

Oral Health Status And Prosthetic Needs Of Geriatric Population In Pune City - A Cross Sectional Study

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Abstract

Objective

To assess the periodontal status, prosthetic status, and prosthetic treatment needs among the geriatric population of Pune city.

Materials and Methods

A cross-sectional study was conducted among 150 individuals aged ≥ 60 years selected through multistage random sampling. Oral examinations were performed using the WHO Oral Health Assessment Form (1997) to record periodontal status, prosthetic status, and prosthetic treatment needs. Data were analyzed using SPSS Version 20.0, and the Chi-square test was applied.

Results

Periodontal pockets of 4–5 mm were the most common periodontal finding (48.7%). Most participants lacked prosthetic rehabilitation in the upper (80.7%) and lower arches (93.3%). Multi-unit prosthetic replacement was the most common treatment need in the upper (38.7%) and lower arches (30.7%). Prosthetic treatment need was observed in 84.0% of participants in the upper arch and 79.3% in the lower arch. A significant association was found between age and lower arch prosthetic treatment need ($p = 0.037$).

Conclusion

The geriatric population of Pune city demonstrated poor periodontal health and considerable unmet prosthetic treatment needs. Strengthening preventive oral healthcare and prosthodontic rehabilitation services is essential to improve oral health and quality of life among older adults.

Keywords

Geriatric population; Periodontal status; Prosthetic status; Prosthetic treatment needs; Oral health; Pune.

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I. Introduction

Aging is a ubiquitous, inevitable, and irreversible biological process that affects all individuals. An increasing number of geriatric people indicates a significant demographic transition worldwide. According to the World Health Organization (WHO), individuals aged 60 years and above are considered elderly.¹

Globally, a demographic revolution is underway, with the proportion of older people growing faster than any other age group.² Since ancient times, humans have sought to extend lifespan and improve health through scientific advancements. Improvements in medical science, public health measures, and social conditions have resulted in a continuous increase in life expectancy across most parts of the world. Consequently, healthcare professionals are challenged not only to increase longevity but also to ensure that the later years of life are productive, healthy, and enjoyable.³

Good oral health plays a vital role in maintaining overall well-being among elderly individuals. Improved oral health enables older adults to enhance self-confidence, maintain social interactions, and preserve functional abilities.⁴ Tooth loss has emerged as a major public health concern among the geriatric population. Edentulism adversely affects masticatory efficiency, leading to dietary modifications, nutritional deficiencies, weight loss, and associated systemic illnesses.⁵ Furthermore, tooth loss may have profound psychological and social consequences, causing embarrassment, reduced self-esteem, and withdrawal from routine social activities, thereby negatively impacting quality of life.⁶

The elderly often face numerous barriers to obtaining oral healthcare, including financial constraints, limited access to treatment facilities, physical disabilities, and the presence of multiple chronic medical and psychological conditions.⁷ Assessment of treatment needs among elderly individuals is therefore an essential

prerequisite for effective oral healthcare planning. This requires systematic evaluation of oral diseases, prosthetic status, and prosthetic needs within the population. Such information facilitates estimation of future treatment demands and assists policymakers in planning appropriate oral healthcare services.⁸

Data regarding prosthetic status and prosthetic needs among geriatric individuals, particularly those residing in institutional settings, remain limited. Although the oral health status of the general elderly population has received increasing attention in recent years, the oral health needs of institutionalized and underprivileged elderly populations continue to be neglected.⁹ Therefore, this study was undertaken to assess the prosthetic status and prosthetic needs of the geriatric population in Pune city. The findings of this study may provide baseline information necessary for developing and implementing effective oral healthcare programs aimed at improving the oral health and quality of life of the elderly individuals.¹⁰

The present study aimed to assess the prosthetic status and prosthetic needs among the geriatric population in Pune city in order to identify their treatment requirements and provide baseline data for planning effective oral healthcare services to improve their quality of life.

II. Methodology

Study Design and Setting

A cross-sectional survey was conducted to determine the prosthetic status and prosthetic treatment needs among the geriatric population residing in Pune city. The study was carried out from March 2026 to May 2026.

Study Population

Sample size was estimated using OpenEpi software version 3.0. Following formula was used for calculation $n = [DEFF * Np(1-p)] / [(d2/Z21-\alpha/2*(N-1)+p*(1-p)]$

The sample size comprised 150 elderly individuals aged 60 years and above residing in Pune city. Individuals who were medically compromised and unable to undergo oral examination were excluded from the study.

Sampling Technique

A multistage random sampling technique was used. Pune city was divided into five ward groups, and two wards from each group were selected using simple random sampling, yielding a total of ten wards. The total sample of 150 participants was equally allocated among the selected wards (15 participants per ward). Census blocks/prabhag areas were selected randomly, followed by systematic random sampling of households. When more than one eligible participant was present in a household, one individual was selected using the lottery method.

Study Procedure

A clinical oral examination was performed to assess the prosthetic status and prosthetic treatment needs of the participants according to the World Health Organization (WHO) Oral Health Assessment Form (1997). Examinations were carried out under adequate illumination while participants were seated comfortably.

Data Collection

Data were collected from geriatric individuals aged 60 years and above residing in the selected ward divisions of Pune city. Prior to data collection, informed consent was obtained from all participants after explaining the objectives and procedures of the study.

A structured and pretested proforma based on the WHO Oral Health Surveys was used to record demographic details, dentition status, prosthetic status, and prosthetic treatment needs.

Clinical examinations were conducted under adequate illumination using a mouth mirror and CPI/CPITN probe. The armamentarium included sterile mouth mirrors, CPI probes, disposable gloves, face masks, instrument trays, and recording sheets. Standard infection control measures and universal precautions were followed during all examinations.

Dentition status was assessed by recording the presence or absence of natural teeth and edentulousness according to WHO criteria. Prosthetic status was recorded separately for the maxillary and mandibular arches, noting the presence of fixed or removable prostheses. Prosthetic treatment needs were assessed and categorized according to WHO guidelines.

Statistical Analysis

The collected data were entered into Microsoft Excel and analyzed using the Statistical Package for the Social Sciences (SPSS; IBM Corp., USA), Version 20.0. Descriptive statistics were used to summarize the findings. Differences in proportions were compared using the Chi-square test. A p-value of <0.05 was considered statistically significant.

III. Results

A total of 150 geriatric participants were included in the study. The mean age of the participants was 74.09 ± 8.64 years, with an age range of 61–95 years. The majority of participants belonged to the 70–79 years age group (38.0%), followed by 60–69 years (32.0%) and ≥ 80 years (30.0%). Males constituted 50.7% of the study population, while females constituted 49.3%.

Table 1. Demographic Characteristics and Periodontal Status Among Study Population

Variable	Frequency	Percentage (%)
60–69 years	48	32.0
70–79 years	57	38.0
≥ 80 years	45	30.0
Male	76	50.7
Female	74	49.3
Calculus	16	10.7
Pocket 4–5 mm	73	48.7
Pocket ≥ 6 mm	35	23.3
Excluded Sextant	26	17.3

Assessment of periodontal status using the Community Periodontal Index (CPI) revealed that periodontal pockets of 4–5 mm (CPI Score 3) were the most prevalent finding, affecting 48.7% of participants. Deep periodontal pockets of ≥ 6 mm (CPI Score 4) were observed in 23.3% of participants, while calculus (CPI Score 2) was present in 10.7% of participants. Excluded sextants accounted for 17.3% of the assessments. These findings indicate a high prevalence of periodontal disease among the geriatric population (Table 1)

Values are presented as frequency (n) and percentage (%). Mean age of participants was 74.09 ± 8.64 years (range: 61–95 years). Community Periodontal Index (CPI) scores were assessed according to the WHO Oral Health Assessment Form (2013).

Table 2. Association Between Age Group and CPI Score among study population.

Age Group	Calculus	Pocket 4–5 mm	Pocket ≥ 6 mm	Excluded Sextant	p-value
60–69	7 (14.6)	21 (43.8)	15 (31.3)	5 (10.4)	
70–79	4 (7.0)	32 (56.1)	11 (19.3)	10 (17.5)	
≥ 80	5 (11.1)	20 (44.4)	9 (20.0)	11 (24.4)	0.320

Table 2 demonstrates the association between age group and CPI score. Periodontal pockets of 4–5 mm were the most common periodontal finding across all age groups. Deep periodontal pockets (≥ 6 mm) were relatively more prevalent among participants aged 60–69 years, whereas excluded sextants were more frequently observed among participants aged ≥ 80 years. However, the association between age group and CPI score was not statistically significant ($\chi^2 = 7.008$, $df = 6$, $p = 0.320$), indicating that periodontal status did not differ significantly across age categories.

Table 3. Prosthetic Status of Upper and Lower Arches among study population

Status	Upper Arch n (%)	Lower Arch n (%)
No Prosthesis	121 (80.7)	140 (93.3)
Bridge	1 (0.7)	4 (2.7)
Partial Denture	24 (16.0)	2 (1.3)
Combination Prosthesis	1 (0.7)	1 (0.7)
Full Denture	3 (2.0)	3 (2.0)

Table 3 summarizes the prosthetic status of both upper and lower arches. The majority of participants did not possess any prosthesis in either arch, accounting for 80.7% in the upper arch and 93.3% in the lower arch. Partial dentures represented the most common existing prosthesis in the upper arch (16.0%), whereas bridges (2.7%) were the most frequently observed prosthetic restoration in the lower arch. These findings suggest inadequate prosthetic rehabilitation among the study population.

Table 4. Prosthetic Treatment Needs in Upper and Lower Arches among study population

Need	Upper Arch n (%)	Lower Arch n (%)
No Need	24 (16.0)	31 (20.7)
One-unit Prosthesis	35 (23.3)	43 (28.7)
Multi-unit Prosthesis	58 (38.7)	46 (30.7)
Combination Prosthesis	1 (0.7)	2 (1.3)
Full Prosthesis	32 (21.3)	28 (18.7)

Table 4 .presents the prosthetic treatment needs of the upper and lower arches. In the upper arch, multi-unit prosthetic replacement was the most common treatment need (38.7%), followed by one-unit prosthetic replacement (23.3%) and full prosthetic replacement (21.3%). Similarly, in the lower arch, multi-unit prosthetic replacement constituted the most common treatment requirement (30.7%), followed by one-unit prosthetic replacement (28.7%) and full prosthetic replacement (18.7%). Only 16.0% and 20.7% of participants required no prosthetic treatment in the upper and lower arches, respectively. These findings indicate a substantial burden of unmet prosthetic treatment needs among the elderly population.

Table 5. Association Between Age Group and Prosthetic Treatment Need Among study population

Upper Arch Prosthetic Need						
Age group	No Need	One unit	Multi-unit	Combination	Full-prosthesis	p value
60-69	8	10	23	0	7	
70-79	7	13	21	0	16	
≥80	9	12	14	1	9	0.464
Lower Arch Prosthetic Need						
Age group	No Need	One unit	Multi-unit	Combination	Full- prosthesis	p value
60-69	7	17	19	0	5	
70-79	17	12	13	0	15	
≥80	7	14	14	2	8	0.037

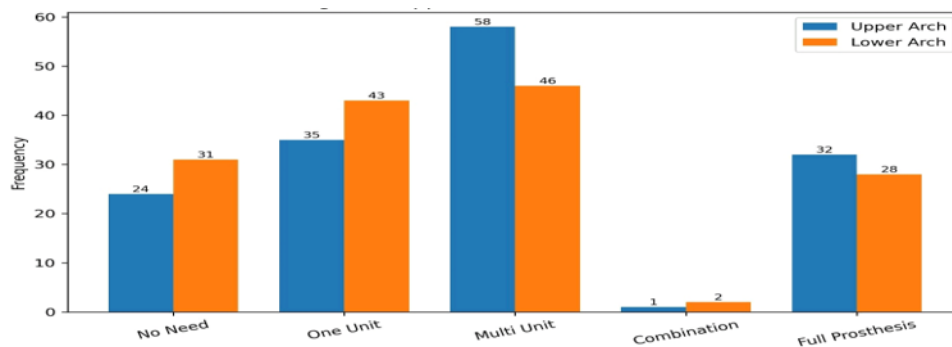


Figure1. Upper vs Lower Prosthetic Need

Table 5 , figure1. illustrates the association between age group and prosthetic treatment needs in both arches. For the upper arch, multi-unit prosthetic replacement was the most common treatment need across all age groups. Although minor variations were observed among different age categories, the association between age group and upper arch prosthetic need was not statistically significant ($\chi^2 = 7.690$, $df = 8$, $p = 0.464$). In contrast, a statistically significant association was observed between age group and lower arch prosthetic need ($\chi^2 = 16.369$, $df = 8$, $p = 0.037$). Multi-unit prosthetic replacement was the predominant requirement among participants aged 60–69 years, while the need for full prosthetic replacement increased with advancing age.

Overall Prosthetic Requirement

Prosthetic treatment need was observed in 84.0% of participants for the upper arch and 79.3% for the lower arch, indicating that a large proportion of the geriatric population required prosthodontic rehabilitation.

IV. Discussion

The present study evaluated periodontal status, prosthetic status, and prosthetic treatment needs among geriatric individuals in Pune city using the WHO Oral Health Assessment Form. The findings revealed a substantial burden of periodontal disease and unmet prosthetic treatment needs among the elderly population. Nearly half of the participants (48.7%) exhibited periodontal pockets of 4–5 mm, while 23.3% demonstrated deep periodontal pockets ≥ 6 mm, indicating a high prevalence of moderate-to-severe periodontal destruction. Similar findings were reported by Yadav et al. (2021), who observed periodontal pockets ≥ 6 mm in 71.1% of institutionalized elderly individuals, emphasizing the increasing burden of periodontal disease with advancing age.¹¹ Likewise, a recent review of geriatric oral health reported that periodontal pockets of 4–5 mm and ≥ 6 mm constituted the most common periodontal findings among older adults, highlighting the widespread prevalence of periodontal disease in aging populations.¹²

In the present study, no statistically significant association was observed between age group and CPI scores ($p = 0.320$). Although participants aged 60–69 years demonstrated a relatively higher prevalence of deep periodontal pockets (31.3%), periodontal disease severity remained consistently high across all age groups. Similar observations were reported by Yadav et al. (2021), who found no significant association between age and

CPI scores among geriatric residents of old-age homes.¹¹ These findings suggest that factors such as oral hygiene practices, systemic health conditions, cumulative plaque exposure, and access to dental care may exert a greater influence on periodontal status than chronological age alone.

The assessment of prosthetic status revealed that 80.7% and 93.3% of participants lacked prosthetic rehabilitation in the upper and lower arches, respectively. Partial dentures represented the most common existing prosthesis in the maxillary arch (16.0%), whereas prosthetic replacement in the mandibular arch was notably limited. Comparable findings were reported in a recent Indian study by Haridas et al. (2024), which demonstrated that 83.5% of elderly participants had no prosthesis in the lower arch and approximately 78% lacked prosthetic rehabilitation in the upper arch.¹³ Similarly, Kamiyeva et al. (2026) reported substantial deficiencies in prosthetic rehabilitation among elderly populations, despite significant tooth loss and functional limitations.¹⁴ The high prevalence of untreated edentulism observed in the present study may be attributed to financial constraints, limited awareness regarding oral rehabilitation, and inadequate utilization of dental services.

Regarding prosthetic treatment needs, multi-unit prosthetic replacement emerged as the most common requirement in both upper (38.7%) and lower arches (30.7%). Furthermore, 84.0% of participants required prosthetic treatment in the upper arch and 79.3% in the lower arch. These findings closely resemble those reported by Haridas et al. (2024), who observed that approximately 77% of geriatric individuals required prosthetic rehabilitation and that multi-unit prosthetic replacement represented the predominant treatment need.¹³ Similarly, epidemiological data from geriatric populations have consistently demonstrated extensive unmet prosthetic requirements due to cumulative tooth loss and inadequate replacement of missing teeth.^{14,15}

The present study also identified a statistically significant association between age group and lower arch prosthetic need ($p = 0.037$), whereas no significant association was observed for upper arch prosthetic requirements. The increased requirement for full prosthetic replacement among older age groups may reflect progressive tooth loss and cumulative oral disease burden over time. Similar age-related trends in prosthetic treatment needs have been documented in recent geriatric oral health surveys, which reported increasing prosthetic demand with advancing age and declining oral function.^{15,16}

The findings of this study are clinically important because untreated periodontal disease and inadequate prosthetic rehabilitation may negatively affect mastication, nutrition, speech, social interaction, and overall quality of life among elderly individuals. Recent evidence suggests that poor prosthetic status is significantly associated with compromised nutritional status and reduced oral health-related quality of life in older adults.^{17,18} Therefore, comprehensive geriatric oral healthcare programs focusing on preventive periodontal therapy, early diagnosis of oral diseases, and affordable prosthodontic rehabilitation are essential to improve oral health outcomes in the aging population.

The high prevalence of unmet prosthetic treatment needs observed in the present study is consistent with recent literature. Haridas et al. (2024) reported that approximately 77.4% of geriatric individuals required prosthetic rehabilitation, compared to 84.0% and 79.3% of participants requiring treatment in the upper and lower arches, respectively, in the present study.¹³ Similarly, Gupta et al. (2022) found that nearly 74.8% of elderly individuals demonstrated unmet prosthetic needs, with multi-unit prosthetic replacement being the most common requirement, comparable to the present findings where multi-unit prostheses accounted for 38.7% of upper arch and 30.7% of lower arch treatment needs.¹⁵ Furthermore, Medeiros et al. (2023) reported that over 80% of institutionalized older adults lacked adequate prosthetic rehabilitation, a finding similar to the present study where 80.7% of participants in the upper arch and 93.3% in the lower arch had no existing prosthesis.¹⁷ Peres et al. (2025) also highlighted that untreated tooth loss and inadequate prosthetic replacement affect more than 70% of older adults in many low- and middle-income settings, emphasizing the substantial burden of oral rehabilitation needs among ageing populations.¹⁹ These findings collectively support the results of the present study and underscore the necessity for accessible prosthodontic services and targeted geriatric oral healthcare programs.

Strengths and Limitations of the Study

The present study has several strengths. It employed a standardized methodology using the WHO Oral Health Assessment Form, ensuring reliable and internationally comparable assessment of periodontal status, prosthetic status, and prosthetic treatment needs. The use of multistage random sampling enhanced the representativeness of the study population across different wards of Pune city, thereby reducing selection bias.. The study assessed both periodontal health and prosthetic rehabilitation needs, providing comprehensive information useful for planning geriatric oral health services. However, certain limitations should be acknowledged. As a cross-sectional study, it cannot establish causal relationships between age and oral health outcomes. The study was conducted in selected wards of Pune city with a sample size of 150 participants; therefore, the findings may not be generalizable to the entire geriatric population of Pune or other regions. Information on socioeconomic status, educational level, systemic diseases, oral hygiene practices, dietary habits, and healthcare utilization was not evaluated, although these factors may influence periodontal health and prosthetic needs.

V. Conclusion

The present study revealed a substantial burden of periodontal disease and unmet prosthetic treatment needs among the geriatric population of Pune city. Periodontal pockets of 4–5 mm were the most common periodontal condition, while a majority of participants lacked adequate prosthetic rehabilitation despite considerable treatment needs. Multi-unit prosthetic replacement was the predominant requirement in both arches, reflecting cumulative tooth loss with advancing age. These findings highlight the need for preventive periodontal care, regular oral health screening, and accessible prosthodontic services to improve oral health, functional ability, and quality of life among older adults.

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