when interpreting the results, is its cross-sectional design, which does not allow to make inferences about possible changes in OHRQoL before and after treatment.

However, it allows the identification of the behavior of the quality of life of the rehabilitated patient under the assumption that it should be moderate to good. Changes before and after rehabilitation are seen in several longitudinal studies, but these changes in the GOHAI score are not always related to a change in the GOHAI category.

Findings obtained by longitudinal studies, such as that of Ilhan *et al.*,¹³ suggest a moderate oral-health-related quality of life after dental rehabilitation at three months

post-insertion. Osman *et al.*,¹² reported a moderate OHRQoL, observing patient satisfaction with the new dentures. In these studies, as well as in the present work, the sample consisted of patients treated at a university dental clinic, where the procedures are supervised by the teaching clinical staff, taking better control of the procedures and where dentists are expected to provide the best satisfaction for the patient. All these factors could explain the similarity in the results.

Different results were observed in other studies,^{11,15} where the GOHAI score was lower, which could be attributed to the performance of treatments in dental clinics and hospitals where there is no supervision in the insertion of the prostheses, which could be considered as a differential factor with respect to the results of the present study.

When evaluating the OHRQoL dimensions, physical function had a lower score in relation to the other dimensions of the GOHAI index. This is in agreement with the findings of Yen *et al.*,¹⁵ who reported that the lack of recovery in physical function leads to a lower OHRQoL assessment, as one of the main reasons for seeking care in dental services is physical recovery.

The psychosocial dimension had a positive impact on the participants, which shows that the use of removable dentures brings about improvements in social, emotional and affective life. The pain or discomfort caused by the use of the removable dentures was the least reported by the participants; this could be due to the previous experience of the patients, which results in a better adaptation to removable dentures.

Mean GOHAI scores in users of partial dentures were higher compared to those using complete dentures. Similar results were observed by Bonnet *et al.*,¹⁴ who reported higher GOHAI scores in bimaxillary partial denture users and lower scores in users of bimaxillary complete dentures. Similarly, Yen *et al.*,¹⁵ when evaluating the association between dental prostheses and OHRQoL, found that the type of removable dentures had an influence on OHRQoL. In their study, users of bimaxillary partial dentures obtained a better score, and a lower score was observed in users of complete single dentures. These results are probably due to the number of teeth, since treatment possibilities decrease with fewer¹⁵ teeth, and a restorative treatment with a complete denture will not produce the same stability and retention as a partial denture; therefore, it will lead to less comfort and less satisfaction for the patient.

Females presented a higher index score compared to male participants, without a significant difference. This result is related to what was reported by Ilhan *et al.*,¹³

These findings are probably due to the greater concern of women regarding the loss of teeth, and to the fact that when they undergo treatment to replace their missing teeth, they will perceive better oral health. Regarding age, it was shown in other studies that the GOHAI index tends to decrease as the age increases, due to the quality of the residual ridge, number of teeth, and displacement of aesthetic aspects by functional ones in older people.^{11,13}

On the other hand, no relationship was observed between previous denture experience and oral-health-related quality of life; however, a higher score was observed in patients using a removable denture for the first time. Similar results were obtained by Osman *et al.*,¹² and Bonnet *et al.*,¹⁴ These findings could be due to the fact that changes in aesthetics, phonation and function are more noticeable and impactful on patients who have never used removable dentures.

Self-perception varies in relation to previous experience of using removable dentures. Despite the fact that adaptation varies over time, patients perceive a better quality of life as the time of use of the denture increases; a better assessment was made by those who had previous experience.^{20,21}

The perception of the mobility of the denture is not an objective indicator to assess its stability and retention; however, it allows the patients to approach and evaluate the comfort and clinical success of the treatment.

The results evidenced a relationship with quality of life, which is similar to the findings of Yen *et al.*,¹⁵ in which the self-perception of a loose and unstable denture is related to a low OHRQoL. If the rehabilitation with a removable denture manages to meet the expectations regarding stability and retention, the self-perception of OHRQoL will have a positive impact.

Few studies have assessed self-perception of OHRQoL after dental treatment. This study allowed to evaluate the quality of life of patients regarding their oral health after prosthetic rehabilitation carried out at a university clinic by undergraduate dentistry students.

In this context and for academic purposes, the procedures are carried out under teacher supervision and strict control; all the treatments are expected to be of good quality. Consequently, results can be

extrapolated to other populations in similar contexts. The results allowed to identify patients whose quality of life had low scores and/or who did not use their dentures. They were urged to return to the clinic for reevaluation, check-ups and retreatment if necessary, encouraging them to improve their quality of life.

Likewise, the findings of this study contributed to provide the necessary evidence to strengthen monitoring and follow-up activities for the discharged patients.

CONCLUSION.

The prosthetic rehabilitation performed resulted in a moderate oral-health-related quality of life in the patients. Of the variables analyzed in this study, the perception of movement of the removable dentures was associated with a better OHRQoL, with a higher GOHAI score being observed in those patients with better retention and stability of the removable dentures; therefore, it should be considered when assessing the impact of rehabilitation.

The GOHAI index turned out to be a reliable instrument for evaluating oral-health-related quality of life and the level of satisfaction with the treatment.

Conflict of interests: The authors declare that they have no conflict of interest.

Ethics approval: This work was approved by the Institutional Research Ethics Committee of the Instituto de Medicina Tropical "Daniel Alcides Carrión" (IMT-DAC) of the Universidad Nacional Mayor de San Marcos (# CIEI-2018-025).

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