Oral Health-related Quality of Life among Patients after Complete Denture Rehabilitation: A 12-month Follow-up Study

Abstract

Introduction: Complete edentulism is an eventual oral health outcome and results from the combined pathology of dental caries, periodontal disease, or faulty method of rehabilitation due to reduced cost. Complete edentulism has a significant concern and leads to reduced quality of life (QoL) along with impact on general health. However, it has been observed that due to wider and better oral health services globally, edentulism rate is decreasing every decade. Edentulism is directly related to masticatory and nutritional problems, and some authors regard it as a good mortality indicator. **Methodology:** The sample population consisted of 100 individuals comprising 63 males and 37 females who fulfilled the inclusion criteria. Geriatric oral health assessment index (GOHAI) was administered by a single investigator at baseline (preinsertion) and also 6 and 12 months postdenture insertion. Sociodemographic data, including age and gender, were also collected. **Results:** It was observed that the overall oral health-related QoL (OHRQoL) scores of the sample improved significantly at 6 and 12 months postinsertion ($P < 0.001$) when compared to baseline scores. When GOHAI scores were compared individually for males and females (pre- and post-insertion), it was observed that there was statistically significant improvement in OHRQoL (male – pre = 25.02 ± 1.34 and post-12 months = 8.84 ± 1.26, $P < 0.001$, female – pre = 25.19 ± 0.88 and post-12 months = 9.05 ± 1.20, $P < 0.001$) postinsertion of denture in both the groups. **Conclusion:** OHRQoL in patients improved after complete denture rehabilitation. There was an upward shift in score for each item in GOHAI from preinsertion to 6 and 12 months postinsertion of dentures, reflecting improvement in OHRQoL of the sample.

Keywords: *Dental prosthesis, geriatric dentistry, oral health, special care*

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Introduction

Old age is an unavoidable biological phenomenon. A substantial increase in lifespan is a result of better and advanced medical care, efficient public health actions, and improved social conditions.[1,2]

According to the WHO, the number of people aged 65 years or older is estimated to grow from 524 million in 2010 to 1.5 billion by 2050.[3] However, such a trend is also accompanied by new disease patterns in the form of noncommunicable diseases (NCDs) along with their huge social and economic cost.[3-5] Global burden of oral disease is one of the most common NCDs. Their impact is huge in terms of pain, suffering, impairment of functions, disability, and ultimately reduced quality of life (QoL).

Complete edentulism is an eventual oral health outcome and results from the combined pathology of dental caries, periodontal disease, or faulty method of rehabilitation due to reduced cost. Edentulism increases by 4% per 10 years in young adults, and it is >10% per decade in individuals aged >70 years. However, it has been observed that due to wider and better oral health services globally, edentulism rate is decreasing every decade.[6,7] Edentulism is directly related to masticatory and nutritional problems, and some authors regard it as a good mortality indicator.[8] Complete edentulism has a significant concern and leads to reduced QoL along with impact on general health (lower intake of fruit and vegetables and low nutrient diet).[9,10] Overwhelming evidence shows the negative effect of edentulism on oral health-related QoL (OHRQoL) in the form of functional, psychological, and social impairment, thus affecting day-to-day life. Elderly with loss of teeth have low self-esteem, decline in psychosocial

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well-being, low participation in social activities, and thus suffer isolation.[5,10-13]

OHRQoL is a multidimensional complex of interrelated domains and has been regarded as health priority.[14] OHRQoL has implications for dental clinical practice and can play a vital role in clinical decision-making and complement to clinical outcomes. Assessment of OHRQoL allows shift from traditional medical/dental criteria to assessment that focus on person's social and environmental factors.[15]

Oral rehabilitation had been associated with a positive effect on OHRQoL.[16] Monitoring changes in response to treatment is one of the major uses of QoL measure in clinical practice.[17] Cohen and Jago have been credited with the introduction of the term "sociodental indicators," and gradually, there was a rise of tools for the assessment of OHRQoL in multiple settings and populations.[18] GOHAI is a self-reported oral health assessment index used in the elderly population.[19] It measures patient-centered definition of health which diverges from disease-centered epidemiological measures of health. GOHAI was initially developed by Atchinson and Dolan in 1990, which was further used in North America in the geriatric population. GOHAI is stable, widely used, and validated in multiple languages[20-23] including Hindi.[24,25]

Thus, the aim of the present study was to assess and compare the effect of complete denture insertion on OHRQoL at three points of time, i.e., preinsertion and 6 and 12 months postinsertion using a prevalidated Hindi GOHAI questionnaire.

Methodology

The present longitudinal follow-up study was conducted in a tertiary care hospital from May 2016 to August 2017. Ethical clearance was obtained from the Institutional Ethical Review Board before the commencement of the study, and informed consent was taken from all eligible participants. A nonprobability sampling method was used. All patients reporting to the Outpatient Department of Prosthodontics during the period of May–July 2016 were screened for eligibility criteria. Initially, 128 patients were eligible for the study, but the final sample comprised a total of 100 participants (loss due to incomplete treatment, not willing to participate in 12-month follow-up, etc.). Patients were excluded if they had any systemic disease which could affect the treatment outcome, psychological disorders, temporomandibular joint disorder, partial dentulous condition, old denture wearer, and single complete denture.

The complete denture fabrication was performed using conventional techniques although minor case-based modifications in the technique and materials were done. It was made sure that all the dentures were processed in the same laboratory and using compression molding technique with standard laboratory procedures.

OHRQoL was assessed using the Hindi version of geriatric oral health assessment index (GOHAI)[24] It includes a total of 12 items which assessed the dimensions of physical functions, psychosocial functions, and pain or discomfort. As 12th item, assess sensitivity of teeth, it was considered irrelevant and thus excluded from the instrument, and finally, 11-item GOHAI was used.[11,26] GOHAI was administered by a single investigator on the six-point Likert scale with options, namely "always – 5," "very often – 4," "often – 3," "sometimes – 2," "seldom – 1," and "never – 0." Thus, the scores ranged from 0 to 55. The scores were reversed for three items, viz., item 3: swallow comfortably; item 5: eat anything without feeling discomfort; and item 7: happy with the looks. In the current study, a lower score was associated with a more positive oral health.

GOHAI was administered by a single investigator at baseline (preinsertion) and also 6 months and 12 months postdenture insertion. Sociodemographic data, including age and gender, were collected.

Statistical analysis

Data were analyzed using SPSS 21.0 (Statistical Package for social sciences, IBM Corporation). Pre- and post-insertion results were compared and analyzed using paired *t*-test and repeated measures ANOVA.

Results

The sample population consisted of 100 individuals comprising 63 males and 37 females. Mean age of the sample was 62.5 ± 8.8 (minimum = 40, maximum = 85) years in which 45 were <60 years of age and 55 were >60 years of age.

A one-way repeated measure ANOVA was used to compare the effect of complete denture insertion on OHRQoL (using GOHAI) in edentulous patients at preinsertion and 6 and 12 months postinsertion [Table 1].

Mauchly's test of sphericity indicated that the assumption of sphericity had been violated, $\chi^2 = 13.03$, $P < 0.001$, and therefore, a Huynh–Feldt correction was used which showed a significant effect of time on GOHAI score; $F (1.77, 175.6) = 4513.70$.

Three paired samples *t*-tests were used to make *post hoc* comparisons between conditions. Pairwise comparisons using Bonferroni's showed that there was significant difference between

Table 1: Descriptive statistics of the general oral health assessment index score at preinsertion and 6 months and 12 months postinsertion of the denture (*n*=100)

	Mean±SD	*P*
Preinsertion	25.08±1.186	<0.001
6 months postinsertion	15.66±1.512	
12 months postinsertion	8.92±1.236	

SD: Standard deviation

preinsertion/6-month postinsertion, preinsertion/12-month postinsertion, and 6-month postinsertion/12-month postinsertion (*P* = 0.000) [Table 2].

When GOHAI scores were compared individually for males and females (pre- and postinsertion), it was observed that there was statistically significant improvement in OHRQoL (male – pre = 25.02 ± 1.34 and post-12 months = 8.84 ± 1.26, *P* < 0.001, female – pre = 25.19 ± 0.88 and post-12 months = 9.05 ± 1.20, *P* < 0.001) postinsertion of denture in both the groups [Table 3].

Along with this, a statistically significant difference was observed for <60 and 60 years of age groups with respect to GOHAI scores, when pre- and post-scores were compared for both the age groups (<60 years: pre – 24.98 ± 0.98 and 12-month post – 8.82 ± 1.28, *P* < 0.001 and >60 years: pre – 28.16 ± 1.34 and 12-month post – 9.00 ± 1.20, *P* < 0.001) [Table 3]. No significant difference was obtained when GOHAI scores were compared for gender and age.

The sample population (*n* = 100) showed statistically significant (*P* < 0.001) improvement in GOHAI score when preinsertion (25.08 ± 1.186) and 12-month postinsertion (8.92 ± 1.236) scores were compared [Table 4]. The change in score for each item of GOHAI at preinsertion and 6 and 12 months postinsertion is summarized in Table 5.

Discussion

Patients' satisfaction with dental treatment depends on its physical, mental, and emotional status. The profession of dentistry has seen a proliferation of various instruments and scales seeking to assess the OHQoL or simply the QoL of patients with various oral conditions.[27] Older people perceive oral health equally important to life quality in a variety of ways,[28] and recent meta-analysis suggests strong evidence that tooth loss is associated with impairment of OHRQoL.[12]

According to a critical appraisal done to evaluate various tools to assess OHRQoL in elderly, GOHAI was among the most popular tools in terms of studies researched and applications from different authors other than the original authors.[29] GOHAI has been used in the Indian context to compare the clinical outcomes and treatments to OHRQoL[25,26,30-33] and also validated in Hindi.[24,25] Thus, the present study focused on 12-month long follow-up of patients with complete denture rehabilitation.

It was observed that the overall OHRQoL scores of the sample improved significantly at 6 and 12 months postinsertion (*P* < 0.001) when compared to baseline scores. Shigli and Hebbal published pilot results and observed a similar improvement in OHRQoL at 1-month postinsertion of complete denture.[26] Dable *et al*. also reported a significant change in GOHAI score and better OHRQoL in a 6-month follow-up postinsertion of dentures.[11] The study by Karmacharya *et al*. conducted in Lucknow, India, also showed improvement in OHRQoL in complete denture patients from baseline to 1st and 3rd month postdenture insertion.[33] Majority of the studies in India have evaluated the OHRQoL within a shorter period of follow-up as

Table 2: Pair-wise comparisons and *post hoc* tests using the Bonferroni correction

Time (I)	Time (J)	Mean difference (I−J)	SE	Significant[a]	95% CI for difference[a]	
					Lower bound	Upper bound
Preinsertion	6 months	9.420*	0.198	0.000*	8.939	9.901
	12 months	16.160*	0.165	0.000*	15.758	16.562
6 months	Preinsertion	−9.420*	0.198	0.000*	−9.901	−8.939
	12 months	6.740*	0.146	0.000*	6.384	7.096
12 months	Preinsertion	−16.160*	0.165	0.000*	−16.562	−15.758
	6 months	−6.740*	0.146	0.000*	−7.096	−6.384

*The mean difference is significant at the 0.05 level, [a]Adjustment for multiple comparisons: Bonferroni. CI: Confidence interval; SE: Standard error

Table 3: Comparison of preinsertion and 12 months postinsertion general oral health assessment index scores with respect to age and gender

Patient characteristics	Frequency, *n* (%)	GOHAI		*P*[a]
		Pre	12 months	
Gender				
Male	63 (63)	25.02±1.34	8.84±1.26	<0.001*
Female	37 (37)	25.19±0.88	9.05±1.20	
Age				
<60	45 (45)	24.98±0.98	8.82±1.28	<0.001*
>60	55 (55)	28.16±1.34	9.00±1.20	

[a]Paired *t*-test, *Significant. GOHAI: General Oral Health Assessment Index

Table 4: Pre and post-value of GOHAI score for the sample (*n*=100)

n	Pre	12th	*P*
100	25.08±1.186	8.92±1.236	*P*<0.001[a]
			t=97.95

[a]Paired *t*-test

Table 5: Change in general oral health assessment index score before and after insertion of dentures

	Preinsertion	6 months	12 months
Q1. How often you limit the kind of foods or amounts of food you eat because of problems with your teeth or denture?	3.87	1.07	0.8
Q2. How often did you have difficulty biting or chewing any kinds of food, such as firm meat or apples?	4.14	1.03	0.22
Q3. How often were you able to swallow comfortably?	0.29	3.99	4.07
Q4. How often have your teeth or dentures prevented you from speaking the way you wanted?	0.84	0.99	0.01
Q5. How often were you able to eat anything without feeling discomfort?	1.65	4.01	4.11
Q6. How often did you limit contacts with people because of the condition of your teeth or dentures?	0.13	1.18	0.22
Q7. How often were you pleased or happy with the looks of your teeth and gums, or dentures?	4.9	1.08	1.06
Q8. How often did you use medication to relieve pain or discomfort from around your mouth?	3	0.23	0.01
Q9. How often were you worried or concerned about the problems with your teeth, gums, or denture?	4.06	1.3	0.45
Q10. How often did you feel nervous or self-conscious because of problems with your teeth, gums, or dentures?	0.97	0.95	0.01
Q11. How often did you feel uncomfortable eating in front of people because of problems with your teeth or denture?	0.01	2.91	1.38

compared to the present study which followed up patients for 12 months. A study from Turkey reported that dental rehabilitation resulted in significant improvement in GOHAI scores and better OHRQoL 3 months after dental rehabilitation among geriatric patients.[34] Veyrune *et al.* conducted a study using GOHAI on 26 patients who received new prostheses. However, no statistical significant difference was observed in GOHAI scores when values for initial assessment was compared with six weeks post-insertion of denture. However, GOHAI score improved after 12 weeks after the participants received their new dentures.[35] A study by Koshino *et al.* also showed similar results after dental or denture rehabilitation.[36]

Mean GOHAI score in the present study was 25.08 ± 1.18, which was comparable to another study done by Agarwal *et al.* (30.176 ± 0.88) in Northern India.[32] No significant difference was observed between mean GOHAI scores between gender and age groups, which was in accordance with a study done by Marya *et al.*[31]

The QoL for the elderly has been assessed in various settings, but only a few studies in India report a long-term assessment after oral rehabilitation. Although the current study focused on 12-month follow-up with respect to OHRQoL after rehabilitation, it had its own limitations. First, a convenience sample was taken for the study; however, it may be noted that the study was primarily concerned about the comparison of preinsertion and postinsertion improvement in OHRQoL. Second, it has also been concluded that GOHAI mainly assesses functional limitations of an individual. Third, the participants of the present study were from low socioeconomic status because the institution where the present study was conducted provides dental treatment free or at highly subsidized charges.

Conclusion

The present study showed a statistical significant difference in pre- and post-GOHAI score and thus further substantiated that oral rehabilitation improves OHRQoL among elderly. Therefore, routine assessment with GOHAI may serve as a complementary and surrogate measure to clinical examination, thus enabling a clinician for comprehensive assessment including clinical outcomes and individual's perception of oral health.

Conflicts of interest

There are no conflicts of interest.

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