

ASSESSMENT OF THE CORRELATION BETWEEN NUTRITIONAL STATUS AND ORAL HEALTH-RELATED QUALITY OF LIFE FOLLOWING CONVENTIONAL COMPLETE DENTURE REHABILITATION: A LONGITUDINAL STUDY

Dr. Roma Roy¹, Dr. Arun Kumar Tiwari², Dr. Manoj Upadhyay³, Dr. Neeta Pasricha⁴, Dr. Rehana Bano⁵

¹Postgraduate Student, Department of Prosthodontics and Crown & Bridge, Babu Banarasi Das College of Dental Sciences, Babu Banarasi Das University, Lucknow, Uttar Pradesh, India. E-mail- romaromalko@gmail.com

²MDS; Reader, Department of Prosthodontics and Crown & Bridge, Babu Banarasi Das College of Dental Sciences, Babu Banarasi Das University, Lucknow, Uttar Pradesh, India. E-mail- draruntiwari@hotmail.com

³MDS; Professor and Head, Department of Prosthodontics and Crown & Bridge, Babu Banarasi Das College of Dental Sciences, Babu Banarasi Das University, Lucknow, Uttar Pradesh, India. E-mail-drmanojup@gmail.com

⁴MDS; Principal, Department of Prosthodontics and Crown & Bridge, Babu Banarasi Das College of Dental Sciences, Babu Banarasi Das University, Lucknow, Uttar Pradesh, India. E-mail-pasrichaneeta@yahoo.com

⁵MDS; Senior Lecturer, Department of Prosthodontics and Crown & Bridge, Babu Banarasi Das College of Dental Sciences, Babu Banarasi Das University, Lucknow, Uttar Pradesh, India. E-mail-bano.rehana111@gmail.com

ABSTRACT:

Background: Complete edentulism can compromise mastication, dietary intake, nutritional status, and oral health-related quality of life (OHRQoL).

Aim: To examine changes in nutritional status and OHRQoL and their association after conventional complete denture rehabilitation.

Study setting and design: A longitudinal before-and-after study conducted in outpatient prosthodontic services at a dental teaching institution in India.

Materials and methods: One hundred and fifty completely edentulous adults aged 50 years or older completed the Mini Nutritional Assessment (MNA) and the 12-item Geriatric Oral Health Assessment Index (GOHAI) before denture insertion and after three months of use. Baseline and follow-up scores were compared using paired-samples t-tests, and associations were examined using Pearson correlation coefficients.

Results: Mean MNA scores increased from 18.76 (standard deviation [SD] 2.09) to 21.91 (SD 1.64), and mean GOHAI scores increased from 36.74 (SD 5.35) to 43.55 (SD 2.97); both $P < 0.001$. MNA and GOHAI scores were not correlated at baseline ($r = 0.025$, $P = 0.762$) but showed a moderate positive correlation at three months ($r = 0.488$, $P < 0.001$).

Conclusion: Nutritional-status and OHRQoL scores improved during the first three months after conventional complete denture rehabilitation and were moderately associated at follow-up. The uncontrolled design supports interpretation as temporal improvement and association rather than causation.

KEYWORDS: complete dentures; edentulism; nutrition; older adults; oral health-related quality of life

INTRODUCTION

Edentulism remains a consequential oral health condition in later life. The loss of natural teeth reduces masticatory efficiency and may lead people to avoid hard or fibrous foods, including fruits, vegetables, and some protein-rich foods. These dietary adaptations can reduce nutrient intake and contribute to poor nutritional status, while the functional, aesthetic, and social consequences of tooth loss can also diminish quality of life.[1-4]

Oral health-related quality of life (OHRQoL) describes how oral conditions affect daily function, comfort, and psychosocial well-being. The Geriatric Oral Health Assessment Index (GOHAI) was developed for older adults and evaluates functional limitation, pain or discomfort, and the psychosocial effects of oral health.[5] Older adults with edentulism generally report poorer OHRQoL than dentate adults, and complete denture treatment can improve patient-reported oral function and well-being.[6]

Nutritional status is an important component of healthy ageing. The Mini Nutritional Assessment (MNA) is widely used to screen older adults for malnutrition and risk of malnutrition.[7] Tooth loss and denture status are associated with dietary intake and nutritional status.[8,9] However, evidence that prosthetic rehabilitation alone produces sustained nutritional improvement is mixed, and dietary counselling may be needed to translate improved oral function into healthier food choices.[10,11]

Few longitudinal studies have evaluated nutritional status and OHRQoL together before and after conventional complete denture rehabilitation. Examining both outcomes may help clarify whether improvements in oral function are accompanied by broader gains in health and well-being. The present study therefore evaluated

changes in MNA and GOHAI scores and examined the correlation between these measures before treatment and after three months of conventional complete denture use. It was hypothesised that both scores would improve after rehabilitation and that higher nutritional status would be associated with better OHRQoL at follow-up.

MATERIAL AND METHODS

Study Design and Setting

This longitudinal before-and-after clinical study was conducted in outpatient prosthodontic services at a dental teaching institution in India. All treatment and assessments were performed under routine clinical conditions.

Ethical Considerations

The study protocol was approved by the relevant institutional ethics committee (approval number: 35). The procedures followed the ethical principles applicable to research involving human participants. All participants provided written informed consent before enrolment.

Participants

The study included 150 completely edentulous adults aged 50 years or older who presented for conventional complete denture rehabilitation. Participants were selected according to the eligibility criteria described below.

Inclusion criteria

- ☐ Completely edentulous and aged 50 years or older.
- ☐ Planned rehabilitation with conventional complete dentures.
- ☐ Willing and able to participate and provide written informed consent.

Exclusion criteria

- ☐ Planned implant-supported prosthetic rehabilitation.
- ☐ Previous rehabilitation with a single complete denture.
- ☐ A systemic condition considered likely to affect nutritional status or oral function.

Clinical Procedure and Assessment Schedule

All participants received conventional complete dentures fabricated according to standard prosthodontic procedures. Nutritional status and OHRQoL were assessed at baseline, before denture insertion, and again after three months of denture use.

Nutritional Status

Nutritional status was assessed using the full Mini Nutritional Assessment. The MNA includes anthropometric, dietary, general-health, and self-assessment domains and yields a total score from 0 to 30; higher scores indicate better nutritional status. Standard interpretation classifies scores below 17 as malnutrition, 17 to 23.5 as risk of malnutrition, and 24 to 30 as normal nutritional status.[7] The analysis used the continuous total score.

Oral Health-Related Quality of Life

OHRQoL was assessed using the 12-item Geriatric Oral Health Assessment Index with the additive scoring method (GOHAI-Add). Each item was scored on a five-point Likert scale, with items coded so that higher total scores indicated better OHRQoL.[5] The analysis used the continuous total score.

Statistical Analysis

Data were entered in Microsoft Excel and analysed using IBM SPSS Statistics, version 21.0 (IBM Corp., Armonk, NY, USA). Participant characteristics were summarised using means, standard deviations, frequencies, and percentages. Baseline and three-month MNA and GOHAI scores were compared using paired-samples t-tests. Pearson correlation coefficients were calculated to assess the associations between MNA and GOHAI scores at each assessment. Tests were two-sided, and $P < 0.05$ was considered statistically significant.

RESULTS

Participant Characteristics

- All 150 enrolled participants were included in the reported analyses. Mean age was 64.47 years (SD 8.65; range 50-80 years). Seventy-eight participants (52.0%) were male and 72 (48.0%) were female. The largest age group was 61-70 years (38.7%), followed by 50-60 years (36.0%) and 71-80 years (25.3%) (Table 1).
- Changes in Nutritional Status and OHRQoL
- Mean MNA score increased from 18.76 (SD 2.09) at baseline to 21.91 (SD 1.64) after three months of denture use ($P < 0.001$). Although the mean score improved, both group means remained within the standard MNA range indicating risk of malnutrition. Mean GOHAI score increased from 36.74 (SD 5.35) to 43.55 (SD 2.97) ($P < 0.001$) (Table 2).
- Correlation Between Nutritional Status and OHRQoL
- MNA and GOHAI scores were not significantly correlated at baseline ($r = 0.025$, $P = 0.762$). After three months of denture use, the scores showed a moderate positive correlation ($r = 0.488$, $P < 0.001$), indicating that participants with higher nutritional-status scores also tended to report better OHRQoL at follow-up (Table 3).

Table 1. Participant characteristics (N = 150)

Characteristic	n	%
Age, mean (SD), years	64.47 (8.65)	-
Age range, years	50-80	-
Age 50-60 years	54	36.0
Age 61-70 years	58	38.7
Age 71-80 years	38	25.3
Male	78	52.0
Female	72	48.0

SD, standard deviation.

Table 2. MNA and GOHAI scores before and after complete denture rehabilitation

Outcome	Baseline, mean (SD)	3 months, mean (SD)	P
MNA	18.76 (2.09)	21.91 (1.64)	<0.001
GOHAI	36.74 (5.35)	43.55 (2.97)	<0.001

GOHAI, Geriatric Oral Health Assessment Index; MNA, Mini Nutritional Assessment; SD, standard deviation. P values are from paired-samples t-tests.

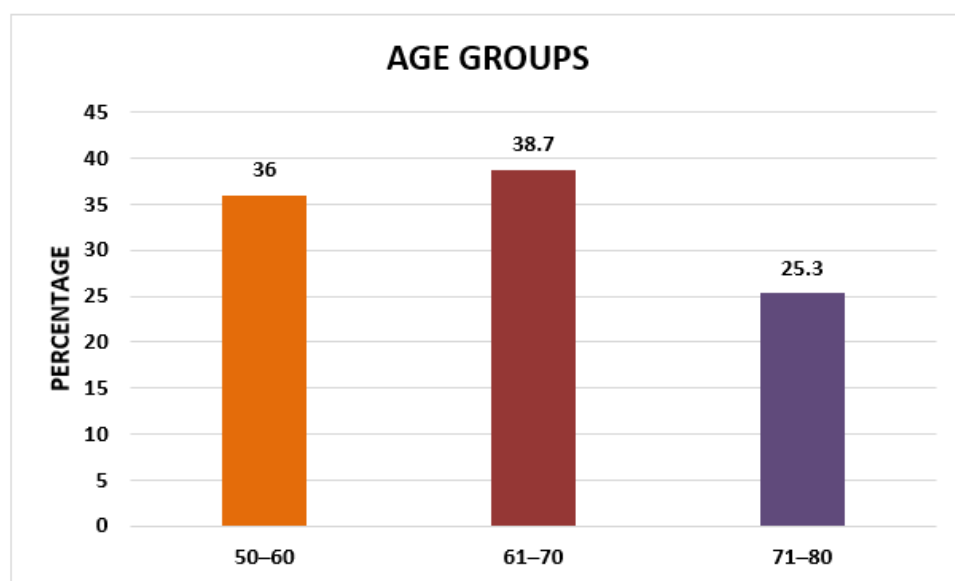
Table 3. Pearson correlations between MNA and GOHAI scores

Assessment	r	P
Baseline	0.025	0.762
3 months	0.488	<0.001

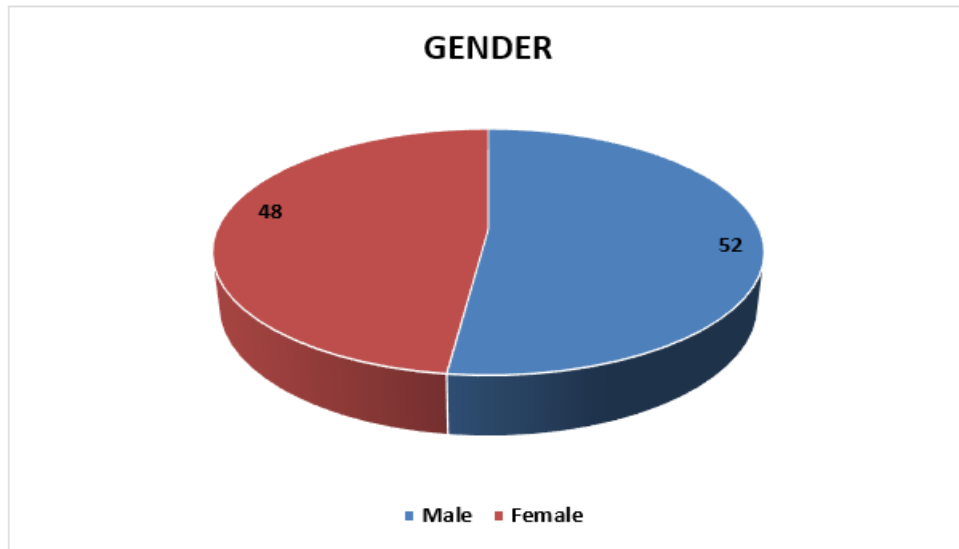
GOHAI, Geriatric Oral Health Assessment Index; MNA, Mini Nutritional Assessment.

Figure Legends

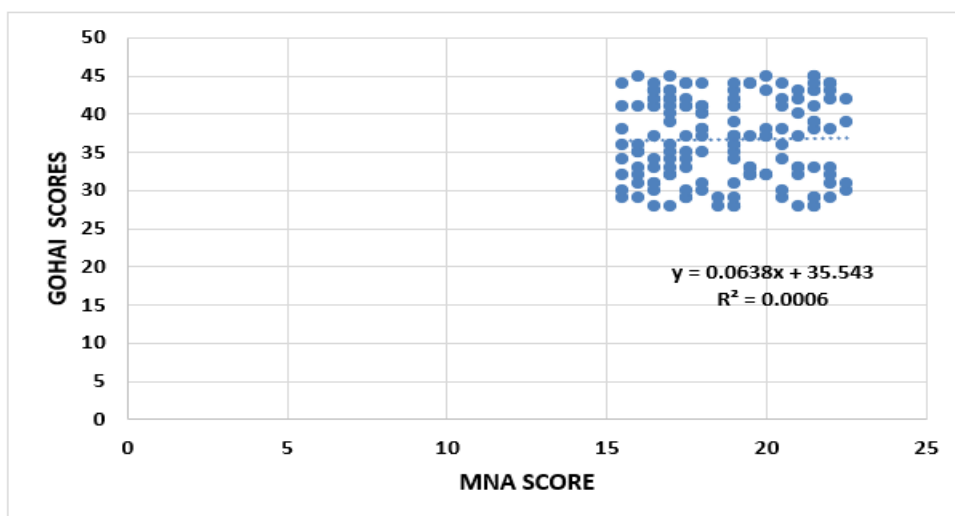
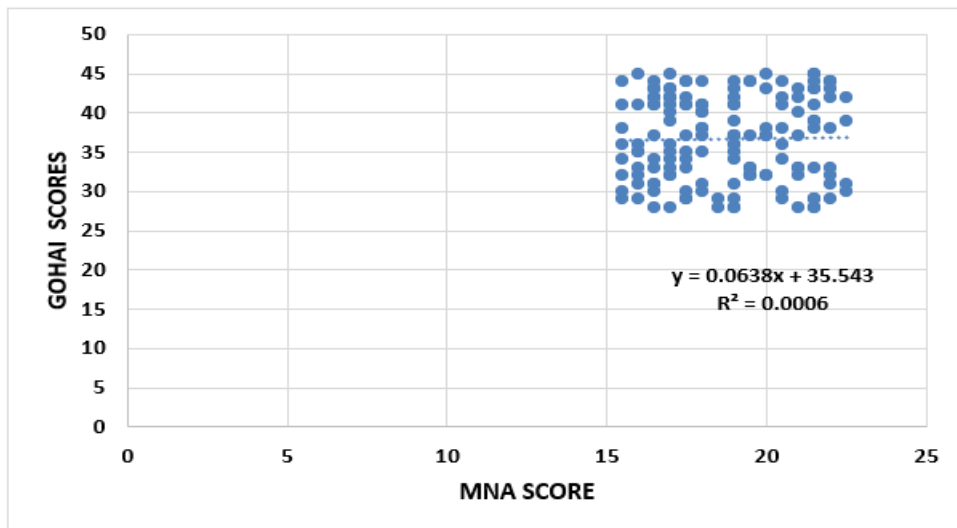
Not applicable; no figures are included.



Most participants belonged to the 61–70 year age group (38.7%), followed by the 50–60 year group (36.0%), indicating that a majority of the study population was in the early elderly age bracket.



The study sample showed a nearly equal gender distribution, with a slight male predominance (52% males and 48% females), ensuring minimal gender-related bias in outcome assessment.



MNA and GOHAI scores did not significantly correlate before denture restoration. In contrast, after three months of complete denture use, a moderate, positive, and statistically significant correlation was observed ($r = 0.488$, $p < 0.001$), suggesting that improvements improved oral health-related quality of life were associated with improvements in nutritional status.

DISCUSSION

This study examined changes in nutritional status and OHRQoL among completely edentulous older adults during the first three months after conventional complete denture rehabilitation. Both MNA and GOHAI scores increased significantly. The two measures were not associated at baseline but were moderately and positively correlated at follow-up. These findings support the clinical relevance of considering oral function, nutrition, and patient-reported well-being together in the care of edentulous older adults.

The increase in MNA score is consistent with the possibility that improved masticatory function enables a broader range of food choices. Edentulous adults often avoid hard or fibrous foods and may consume diets of lower nutrient density.[2,3] Contemporary evidence also indicates that adults who wear dentures can have suboptimal nutrient intake and diet quality.[12] Nevertheless, the follow-up group mean remained within the standard MNA range for risk of malnutrition. The finding should therefore be interpreted as an improvement in screening score rather than evidence that nutritional risk was eliminated.

GOHAI scores also improved substantially after rehabilitation, suggesting benefits in functional, discomfort, and psychosocial domains. Complete dentures can restore basic oral function and appearance, and previous studies have reported improvements in patient-centred outcomes after treatment.[6] Better speech, improved confidence during social eating, and greater comfort during mastication are plausible contributors, although these mechanisms were not measured directly in the present study.

The emergence of a moderate correlation between MNA and GOHAI scores at follow-up suggests that participants who perceived better oral-health-related functioning also tended to have better nutritional-status scores. Oral function and dietary intake are linked in older adults, but nutrition is shaped by many additional factors, including comorbidity, socioeconomic resources, food access, preferences, and health behaviours.[13,14] The correlation should therefore not be interpreted as evidence that changes in OHRQoL caused changes in nutritional status.

The wider literature cautions against assuming that prosthetic treatment alone consistently improves dietary intake or nutritional status. A systematic review found heterogeneous evidence and highlighted the potential value of combining prosthetic rehabilitation with individualised dietary advice.[10] Nutritional screening and referral may therefore be useful components of prosthodontic care, particularly when MNA scores remain below the normal range after rehabilitation. Dietary counselling for denture wearers should also address gradual adaptation, food texture, nutrient density, and safe progression towards a varied diet.[11]

Strengths and Limitations

Strengths of the study include its longitudinal assessment of the same participants and simultaneous evaluation of nutritional status and OHRQoL. Several limitations should be considered. First, the uncontrolled before-and-after design cannot establish that denture treatment caused the observed changes; adaptation over time, regression to the mean, or unmeasured changes in health and diet may have contributed. Second, the three-month follow-up does not establish whether improvements were sustained. Third, nutritional status and OHRQoL were assessed with questionnaires without objective dietary records, biochemical markers, or measures of denture quality and masticatory performance. Fourth, the single-centre sample may limit generalisability. Finally, the analyses did not adjust for potential confounders such as comorbidity, socioeconomic status, or dietary counselling.

Implications for Research and Practice

Future studies should include comparison groups, longer follow-up, and objective measures of dietary intake, nutritional biomarkers, and oral function. Reporting the quality and adaptation of the prostheses and documenting any dietary counselling would help identify the mechanisms underlying change. In practice, screening for nutritional risk before and after denture rehabilitation may help identify patients who need coordinated care from dental professionals, dietitians, and geriatric health services.

CONCLUSION

MNA and GOHAI scores improved during the first three months after conventional complete denture rehabilitation, and the two outcomes were moderately correlated at follow-up. Because the study lacked a control group, the findings demonstrate temporal improvement and association rather than causation. Integrating oral rehabilitation with nutritional screening and, when indicated, dietary support may strengthen patient-centred care for edentulous older adults.

REFERENCES

1. Emami E, de Souza RF, Kabawat M, Feine JS. The impact of edentulism on oral and general health. *J Can Dent Assoc.* 2013;79:d17.
2. Joshipura KJ, Willett WC, Douglass CW. The impact of edentulousness on food and nutrient intake. *J Am Dent Assoc.* 1996;127(4):459-67.
3. Sheiham A, Steele JG, Marcenes W, Finch S, Walls AWG. The relationship among dental status, nutrient intake, and nutritional status in older people. *J Dent Res.* 2001;80(2):408-13.

4. Steele JG, Sanders AE, Slade GD, Allen PF, Lahti S, Nuttall N, et al. How do age and tooth loss affect oral health impacts and quality of life? A study comparing two national samples. *Community Dent Oral Epidemiol.* 2004;32(2):107-14. doi:10.1111/j.0301-5661.2004.00131.x.
5. Atchison KA, Dolan TA. Development of the Geriatric Oral Health Assessment Index. *J Dent Educ.* 1990;54(11):680-7.
6. Allen PF, McMillan AS. A review of the functional and psychosocial outcomes of edentulousness treated with complete replacement dentures. *J Can Dent Assoc.* 2003;69(10):662.
7. Vellas B, Guigoz Y, Garry PJ, Nourhashemi F, Bennahum D, Lauque S, et al. The Mini Nutritional Assessment (MNA) and its use in grading the nutritional state of elderly patients. *Nutrition.* 1999;15(2):116-22. doi:10.1016/S0899-9007(98)00171-3.
8. Nowjack-Raymer RE, Sheiham A. Association of edentulism and diet and nutrition in US adults. *J Dent Res.* 2003;82(2):123-6. doi:10.1177/154405910308200209.
9. Sahyoun NR, Lin CL, Krall E. Nutritional status of the older adult is associated with dentition status. *J Am Diet Assoc.* 2003;103(1):61-6.
10. Brigido JA, de Oliveira da Rosa WL, Lund RG. The effect of prosthetic rehabilitation with or without dietary advice on nutritional status in elderly patients: A systematic review. *Aging Clin Exp Res.* 2023;35(11):2399-411. doi:10.1007/s40520-023-02578-6.
11. Moynihan P, Varghese R. Eating advice for people who wear dentures: A scoping review. *Int J Environ Res Public Health.* 2022;19(14):8846. doi:10.3390/ijerph19148846.
12. Gomez GGF, Xu H, Spence LA, Patel P, Bualteng V, Cheriyan B, et al. Assessing the nutrient intake and diet quality of adults wearing dentures using the Healthy Eating Index. *BMC Oral Health.* 2025;25:996. doi:10.1186/s12903-025-06182-0.
13. Iwasaki M, Hirano H, Ohara Y, Motokawa K. The association of oral function with dietary intake and nutritional status among older adults: Latest evidence from epidemiological studies. *Jpn Dent Sci Rev.* 2021;57:128-37. doi:10.1016/j.jdsr.2021.07.002.
14. Yoshida M, Suzuki R, Kikutani T. Nutrition and oral status in elderly people. *Jpn Dent Sci Rev.* 2014;50(1):9-14. doi:10.1016/j.jdsr.2013.09.001.