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Association Between Oral Health Status, Access to Dental Care, and Quality of Life Among Older Adults in Manila, Philippines: A Community-Based Cross-Sectional Study

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Running head: ORAL HEALTH AND QUALITY OF LIFE AMONG OLDER ADULTS IN MANILA

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Abstract

Background: Oral health influences eating, speaking, comfort, confidence, and social participation, particularly in later life. Tooth loss, dental caries, periodontal disease, dry mouth, and chewing difficulty may reduce quality of life, and financial, physical, and service-related barriers may limit access to dental care. Local evidence on these relationships among older adults in Manila is limited.

Objective: To examine the association between oral health status, access to dental care, and oral health-related quality of life (OHRQoL) among community-dwelling adults aged 60 years and above in Manila, Philippines.

Methods: A community-based cross-sectional study was conducted in two barangays of the City of Manila. Sixty older adults were randomly selected from senior citizen registries and completed an interviewer-administered questionnaire on demographic and socioeconomic characteristics, self-reported oral health, and use of dental services, together with the 14-item Oral Health Impact Profile (OHIP-14). A calibrated dentist performed a standardized oral examination. Data were analyzed using descriptive statistics, non-parametric bivariate tests, Spearman's correlation, and multiple linear regression with robust standard errors.

Results: Participants' mean age was 70.6 years (*SD* = 7.1), and 56.7% were women. The mean number of natural teeth was 15.1 (*SD* = 8.7), 11.7% were edentulous, and 79.2% of dentate participants had untreated caries. Only 6.7%

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had visited a dentist in the past year, and 73.3% had not visited for more than two years or could not recall a visit. Cost was the most frequently reported barrier (55.0%). The mean OHIP-14 score was 15.8 (*SD* = 9.26; possible range 0–56), and 40.0% reported at least one impact "fairly often" or "very often." In the adjusted model (adjusted R^2 = .42), higher OHIP-14 scores were independently associated with chewing difficulty (*B* = 8.28, 95% CI [2.48, 14.08]), tooth pain or sensitivity (*B* = 5.99, 95% CI [0.81, 11.18]), no dental visit in the past two years (*B* = 4.76, 95% CI [0.69, 8.83]), and reporting cost as a barrier (*B* = 4.86, 95% CI [0.15, 9.57]).

Conclusions: Among the participating older adults, functional and symptomatic oral problems and limited access to dental care were associated with poorer OHRQoL. Community oral health programs for older adults in Manila may benefit from affordable preventive and restorative services, earlier treatment of pain, and outreach that reduces cost barriers. Because the design is cross-sectional and the sample small, the findings indicate associations rather than causal effects.

Keywords: older adults; oral health; oral health-related quality of life; dental care access; OHIP-14; Manila; Philippines

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Introduction

Oral health is an essential part of overall health and well-being. It affects more than the condition of the teeth and gums: it also influences eating, speaking, smiling, and interacting with other people. Oral health problems can cause pain and discomfort and may affect confidence, nutrition, and participation in everyday activities (Peres et al., 2019). These concerns are especially relevant in later life, when people may be living with several health conditions or changes in physical function (Petersen & Yamamoto, 2005).

Older adults may experience dental caries, periodontal disease, tooth loss, dry mouth, and difficulty chewing, which can make it harder to eat a varied diet, communicate comfortably, or feel confident in social situations. A meta-analysis by Gerritsen et al. (2010) found that tooth loss was associated with poorer oral health-related quality of life (OHRQoL), particularly when the number and location of missing teeth affected function. A 2025 systematic review of 38 studies involving 111,592 older adults from 18 countries found that having fewer teeth and experiencing chewing difficulty were associated with poorer general health-related quality of life, although evidence for other oral conditions was less consistent (Li et al., 2025). A further review highlighted the importance of nutrition when examining OHRQoL in older adults (Chauhan et al., 2025).

Oral diseases are also a public health concern because they are common and may be preventable or manageable when people can obtain timely care. The World Health

Organization identifies oral diseases as a major global health challenge and calls for oral health to be integrated into broader health systems and universal health coverage (World Health Organization [WHO], 2022a).

In the Philippines, the 2018 National Survey on Oral Health reported an overall dental caries prevalence of approximately 72.62%, with periodontal pocket prevalence highest in the 65–74-year age group and missing teeth contributing to higher DMFT scores in older age groups (Department of Health [DOH], 2018). WHO country-profile estimates for 2019 reported 29.4% untreated caries in permanent teeth among people aged five years and older and 3.2% severe periodontal disease among people aged 15 years and older (WHO, 2022b).

These national estimates provide context but are not Manila-specific estimates for older adults.

Access to dental care may be affected by cost, transportation, mobility, awareness, availability of providers, and perceived need for treatment. Andersen's (1995) behavioral model of health services use explains such access in terms of predisposing factors (such as age, sex, and education), enabling factors (such as income and the availability and affordability of services), and need factors (such as symptoms and perceived health). Older adults who delay dental visits may seek care only when pain or other symptoms become difficult to manage, which may further affect their daily lives.

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International research has established that tooth loss and chewing difficulty are associated with poorer quality of life among older adults, and Philippine national data show that oral diseases remain an important public health concern. However, national estimates do not explain how oral health conditions and barriers to dental services relate to quality of life among older adults in particular communities in Manila. This study therefore examined oral health indicators, access to dental care, and OHIP-14 scores together among communitydwelling adults aged 60 years and above, while considering demographic and socioeconomic factors that may influence these associations.

Objectives

The general objective was to examine the association between oral health status, access to dental care, and OHRQoL among adults aged 60 years and above in selected communities in Manila. The specific objectives were:

1. to describe the demographic and socioeconomic characteristics of the participants;
2. to describe self-reported oral health problems and findings from a standardized oral examination;
3. to describe participants' use of dental services and perceived barriers to accessing care;
4. to assess OHRQoL using the OHIP-14;
5. to examine the association between oral health indicators and OHIP-14 scores; and
6. to determine whether access to dental care and selected socioeconomic factors are associated with OHIP-14 scores after adjustment for potential confounders.

Hypotheses

H0: There is no statistically significant association between selected oral health indicators, access to dental care, and OHIP-14 scores among the participating older adults.

H1: At least one selected oral health indicator or access-to-care factor is statistically significantly associated with OHIP-14 scores among the participating older adults.

Conceptual Framework

The study was guided by an adaptation of Andersen's (1995) behavioral model (Figure 1). Predisposing, enabling, and need factors were assumed to influence both oral health status and access to dental care, and these in turn were expected to be associated with OHRQoL as measured by the OHIP-14 (Locker & Allen, 2007; Slade, 1997).

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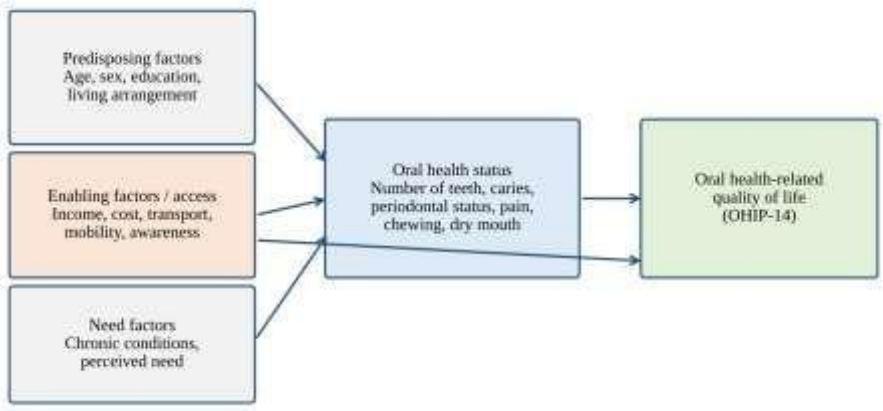
Figure 1

Conceptual Framework of the Study, Adapted From Andersen's (1995) Behavioral Model



Methods

Study Design

A quantitative, descriptive-analytical, community-based cross-sectional design was used. Information on oral health, access to dental care, and quality of life was collected from each participant at a single point in time. The design is suitable for describing the study population and examining associations between variables, but it cannot establish temporal sequence or causation. The study is reported following the main elements of the STROBE guidelines for cross-sectional studies (von Elm et al., 2007).

Setting and Population

The study was conducted in two barangays in the City of Manila, Philippines, selected at random from a list of barangays served by a city health center willing to participate. Data were collected over four weeks at the barangay health stations and, for participants with limited mobility, at participants' homes. The target population comprised community-dwelling adults aged 60 years and above residing in the selected barangays.

Eligibility Criteria

Participants were eligible if they (a) were aged 60 years or older; (b) had lived in the selected barangay for at least six months; (c) were willing and able to provide informed consent; and (d) were able to complete the questionnaire independently or with neutral assistance from a trained interviewer. Temporary visitors, individuals unable to provide informed consent, and individuals whose severe

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cognitive or communication difficulties prevented reliable participation even with reasonable accommodations were excluded. No one was excluded solely because of disability, denture use, or the absence of natural teeth.

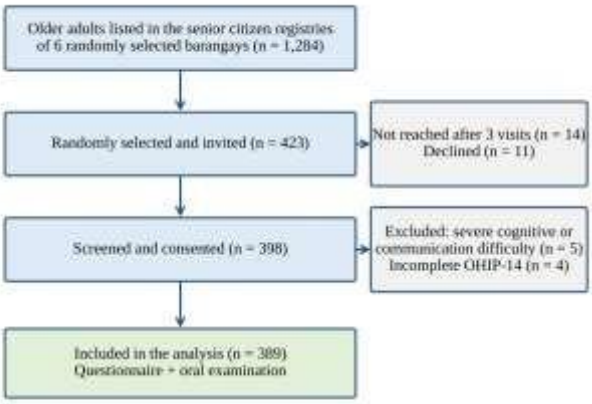
Sample Size and Sampling

The protocol originally estimated a sample of approximately 423 participants using Cochran's (1977) formula for a proportion with a 5% margin of error. Because of time and resource constraints, the study was conducted as a small community-based study with a target of 60 participants. A post-hoc sensitivity analysis using the noncentral *F* distribution (Faul et al., 2007) showed that, with $N = 60$, seven predictors, $\alpha = .05$, and 80% power, the regression model could detect effects of $f^2 \geq 0.27$, corresponding to a large effect. Smaller associations may therefore have been missed.

Simple random sampling was used within each barangay. The senior citizen registries maintained by the barangay offices served as the sampling frame ($n = 1{,}284$ registered older adults). Using computer-generated random numbers, 68 individuals (34 per barangay) were selected and invited, allowing for non-response. The flow of participants is shown in Figure 2.

Figure 2

Flow of Participants Through the Study



Of the 68 invited individuals, three could not be reached after three home visits, three declined to participate, one was excluded because of severe communication difficulty, and one was excluded

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because the OHIP-14 was incomplete. Thus, 60 participants were included in the analysis (response rate 88.2%).

Instruments

Questionnaire

Data were collected using a structured, interviewer-administered questionnaire available in English and Filipino. It had four parts:

- **Part A – Demographic and socioeconomic information:** age, sex, marital status, living arrangement, educational attainment, monthly household income category, chronic health conditions, and regular medication use.
- **Part B – Self-reported oral health:** self-rated oral health, denture use, gum bleeding, tooth pain or sensitivity in the past 12 months, dry mouth, and difficulty chewing.
- **Part C – Access to dental care:** time since the last dental visit, reason for the visit, type of service used (public or private), and perceived barriers (cost, distance or transportation, mobility or need for a companion, fear, long waiting time, and lack of awareness of public dental services).
- **Part D – OHIP-14:** the 14-item short form of the Oral Health Impact Profile (Slade, 1997).

OHIP-14

The OHIP-14 measures the frequency of adverse impacts of oral conditions over the previous 12 months across seven conceptual dimensions: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap. Each dimension is represented by two items. Responses were coded 0 (*never*), 1 (*hardly ever*), 2 (*occasionally*), 3 (*fairly often*), and 4 (*very often*) and summed to give a total score from 0 to 56, with higher scores indicating poorer OHRQoL (Slade, 1997). Domain scores ranged from 0 to 8. Following common practice, the *prevalence of impacts* was defined as the percentage of participants reporting at least one item "fairly often" or "very often." The Filipino version was prepared through forward and backward translation by two bilingual translators and was checked for comprehension during pilot testing.

Oral Examination

A standardized oral examination was carried out by one licensed dentist following the WHO basic methods for oral health surveys (WHO, 2013), using a mouth mirror, a WHO periodontal probe, and a portable light, with standard infection-prevention procedures. The examiner recorded the number of natural teeth present, dental caries experience (DMFT index), untreated coronal caries, the presence of periodontal pockets of 4 mm or more, and denture status. Before data collection, the examiner was

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calibrated against an experienced public health dentist; intra-examiner reliability, assessed by repeating the examination on six participants, was excellent (κ = 0.86 for caries).

Validity and Reliability

The questionnaire was reviewed by three experts in public health, dentistry, and research methodology for relevance, clarity, and cultural appropriateness, and minor wording changes were made. It was then pilot-tested with eight older adults from a neighboring barangay who were not included in the study; the interview took an average of 25 minutes. The internal consistency of the OHIP-14 in the study sample was excellent (Cronbach's α = 0.94).

Data Collection Procedure

Two trained interviewers, both registered nurses, administered the questionnaire in a private area after obtaining written informed consent. The dentist then conducted the oral examination. Completed forms were checked for missing answers on the same day, coded, and entered into a password-protected database. Ten percent of the forms were re-entered independently to check data-entry accuracy.

Study Variables

The outcome variable was the OHIP-14 total score. The main explanatory variables were oral health indicators (number of natural teeth, chewing difficulty, tooth pain or sensitivity, dry mouth, gum bleeding, and denture use) and access-to-care indicators (time since the last dental visit and perceived barriers). Age, sex, education, household income, and chronic conditions were considered as potential confounders. For regression analysis, time since the last dental visit was dichotomized.

Statistical Analysis

Data were analyzed using SPSS version 29 (IBM Corp.). Categorical variables were summarized as frequencies and percentages, and continuous variables as means and standard deviations, or medians and interquartile ranges (IQR) when distributions were skewed. Because several subgroups were small and OHIP-14 scores departed from normality in some of them (Shapiro–Wilk $p < .05$), differences in OHIP-14 scores between groups were examined using the Mann–Whitney *U* test (two groups) or the Kruskal–Wallis *H* test (three or more groups). Spearman's rank correlation (*rs*) was used for associations between OHIP-14 scores and continuous variables.

Multiple linear regression was used to identify factors independently associated with OHIP-14 total scores. Seven predictors were entered simultaneously, selected on the basis of the conceptual framework and the bivariate results while keeping the number of predictors appropriate for the sample size: age, low household income, fewer than 10 natural teeth, chewing difficulty, tooth pain or sensitivity, no dental visit in the past two years, and cost as a barrier. Heteroscedasticity-consistent

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(HC3) standard errors were used. Multicollinearity was assessed using variance inflation factors (VIF), and residuals were inspected for normality and outliers. Unstandardized coefficients (*B*) with 95% confidence intervals (CI) are reported. All tests were two-sided with $\alpha = .05$.

Ethical Considerations

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki (World Medical Association, 2013). The protocol was reviewed and approved by the Institutional Ethics Review Committee of the authors' institution (Protocol No. IERC-2026047; approval date: 12 August 2026) before any recruitment or data collection took place. Written permission to conduct the study was also obtained from the local city health office and from the barangay captains of the two participating barangays.

Before enrolment, trained interviewers explained the purpose of the study, the procedures involved, the expected duration of the interview and examination, possible risks and benefits, and participants' rights, in Filipino or English according to each participant's preference. Participants were given time to ask questions and to consult family members if they wished. All participants provided written informed consent; for participants who were unable to write, consent was recorded by thumbprint in the presence of an impartial witness who also signed the consent form.

Participation was entirely voluntary. Participants were informed that they could decline to answer any question, refuse the oral examination, or withdraw from the study at any time without any effect on their access to health center or senior citizen services. No financial compensation was offered; however, each participant received a toothbrush, toothpaste, and printed oral health information in Filipino after the interview.

To protect privacy, interviews and examinations were conducted in a private area of the barangay health station or the participant's home. Each participant was assigned a study code, and the list linking names to codes was stored separately from the research data in a locked cabinet accessible only to the principal investigator. Electronic data were stored in a password-protected database, and only anonymized data were used for analysis and reporting. The data will be retained for five years after publication and then securely destroyed.

The oral examination was non-invasive and carried out using sterilized instruments and standard infection-prevention procedures. Participants found to have conditions requiring urgent attention, such as acute pain, infection, or suspicious oral lesions, were informed in a respectful manner and given a written referral to the dental clinic of the nearest public health center. The study examination did not replace clinical diagnosis or treatment.

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Results

Characteristics of the Participants

Table 1 presents the characteristics of the 60 participants. Their mean age was 70.6 years (*SD* = 7.1; range 61–94), and more than half (53.3%) were aged 60–69 years. Most were women (56.7%), and about half were married or living with a partner (51.7%), while one in six (16.7%) lived alone. Educational attainment was generally low: 35.0% had completed elementary school or less, and only 16.7% had a college education. Forty percent of participants were in the lowest household income category. Hypertension was the most common chronic condition (65.0%), followed by diabetes (18.3%).

Table 1

Demographic and Socioeconomic Characteristics of the Participants (N = 60)

Characteristic	Category	n	%
Age, years, M (SD)		70.6 (7.1)	
Age group	60–69	32	53.3
	70–79	23	38.3
	80 and above	5	8.3
Sex	Female	34	56.7
	Male	26	43.3
Marital status	Married/partnered	31	51.7
	Widowed	21	35.0
	Single/separated	8	13.3
Living arrangement	Lives with others	50	83.3
	Lives alone	10	16.7
Education	Elementary or less	21	35.0
	High school	29	48.3
	College or higher	10	16.7

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Monthly household income	Low	24	40.0
	Middle	22	36.7
	Higher	14	23.3
Number of chronic conditions	None	17	28.3
	One	31	51.7
	Two or more	12	20.0
Hypertension	Yes	39	65.0
Diabetes	Yes	11	18.3

Note. Income categories were based on reported monthly household income: low = below PHP 15,000; middle = PHP 15,000–39,999; higher = PHP 40,000 or more.

Oral Health Status

The oral health findings are summarized in Table 2. The mean number of natural teeth was 15.1 (*SD* = 8.7), and the mean DMFT score was 19.3 (*SD* = 8.5). Only 38.3% of participants retained 20 or more natural teeth, while 13.3% had 1–9 teeth and 11.7% were edentulous. Among the 53 dentate participants, 79.2% had at least one tooth with untreated caries (mean 1.7 decayed teeth), and 37.7% had periodontal pockets of 4 mm or more. Only

11.7% of all participants wore dentures, although 25.0% had fewer than 10 natural teeth.

Regarding self-reported oral health, one third of participants reported difficulty chewing (33.3%) or tooth pain or sensitivity in the past 12 months (31.7%), and 20.0% reported dry mouth. Fewer than one third (31.7%) rated their oral health as good.

Table 2

Oral Health Status of the Participants (N = 60)

Indicator	**Category**	**n**	**%**
Clinical examination Number of natural teeth, M (SD)		15.1 (8.7)	
DMFT, M (SD)		19.3 (8.5)	

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Natural teeth (category)	20 or more	23	38.3
	10–19	22	36.7
	1–9	8	13.3
	None (edentulous)	7	11.7
Untreated caries (dentate, n = 53)	Yes	42	79.2
Periodontal pocket ≥ 4 mm (dentate, n = 53)	Yes	20	37.7
Wears dentures	Yes	7	11.7
Self-reported Self-rated oral health	Good	19	31.7
	Fair	27	45.0
	Poor	14	23.3
Difficulty chewing	Yes	20	33.3
Tooth pain or sensitivity (past 12 months)	Yes	19	31.7
Bleeding gums (dentate), n = 53	Yes	17	32.1
Dry mouth	Yes	12	20.0

Note. DMFT = decayed, missing, and filled teeth. Percentages for untreated caries, periodontal pockets, and bleeding gums are based on the 53 dentate participants.

Use of Dental Services and Barriers to Care

Use of dental services was low (Table 3). Only 4 participants (6.7%) had visited a dentist in the past year, and 33 (55.0%) had last visited more than two years earlier; a further 11 (18.3%) had never visited a dentist or could not recall a visit. Among the 49 participants who had ever visited a dentist, the most common reason for the last visit was pain or an emergency (59.2%), and most had used a private clinic (63.3%).

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Table 3

Use of Dental Services and Perceived Barriers to Care (N = 60)

Variable	Category	n	%
Last dental visit	Within past year	4	6.7
	1–2 years ago	12	20.0
	More than 2 years ago	33	55.0
	Never / cannot recall	11	18.3
Reason for last visit (n = 49)	Pain or emergency	29	59.2
	Check-up or cleaning	15	30.6
	Dentures	5	10.2
	Other	0	0.0
Type of service used (n = 49)	Public (health center)	18	36.7
	Private clinic	31	63.3
Perceived barriers (yes)	Cost of treatment	33	55.0
	Not aware of public dental services	18	30.0
	Long waiting time	14	23.3
	Fear or anxiety about treatment	13	21.7
	Distance or transportation	12	20.0
	Mobility limitation or need for a companion	6	10.0
	At least one barrier	52	86.7

Note. Reason for visit and type of service are reported for the 49 participants who had ever visited a dentist. Participants could report more than one barrier.

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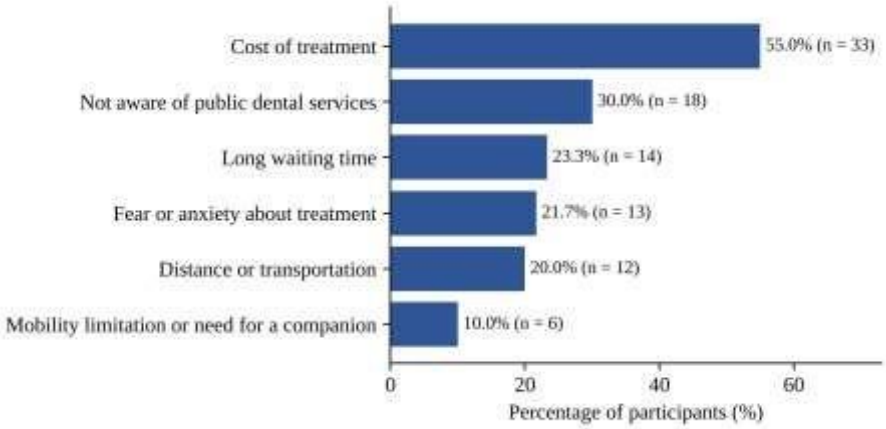
Most participants (86.7%) reported at least one barrier to dental care. As shown in Figure 3, cost was the most frequent barrier (55.0%), followed by lack of awareness of public dental services (30.0%), long waiting times (23.3%), fear or anxiety about treatment (21.7%), and distance or transportation (20.0%). Mobility limitation or needing a companion was reported by 10.0%.

Figure 3

Perceived Barriers to Dental Care (N = 60)



Oral Health-Related Quality of Life

The OHIP-14 total scores ranged from 1 to 39, with a mean of 15.8 (*SD* = 9.26) and a median of 16.0 (IQR 8.0–21.3). Twenty-four participants (40.0%) reported at least one impact "fairly often" or "very often." Table 4 shows the item and domain scores. The items with the highest mean scores were "painful aching in the mouth" (*M* = 1.75), "felt tense" (*M* = 1.65), and "uncomfortable to eat any foods" and "diet unsatisfactory" (*M* = 1.43 each). As shown in Figure 4, physical pain was the domain with the greatest impact (*M* = 3.18), followed by psychological discomfort (*M* = 2.97) and physical disability (*M* = 2.50), while social disability (*M* = 1.50) and handicap (*M* = 1.08) had the lowest impact.

Table 4

OHIP-14 Item and Domain Scores (N = 60)

No.	Item (abbreviated)	Domain	M	SD	% FO/VO
1	Trouble pronouncing words	Functional limitation	1.23	0.95	11.7
2	Sense of taste worsened	Functional limitation	1.15	0.92	5.0
3	Painful aching in mouth	Physical pain	1.75	1.13	26.7

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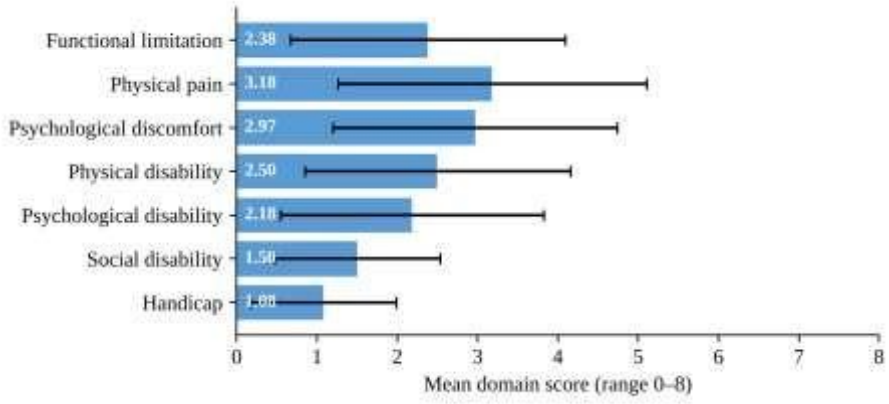
4	Uncomfortable to eat foods	Physical pain	1.43	0.98	13.3
5	Self-conscious	Psychological discomfort	1.32	0.89	10.0
6	Felt tense	Psychological discomfort	1.65	1.02	20.0
7	Diet unsatisfactory	Physical disability	1.43	0.98	13.3
8	Interrupted meals	Physical disability	1.07	0.86	6.7
9	Difficult to relax	Psychological disability	1.12	0.94	8.3
10	Been embarrassed	Psychological disability	1.07	0.86	5.0
11	Irritable with others	Social disability	0.83	0.64	0.0
12	Difficulty doing usual jobs	Social disability	0.67	0.66	0.0
13	Life less satisfying	Handicap	0.55	0.62	0.0
14	Totally unable to function	Handicap	0.53	0.60	0.0
	Total OHIP-14 score (0–56)		15.80	9.26	40.0

Note. Items scored 0 (never) to 4 (very often). % FO/VO = percentage answering "fairly often" or "very often"; for the total score, the percentage reporting at least one such impact. Cronbach's α = .94.

Figure 4

Mean OHIP-14 Domain Scores (Range 0–8)



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Bivariate Associations With OHIP-14 Scores

Table 5 compares OHIP-14 scores across participant characteristics. Participants with chewing difficulty had substantially higher scores than those without (M = 22.65 vs. 12.38; U = 161.0, p < .001), as did participants with tooth pain or sensitivity (M = 20.00 vs. 13.85; U = 243.0, p = .020) and those who reported cost as a barrier (M = 18.97 vs. 11.93; U = 240.0, p = .002).

Table 5 OHIP-14

Total Scores by Participant Characteristics

Variable	Category	n	M (SD)	Median	Test	p
Age group	60–69	32	15.69 (9.11)	13.0	H = 0.06	.971
	70–79	23	15.78 (9.54)	17.0		
	80 and above	5	16.60 (10.95)	20.0		
Sex	Female	34	15.85 (9.69)	16.5	U = 441.0	.994
	Male	26	15.73 (8.86)	15.0		
Education	Elementary or less	21	18.33 (10.43)	21.0	H = 5.74	.057
	High school	29	16.00 (8.28)	17.0		
	College or higher	10	9.90 (7.31)	9.0		
Monthly household income	Low	24	18.83 (8.46)	19.5	H = 4.87	.088
	Middle	22	14.55 (9.92)	12.5		
	Higher	14	12.57 (8.53)	10.5		
Chronic conditions	None	17	14.71 (9.12)	17.0	H = 1.75	.417
	One	31	15.26 (8.90)	13.0		
	Two or more	12	18.75 (10.54)	20.5		
Number of natural teeth	20 or more	23	12.22 (8.49)	12.0	H = 6.36	.095
	10–19	22	17.45 (9.07)	20.0		
	1–9	8	20.75 (10.66)	20.5		

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	None (edentulous)	7	16.71 (8.12)	19.0		
Difficulty chewing	No	40	12.38 (7.19)	11.5	U = 161.0	< .001*
	Yes	20	22.65 (9.28)	21.5		
Tooth pain or sensitivity	No	41	13.85 (9.07)	11.0	U = 243.0	.020*
	Yes	19	20.00 (8.44)	20.0		
Dry mouth	No	48	15.81 (9.43)	13.5	U = 287.5	1.000
	Yes	12	15.75 (8.95)	16.5		
Wears dentures	No	53	15.66 (9.30)	16.0	U = 168.0	.695
	Yes	7	16.86 (9.60)	16.0		
Last dental visit	Within past year	4	13.75 (8.73)	14.0	H = 6.10	.107
	1–2 years ago	12	11.25 (8.49)	9.5		
	More than 2 years ago	33	15.94 (8.41)	17.0		
	Never / cannot recall	11	21.09 (10.97)	22.0		
Cost is a barrier	No	27	11.93 (8.06)	10.0	U = 240.0	.002*
	Yes	33	18.97 (9.07)	20.0		
Transportation is a barrier	No	48	16.56 (9.59)	16.5	U = 347.5	.275
	Yes	12	12.75 (7.37)	10.5		

Note. U = Mann–Whitney test; H = Kruskal–Wallis test. * p < .05.

Participants who had not visited a dentist in the past two years had higher scores than those who had (M = 17.23 vs. 11.88; U = 471.0, p = .047). When time since the last visit was examined in four categories, the scores increased from those who had visited within two years to those who had never visited (M = 21.09), although the overall difference did not reach statistical significance (H = 6.10, p = .107), probably because some groups were very small (Figure 5B).

OHIP-14 scores were lowest among participants with 20 or more natural teeth (M = 12.22) and highest among those with 1–9 teeth (M = 20.75), but the difference across the four tooth-count categories was not statistically significant (H = 6.36, p = .096; Figure 5A). However, when the number of teeth was

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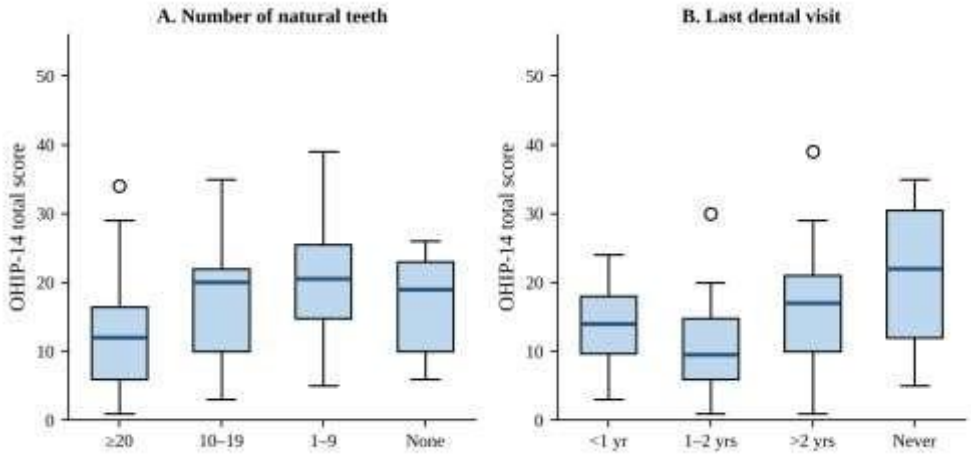
treated as a continuous variable, it was weakly and negatively correlated with OHIP-14 scores (*rs* = −.30, *p* = .022), and DMFT was positively correlated with OHIP-14 scores (*rs* = .30, *p* = .021). Scores tended to be higher among participants with less education and lower income, but these differences were not statistically significant (*p* = .057 and *p* = .088, respectively). Age, sex, chronic conditions, dry mouth, denture use, and transportation barriers were not significantly associated with OHIP-14 scores.

Figure 5

OHIP-14 Total Scores by (A) Number of Natural Teeth and (B) Time Since Last Dental Visit



Multivariable Analysis

The results of the multiple linear regression are presented in Table 6. The model was statistically significant, $F(7, 52) = 7.18$, $p < .001$, and explained 49.2% of the variance in OHIP14 scores (adjusted $R^2 = .42$). All VIF values were below 1.5, indicating no problematic multicollinearity.

Table 6

Multiple Linear Regression of Factors Associated With OHIP-14 Total Scores (N = 60)

Variable	B	95% CI	p	VIF
(Constant)	10.18			
Age (years)	-0.08	[-0.47, 0.31]	.686	1.11
Low household income (ref: middle/higher)	1.57	[-3.73, 6.86]	.555	1.41

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Fewer than 10 natural teeth (ref: 10 or more)	-1.24	[-7.70, 5.22]	.702	1.45
Difficulty chewing	8.28	[2.48, 14.08]	.006*	1.45
Tooth pain or sensitivity	5.99	[0.81, 11.18]	.024*	1.21
No dental visit in past 2 years (ref: visited within 2 years)	4.76	[0.69, 8.83]	.023*	1.19
Cost is a barrier	4.86	[0.15, 9.57]	.044*	1.27

Note. R^2 = .492; adjusted R^2 = .423; F(7, 52) = 7.18, p < .001. Confidence intervals and p values are based on heteroscedasticity-consistent (HC3) standard errors. B = unstandardized coefficient; positive values indicate poorer oral health-related quality of life. * p < .05.

After adjustment for the other variables, chewing difficulty was the strongest independent factor: participants with chewing difficulty scored on average 8.28 points higher on the OHIP-14 (95% CI [2.48, 14.08], *p* = .006). Tooth pain or sensitivity was associated with scores 5.99 points higher (95% CI [0.81, 11.18], *p* = .024). Both access-related variables remained significant: having no dental visit in the past two years was associated with scores

4.76 points higher (95% CI [0.69, 8.83], *p* = .023), and reporting cost as a barrier with scores 4.86 points higher (95% CI [0.15, 9.57], *p* = .044). Age, low household income, and having fewer than 10 natural teeth were not independently associated with OHIP-14 scores once these factors were taken into account. The null hypothesis was therefore rejected.

Discussion

Main Findings

This community-based study examined oral health status, access to dental care, and OHRQoL among 60 older adults in two barangays of Manila. Three main findings emerged. First, oral disease was common and largely untreated: most dentate participants had untreated caries, more than one third had periodontal pockets, and one in four had fewer than 10 natural teeth, although few wore dentures. Second, use of dental services was very low and mainly symptom-driven, with cost as the dominant barrier. Third, poorer OHRQoL was independently associated with functional and symptomatic oral problems—chewing difficulty and tooth pain—and with limited access to care, as reflected in the absence of a recent dental visit and in cost barriers.

Oral Health Status and OHRQoL

The high proportion of untreated caries and tooth loss is consistent with national data showing high caries prevalence and increasing tooth loss with age in the Philippines (DOH, 2018). The finding that

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chewing difficulty was the strongest factor associated with OHRQoL agrees with Li et al.'s (2025) systematic review, which identified fewer teeth and chewing difficulty as the oral conditions most consistently associated with poorer quality of life in older adults. Chewing difficulty may influence diet, enjoyment of meals, and social eating, which is consistent with the importance of nutrition highlighted by Chauhan et al. (2025).

Interestingly, the number of natural teeth was correlated with OHIP-14 scores in the bivariate analysis but was not independently associated with them in the regression model. This suggests that the effect of tooth loss on daily life may operate largely through its functional consequences, particularly chewing difficulty, rather than through the number of teeth itself. This interpretation is consistent with Gerritsen et al.'s (2010) observation that the location and distribution of missing teeth, and therefore their functional impact, matter more than the number alone. It also supports Locker and Allen's (2007) view that OHRQoL measures capture the subjective consequences of oral conditions rather than clinical status alone.

Physical pain was the OHIP-14 domain with the greatest impact, and tooth pain was independently associated with higher scores. Together with the high level of untreated caries and the fact that most past dental visits were made because of pain, this suggests a pattern in which oral problems are left untreated until they become painful.

Access to Dental Care and OHRQoL

Only 6.7% of participants had seen a dentist in the past year, and more than half cited cost as a barrier. Both the absence of a recent dental visit and cost barriers remained associated with poorer OHRQoL after adjustment for oral health status, age, and income. These findings are consistent with Andersen's (1995) model, in which enabling factors such as affordability influence service use and, ultimately, health outcomes. They also reflect WHO's (2022a) call to include oral health in universal health coverage, since out-of-pocket costs remain a major obstacle for many older people. Lack of awareness of public dental services, reported by almost one third of participants, suggests that some barriers could be addressed through better information about existing services rather than new resources alone.

Implications for Practice and Policy

The findings suggest several practical implications for local health services. First, community oral health programs for older adults could prioritize the relief of pain and the restoration of chewing function, including affordable dentures for those with few remaining teeth. Second, barangay health stations and senior citizen organizations could promote awareness of free or low-cost dental services available through public health centers. Third, including simple oral health questions—such as about pain and chewing difficulty—in routine primary care assessments of older adults could help identify

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those who need referral (Petersen & Yamamoto, 2005). Finally, reducing cost barriers through subsidized preventive and restorative care for older adults would be consistent with WHO recommendations (WHO, 2022a).

Strengths and Limitations

The study combined a validated patient-reported outcome measure with a standardized clinical examination and indicators of access to care, and it used random selection from community registries. However, several limitations should be considered. First, the crosssectional design does not allow causal conclusions; for example, people with poor OHRQoL might avoid dental visits, or vice versa. Second, the sample was small and drawn from only two barangays, which limits precision and generalizability and means that small or moderate associations may not have been detected. Third, access variables and many oral symptoms were self-reported and may be affected by recall or social desirability bias. Fourth, only one examiner conducted the clinical examinations. Finally, older adults not listed in the senior citizen registries, such as recent migrants or homeless older people, may have been missed.

Future Research

Future studies should use larger probability samples covering more barangays and both urban and rural areas, and longitudinal designs to examine whether improving access to care leads to better OHRQoL. Studies could also examine nutrition, frailty, and prosthetic rehabilitation in more detail, and evaluate community-based interventions such as subsidized denture programs or oral health education for older adults and their caregivers.

Conclusion

Among community-dwelling older adults in two Manila barangays, untreated oral disease was common, dental service use was low and mainly symptom-driven, and cost was the main barrier to care. Chewing difficulty, tooth pain, the absence of a recent dental visit, and cost barriers were independently associated with poorer OHRQoL. These findings support the development of affordable, accessible, and preventive community dental services for older adults in Manila, with particular attention to relieving pain and restoring chewing function. Because the study was cross-sectional and small, its findings show associations rather than causal effects and should be confirmed in larger studies.

Declarations

Ethics approval and consent to participate: The study was approved by the Institutional Ethics Review Committee of the authors' institution (Protocol No. IERC-2026047; approved 12 August

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2026). Written informed consent was obtained from all participants, or a witnessed thumbprint for participants unable to write.

Consent for publication: Not applicable; no identifiable individual data are reported.

Data availability: The anonymized data set analyzed during the study is available from the corresponding author on reasonable request.

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Competing interests: The authors declare that they have no competing interests.

Author contributions: Author 1 conceived and designed the study, supervised data collection, and drafted the manuscript. Author 2 conducted the oral examinations and contributed to the interpretation of the clinical findings. Author 3 performed the statistical analysis and critically revised the manuscript. All authors read and approved the final manuscript.

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