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Oral Health Related Quality of Life of Patients Using Conventional Dentures versus Implant-Supported Overdentures

Ramtin Azar[1*], Hassan Semyari[2], Mohamad Javad Kharazifard[3]

1. Department of Oral and Maxillofacial Radiology, School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran
2. Department of Periodontology, Dental School of Shahed University, Tehran, Iran
3. Dental Research Center, Dentistry Research Institute, Tehran University of Medical Sciences, Tehran, Iran

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**** Corresponding author:***
Department of Oral and Maxillofacial Radiology, School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran

Email: dr.ramtinazar@gmail.com

A B S T R A C T

Objectives: This study aimed to compare the oral health related quality of life (OHRQoL) of patients using conventional dentures versus implant-supported overdentures.

Materials and Methods: This study evaluated the OHRQoL of 90 patients between 35 to 75 years who were selected from several public and private dental clinics in Tehran in 2018. Of all, 45 had conventional dentures of both jaws, and 45 had a mandibular overdenture supported by two implants at the site of mandibular canine teeth and a conventional maxillary denture. The OHRQoL of patients was determined using the Oral Health Impact Prfile-20 (OHIP-20). The questionnaire was translated to Persian, and its content validity and internal consistency were confirmed. Data were analyzed by one-way ANOVA, Mann-Whitney test, and independent t-test.

Results: In the conventional denture group, 46.7% had good, 46.7% had moderate, and 6.6% had poor OHRQoL. These values were 55.6%, 37.8% and 6.6% in the overdenture group, respectively. Level of education had a significant correlation with the total score of OHIP-20 in both groups ($P<0.05$). But no significant association was noted between the residential status and gender of patients with different domains of OHRQoL ($P>0.05$) except for the psychological disability domain, which had a higher mean value in males with conventional dentures ($P<0.05$).

Conclusion: Patients with a mandibular overdenture supported by two implants at the site of canine teeth and a conventional maxillary denture had higher OHRQoL than patients with conventional dentures of both jaws.

Keywords: Dental Prosthesis, Implant-Supported; Dentures; Quality of Life

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INTRODUCTION

Fast resorption of the alveolar ridge following extraction of teeth is a common problem in the elderly that complicates achieving optimal denture retention and stability. To overcome such limitations, implant-supported overdentures were introduced and gained increasing popularity [1,2]. Thus, at present, two options are available for rehabilitation of an edentulous ridge namely conventional dentures and implant-supported overdentures. Evidence shows that

overdentures can provide better retention and stability and are more easily accepted by patients compared with conventional dentures [3]. Also, overdentures can easily provide optimal lip and soft tissue support [4]. However, high cost [5] and food retention [6] are among the drawbacks of overdentures.

In the 1948, the World Health Organization redefined the definition of health as a complete state of physical and psychosocial wellbeing and not only the absence of disease and disability [7]. Since then, the quality of life (QoL) has become an interesting, yet highly debated, topic of research in many clinical medical and dental fields. Knowledge about the QoL can help the medical/dental team to choose a treatment among the available options that further promotes the QoL of patients [8,9]. Recently, considering the significant effect of oral health status on the QoL of individuals [10], the concept of oral health related quality of life (OHRQoL) was developed.

In many countries worldwide, patients' opinions are collected to assess the clinical effect of treatment on patients. The Oral Health Impact Profile (OHIP-20) is among the strongest and most effective instruments for assessment of OHRQoL of patients [11]. The OHIP-20 is a 20-item questionnaire to evaluate the effect of oral health status on the daily performance and social interactions of patients based on seven domains related to QoL namely functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap. The OHIP is commonly used for assessment of OHRQoL [12,13].

However, such questionnaires should be customized and tailored based on the culture and lifestyle of the target population [14,15]. Thus, it has been translated to many languages and its validity and internal consistency have been confirmed for use in several countries worldwide [16-20]. In order to determine the scientific validity of a questionnaire, its content validity must be evaluated [21]. In order to assess the reliability of a questionnaire, its internal consistency should be determined by calculating the Cronbach's alpha [22].

The Persian version of the OHIP-14 has been previously validated in Iran for use on the Iranian population [23-25]. However, to the best of the authors' knowledge, the Persian version of the OHIP-20 has not been validated for use in Iran. The OHIP-20 has 20 questions, compared with the OHIP-14, which contains 14 items. Thus, the former enables more comprehensive assessment of the QoL. Thus, considering the increasing prevalence of edentulism and the growing use of dental implants and subsequently implant-supported overdentures, this study aimed to assess the OHRQoL of patients with conventional dentures versus implant-supported overdentures using the Persian version of the OHIP-20.

MATERIALS AND METHODS

This descriptive cross-sectional study evaluated 90 patients between 35 to 75 years who were selected from two public and two private dental clinics in Tehran in 2018. Of all, 45 patients had conventional dentures of both jaws, and 45 had a conventional maxillary denture and a mandibular overdenture supported by two implants placed at the site of canine teeth by specialists. All patients were evaluated within a 2-month period. At least one year had passed since the completion of prosthetic treatment of patients. The other inclusion criteria were absence of psychological disorders, no alcoholism or obesity, not smoking more than one pack per day, absence of acute or chronic symptoms of temporomandibular joint disorders, ability to speak in Persian, having a minimum of 3 years of history of complete edentulism, residing in Tehran, and willingness for participation in the study. The patients signed informed consent forms prior to participation in the study.

Two questionnaires were used for data collection in this study. The first questionnaire was self-designed and asked for demographic information of patients such as gender, age, level of education (under high-school diploma, high-school diploma, bachelor's degree, master's degree and higher), residential status (rental or

owned), and number of months passed from their treatment.

The second questionnaire was the OHIP-20, which was used to assess the OHRQoL of patients. For this purpose, we first had to translate the questionnaire to Persian. We asked for permission from the designer of the questionnaire Dr. Gary Slade and after obtaining his permission, the questionnaire was translated to Persian using the forward-backward translation method. In this regard, first the English version of the questionnaire was translated to Persian by two expert translators, who were also dentists and had IELTS score >7, and then the Persian version was back-translated to English by two other translators. An English teacher with a PhD degree in English literature compared the translated version with the original version, made the necessary changes, and prepared the final Persian version.

In order to assess the scientific validity of the questionnaire, its content validity was evaluated.

For this purpose, 10 experts in the field including 3 periodontists and 2 oral and maxillofacial surgeons who were the faculty members of the School of Dentistry of Tehran University of Medical Sciences with IELTS score of >7 and five instructors of Tarbyat Modarres University with a PhD degree in English literature were asked to assess the Persian version of the questionnaire regarding its scientific content and make the necessary changes. After applying their requested changes, the final version was edited and confirmed by the experts.

In order to assess the reliability of the questionnaire, its internal consistency was evaluated by calculating the Cronbach's alpha, which was found to be 0.81, and the reliability of the questionnaire was confirmed to be optimal.

The patients were then requested to fill out the Persian version of the questionnaire. The OHIP-20 has a Likert-type scale. It contains 20 questions in seven domains, and each question has 6 answer choices of never, rarely, occasionally, sometimes, usually, and always scored from 1 (never) to 6 (always). Patients who acquire a lower score have a higher QoL and vice versa [26].

The total score of the questionnaire may range from 20 to 120. Patients with a total score in the range of 20 to 40 have good QoL, those with a total score in the range of 40 to 100 have a moderate QoL and those with a total score between 100 to 120 have a poor QoL.

As mentioned earlier, the OHIP-20 has seven subdomains as follows:

Functional limitation: Problems in eating, food retention, denture mobility.

Physical pain: Pain when chewing, presence of ulcers in the mouth, irritation caused by denture

Psychological discomfort: Concerns about the denture-related complications

Physical disability: Inability to eat, dissatisfaction with nutrition

Psychological disability: Frustration or being ashamed because of the denture problems

Social disability: Avoiding presence in the community and becoming less tolerant to others due to denture problems

Handicap: Lower level of satisfaction with life due to denture problems

In order to assess the correlation of the level of education with different QoL domains in each group, first normal distribution of data was evaluated by the Kolmogorov-Smirnov test. Next, one-way ANOVA was used to compare the mean score of the domains in the two groups of patients with different levels of education. The non-parametric Mann-Whitney test was used to assess the correlation of residential status and different domains of QoL in each group. Considering the normal distribution of data regarding gender, the correlation of gender with different QoL domains was analyzed using independent t-test. Data were analyzed by SPSS version 22 (SPSS Inc., IL, USA) via multiple linear regression (backward method) at 0.1 level of significance.

RESULTS

Table 1 shows the frequency of good, moderate and poor OHRQoL in the two groups of patients. The mean total score of the OHIP-20 for OHRQoL was 43.82±15.95 in the overdenture and 48.64±18.44 in the conventional denture group (lower mean scores indicate higher QoL). This difference was statistically significant (P=0.063).

Table 1. Frequency of good, moderate, and poor oral health-related quality of life (OHRQoL) in the two groups of patients

OHRQoL	Conventional		Overdenture	
	N	%	N	%
Good	21	46.7	25	55.6
Moderate	21	46.7	17	37.8
Poor	3	6.6	3	6.6

Table 2 shows the mean score of different domains in the two groups. The mean score of the functional limitation (P=0.063) and physical pain (P=0.046) domains was significantly higher in the conventional group. The mean score of the physical discomfort domain was significantly higher in the overdenture group (P=0.043). The mean score of the physical disability domain was significantly higher in the conventional group (P=0.036). The mean score of the psychological disability domain was almost the same in the two groups (P=0.29). The mean score of the social disability domain was significantly higher in the overdenture group (P=0.056). The mean score of the handicap domain was significantly higher in the conventional denture group (P=0.096).

The mean score of different domains of the OHIP-20 in the two groups had a significant correlation with level of education of patients (P=0.054). Different domains of the OHIP-20 had no significant correlation with the residential status of patients in the two groups according to the multiple linear regression (backward method; P=0.584).

Regarding the correlation of the OHIP-20 domain scores and gender, no significant correlation was noted in the overdenture group (P=0.584). No significant correlation was noted in the conventional denture group either except for the psychological disability score, which was higher in males (P=0.29).

DISCUSSION

This study assessed the OHRQoL of patients using conventional dentures versus implant-supported overdentures. The current results indicated that at 28 months after prosthetic treatment, 55.6% of patients with overdentures and 46.7% of those with conventional dentures had good QoL. The mean total score of OHRQoL was found to be 43.82±15.9 in the overdenture and 48.64±18.44 in the conventional denture group.

These values were 66.1±28.08 and 89.3±40.42, respectively in a study by Awad et al, [27] 35±15.94 and 47.84±22.6, respectively in a study by Heydecke et al, [12] and 85.20±19.57 and 103.74±30.96, respectively in a study by Heydecke et al [28]. In a study by Allen and McMillan [11], the mean total score of OHRQoL was 65.9 in the overdenture and 40.5 in the conventional denture group, which indicates lower QoL in the overdenture group. Difference between their results and ours may be due to the fact that they only received dental implants in one jaw, and the patients had not been standardized in terms of their maxillary rehabilitation (some had dental implants and some had conventional dentures).

Table 2. Subdomain scores (mean±standard deviation) acquired by patients in the two groups

OHRQoL	Conventional	Overdenture	P-value
Functional limitation	8.11±3.93	6.89±3.48	0.063
Physical pain	10±4.63	8.22±3.25	0.046
Psychological discomfort	6.78±3.18	6.82±7.97	0.043
Physical disability	10.42±5.68	8±3.43	0.036
Psychological disability	4.22±1.86	4.16±1.98	0.29
Social disability	5.11±2.25	6.04±2.61	0.056
Handicap	4±1.92	3.69±1.79	0.056
Total	48.64±18.44	43.82±15.95	0.063

OHRQoL=Oral health-related quality of life

In our study, the overdenture group had the highest OHRQoL in the handicap, psychological disability, social disability and psychological discomfort domains. Similar results were obtained by Awad et al, [27] Heydecke et al, [12] and Heydecke et al, [28] who reported the highest QoL in overdenture patients in the same domains. The abovementioned studies unanimously reported higher OHRQoL in patients who received implant-supported overdentures compared with conventional dentures. In our study, higher score gained by patients with conventional dentures in the handicap domain indicates lower satisfaction with life due to denture-related problems. Higher score of the psychological disability domain in the conventional denture patients indicates their anger or embarrassment due to their denture problems. Higher score of the social disability domain in the conventional denture wearers also highlights their avoidance from the society and their reluctance to participate in social activities due to their denture problems. Also, higher score of the psychological discomfort domain in such patients points to their denture-induced anxiety and concerns.
In our study, the overdenture group had the lowest OHRQoL in the physical pain, physical disability and functional limitation domains, which was in line with the results of Awad et al, [27] Heydecke et al, [12] Heydecke et al [28].
In our study, the maximum QoL scores in the conventional denture group were noted in the handicap, psychological disability, social disability and psychological discomfort domains, which was in agreement with the results of Awad et al, [27], Heydecke et al, [12] and Heydecke et al [28]. In our study, the minimum scores of QoL in the conventional denture group were noted in the functional limitation, physical pain and physical disability domains. These findings were in accordance with those of Awad et al, [27] Heydecke et al, [12] and Heydecke et al [28].
In general, the mean QoL score in the study by Awad et al. [27] was higher than that in our study probably due to the fact that they used the OHIP-49 instead of the OHIP-20. Bouma et al. [29] assessed the QoL of patients that received conventional dentures and implant-supported overdentures using the Groningen Activity Restriction Scale-Dentistry questionnaire as a tool to assess the QoL. They found that the level of QoL was the same in both groups. Difference between their results and ours may be due to the use of different questionnaires.
Some previous studies used the 36-item Short Form Survey to assess the general QoL of patients in addition to their OHRQoL [30, 31]. However, Heydecke et al. [12] found no significant difference in the general health of patients receiving conventional and implant-supported overdentures after treatment. They confirmed that the oral health status was largely independent of general health status. Moreover, Allen and McMillan [11] reported that assessment of general QoL of patients with the 36-item Short Form Survey is not suitable for evaluation of the effect of dental interventions. Thus, general QoL of patients was not evaluated in the present study. Also, evidence shows that the mechanism of attachment of prosthesis to implant has no significant effect on level of satisfaction of patients [12,32,33]. Thus, the bar and ball attachment status was not evaluated in the overdenture group in our study. The mandibular ridge height was not evaluated in this study either since a previous study by Katsuhiko and Neal [34] found no significant effect of mandibular ridge height on patients' perception in the conventional denture and overdenture groups.
With regard to the correlation of demographic factors with OHRQoL of patients, the current results revealed a significant association between the level of education and OHRQoL in both groups. This finding was in contrast to the results of Heydecke et al, [12] and Allen and McMillan [11]. However, the correlation of residential status and OHRQoL was not significant in any group, which was in agreement with the

findings of Heydecke et al, [12] and Allen and McMillan [11]. Gender and OHRQoL were not significantly correlated in the overdenture group. The same was true for the conventional denture group except that the psychological disability domain had a significant correlation with gender, and males acquired a higher mean score in the psychological disability domain. This finding was in contrast to that of Awad et al, [27] since they reported that demographic factors had 31% effect on the QoL score after treatment.

Considering the fact that the frequency of good QoL was 55% in the overdenture and 46% in the conventional denture group in our study, it seems that mandibular overdenture supported by two implants at the site of canine teeth can increase the QoL of patients, compared with the use of conventional dentures for both jaws. This finding was in line with the results of a literature review by Assunção et al [35]. A recent systematic review and meta-analysis of the available literature on this topic using the OHIP also highlighted the superiority of overdenture treatment in terms of higher patient satisfaction [36].

CONCLUSION

Patients with a mandibular overdenture supported by two implants at the site of canine teeth and a conventional maxillary denture had higher OHRQoL than patients with conventional dentures of both jaws.

CONFLICT OF INTEREST STATEMENT

None declared.

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