

Impact of Tooth Loss on Oral Health Related Quality of Life among Geriatric Patients Attending a Tertiary Care Center of Koshi Province

Tarakant Bhagat¹, Ashish Shrestha¹, Santosh Kumari Agrawal¹, Ujwal Gautam¹, Binamra Ghimire¹, Deepak Sharma¹, Rakshita Yadav¹, Sonu Agrawal¹, Urmila Paudel¹

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Urmila Paudel

urmila.paudel06@gmail.com



<https://orcid.org/0009-0006-6564-8352>

¹ Department of Public Health Dentistry, B.P. Koirala Institute of Health Sciences, Dharan, Nepal

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Abstract

Background: The prevalence of chronic diseases such as dental caries and periodontal diseases is higher and the risk of tooth loss is also higher among geriatric patients. The loss of teeth has a negative impact on an individual resulting in functional, psychological and social limitations affecting the quality of life. This study was conducted to assess the impact of tooth loss on oral health-related quality of life (OHRQoL) using the Geriatric Oral Health Assessment Index (GOHAI).

Methods: A cross-sectional study was conducted among 131 geriatric patients with at least one missing tooth and seeking dental care in a tertiary care center of province one. The Nepali version of Geriatric Oral Health Assessment Index (GOHAI) was used to assess the impact of tooth loss on oral health related quality of life. Descriptive statistics along with independent t-test and ANOVA were applied. Statistical significance was set as $p < 0.05$.

Results: The mean ($\pm$ SD) GOHAI score of the participants was 44.27 ($\pm$ 8.31). Severity of tooth loss, self-rated oral health and mobility of teeth had significant impact on oral health related quality of life. The majority of study participants perceived their dental health was good, despite their low GOHAI score.

Conclusion: The study showed a relationship between tooth loss and a reduced oral health-related quality of life in geriatric patients. Tooth loss within the oral cavity causes functional limitations and discomfort.

Keywords: Geriatric; GOHAI; Oral health-related quality of life; Tooth loss

Declarations

Ethics approval and consent to participate: The study was conducted in accordance with ethical standards after approval from the Institutional Review Committee with Ref.no. 220-081-082 of BPKIHS. All participants were clearly informed about the study objectives and procedures, and written informed consent was obtained prior to participation.

Consent for publication: Participants voluntarily provided written consent permitting the publication of anonymized data and study findings for academic and research purposes.

Availability of data and materials: The datasets generated and analyzed during the current study are securely stored and can be made available by the corresponding author upon reasonable request.

Competing interest: None

Funding: None.

Authors' contributions: The study was conceptualized and designed collaboratively. TB brought the concept of the study. AS, SKA contributed to the design of the study. BG, DS, RY, SA contributed for data collection. SKA and UG did data analysis and interpretations. UP prepared the manuscript. All authors read and approved the final manuscript.

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BACKGROUND

Oral health is “multifaceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow, and convey a range of emotions through facial expressions with confidence and without pain, discomfort, and disease of the craniofacial complex.” [1] Improvements in oral health could have great systemic implications for the organism, contributing to the prevention of pathologies, benefitting society, and enhancing individuals’ quality of life [2].

Oral health-related quality of life refers to perceived oral symptoms, as well as the experienced functional and psychosocial impacts of oral disorders. It is an important component of the overall health of individuals. A lower oral health-related quality of life could exacerbate the feelings of loneliness, social isolation, or lower mental health [3].

In older adults, the prevalence of chronic diseases such as dental caries and periodontal diseases is higher and the risk of tooth loss is also higher. Tooth loss causes functional impairments in mastication and aesthetics, which ultimately diminish quality of life. Strong evidence is found linking tooth loss and impairment in oral health related quality of life (OHRQoL) [4].

The World Health Organization (WHO) Global Oral Health Program has identified dental caries, periodontal disease, and dental trauma as the main cause of tooth loss [5]. The majority of current research, however, is constrained by its small sample sizes, disease-specific samples, or age groupings (e.g., elderly people). Given these limitations in existing studies, our goal was to assess the correlates of oral health related quality of life in a geriatric population sample. A variety of Oral Health-Related Quality of Life (OHRQoL) instruments have been developed to evaluate the functional and psychosocial impact of oral disease [4, 6]. In clinical or epidemiological investigations, the Geriatric Oral Health Assessment Index Questionnaire (GOHAI), created by Atchison and Dolan, is frequently used to evaluate oral health [7]. It contains questions related to physical function, pain and discomfort, and psychological function and has effectively assessed these domains to determine oral health-related quality of life [8]. Thus, we adapted the GOHAI Nepali version to assess self-perceived oral health through 12 questions [9]. The objective of the study was to assess the impact of tooth loss on oral health related quality of life of geriatric patients visiting the Department of Oral Medicine and Radiology using GOHAI and to assess the association of the impact of tooth loss with the GOHAI score.

METHODS

A cross-sectional study was carried out at the Department of Oral Medicine and Radiology, B.P. Koirala Institute of Health Sciences, Dharan, Nepal. The departmental research unit [DRU/97/024] of college of dental surgery, BPKIHS approved the study and was endorsed by BPKIHS Institutional Review Committee (220-081-082) also supported it.

Written informed consent was obtained from the participants before enrolling in the study. The duration of the study was two months. A convenience sampling technique was used for the study. Patients aged 60 years and above visiting Department of Oral Medicine and Radiology with at least one missing permanent tooth due to dental caries, periodontal disease, dental trauma and/or any other reason were included in the study.

The sample size was calculated based on average number of patients (aged 60 years or above) visiting the Department of Oral Medicine and Radiology OPD at BPKIHS in a two-month period (150).

Using Slovin’s formula $10, n = N / (1 + Ne^2)$

n = sample size

N = given population (150 geriatrics patients visiting Department of Oral Medicine and Radiology OPD, College of Dental Surgery in a two-month period)

e = margin of error (5%)

Using a 5% margin of error, the sample size was calculated to be 109.

Thus, the final sample size was estimated to be 131 after adding 20% non-response rate

Patients visiting the dental OPD at BPKIHS, Dharan were approached and recruited conveniently from the waiting room after assessing for eligibility. The written informed consent was obtained from patients. The purpose for carrying out the study was explained to all the participants. The investigators collected the data from patients by interview and oral examination.

The translated and validated Nepalese version of Geriatric Oral Health Assessment Index (GOHAI) [9] was used to assess the oral health related quality of life. It comprised of 12 questions: four questions assessing physical function, three questions assessing pain, and discomfort whereas five questions assessing psychological function. Each question has five options: - never (5), seldom (4), sometimes (3), often (2), always (1). For items 3, 5, and 7, the scores were reversed. The total GOHAI sum score ranged from 12 to 60, with higher scores indicating better OHRQoL. One of three categories—good quality of life (57–60), moderate

quality of life (51–56), or poor quality of life (<51)—was assigned to the final GOHAI score. Another variable, the self-rated oral health of the participant was recorded [11]. An oral examination of the same patients was done to assess the number of teeth present, missing teeth, and mobility of teeth.

The data were entered into a Microsoft Excel sheet and analyzed using SPSS (Statistical Package for Social Sciences) version 23. Analysis was done using descriptive statistics and expressed in the form of percentage, frequency, mean, standard deviation. Continuous outcomes were assessed for assumption of normality using the Shapiro Wilk test. Independent t-test and ANOVA were used for inferential statistics.

RESULTS

Majority (53.44%) of the participants were males. The mean age was 67.38 ($\pm$ 5.95) years with a range of 60 to 86 years. About (40.5%) had more than ten missing teeth in their oral cavity. Around

two-thirds of study participants (64.9%) had reported their oral health status as fair (**Table 1**). Regarding mobility of teeth, most of them had grade I mobility (62.6%).

Table 1: Demographic characteristics of study

Variables	Category	N (%)
Gender	Male	70 (53.44%)
	Female	61 (46.56%)
Severity of Tooth Loss	1-5	43 (32.8%)
	6-10	35 (26.7%)
	>10	53 (40.5%)
Self-rated oral health	Good	26 (19.8%)
	Fair	85 (64.9%)
	Poor	20 (15.3%)
Mobility of Teeth	Grade I	82 (62.60%)
	Grade II	69 (52.7%)
	Grade III	29 (22.14%)

Table 2: GOHAI response of study participants (n=131)

GOHAI items	Questions	Responses, n (%)				
		Always	Often	Sometimes	Seldom	Never
Physical functions	Limitations in having different kinds of food	15 (11.5%)	22 (16.8%)	34 (26.0%)	20 (15.3%)	40 (30.5%)
	Feel trouble in biting or chewing food	32 (24.4%)	30 (22.9%)	30 (22.9%)	13 (9.9%)	26 (19.8%)
	How comfortable are you while swallowing	101 (77.1%)	8 (6.1%)	10 (7.6%)	3 (2.3%)	9 (6.9%)
	Any difficulty in speaking	1 (0.8%)	8 (6.1%)	15 (11.5%)	11 (8.4%)	96 (73.3%)
Pain and discomfort	Able to take food without any discomfort	26 (19.8%)	38 (29.0%)	36 (27.5%)	22 (16.8%)	9 (6.9%)
	Taken any medicines from getting relief from pain	4 (3.1%)	5 (3.8%)	52 (39.7%)	19 (14.5%)	51 (38.9%)
	Sensitivity to hot/cold substances or sweet foods	23 (17.6%)	19 (14.5%)	51 (38.9%)	16 (12.2%)	22 (16.8%)
Psychological function	Experienced declines in having face-to-face contact with people	10 (7.6%)	10 (7.6%)	14 (10.7%)	9 (6.9%)	88 (67.2%)
	Satisfied with the appearance of teeth	37 (28.2%)	33 (25.2%)	21 (16.0%)	25 (19.1%)	15 (11.5%)
	Concerned about the condition of teeth, condition of gums and condition of dentures	7 (5.3%)	20 (15.3%)	25 (19.1%)	27 (20.6%)	52 (39.7%)
	Presence of self-consciousness about the status of teeth, gums and dentures	16 (12.2%)	14 (10.7%)	24 (18.3%)	29 (22.1%)	48 (36.6%)
	Feel quite uncomfortable eating in front of others?	11 (8.4%)	13 (9.9%)	12 (9.2%)	9 (6.9%)	86 (65.6%)

The overall mean ($\pm$ SD) GOHAI score of the participants was 44.27($\pm$ 8.31). Based on responses of participants to the GOHAI questionnaire, more than two-thirds of them had poor quality of life (77.9%).

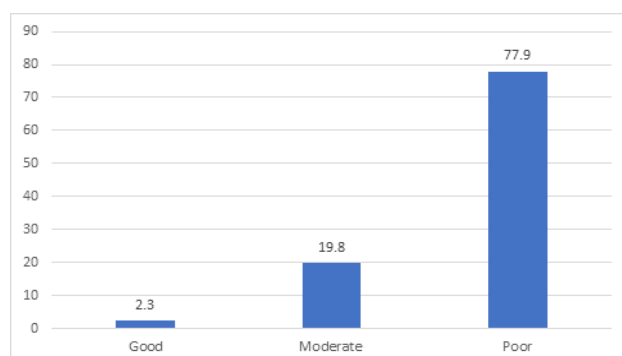


Figure 1: GOHAI score categorization of study participants

Around 24.4% of participants reported trouble while biting or chewing hard food. More than two-thirds of them were always comfortable while swallowing (77%). Most of them (73%) did not have any difficulty while speaking.

Furthermore, only 19.8% of them were always capable of consuming food without any discomfort while 6.9% were never able to take food without discomfort. A majority of them (39.7%) took medication sometimes for pain relief. Similarly, **Table 2** shows that more than two-thirds of study participants reported sensitivity to hot, cold or sweet substances. Regarding psychological aspects, many of them (28.2%) were always satisfied with the appearance of their teeth. Moreover, a small minority (5.3%) of them were concerned about condition of their gums, teeth and dentures and 36.6% were never self-conscious regarding the status of their teeth, gums, or dentures. About two-thirds of them (65.6%) were never comfortable eating in front of others.

Table 3: Association between mean GOHAI score and study variables

Variables		GOHAI score (Mean $\pm$ SD)	P value
Sex	Male	45.5 $\pm$ 7.6	0.09
	Female	42.8 $\pm$ 8.9	
Number of Missing Teeth	$\leq$ 20	44.8 $\pm$ 8.2	0.7
	>20	41.1 $\pm$ 8.4	
Severity of Tooth Loss	1-5	45.7 $\pm$ 7.2	0.02
	6-10	46.2 $\pm$ 8.6	
	>10	41.9 $\pm$ 8.5	
Self-rated Oral Health	Good	48.6 $\pm$ 4.8	<0.01
	Fair	45.2 $\pm$ 7.3	
	Poor	34.7 $\pm$ 9.1	
Tooth mobility	Grade I	45.3 $\pm$ 7.2	0.01
	Grade II	43.7 $\pm$ 7.7	
	Grade III	44.2 $\pm$ 7.7	

Table 3 shows that the severity of tooth loss, self-rated oral health and mobility of teeth had a significant impact on oral health related quality of life.

DISCUSSION

The current study demonstrated that the overall quality of life of the participants was poor with a mean GOHAI score of 44.27 ($\pm$ 8.31). This is in consistent with findings from other study results from China⁵ and Myanmar [12-14]. Since teeth are essential for many activities, including speaking and chewing, losing teeth can cause problems with eating and pronouncing words correctly. Additionally, missing teeth can affect self-esteem and overall oral health-related quality of life. Aguiar et al. [13] conducted a study that supported this conclusion.

About 24.4% of participants reported trouble biting or chewing food, which is similar to findings from studies conducted by Venkatsen et al [8] and Agrawal et al [14]. This could be attributed to the fact that tooth loss predominantly impacts chewing and biting due to the essential role of teeth in these functions. Additionally, a significant number of participants experienced sensitivity, pain, and discomfort while eating, often resorting to medication for relief. This is consistent with findings from Cheng et al. where only a small fraction always took medicine for pain relief. Regarding sensitivity to hot, cold, or sweet foods, most study participants reported experiencing it sometimes, while Cheng et al [15] and Htay YN [12] found different distributions of tooth sensitivity.

This study showed that elderly people did not experience a negative impact on psychosocial function. This could be due to their acceptance of tooth loss as a natural part of aging, a focus on other aspects of health and well-being, similar tooth loss among older peers, less professionally active occupations, and gradual tooth loss. Older people might have gradually accepted their appearance, leading to no decline in face-to-face contact, less worrying about their condition, or being self-conscious or uncomfortable eating in front of others. These findings are in concordance with a study conducted by Cheng et al [14].

Mobility of teeth had a significant impact on oral health related quality of life, which is similar to the study conducted by Sonnenschein et al [16] and Mashalkar et al [17]. Mobile teeth cause difficulty in chewing food, can also cause pain, which affects oral health. Most of the study participants reported fair oral health status, which is similar to a study conducted by Zaitsu et al [18]. However, the overall oral health related quality of life among participants was poor.

The current study was conducted in a single center, which

could limit the generalizability of the findings. These findings highlight the importance of early intervention and preventive measures to address tooth loss and its consequences among geriatric patients. Dental healthcare providers should focus on promoting oral hygiene practices, providing regular check-ups, and offering appropriate treatments to prevent further tooth loss and improve the overall oral health-related quality of life among the elderly population.

CONCLUSION

The study showed that most study participants had poor GOHAI scores, indicating poor oral health-related quality of life. Various oral health factors,

such as difficulty biting and chewing food and sensitivity to various hot, cold, and sweet foods, were significantly impacted by tooth loss. The research findings indicate that severity of tooth loss, self-rated oral health status, and mobility of teeth have a significant impact on oral health-related quality of life among geriatric patients attending a tertiary care center. This study suggests that a regulatory body is necessary to address the oral health needs of the geriatric population by providing affordable dental care services to those in need.

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