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EVALUATION OF FACTORS CONTRIBUTING TO DENTURE HYGIENE IN EDENTULOUS PATIENTS

Karin Tika Fitria[1,2*], Lismi Dahniar[1], Rusmiati[1,2]
[1] Departement of Dental Health, Politeknik Kesehatan Kementerian Kesehatan Jambi, Indonesia
[2]PUI-PK, Politeknik Kesehatan Kementerian Kesehatan Jambi, Indonesia
Corresponding author: karintika.fitria@poltekkesjambi.ac.id

ABSTRACT

Background: Maintaining denture hygiene in edentulous patients is essential to prevent conditions such as denture stomatitis. At RS Khusus Gigi dan Mulut Sumatera Selatan, many patients reported gum swelling due to poor hygiene, emphasizing the need to evaluate contributing factors. This study aimed to assess the influence of demographic and behavioral variables on denture hygiene.
Methods: A cross-sectional study was conducted involving 40 edentulous patients. Data were collected through structured interviews and clinical examinations. Variables included age, gender, knowledge level, behavior, and type of denture. Knowledge was measured using a validated questionnaire, and denture hygiene was assessed clinically. Statistical analysis using the chi-square test was performed to determine significant associations ($p < 0.05$).
Results: There were statistically significant associations between denture hygiene and gender ($p = 0.018$), knowledge level ($p = 0.006$), hygiene behavior ($p = 0.012$), and the use of special denture cleaning agents ($p = 0.004$). No significant associations were found with age ($p = 0.317$) or denture type ($p = 0.228$). Female patients tended to have poorer denture hygiene due to psychosocial and lifestyle factors, while those with better knowledge and proper hygiene behaviors had improved outcomes.
Conclusion: Denture hygiene is significantly influenced by gender, knowledge, behavior, and use of cleaning agents. Educational interventions should focus on these areas to improve oral health outcomes.

Keywords: denture hygiene; edentulous patients; knowledge level; oral health behavior

INTRODUCTION

Edentulism, or the complete loss of natural teeth, remains a significant public health issue, particularly among the elderly. As life expectancy increases globally, the number of edentulous individuals is also rising, especially in developing countries like Indonesia. For these individuals, removable dentures serve as essential prosthetic devices that restore basic functions such as chewing, speaking, and facial aesthetics, ultimately improving quality of life. However, the use of dentures also introduces the need for consistent and proper hygiene maintenance to prevent oral health complications(Hobkirk & Zarb, 2022).

Maintaining denture hygiene is critically important. Poor denture care is associated with several oral and systemic health risks, including denture stomatitis, halitosis, mucosal inflammation, fungal infections (particularly *Candida albicans*), and biofilm buildup. Denture-related infections can also increase the risk of aspiration pneumonia in elderly patients and have been linked to systemic conditions such as cardiovascular disease and diabetes. Despite these risks, many patients continue to exhibit poor denture cleaning practices, often due to lack of knowledge, physical limitations, or neglect(Devcic et al., 2021; Le Bars et al., 2022).

Several factors may influence denture hygiene behavior, including demographic variables such as age and gender, cognitive and psychological factors, the presence of systemic illness, the level of health literacy, and the availability of social or caregiver support. Among these, patient knowledge and daily behavior regarding cleaning routines play pivotal roles. Prior research has demonstrated

that individuals with adequate knowledge of denture care tend to practice more effective hygiene behaviors, while others struggle due to misinformation or underestimation of its importance(Herwanto et al., 2021; Pavlova, 2023).

In Indonesia, dental health promotion for the elderly is still limited, and denture users often lack structured education or follow-up care. Moreover, anecdotal reports and preliminary observations at RS Khusus Gigi dan Mulut Palembang have highlighted a recurring problem: many edentulous patients report discomfort such as swollen gums, burning sensations, or bad breath, which can often be traced back to poor denture hygiene. These local findings echo broader global trends, suggesting that despite the availability of prosthetic rehabilitation, oral hygiene among denture wearers remains an unresolved issue.

Given the complexity of factors affecting hygiene behavior and the growing elderly population in South Sumatra, it is crucial to identify and understand what influences patients' denture care routines. This study seeks to evaluate the relationship between various patient factors—such as age, gender, knowledge, hygiene behavior, type of denture used, and use of specialized denture cleaning agents—and denture hygiene outcomes. By analyzing these relationships, we aim to provide insights that can inform targeted education, policy development, and intervention strategies to support better oral health in edentulous populations.

METHODS

This study used a cross-sectional design and included 40 edentulous patients who visited RS Khusus Gigi dan Mulut Palembang. Participants were selected based on inclusion criteria, including being completely edentulous, wearing removable dentures, and giving consent to participate. Data collection involved two methods: structured interviews to assess demographic characteristics, knowledge, and hygiene behaviors; and clinical examinations to evaluate denture cleanliness and type.

The independent variables in this study included age, gender, level of knowledge about denture hygiene, personal cleaning behavior, the use of special denture cleaning agents, and denture type. The dependent variable was denture hygiene status, assessed through clinical examination based on visible plaque, stains, and odor. Statistical analysis was conducted to determine the significance of relationships between these variables and denture hygiene outcomes.

RESULTS AND DISCUSSION

This study examined the relationship between several factors and denture hygiene status in edentulous patients. The key variables analyzed included gender, knowledge level, denture cleaning behavior, use of special cleaning agents, age, and type of denture.

Table 1. Factors contributing to Denture Hygiene in Edentulous Patients

Variables	Denture Hygiene				p value
	Good		Poor		
	n	%	n	%	
Age					
<63 (n=22)	5	22,7	17	77,3	0,791
≥63 (n=18)	5	27,8	13	77,2	
Gender					
Male (n=13)	7	53,8	6	46,2	0,006*
Female (n=27)	3	11,1	24	88,9	
Knowledge					
Good (n=10)	6	60	4	40	0,007*
Poor (n=30)	4	13,3	26	86,7	
Behaviour					
Good (n=15)	7	46,7	8	53,3	0,024*
Poor (n=25)	3	12	22	88	
The use of a special agent					
Yes (n=13)	6	46,2	7	53,8	0,05*
No (n=27)	4	14,8	23	85,2	
Type of Denture					
Full (n=31)	7	22,6	24	77,4	0,665
Partial (n=9)	3	33,3	6	66,7	

The results in Table 1 revealed significant associations between denture hygiene and four factors: gender, knowledge,

behaviour, and use of cleaning agents. However, age and type of denture did not show significant correlations with hygiene status.

Gender and Denture Hygiene

The analysis indicated that female patients were more likely to have poor denture hygiene compared to their male counterparts. In contrast to the findings of the present study, previous research has reported differing results, indicating that female denture wearers are more likely to engage in daily denture cleaning and maintain a higher level of denture hygiene compared to their male counterparts. This has been attributed to women generally exhibiting greater concern for personal appearance and health-related behaviors, which may influence their oral hygiene practices more positively than men. (Tosun & Uysal, 2025).

Despite reportedly higher cleaning frequency among women, more female patients perceived denture-related odor compared to their male counterparts. This paradox may suggest that female patients, although more consistent with cleaning routines, might employ less effective cleaning techniques. Additionally, longer average duration of denture use among women—often attributed to higher life expectancy—could contribute to increased biofilm accumulation. Furthermore, potential biological or behavioral factors may make female patients more susceptible to plaque buildup and odor-causing bacteria, ultimately resulting in poorer denture hygiene outcomes(Kulak-Ozkan et al., 2002).

While this may appear counterintuitive, it reflects the sociocultural dynamics often observed in older women in Indonesia. Elderly women, especially those living with extended families, often shoulder greater domestic responsibilities, including caregiving, cooking, and household maintenance. These duties may reduce the time and energy available for personal self-care, including oral hygiene.

Knowledge and Denture Hygiene

A strong correlation was found between knowledge level and denture hygiene status. Participants with adequate knowledge were significantly more likely to exhibit good cleaning practices. These individuals understood proper cleaning techniques, such as daily brushing of dentures, soaking them in appropriate solutions, and avoiding harmful practices like boiling or using bleach. This finding aligns with the health behavior theory, which suggests that knowledge is a foundational element for shaping attitudes and driving behavior change. Health education, therefore, plays a crucial role in improving denture hygiene. Several study supports this findings, emphasizing that educational interventions significantly improve hygiene outcomes among prosthetic users(Dwivedi et al., 2021; Moussa et al., 2022; Wong et al., 2019).

Behavior and Hygiene Practice

Patient-reported behavior showed a clear relationship with denture cleanliness. Respondents who cleaned their dentures regularly — particularly those who brushed and soaked their dentures daily — had noticeably better hygiene. In contrast, those who relied solely on rinsing or cleaned their dentures sporadically showed signs of plaque buildup, discoloration, or odor. Similar finding also found in study by Tosun & Uysal, (2025) showed that daily denture cleaning, removing the denture at night, and storing it in water while out of the mouth significantly improved denture hygiene. These practices support the concept that habitual behaviors are essential to maintaining prosthesis cleanliness. When such behaviors are reinforced through routine and supported by caregivers or health systems, they are more likely to result in sustained oral hygiene outcomes. Therefore, promoting and establishing consistent daily denture care routines should be a key component of oral health education and intervention programs, particularly for edentulous populations.

Use of Special Cleaning Agents

Patients who used special denture cleaning agents, such as effervescent tablets or chlorhexidine-based solutions, had significantly better hygiene outcomes than those using only water or regular toothpaste. Special agents are formulated to eliminate biofilm, stains, and fungal colonization without damaging the denture surface. The findings confirm previous reports by (Duyck et al., 2016), who demonstrated that the use of specific cleansing agents significantly reduces microbial load on dentures, including *Candida albicans*, which is a common cause of denture stomatitis. Unfortunately, many patients in this study were unaware of or could not access such products. This highlights the need for both education and accessibility when promoting proper denture hygiene techniques.

Age and Denture Hygiene

Contrary to assumptions, age did not show a significant relationship with denture hygiene in this study. While aging is associated with physical decline, including reduced manual dexterity and vision, these were not the determining factors in denture care behavior. It appears that regardless of age, what mattered more was whether the individual had proper knowledge and behavioral support. Contrasting results were found in Saha's et al., (2014) study, where younger denture wearers demonstrated more frequent denture cleaning habits compared to their older counterparts. Nearly half of the subjects cleaned their dentures once daily. Another study Shah et al., (2021) also reported similar findings regarding denture cleaning frequency, noting that more than 50% of patients aged over 70 years did not clean their dentures regularly(p value 0,001)

Type of Denture

The type of denture used — whether full acrylic or flexible — was not significantly associated with hygiene status. While some studies suggest that material type may affect biofilm accumulation (with acrylic surfaces being more prone to microbial retention), this study did not find a direct connection. This could be due to the overriding influence of hygiene behavior: even dentures made from more plaque-retentive materials can be kept clean with proper care. Therefore, emphasis should be placed on the patient's cleaning routine rather than on the material composition of the denture.

These findings emphasize that denture hygiene is not merely a matter of material or aging but of behavior, knowledge, and support. Oral health promotion programs should target specific subgroups — especially older women and individuals with limited awareness — with simple, practical instructions and demonstrations. Distribution of affordable denture cleaning products and training caregivers can also make a significant difference in long-term outcomes. Clinics and public health centers should integrate denture hygiene counseling into regular visits, particularly in areas where elderly populations are underserved.

CONCLUSION

This study found that denture hygiene among edentulous patients is significantly influenced by gender, knowledge, personal hygiene behavior, and the use of special cleaning agents. Age and type of denture were not significantly associated with hygiene status. These results emphasize the importance of health education and behavioral support in improving denture care, particularly among vulnerable groups such as older women and those with limited knowledge.

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