ORIGINAL ARTICLE

A complete denture hygiene maintenance instruction booklet in enhancing elderly behavior: an experimental study

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ABSTRACT

Introduction: The aging process introduces behavioral and physiological challenges, including tooth loss. While complete dentures restore function and aesthetics, inadequate hygiene compromises their effectiveness. Existing educational resources often lack clarity and do not adequately support behavior change. This study aimed to analyze a complete denture hygiene maintenance instruction. **Methods:** This study employed an experimental one-group pretest and posttest design, involving 37 elderly participants from Panti Jompo Pusaka 41 Yayasan Al-Madiniyah. A 15-item questionnaire was administered through structured interviews both before and two weeks after the distribution of a booklet on denture hygiene maintenance instruction techniques. The Wilcoxon signed-rank test was used to analyze differences. **Results:** Following the two-week intervention, 78% of participants achieved good knowledge scores, 84% demonstrated good attitudes, and 73% reported good hygiene practices. Wilcoxon analysis showed significant improvements across all three domains (p=0,001). **Conclusion:** The use of instructional booklets can enhance a complete denture hygiene maintenance instruction among the elderly. Although behavior is presented as an overall outcome, the analysis was conducted independently for each domain to ensure interpretive clarity.

KEYWORDS

Elderly, complete denture, booklet, cleaning behaviour

INTRODUCTION

Indonesia has entered the aging population phase since 2021, with approximately one in ten individuals classified as elderly. According to the National Socioeconomic Survey (Susenas) in March 2024, the proportion of elderly individuals in Indonesia has reached 12%. Between 2010 and 2022, this percentage increased by approximately four percent. In 2024, the Indonesian Central Bureau of Statistics (BPS) reported that 63.29% of the elderly population belonged to the young-old category (60–69 years), 28.11% were categorized as middle-old (70–79 years), and 8.61% were classified as old-old (≥80 years).[1] The elderly population is considered a vulnerable group at higher risk of experiencing various health issues due to physiological and cognitive decline.[2]

Oral health is a fundamental aspect of elderly well-being.[2] The aging process involves physical, behavioral, and social changes that increase vulnerability to various health issues, including tooth loss. Among older adults, tooth loss remains a significant oral health concern, frequently linked to poor overall oral health

outcomes.[3] The World Health Organization (WHO) has identified edentulism as a significant public health concern that substantially affects both oral and overall health status.[4] The Indonesian Health Survey (SKI) 2023 reported that tooth loss due to extraction or spontaneous loss was the second most prevalent dental and oral health issue in Indonesia after dental caries, affecting 20.1% of the overall population and up to 46.5% among the elderly (aged 65 and above).[5]

To address issues related to mastication, swallowing, aesthetics, and social acceptance due to tooth loss, elderly individuals commonly use dentures to replace missing natural teeth and restore their functions.[6] As individuals age, the need for dentures increases. Complete dentures are the primary treatment modality for elderly individuals experiencing total tooth loss in one or both dental arches.[7]

Proper denture maintenance and hygiene are essential for preserving oral health and ensuring the long-term functionality and durability of removable dentures. Poor complete denture hygiene can lead to increased plaque accumulation, predisposing individuals to oral infections such as denture stomatitis, angular cheilitis, halitosis, and denture irritation hyperplasia, and negatively impacting their quality of life.[6,8-9]

A key factor influencing the success of complete denture treatment is patient adherence to proper hygiene practices.[10] The elderly, particularly those with cognitive decline, may struggle to retain and apply instructions from their dentist regarding denture care.[11] This limitation highlights the need for educational methods that are accessible, repetitive, and easy to understand. One effective method is the use of instructional booklets, which provide written and visual guidance that can be revisited as often as needed. For younger caregivers or middle-aged adults, booklets can be supplemented with digital tools such as reminder apps or instructional videos. Meanwhile, older caregivers such as elderly spouses may benefit more from simplified, hands-on demonstrations and routine-based assistance.[12-13] Therefore, practical and accessible educational methods are needed to support optimal complete denture hygiene.

Denture hygiene instructions can be delivered verbally or in written form. However, verbal instructions alone are often insufficient if not supplemented with additional educational materials. Patients who receive only verbal instructions tend to struggle with retaining all the information provided by their dentist. Written instructions are crucial in enabling patients to revisit and reinforce their understanding of proper denture care.[14] One of the most effective written educational materials is the booklet. A booklet is a small-format educational resource that presents information in a structured manner, often accompanied by illustrations, enhancing comprehension and memory retention.[15] Compared to leaflets, booklets provide a more comprehensive and systematic presentation of information, making them a superior tool for patient education.[16]

Dentists play a crucial role in educating patients on complete denture care. Dentists are not only responsible for the fabrication and fitting of dentures but also for ensuring that patients understand how to properly maintain and clean them. The instructions provided by dentists should be delivered through effective methods to ensure patient comprehension and adherence, particularly among elderly individuals who may have memory or cognitive limitations.[11]

Therefore, educational materials such as booklets can serve as a valuable tool in assisting dentists to effectively convey denture hygiene practices to patients, particularly for elderly patients who may have difficulty processing or retaining verbal instructions. Compared to conventional methods such as verbal instructions or simple leaflets, booklets offer structured, sequential, and illustrated content that enhances engagement, comprehension, and memory retention, while verbal instructions remain the dominant method in prosthodontic practice, visual tools such as booklets have been underutilized.[17] Thus, introducing a booklet-based intervention in this context presents both a practical solution and a novel approach to improve denture hygiene behavior among elderly populations.

Several studies have demonstrated that booklets are effective in enhancing learning outcomes and improving comprehension of educational materials.[18-19] Moreover, research has shown that the use of booklets can improve knowledge and behavior in dental health education, as evidenced by a study conducted by Wirata and Agung in 2021.[20]

However, verbal instruction remains the dominant method in prosthodontic practice, while visual and structured tools such as booklets are underutilized. The novelty of this study lies in evaluating the impact of a booklet-based educational intervention on behavioral changes related to complete denture hygiene among elderly individuals, an area that has not been previously explored. Therefore, This study aimed to analyze changes in a complete denture hygiene maintenance instruction booklet in enhancing elderly behavior.

METHODS

This study employed a one-group pretest–posttest experimental design aimed at evaluating changes in complete denture cleaning behavior among elderly patients following instructions provided through an educational booklet. Data were collected before the intervention (pretest) and two weeks after the intervention (posttest). The two-week period was selected to assess short-term improvement in denture cleaning behavior, based on previous studies suggesting that behavioral responses to educational interventions can begin to emerge within this timeframe.

Denilson[21] found that significant changes in oral hygiene behavior among elderly individuals were observable two weeks after receiving instructions. Similarly, Dunbar[22] noted that a two-week duration is sufficient to initiate habit formation and allow individuals to begin internalizing new routines. While longer follow-up periods are ideal for assessing sustained behavioral change, the two-week period in this study was chosen as a practical and evidence-based starting point for evaluating initial behavioral responses. The study was conducted from October 18 to November 1, 2024.

The study focused on the elderly residents of Panti Jompo Pusaka 41 Yayasan Al-Madiniyah as the target population. The sample included elderly participants aged 60 years or older who had experienced total tooth loss in one or both dental arches and used complete dentures. The sample size was determined using categorical analysis formulas[23], with a minimum requirement of 18 participants. A total of 37 elderly participants fulfilled the inclusion criteria and participated as respondents.

The inclusion criteria encompassed elderly participants aged 60 years or older who used acrylic-based complete dentures with good retention and agreed to participate in the study. The exclusion criteria included individuals with uncontrolled systemic diseases, users of removable partial dentures, and those who were absent during data collection using the questionnaire.

Data collection was conducted through interviews using a questionnaire to assess baseline complete denture hygiene maintenance behavior. The intervention involved providing an educational booklet containing complete denture cleaning instructions, which were verbally explained by the researcher. The instructions within the booklet were presented in both pictorial and textual formats to enhance participants' understanding and promote adherence to the recommended cleaning procedures. Additionally, nursing home caregivers were instructed to remind respondents daily to follow the booklet's complete denture cleaning guidelines. Two weeks after the intervention, respondents were re-interviewed using the same questionnaire to assess behavioral changes.

Before the study commenced, respondents voluntarily read and signed an informed consent form. The behavioral evaluation was based on three distinct domains: knowledge, attitude, and practices regarding complete denture hygiene.

Each domain was assessed using five items, with responses scored as 1 for "yes/know/agree" and 0 for "no/do not know/disagree", leading to a total score range of 0 to 5 per domain. Scores were categorized as poor (0–2), moderate (3–4), and good (5).

Table 1. Questionnaire on a complete denture hygiene maintenance

No	Question	Response	Scoring
	Knowledge Aspect		
1	Do you know that wearing complete dentures can negatively affect oral hygiene?	Know/Don't know	Know=1; Don't know= 0
2	Do you know that complete dentures should be removed at night before sleeping?		
3	Do you know that complete dentures removed at night but not soaked in water can cause the dentures to shrink?		
4	Do you know that cleaning the soft tissues in the mouth (palate, tongue, and gums) can prevent fungal infections and bad breath?		
5	Do you know that regular check-ups with the dentist after getting dentures are necessary to maintain oral health?		
	Attitude Aspect		
1	Do you agree that complete dentures need to be kept clean?	Agree/ Disagree	Agree=1; Disagree=0
2	Do you agree that complete dentures should be removed at night before sleeping?		
3	Do you agree that complete dentures removed at night should be soaked in water?		
4	Do you agree that the soft tissues in the mouth (palate, tongue, and gums) also need to be kept clean?		
5	Do you agree that regular check-ups with the dentist after getting complete dentures are necessary?		
	Practices Aspect		
1	Do you clean your complete dentures after every meal?	Yes/No	Yes=1; No=0
2	Do you remove your complete dentures before sleeping at night?		
3	Do you soak your complete dentures in water when they are removed and not in use?		
4	Do you clean the soft tissues in your mouth (palate, tongue, and gums)?		
5	Do you have dental check-ups after getting your complete dentures fitted?		

The questionnaire consisted of 15 ordinal-scale questions across three domains: knowledge, attitude, and practice, developed based on instruments used in prior research and refined through expert validation. Each domain contained five items. The knowledge items assessed understanding of denture care principles (e.g., the importance of daily cleaning), while the practice items evaluated daily hygiene behaviors (e.g., soaking or brushing dentures). All items were scored as 1 for correct or positive responses and 0 for incorrect or negative responses. The complete list of questionnaire items, response options, and scoring criteria is presented in Table 1. While the original study did not report psychometric validation, this study conducted an independent validation process. Content validity was evaluated by two prosthodontic experts to ensure clarity and relevance of the items. Additionally, a pilot study was conducted among a separate group of elderly participants to assess internal consistency, yielding a Cronbach's alpha of 0.796, which indicates acceptable reliability for the instrument.

Data analysis was performed using the Wilcoxon signed-rank test in conjunction with the SPSS software to assess differences in knowledge, attitude, and behavior scores before and after the intervention within the same group. The Wilcoxon signed-rank test was selected due to the non-normal distribution of the data and the paired pre-post design of the study. Respondents were provided with comprehensive explanations regarding the study objectives, and participation was entirely voluntary following informed consent.

RESULTS

In this study, a total of 37 elderly participants were selected according to the established criteria. The results of this study are presented in detail in the attached tables. Participant characteristics are presented in Table 2 and Table 3.

Table 2. Distribution of research respondents (elderly participants)

Gender	Total	Percentage (%)
Female	21	57
Male	16	43

In Table 2, the total number of elderly participants using acrylic complete dentures was 37, consisting of 57% female participants and 43% male participants.

Table 3. Distribution of research respondents (elderly participants) by age group

Age	Total	Percentage (%)
Middle Age (45-59 years)	0	0
Elderly (60-74 years)	24	65
Old (75-90 years)	13	35
Very old (>90 years)	0	0

In this study, the respondents were grouped into four age categories according to the WHO classification: 45–59 years (middle-aged), 60–74 years (elderly), 75–90 years (old), and over 90 years (very old). The results showed that no complete denture users were found in the middle age group, while the elderly group consisted of 24 participants (65%), and the old group consisted of 13 participants (35%), as summarized in Table 3.

Table 4. Overview of a complete denture hygiene maintenance instruction (Knowledge, Attitude, and Practices) Before Receiving the Intervention through the Booklet

Variable	Frequency	Percentage (%)
Knowledge		
Good	1	3
Moderate	24	65
Poor	12	32
Attitude		
Good	4	11
Moderate	26	70
Poor	7	19
Practices		
Good	2	5
Moderate	18	49
Poor	17	46

Table 4 presents the distribution of elderly participants' scores in the domains of knowledge, attitude, and practice related to complete denture hygiene before the educational intervention using an instructional booklet. In the knowledge domain, 3% of participants (1 person) demonstrated good knowledge, 65% (24 people) were in the moderate category, and 32% (12 people) had poor knowledge. For the attitude domain, 11% (4 people) showed a good attitude, 70% (26 people) were in the moderate category, and 19% (7 people) had poor attitudes. In terms of practice, 5% (2 people) were in the good category, 49% (18 people) were moderate, and 46% (17 people) had poor practices regarding complete denture cleaning.

These results suggest that prior to the intervention, the majority of participants had moderate levels of knowledge and attitude, but a significant proportion demonstrated poor hygiene practices. This discrepancy highlights the importance of targeted educational strategies that not only increase awareness but also translate knowledge and attitudes into actual behavior. Although the study refers to denture cleaning behavior as a general outcome, each domain (knowledge, attitude, and practice) was assessed and analyzed independently to ensure clarity and consistency in data interpretation.

Table 5. Overview of a complete denture hygiene maintenance instruction two weeks after receiving the intervention through the booklet

Variable	Frequency	Percentage (%)
Knowledge		
Good	29	78
Moderate	8	22
Poor	0	0
Attitude		
Good	31	84
Moderate	6	16
Poor	0	0
Practices		
Good	27	73
Moderate	10	27
Poor	0	0

The data presented in Table 5 show the distribution of elderly participants' responses in the domains of knowledge, attitude, and practice related to denture hygiene maintenance instruction, assessed two weeks after the instructional booklet intervention. The results show substantial improvements across all domains. In the knowledge domain, 78% (29 participants) demonstrated good understanding of denture care, while 22% (8 participants) were categorized as moderate, and none were in the poor category. In the attitude domain, 84% (31 participants) exhibited a positive outlook toward denture hygiene, while 16% (6 participants) were moderate, and no participants displayed poor attitudes. In the practice domain, 73% (27 participants) reported consistently performing proper denture cleaning practices, with the remaining 27% (10 participants) in the moderate category. These findings reflect a marked improvement in denture cleaning behavior, as seen through enhanced knowledge, more positive attitudes, and improved daily hygiene routines among elderly participants. As presented in Table 6, the statistical analysis of the data further supports these findings, demonstrating a significant improvement in behavior following education through the booklet.

Table 6. Statistical results of wilcoxon signed-rank test for behavior of a complete denture hygiene maintenance instruction

Category	Before		After		p value
	n	%	n	%	
Good	2	5,4	29	78,4	
Moderate	25	67,8	8	21,6	0,001
Poor	10	27	0	0	
Total	37	100	37	100	

DISCUSSION

This study collected data twice, before and after the administration of the complete denture cleaning booklet, with a two-week interval after the initial instruction. A total of 37 elderly participants were involved, exceeding the minimum requirement of 18. Table 2 shows the gender distribution of respondents, with 21 females (57%) and 16 males (43%). These findings are consistent with previous research by Theodorus.,[17] which reported that complete

denture usage is more prevalent among women than men. Several other studies have also suggested that elderly women are more likely to use complete dentures due to their greater concern for aesthetics and social interactions.[24-25] This suggests that women tend to be more attentive to their appearance and oral health maintenance.

In terms of age, Table 3 illustrates the distribution of participants according to the WHO classification with the majority (65%, n = 24) in the elderly group (60-74 years), and 35% (n=13) classified as old (75 years and older). These findings align with the study by Wongkar and Siagian.,[26] which reported that the elderly group constituted the largest proportion of complete denture users (70%).[26] Additionally, data from *Badan Pusat Statistik* support this trend, indicating that elderly individuals are more likely to use complete dentures compared to older age groups.[1] This suggests that the 60-74 age range is more prone to denture use, likely due to factors like increased awareness of oral health and social factors.

At the initial stage before the intervention, Table 4 shows the distribution of knowledge, attitude, and practice scores related to complete denture hygiene among elderly residents of *Panti Jompo Pusaka* 41 *Yayasan* Al-Madiniyah. In the knowledge domain, 3% of participants (1 person) demonstrated good knowledge, 65% (24 participants) were in the moderate category, and 32% (12 participants) had poor knowledge. For the attitude domain, 11% (4 participants) showed a good attitude, 70% (26 participants) were moderate, and 19% (7 participants) had poor attitudes. Regarding practice, 5% (2 participants) were in the good category, 49% (18 participants) were moderate, and 46% (17 participants) exhibited poor hygiene practices.

These findings suggest that prior to receiving the booklet intervention, most participants possessed moderate awareness and attitudes regarding denture hygiene, but their actual daily practices remained insufficient. This discrepancy is likely due to unclear or insufficient instructions from dental professionals. Providing clear instructions on denture cleaning and maintenance plays a crucial role in ensuring denture hygiene. Proper maintenance not only supports the aesthetic and oral functions of dentures but also contributes to the overall quality of life of the patients. Inadequate instructions can lead to poor cleaning behavior, negatively affecting patients' awareness and behavior regarding denture care, as well as increasing the risk of related health issues.[27] These results are consistent with those reported by Saxena.,[6] and Rehman.,[27] who found that although elderly denture wearers may have moderate levels of awareness, their hygiene practices are often inadequate due to insufficient guidance.[6,27] The importance of denture hygiene extends beyond oral health, as it is closely linked to the systemic health of elderly individuals. This also aligns with the findings of Cankaya.,[12] which indicate that elderly individuals with poor denture hygiene are at a higher risk of developing health complications due to unhygienic dentures.[12]

Instructional materials, such as booklets, are expected to not only enhance oral hygiene but also contribute to maintaining the overall well-being of elderly individuals. Without adequate instructions, elderly individuals often fail to recognize the importance of maintaining proper denture hygiene. A study by Zakaria.,[28] reported that a significant number of denture wearers did not receive clear instructions on denture hygiene and were unaware of the importance of regularly cleaning their dentures, with many relying solely on water for cleaning.[28]

After the intervention, Table 5 shows substantial improvements in each domain. In the knowledge domain, 78% of participants achieved good scores; for attitude, 84% were categorized as good; and for practice, 73% demonstrated consistent hygiene behaviors. These findings are consistent with the study by Denilson (2022), which found that significant behavioral changes occurred within two weeks after the initial instruction.[21] Additionally, Dunbar.,[22] suggested that a two-week period is an effective timeframe for observing changes in oral health habits, as individuals begin forming new habits that can be sustained over time.[22]

The effectiveness of the booklet intervention in improving denture hygiene knowledge, attitude, and practices among elderly participants was further evaluated using the Wilcoxon test, as shown in Table 6. This test was applied to compare pre-intervention and post-intervention conditions to determine whether significant behavioral changes occurred. The normality test revealed that the pre- and post-test data were not normally distributed, with a p-value of 0.000. This indicates a statistically significant difference between the pre- and post-intervention conditions ($p<0.005$), confirming that the booklet intervention significantly improved scores across knowledge, attitude, and practice domains related to denture hygiene behavior. These findings are consistent with the study by Sari.,[16] which concluded that booklets are more effective than other media, such as leaflets, in enhancing knowledge.[16]

The findings of this study highlight the effectiveness of the instructional booklet in improving denture hygiene behavior among elderly participants. However, the behavioral change observed was not uniform across all aspects. According to the health behavior model, the three primary components — knowledge, attitude, and practice—play crucial roles in shaping behavior. The results indicate that the most significant improvement occurred in the knowledge component, with elderly participants gaining a better understanding of the importance of denture hygiene and proper cleaning methods. However, changes in attitude and practice require a longer time, as they depend on individual habits and motivation. As shown in previous research by Tang and Wang.,[29] individuals with greater knowledge are more likely to adopt health-related behaviors, suggesting that access to information can positively impact health-supporting behaviors. This suggests that while booklets are effective in enhancing knowledge, they should be supplemented with other methods, such as follow-up interventions or demonstrations by healthcare providers, to promote sustained behavior change.[29]

In this study, the booklet was utilized as an educational tool to provide an intervention for elderly individuals regarding denture cleaning practices. As a health promotion medium, booklets offer several advantages, including affordability, comprehensive information, ease of storage, and visually engaging designs. These advantages make booklets an effective tool for enhancing elderly individuals' engagement with educational materials.[30] These findings align with research by Suyatmi.,[31] which demonstrated that booklets significantly improve knowledge and influence attitudes.[31] The study also found that health promotion through booklets is effective in increasing understanding. Observational results showed that two weeks after receiving the booklet, most elderly participants exhibited improvements in denture hygiene behavior. However, the statistical significance of these changes required further validation through additional analysis. Therefore, the Wilcoxon test was conducted to determine whether there was a significant difference between pre-intervention and post-intervention behavior.

The findings of this study indicate that education through booklets can be an effective strategy for improving denture hygiene behavior among elderly individuals. Therefore, this approach can be integrated into oral health education programs targeting elderly patients. However, to ensure sustainable behavioral change, education should not be a one-time intervention but should be reinforced through periodic follow-up sessions. Sustainability can also be supported by regular training for caregivers in nursing homes and the provision of appropriate denture-cleaning tools. Additionally, establishing habits through initial supervision is crucial to help integrate these behaviors into daily routines.

These findings highlight the critical role of simple and accessible educational tools in improving oral health outcomes among elderly populations. Although this study demonstrates an improvement in behavior following booklet-based education, several limitations must be considered. One limitation is the relatively small sample size, which was restricted to a single location, limiting the

generalizability of the findings. To address this, researchers ensured that participants had homogeneous characteristics to enhance the study's internal validity. Another limitation is the relatively short intervention period, preventing a full evaluation of the long-term effects. Future research with a broader scope and more diverse educational methods is needed to provide deeper insights into the most effective strategies for improving denture hygiene among elderly individuals.

CONCLUSION

Instructional booklets have demonstrated potential in improving denture-cleaning behavior among elderly individuals, emphasizing the importance of accessible and practical educational tools in oral health promotion. To optimize educational outcomes, booklets should be integrated with complementary methods such as direct demonstrations by healthcare professionals. This multimodal approach may enhance comprehension, engagement, and long-term behavior change by addressing both informational and practical aspects of denture hygiene. The implication of this research is that integrating booklet-based education with hands on support can be a strategic component in geriatric oral health programs, ensuring that behavioral change is not only initiated but also sustained over time.

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