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The Relationship Between Oral Hygiene Knowledge and Oral Hygiene Status of The Elderly in the Periodontology Specialist Clinic RSGM UNAIR

Nuril Hanifah, Silvia Prasetyowati^{id}, Ratih Larasati^{id}, and Sri Hidayati^{id}

Department of Dental Health, Poltekkes Kemenkes Surabaya, Surabaya, Indonesia

Corresponding author: Silvia Prasetyowati (e-mail: silviaprasetyowati@poltekkes-surabaya.ac.id)

ABSTRACT The objective this research aimed to ascertain the connection between understanding of oral health and actual mouth cleanliness status of elderly patients at the Periodontology Specialist Clinic of RSGM Universitas Airlangga. An analytical survey with a cross-sectional method was used for this research. Through purposive sampling, a total of 54 individuals were selected to participate. The findings indicated that most of respondents had a middle level of knowledge regarding oral and dental hygiene, while most exhibited poor oral hygiene status. The Chi-Square test was conducted to the gathered data to examine the correlation between participants' knowledge and their oral hygiene status. Nevertheless, the analysis revealed no significant association between understanding of oral health and actual mouth cleanliness status among the elderly. This outcome is presumed to be due to the absence of behavioral data related to the respondents' oral hygiene practices. Consequently, it's recommended that healthcare providers consistently offer education and counseling on oral and dental care to the elderly in order to enhance their oral health status.

INDEX TERMS knowledge of oral and dental hygiene, oral and dental hygiene status, oral hygiene, oral health, and elderly

I. INTRODUCTION

Oral health is often overlooked in discussions about health concerns among the elderly, a group commonly affected by multiple comorbidities, particularly cardiovascular and cancer-related conditions, which significantly impact their quality of life [1]. Oral hygiene is a vital element of public health that is often overlooked, especially in vulnerable groups such as the elderly. The deterioration of oral function in these vulnerable groups has the potential to affect quality of life, ability to eat, speak and overall health [2]. Population aging is a global phenomenon that still requires effective strategies for management in healthcare settings. According to the World Report on Ageing and Health, the number of people over the age of 60 is expected to double by 2050 [3].

According to the 2018 Riskesdas report, 57.6% of the population experienced oral health issues. The prevalence of tooth loss was 17.5% among individuals aged 35–44 and rose to 30.6% in those aged 65 and older [4]. According to the 2023 Indonesian Health Survey, dental problems remain common among older adults. In the 55–64 age group, 48.9% reported cavities or pain, 37.2% had missing teeth, and 11.7% had loose teeth. Among those aged 65 and above, the figures were 4.6%, 46.5%, and 14.4% respectively. These issues result from a combination of various contributing

factors [5]. In individuals aged 65 and over, the most commonly observed dental conditions include periodontal disease, edentulism, dental caries, oral mucosal lesions, oral infections, and temporomandibular disorders. Hyposalivation is also frequently seen in patients undergoing long-term treatment for chronic conditions such as hypertension or dyslipidemia, which significantly elevates the risk of dental caries and mucosal infections [1]. In a study on geriatric oral health in several Indonesian cities using the OHI-S index, 50.2% of the 233 elderly respondents were found to have moderate oral hygiene. Meanwhile, 42.5% fell into the poor hygiene category, and only 7.3% had good gum hygiene [6]. Low levels of knowledge, attitudes, and behaviors related to oral health can significantly impact dental and oral conditions [7]. Such conditions have a profound impact on the daily lives of the elderly, diminishing their oral function, confidence, and social participation. This decline ultimately affects their oral health-related quality of life, which encompasses satisfaction with basic functions like eating, sleeping, interacting socially, and maintaining self-esteem [8].

Elderly dental health is influenced by four main factors: individual, family (heredity and habits), socio-cultural environment, and dental health services. Knowledge, gained

through the senses, plays a key role in shaping behavior. Good knowledge helps maintain proper oral hygiene. In contrast, limited knowledge can lead to tooth loss, causing psychological effects like difficulty chewing, reduced appetite, embarrassment, weight loss, social withdrawal, and decreased concentration[9].

A study from Loma Linda University showed that 56.9% of participants had poor oral health knowledge, influenced by older age and lower education levels. Similarly, a 2020 study in Hong Kong found that limited education affected both oral hygiene knowledge and daily practices[10].

The results of dental hygiene examinations on 27 elderly people conducted in June 2024 at the Universitas Airlangga Dental and Oral Hospital at the Periodontology Specialist Clinic obtained an average Debris Index of 1.979, Calculus Index of 1.742. Looking at the average OHI-S score of 3.76 which is in the poor category, it can be concluded that the dental hygiene of the elderly at RSGM Unair, especially at the Periodontology Specialist Clinic, is at a low level.

Communicative, informational, and educational media play an important role in preventing oral hygiene problems. With this, it is expected to transform harmful behaviors into healthy ones, increase public education and awareness, and trigger proactive participation in oral health development in the community[11].

Poor oral health literacy has been linked to unfavorable outcomes such as poor oral health status, dental neglect, and irregular dental visits. To design effective communication and intervention strategies, a clear understanding of the elderly population is essential. However, a gap remains in understanding how their oral health knowledge influences their perceived oral health-related quality of life. This highlights the need to assess their oral health knowledge as a key element of oral health literacy and to identify specific areas where knowledge is lacking, in order to develop targeted educational programs that address the unique needs of older adults[12]. Family and environmental support, including assistance from health facilities, also influence the oral health behaviors of the elderly. The OHI-S (Oral Hygiene Index– Simplified) demonstrates that an individual's knowledge impacts their dental care practices, which in turn affects their overall oral hygiene. Social support plays a critical role in the effectiveness of oral health maintenance in older populations.

II. METHOD

This Research samples were selected using a purposive sampling method, in which participants were chosen based on specific criteria relevant to the study objectives. Purposive sampling is widely used in research because it fits within various research paradigms and allows for the intentional selection of participants who meet specific criteria. This approach helps minimize bias and enhances the reliability and trustworthiness of the results. Additionally, some scholars have contributed to ongoing discussions on effective sampling techniques and their appropriate application in research[13].

A. STUDY DESIGN AND RATIONALE

This study employed a cross-sectional analytic survey design to examine the relationship between risk factors and outcomes by collecting data simultaneously from the entire target population using questionnaire examination sheet. Therefore, a cross-sectional design involves a single measurement at a specific point in time, and in this context, it is used to analyze the association between variables[14].

B. STUDY SETTING

This study was conducted at the Periodontology Specialist Clinic of RSGM Unair, located on Jl. Prof. Dr. Moestopo Number 47, Pacar Kembang Village, Tambaksari District, Surabaya City, East Java. RSGM Unair provides various excellent facilities in polyclinic services, including inpatient services and oral surgery operating rooms. This hospital also serves as a referral center for gilut health from various regions in Indonesia. In terms of services organized by RSGM Unair includes services for general patients, Social Security Organizing Agency (BPJS) and insurance patients who have collaborated with RSGM Unair. The study took place over a period extending from July 2024 to February 2025, encompassing phases of preparation, implementation, data collection, and analysis.

C. PARTICIPANTS AND SAMPLING METHOD

This study focused on middle-aged (45–59 years) and elderly individuals who visited the Periodontology Specialist Clinic at the Dental and Oral Hospital of Airlangga University in June 2024, from a total of 271 patients. The inclusion criteria for this study were individuals aged 45–59 who visited the Prosthodontics Specialist Clinic at the Dental and Oral Hospital of Universitas Airlangga, had at least one index tooth, were in good physical and psychological health, and were willing to participate by signing informed consent. Exclusion criteria included individuals under 45 years of age, those without an index tooth, or those unwilling to participate in the study. Medical research is fundamentally focused on advancing knowledge of the human body to improve patient care and treatment outcomes. Clinical trials aim to evaluate the safety and effectiveness of new interventions, requiring participant recruitment based on defined criteria. However, this recruitment phase is often difficult and time-intensive, contributing to a high number of delayed, incomplete, or cancelled studies[15].

D. DATA COLLECTION INSTRUMENTS AND PROCEDURE

Data collection was conducted using an oral examination and a questionnaire, requiring approximately 40 minutes to complete. The first variable assessed the elderly's knowledge of oral hygiene, including their understanding of its condition and maintenance. Knowledge levels were classified as good, moderate, or poor based on the proportion of correct answers. The second variable, oral hygiene status, was evaluated using the OHI-S index, which measures debris and calculus levels and categorizes results as good, moderate, or poor. The OHIS assessment is conducted by examining six specific indicator teeth, strategically selected

to represent both the anterior and posterior regions of the oral cavity. These include the buccal surfaces of the maxillary right and left first molars, the labial surfaces of the maxillary right and mandibular left central incisors, and the lingual surfaces of the mandibular right and left first molars. The evaluation is limited to the clinically visible tooth surfaces to ensure standardization and reproducibility of measurements.

E. DATA ANALYSIS

The collected data were analyzed using the Chi-Square test with a significance level of $\alpha = 0.05$. Data Processing included several steps: Researchers edited each questionnaire to ensure completeness and accuracy on-site, allowing immediate correction when necessary. Each response was scored using numerical values to simplify data entry. Coding transformed responses into numerical data for easier analysis and organization into working tables. The data were then systematically entered into SPSS version 16.0, cleaned to eliminate input errors, and tabulated to summarize the frequency of each variable. Data Analysis was conducted in two parts: Univariate analysis was used to describe the distribution of both independent and dependent variables using frequencies and percentages. This helped identify respondent characteristics[16]. Bivariate analysis examined the relationship between the elderly's knowledge of oral hygiene and tooth loss using the Chi-Square test. This test requires normally distributed data and at least one ordinal variable[17].

F. ETHICAL CONSIDERATIONS

This study received ethical approval from the Health Research Ethics Commission of Poltekkes Kemenkes Surabaya (No. EA/3092/KEPK-Poltekkes_Sby/V/2024) and ethical clearance from the Ethics Committee of the Dental and Oral, Airlangga University (No.2/UN3.9.3/Etik/PT/2025). Respondents were fully informed about the research process and outcomes through an informed consent procedure. Participation was voluntary, without coercion, and confirmed by signing the informed consent form. Confidentiality of the data is strictly maintained and used solely for research purposes. Informed consent benefits research involving human participants by demonstrating respect, fostering participant engagement, and strengthening the researcher– participant relationship, which may help prevent dissatisfaction and reduce the risk of legal disputes[18].

III. RESULTS

A. GENDER FREQUENCY OF THE ELDERLY AT THE PERIODONTOLOGY SPECIALIST CLINIC IN FEBRUARY 2025.

TABLE 1

Distribution of Elderly Gender Frequency in Periodontology Specialist Clinic in February 2025

No.	Gender	Frequencies	Percentage
1.	Male	21	38,9%
2.	Female	33	61,1%
	Total	54	100%

TABLE 1 shows that the majority of respondents were female (33 individuals or 61.1%), while male respondents accounted for 21 individuals (38.9%).

B. EDUCATION FREQUENCY OF THE ELDERLY AT THE PERIODONTOLOGY SPECIALIST CLINIC IN FEBRUARY 2025

TABLE 2

Distribution of Education Frequency in Periodontology Specialists Clinic in February 2025.

No.	Education	Frequencies	Percentage
1.	Senior High School	38	70,4%
2.	Diploma's degree	3	5,6%
3.	Bachelor's degree	12	22,2%
4.	Master's degree	1	1,9%
	Total	54	100%

According to the TABLE 2, the majority of respondents had a high school education (38 individuals or 70.4%), followed by those with a bachelor's degree (S1) at 12 individuals (22.2%), a diploma (D3) at 3 individuals (5.6%), and the fewest with a master's degree (S2), comprising 1 individual (1.9%).

C. EMPLOYEES FREQUENCY OF THE ELDERLY AT THE PERIODONTOLOGY SPECIALIST CLINIC IN FEBRUARY 2025

TABLE 3

Distribution of Employees Frequency of the Elderly at the Periodontology Specialist Clinic in February 2025

No.	Job	Frequencies	Percentages
1.	Housewife	17	31,5%
2.	Private-worker	23	42,6%
3.	Self-employed	2	3,7%
4.	Civil servant	9	16,7%
5.	Doctor	1	1,9%
6.	Retirees	2	3,7%
	Total	54	100%

According to TABLE 3, the data show that the majority of respondents were employed in the private sector (23 individuals or 42.6%), followed by housewives (17 individuals or 31.5%), civil servants (9 individuals or 16.7%), self-employed and retired individuals (2 individuals or 3.7% each), while the fewest respondents were in other occupations, totaling 1 individual (1.9%).

D. DATA COLLECTION ON DENTAL AND ORAL HYGIENE KNOWLEDGE AND DENTAL AND ORAL HYGIENE STATUS OF THE ELDERLY AT THE PERIODONTOLOGY SPECIALIST CLINIC IN FEBRUARY 2025

Based on TABLE 4 of the examination that has been carried out on 54 respondents in February 2025, the results of the OHIS examination of elderly people aged 45-59 years can be seen that most of the respondents are in the bad category 28 people (51.9%), then those in the moderate category 26 people (48.1%).

TABLE 4

Distribution of Education Frequency in Periodontology Specialits Clinic in February 2025.

OHIS' Criteria	Frequenciencies	Percentage	Scoring Criteria
Good	0	0%	Good 0 - 1,2
Mid	26	48,1%	Mid 1,3 - 3,0
Poor	28	51,9%	Poor 3,1 – 6,9
Total	56	100%	

TABLE 5

Distribution of Assessment Oral Health Knowledge in Periodontology Specialits Clinic in February 2025.

Scoring Criteria	Frequencies	Percentage	Knowledge Criteria
Good	20	37,0%	Good: 76-100
Mid	26	48,1%	Mid: 56-75
Poor	8	14,8%	Poor <56
Total	54	100%	

TABLE 5 shows that most respondents (26 individuals or 48.1%) had a moderate level, followed by 20 individuals (37.0%) in the good category, and 8 individuals (14.8%) in the poor category.

TABLE 6

Distribution of Elderlyly Dental and Oral Health Knowledge Questionnaires in Periodontology Specialits Clinic in February 2025

No	Oral Hygiene Knowledge	True (%)	False (%)
1.	Definition of Plaque	85,2	14,8
2.	Plaque shape	3,7	96,3
3.	Where plaque attaches	77,8	22,2
4.	Shape of tooth surface with plaque	66,7	33,3
5.	Definition of calculus	85,2	14,8
6.	The effects of calculus	88,9	11,1
7.	Coloring agent function (disclosin gel)	57,4	42,6
8.	Definition of maintaining oral health	70,4	29,6
9.	How to maintain oral health	90,7	9,3
10.	How many oral health check-ups	77,8	22,2
11.	Parts to clean to eliminate bacteria that cause bad breath	53,7	46,3
12.	The right way to brush your teeth	37	63
13.	Good and correct tooth brshing use	90,7	9,3
14.	Certain number of times a day for brushing teeth	77,8	22,2
15.	The purpose of maintaining oral health hygiene	83,3	16,7
16.	The right time to brush teeth	85,2	14,8
17.	Best toothpaste ingredients	74,1	25,9
18.	Good toothbrush	92,6	7,4
19.	How often to replace the toothbrush	59,3	40,7
20.	Fluoride function	48,1	51,9

Based on TABLE 6, the majority of respondents (52 individuals or 96.3%) did not recognize the shape of dental plaque. Additionally, 34 respondents (63%) lacked knowledge of proper and effective brushing techniques, and 28 individuals (51.9%) were unaware of the function of fluoride.

E. ANALYSIS OF THE RELATIONSHIP BETWEEN DENTAL AND ORAL HYGIENE KNOWLEDGE AND DENTAL AND ORAL HYGIENE STATUS OF THE ELDERLY AT PERIODONTOLOGY SPECIALIST CLINIC IN FEBRUARY 2025

TABLE 7

Analysis' Distribution of Elderly Dental and Oral Health Knowledge with Dental and Oral Hygiene Status in Periodontology Specialits Clinic in February 2025

		Oral Hygiene Status		Total	p value
		Mid	Poor		
Categories of Knowledge Score in Elderly	Good 76-100	10 18,5%	10 8,5%	20 37%	0,353
	Mid 56-75	14 25,9%	12 22,2%	26 48,1%	
	Poor <56	2 3,7%	6 11,1%	8 14,8%	
	Total	26 48,1%	28 51,9%	54 100,0%	

Based on TABLE 7, because the p value (0.353) is greater than α (0.05), the null hypothesis (H0) is accepted and the alternative hypothesis (H1) is rejected so that it explains that there is no statistically significant relationship between gilut hygiene knowledge and oral hygiene status of the elderly at the Periodontology Specialist Clinic in February 2025. This indicates that there is no statistically significant relationship between the level of oral health knowledge and the oral hygiene status of elderly patients. In other words, variations in oral health knowledge among the respondents did not correspond to significant differences in their measured oral hygiene status. These findings suggest that factors other than knowledge—such as manual dexterity, oral health habits, or access to dental care—may have a more substantial influence on oral hygiene in the elderly population examined.

IV. DISCUSSION

Findings from the Periodontology Specialist Clinic show that most respondents have a moderate level of dental knowledge. However, the questionnaire revealed limited understanding of plaque formation, proper brushing techniques, and the function of fluoride. This lack of awareness may lead to food debris buildup and plaque accumulation. Moreover, educational background plays a role in shaping the elderly's ability to maintain gum health. Understanding dental and oral health is acquired through a complex cognitive process. Its is also in line with a research from[19] that poorer or tge lower education of a person, the worse impact on oral health knowledge. Insufficient knowledge about its importance may result in poor oral hygiene practices and neglect of proper care[20].

Based on the OHI-S assessment conducted at the Periodontology Specialist Clinic of the Dental and Oral Hospital, Airlangga University, the average oral hygiene score among the elderly participants was classified as poor. This finding is supported by previous research[21][22], which reported that most elderly respondents exhibited poor oral hygiene. The results show that elderly respondents have moderate knowledge of gum hygiene. Many are unaware of proper brushing techniques, plaque formation, areas to clean,

when to replace toothbrushes, and fluoride's role. This knowledge gap can lead to plaque buildup. Education level significantly influences their awareness of gum health. Other studies support this, showing that higher education levels are linked to better knowledge of periodontal health. As education increases, so does awareness of oral health. Brushing teeth is a simple and effective way to maintain oral hygiene. It should be done gently, using circular motions for about two minutes with the right technique, brush, and toothpaste. Brushing too hard or incorrectly can harm gums and cause plaque buildup. Good gum care helps prevent infections, and understanding proper oral hygiene is key—prevention is always better than treatment[23].

Data analysis showed no significant relationship between knowledge and gum hygiene status among respondents at the Periodontology Specialist Clinic of RSGM Unair. The Chi-Square test revealed a p-value greater than α , indicating no statistical association between knowledge level and gum hygiene. This aligns with the research findings[24], which also show that knowledge does not influence the gum hygiene status of respondents. Attitudes and actions also influence oral hygiene behavior. Some elderly individuals may have good knowledge but poor oral hygiene, often due to negative attitudes that prevent them from applying what they know in daily habits[25].

The questionnaire results at the RSGM Unair Periodontology Specialist Clinic revealed that respondents had varying levels of knowledge about gum hygiene, which plays an important role in determining oral health. Oral health knowledge is essential for promoting healthy behavior, enabling individuals to take steps to protect their health. Various studies have shown that greater knowledge is linked to better oral hygiene and health-related habits[26][27].

Respondents with good knowledge but poor OHI-S scores may be affected by improper brushing techniques, irregular brushing times, or skipping brushing after meals or before bed. Good knowledge alone is not enough—proper dental care practices are essential. It's also important to clean all areas, including the tongue, as bacteria causing bad breath can accumulate there, not just on the teeth. Another study[28] found significant differences in self-reported oral health across education levels. Interestingly, individuals with lower education reported better oral health, possibly due to limited awareness of oral problems. This lack of knowledge may lead to underreporting of issues. The study also noted that less educated adults were less likely to seek preventive dental care, emphasizing the importance of improving oral health education for this group. Individuals who visited the dentist twice a year showed better knowledge and attitudes compared to those who hadn't had a check-up in over a year. Regular dental visits offer more opportunities to receive accurate information from professionals, which helps build a more positive outlook on oral health[29].

Lawrence Green identified several factors that influence health behavior, including knowledge, supporting, and reinforcing factors. However, this study did not explore whether the elderly actually apply their knowledge of gum

hygiene in daily life. It's possible that gum hygiene is not a priority for them, as they may be more concerned with other health issues. Additionally, barriers such as distance from dental care facilities, high treatment costs, and limited healthcare support can prevent them from accessing proper dental care[30]. Oral health problems are largely preventable with regular care, supported by proper knowledge and behavior. To improve oral health-related quality of life (OHRQoL), targeted education is essential—especially for older adults, whose habits and beliefs are often harder to change. However, current education is often limited to basic information or brushing techniques. Healthcare providers should create more detailed and behavior-focused programs, along with plans for continuous, not just one-time, oral health education[31][32][33]. It's important to note that knowledge is just one factor influencing oral health. Health behavior models emphasize other key elements, such as self-efficacy, motivation, perceived benefits and barriers, susceptibility, and social norms. While knowledge is essential, it must be supported by these factors to effectively drive positive changes in oral hygiene behavior[34][35][36].

V. CONCLUSION

This research conducted in February 2025 at the Periodontology Specialist Clinic of RSGM Unair explored the relationship between elderly individuals' knowledge of gingival hygiene and their actual hygiene status. The findings revealed that although most respondents had a moderate level of oral health knowledge, the majority still demonstrated poor gingival hygiene. Statistical analysis indicated no significant correlation between knowledge and hygiene status, suggesting that knowledge alone does not necessarily translate into good oral hygiene practices. Other influencing factors, such as daily behavior, personal attitudes, and limited access to dental care, likely contribute to this outcome.

These results underline the importance of encouraging the elderly to adopt consistent and correct oral hygiene habits, including proper brushing techniques, brushing at the right times, and attending routine dental check-ups at least every six months. Healthcare professionals also play a key role in improving geriatric oral health by providing targeted education and counseling, which can be effectively delivered in accessible settings like clinic waiting areas. This investigation also provides a basis for future studies aimed at developing more comprehensive, behavior-oriented oral health interventions. Further research is needed to better understand the behavioral aspects that influence oral hygiene and to design educational approaches that lead to sustainable improvements in oral health among older adults.

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AUTHOR CONTRIBUTION

This study was carried out by Nuril Hanifah, beginning from the conceptualization and research design, through data collection and implementation, to the preparation of this manuscript. The process was supported by supervisors, Silvia Prasetyowati and Ratih Larasati, who provided valuable guidance and feedback to enhance the quality and scope of the study. Their contributions helped ensure that the outcomes align with established standards, address a broad range of relevant issues, and offer meaningful benefits to a wide audience.

DECLARATIONS

ETHICAL APPROVAL

This study received ethical approval from the Health Research Ethics Commission of Poltekkes Kemenkes Surabaya (No. EA/3092/KEPK-Poltekkes_Sby/V/2024) and ethical clearance from the Ethics Committee of the Dental and Oral, Airlangga University (No.2/UN3.9.3/Etik/PT/2025). Respondents were fully informed about the research process and outcomes through an informed consent procedure. Participation was voluntary, without coercion, and confirmed by signing the informed consent form.

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