



The Effect of Knowledge on Periodontitis in the Elderly

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ABSTRACT

Periodontitis is a destructive inflammatory disease of the tooth-supporting tissues and is common among the elderly. World Health Organization (WHO) data indicate that the prevalence of periodontal disease is approximately 19% and increases significantly after the age of 55. Preliminary observations at the Elderly Integrated Health Post (Posyandu Lansia) in Pilang Kidul Village, Kemangsen Hamlet, Sidoarjo City, showed a high prevalence of periodontal problems among the elderly. This study aimed to examine the effect of knowledge on the occurrence of periodontitis in the elderly. A quantitative cross-sectional design was used, involving 50 elderly participants selected through total sampling. Data were collected using a knowledge questionnaire and periodontal examinations based on the Periodontal Disease Index (PDI). Chi-square analysis revealed a significant association between knowledge level and periodontitis ($p = 0.01$; $p < 0.05$). In conclusion, knowledge significantly influences the occurrence of periodontitis among the elderly, emphasizing the need for oral health education programs to reduce periodontal disease in this population.

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INTRODUCTION

Aging is a natural and unavoidable process experienced by all humans throughout the life course. According to Law of the Republic of Indonesia No. 13 of 1998 Article 1 Paragraph 2, elderly individuals are defined as those aged 60 years and above (Wahyuni et al., 2021). Along with increasing age, individuals experience physiological changes that may affect overall health. One important aspect influenced by aging is oral and dental health, which plays a significant role in maintaining systemic health.

The elderly are considered a vulnerable group to oral diseases, particularly periodontal diseases. The most common periodontal conditions affecting the elderly are gingivitis and periodontitis. Periodontitis is a destructive inflammatory disease of the tooth-supporting tissues caused by specific microorganisms, leading to progressive destruction of the periodontal ligament and alveolar bone (Könönen, Gursöy, & Gursöy, 2019). If left untreated, periodontitis can result in severe complications, including tooth loss and impaired oral function.

According to World Health Organization (WHO) data, the global prevalence of periodontal disease is approximately 19%, with onset beginning in late adolescence and increasing significantly after the age of 55. National data from Riskesdas 2018 show that oral and dental problems affect 61.9% of individuals aged 55–64 years and 54.2% of those aged 65 years and above. The prevalence of periodontitis is even higher, reaching 75.9% in the 55–64 age group and 66.0% among individuals aged 65 years and older. Despite this high prevalence, only a small proportion of elderly individuals receive professional dental care (Vasandani, Susilawati, & Putri, 2024).

Common oral health problems among the elderly include tooth loss, periodontal disease, xerostomia, and periodontitis (Wahyuni et al., 2021). Tooth loss often occurs as a consequence of periodontal tissue damage and the progressive destruction of supporting structures (Febrianti et al., 2022). Previous studies indicate that inadequate knowledge and poor oral health behaviors are major contributing factors to periodontal disease (Asri et al., 2021). Preventive measures include proper toothbrushing techniques, appropriate brushing times, the use of fluoride toothpaste, and avoiding excessive brushing pressure (Hanik et al., 2021).

Health education related to personal hygiene is essential to improve oral health awareness and behaviors among the elderly. Adequate knowledge is expected to encourage better oral hygiene practices and reduce the risk of periodontal disease (Liana et al., 2023). Preliminary examinations conducted in January 2025 at the Posyandu Lansia in Pilang Kidul Village, Kemangsen Hamlet, Sidoarjo City, revealed that 80% of elderly participants experienced periodontal problems, exceeding the national prevalence reported in Riskesdas 2018. This condition highlights a research gap regarding the influence of knowledge on periodontitis at the community health service level. Therefore, this study aims to determine the effect of knowledge on the occurrence of periodontitis among the elderly attending the Posyandu Lansia in Pilang Kidul Village, Kemangsen Hamlet, Sidoarjo City.

METHOD

This study employed a quantitative analytical design with a cross-sectional approach, which is appropriate for examining the association between knowledge and periodontitis at a single point in time. The study was conducted at the Elderly Integrated Health Post (Posyandu Lansia) in Pilang Kidul Village, Kemangsen Hamlet, Balongbendo District, Sidoarjo, East Java, Indonesia, in January 2025.

The study population consisted of all elderly individuals attending the Posyandu Lansia in Pilang Kidul Village, totaling 50 respondents. A total sampling technique was applied, whereby all members of the population were included as research participants. Data were collected using a structured questionnaire to assess oral and dental health knowledge and a clinical periodontal examination using the Periodontal Disease Index (PDI) to evaluate periodontal status.

The knowledge questionnaire was adopted from a previously published and validated instrument by Bodhidatta et al. (2025). The questionnaire consisted of 10 multiple-choice questions. Each correct answer was scored as 1, while incorrect answers were scored as 0. Knowledge levels were categorized as good (76–100%), moderate (56–75%), and poor ($\leq 55\%$).

Data analysis was performed using the Chi-square statistical test with a significance level of $p = 0.05$ to determine the association between knowledge level and the incidence of periodontitis among the elderly. This study aimed to assess the effect of oral and dental health knowledge on the occurrence of periodontitis in elderly individuals attending the Posyandu Lansia in Pilang Kidul Village, Kemangsen Hamlet, Sidoarjo City.

RESULTS AND DISCUSSION

Table 1. Frequency Distribution of Respondent Characteristics Age, Education Level, Occupation and Gender.

Variable	Frequency	Percentage (%)
Age Group (years)		
49–55	19	38.0
56–60	20	40.0
61–65	2	4.0
66–70	6	12.0
71–75	3	6.0
Total	50	100
Education Level		
No formal education	22	44.0
Elementary school	4	8.0
Junior high school	16	32.0
Senior high school	8	16.0
Total	50	100
Occupation		
Not working	12	24.0
Farmer	21	42.0
Entrepreneur	12	24.0
Retired factory employee	5	10.0
Total	50	100
Gender		
Male	8	16.0
Female	42	84.0
Total	50	100

Table 1 shows that most respondents were aged 56–60 years (40.0%). Nearly half of the elderly had no formal education (44.0%), and the majority worked as farmers (42.0%). Female respondents dominated the study population, accounting for 84.0% of participants. These characteristics indicate that the study population largely consisted of middle-aged elderly women with low educational attainment.

Table 2. Distribution of Knowledge Levels about Periodontitis among the Elderly (2025).

Knowledge Level	Frequency	Percentage (%)	Scoring Category (%)
Good	10	20.0	76–100
Moderate	22	44.0	56–75
Poor	18	36.0	≤55
Total	50	100	
Mean Score			56.4

Table 2 indicates that most elderly respondents had a moderate level of knowledge about oral and dental health (44.0%). However, a substantial proportion still demonstrated poor knowledge (36.0%). The mean knowledge score of 56.4 suggests that overall knowledge among respondents was at a moderate level.

Table 3. Distribution of Periodontal Tissue Examination Based on PDI.

Periodontal Status	Frequency	Percentage (%)	PDI Category
Healthy	0	0.0	0
Gingivitis	20	40.0	1–3
Periodontitis	30	60.0	3.1–6
Total	50	100	

Table 3 shows that none of the elderly respondents had healthy periodontal conditions. Most respondents were diagnosed with periodontitis (60.0%), while the remaining 40.0% experienced gingivitis, indicating a high prevalence of periodontal disease among the elderly population.

Table 4. Relationship between Knowledge Level and Periodontal Status (Chi-Square Test)

Knowledge Level	Periodontitis	Gingivitis	Total
Poor	15	3	18
Moderate	14	8	22
Good	1	9	10
Total	30	20	50

Table 4 demonstrates that respondents with poor and moderate knowledge levels were more likely to experience periodontitis. In contrast, respondents with good knowledge were predominantly diagnosed with gingivitis rather than periodontitis, suggesting a potential protective effect of higher knowledge levels on periodontal health.

Table 5. Chi-Square Analysis of the Effect of Knowledge on Periodontitis

Knowledge Level	Periodontitis (n)	Percentage (%)	p-value
Poor	15	30.0	0.01
Moderate	14	28.0	
Good	1	2.0	
Total	30	60.0	

Table 5 shows that periodontitis was most prevalent among elderly individuals with poor knowledge levels (30.0%). The Chi-square test yielded a significant p-value of 0.01 ($p < 0.05$), indicating a statistically significant effect of knowledge on the incidence of periodontitis among the elderly. Therefore, the alternative hypothesis (H_1) was accepted, and the null hypothesis (H_0) was rejected.

DISCUSSION

The assessment of oral and dental health knowledge among the elderly in this study revealed that most respondents were categorized as having a moderate level of knowledge based on questionnaire scores. This finding supports the predisposing factors described in the modified Lawrence Green theory, which states that knowledge influences individual behavior in maintaining health status. Elderly individuals with higher levels of knowledge tend to engage in preventive behaviors, such as proper tooth brushing, routine dental check-ups, and an awareness of the importance of maintaining oral and dental health (Novitasari, 2019).

This result is consistent with the study conducted by Mulyana et al. (2023), which demonstrated a significant relationship between the level of oral and dental health knowledge and concern for maintaining oral hygiene. Knowledge plays a crucial role in shaping individual actions, as increased knowledge enables individuals to apply learned information in their daily habits (Zuhroh et al., 2022). This concept aligns with the theories proposed by Green and Notoatmodjo, which emphasize that higher knowledge levels are associated with increased attention to oral health, while limited knowledge often leads to inadequate dental care (Farooq et al., 2021).

Health education is also recognized as an essential strategy to address knowledge gaps, particularly among families and caregivers. Banowati et al. (2021) reported that health education can compensate for insufficient parental knowledge, as behavioral neglect of oral hygiene remains a major contributor to oral health problems in the community. Supporting this view, Ulfah and Utami (2020) found a significant relationship between parental knowledge and dental caries in children. Furthermore, Hawijayanti (2022) emphasized that maternal knowledge, especially regarding oral hygiene maintenance, has a substantial influence on children's oral health due to the close relationship between mothers and their children.

Several studies have highlighted that knowledge significantly contributes to oral health status. Jannah et al. (2022) stated that knowledge levels play a major role in determining oral and dental health status, while Namira et al. (2021) found that higher oral health knowledge is associated with lower incidences of oral and dental damage. However, these findings contrast with Brigitta et al. (2024), who reported that although knowledge provides a fundamental understanding of dental care, good oral health behavior also depends on other factors such as attitudes and established daily habits.

Based on the researchers' observations, the results reflect the actual conditions of the study population, where many respondents demonstrated limited understanding of proper oral and dental health maintenance. Adequate knowledge remains a critical factor influencing health behavior and plays an important role in maintaining optimal oral and dental health status among the elderly.

Periodontal examination using the Periodontal Disease Index (PDI) indicated that a total of 30 elderly participants in this study experienced varying degrees of periodontitis. According to Auli et al. (2020), oral and dental health problems among the elderly are often severe and insufficiently addressed, as many older individuals no longer prioritize oral hygiene. Periodontitis is particularly prevalent among older adults due to its association with tooth loss and reduced masticatory function, which can negatively affect nutrition, speech, and overall quality of life.

Periodontitis in the elderly is also associated with increased systemic inflammation, cardiovascular disease, malnutrition, cognitive impairment, disability, and decreased physical function. This condition can affect individuals of all ages who retain their natural teeth, from adolescence to old age. The findings of this study are in line with Amalia et al. (2023), who reported a relationship between knowledge levels and periodontal disease. Similarly, Anggraini et al. (2024) concluded that higher oral health knowledge is associated with a lower risk of periodontal disease, emphasizing the importance of maintaining oral hygiene to prevent periodontal conditions.

The accumulation of dental plaque occurs more rapidly in elderly individuals than in younger populations due to physiological changes in saliva and exposure of rough cementum surfaces, which facilitate plaque formation. Additional contributing factors include soft diets, reduced oral activity, and increased incidence of xerostomia (Putri et al., 2024). Susanti et al. (2021) further confirmed a significant relationship between oral health knowledge and periodontitis, highlighting that attitudes and behaviors are major determinants of oral health in developing countries.

Good knowledge of periodontal health can be effectively implemented to maintain healthy periodontal tissues, even in the presence of risk factors such as dental crowding (Devina et al., 2023). However, Şahin (2024) argued that knowledge alone is insufficient to ensure proper periodontal care, emphasizing the importance of family and social support in facilitating behavioral change. This perspective is reinforced by Mujahidin and Sampoerna (2019), who reported no significant correlation between patient knowledge and adherence to repeated dental treatments, noting that motivation, perceived need, and treatment costs also influence compliance.

Family support plays a vital role in encouraging elderly individuals to maintain oral hygiene. Nora et al. (2023) highlighted that families can serve as strong motivators by accompanying elderly individuals to dental services and providing facilities for oral hygiene practices. Positive attitudes toward oral health are associated with better oral hygiene, whereas negative attitudes contribute to poorer outcomes (Namira et al., 2021). Wahyuni et al. (2021) also reported low awareness among the elderly regarding oral health maintenance, primarily due to insufficient family support, limited access, and inadequate healthcare services.

Statistical analysis using the Chi-square test demonstrated a significant relationship between knowledge and periodontitis among the elderly ($p = 0.01 < 0.05$), indicating that higher levels of oral health knowledge are associated with better periodontal health. Conversely, lower knowledge levels correspond to increased severity of periodontal disease (Susanti et al., 2021).

Health behavior is influenced by multiple factors, including knowledge, role models, resources, and cultural context. Susanti and Anang (2021) emphasized that knowledge is a critical domain in shaping health behavior and that behaviors grounded in knowledge are more sustainable. However, Ruslan and Parmasari (2022) demonstrated that knowledge alone may not be sufficient to alter harmful behaviors such as smoking, which accelerates plaque accumulation and calculus formation. Smoking has been shown to worsen periodontal conditions due to the toxic and carcinogenic components of tobacco smoke (Prasetyowati et al., 2022).

These findings align with the modified theories of Lawrence Green and Hendrik L. Blum, as discussed by Irwan (2017), which assert that health status is determined by multiple interacting factors beyond knowledge alone. Comprehensive health interventions must address behavioral change, healthcare access, environmental conditions, and biological factors to effectively improve oral and periodontal health outcomes among the elderly.

CONCLUSION

Based on the findings of this study on the effect of knowledge on periodontitis among the elderly, it can be concluded that the level of oral and dental health knowledge among elderly individuals at the Elderly Integrated Health Post (Posyandu Lansia) in Pilang Kidul Village, Kemangsen Hamlet, Sidoarjo City was predominantly in the moderate category. Periodontal examinations using the Periodontal Disease Index (PDI) revealed that the majority of elderly participants were classified as having periodontitis. Statistical analysis demonstrated a significant effect of oral and dental health knowledge on the occurrence of periodontitis among the elderly in Pilang Kidul Village, Kemangsen Hamlet, Sidoarjo City.

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