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Impact of subjective factors on denture cleanliness among removable denture wearers

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ABSTRACT

Background: Individuals who use removable dentures should practice proper denture care to avoid issues such as infections, denture-related stomatitis, and unsatisfactory aesthetics. *Aim:* This study aims to evaluate the influence of subjective factors such as, gender, hygiene habits, and education level on the denture cleanliness index (DCI) among removable denture wearers in Iraq. *Methodology:* A cross-sectional survey was conducted among 120 complete and partial denture wearers to assess their education level and self-reported denture care habits. After collecting data and additional denture-related information, the data was analysed descriptively (frequency and percentage) with statistical tools employed in SPSS. A disclosing agent was used to assess the participants' dentures. DCI was then used to evaluate the discolored dentures. *Results:* The patients' average age was 65.33±8.72 years. A total of 65 (54.2%) females and 55 (45.8%) males were present. Denture Cleanliness Index scores of one (denture is visibly clean) were found more in females compared to males, whereas the difference is statistically significant (p<0.05). *Conclusion:* It can be concluded that an individual's choice of methods and behaviors for maintaining denture hygiene is heavily influenced by their gender. Additionally, education level has an important effect on the denture cleanliness index.

KEYWORDS

denture cleanliness index, removable denture, hygiene habits, plaque, heat-cured acrylic

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1. INTRODUCTION

Dentures are used to restore lost teeth and are primarily utilized by elderly people. Though it aids digestion and enhances facial appear, proper washing is essential. If denture hygiene is not maintained, it can lead to both oral and systemic problems [1]. Denture plaques can also become calcified if not removed carefully and consistently, forming calculus that is easily discolored by smoke, coffee, tea, and some drugs [2]. Patients are typically instructed on denture cleanliness practices after the placement of new dentures, and this is frequently reinforced during subsequent denture maintenance consultations. Mechanical, chemical, or a mix of these treatments are the most commonly advised approaches for removing debris from dentures. The mechanical approach entails cleaning the denture at least twice a day with a denture brush, toothbrush, or shoe brush with soft or toilet soap [3]. Gender variations in cleaning procedures are possible, although they

are not as noticeable as those in education [4]. As a result, the purpose of this study is to assess the impact of personal factors such as gender, hygiene practices, and educational level on the denture cleanliness index (DCI) among removable denture wearers in Iraq.

2. METHODOLOGY

2.1 Study design

A descriptive cross-sectional study was carried out in the Department of Prosthodontics at hospitals in Iraq. The data was collected from February 2023 to December 2024. Completely or partially edentulous elderly persons who have been wearing acrylic dentures for more than a year and were willing to participate in the study. Participants were asked basic socio-demographic questions such as their name, age, gender, cleaning materials, and educational level. All the information was documented in proforma.

2.2 Statistical analysis

The data was then analysed statistically using SPSS software. To determine the statistical significance between the variables, the Chi-square test was utilized, with a significance level of $p<0.05$.

2.3 Clinical assessments

For the second step of the trial, the dentures were cleansed with cold water to remove food particles and debris. After that, a disclosing agent was put to the denture's fitting surface. It was left in this state for 30 sec before being washed with cool water. The stained dentures were then evaluated by using DCI, which ranges from 0 (best) to 4(worst). A zero score indicates the absence of a plaque. Score 1 denotes mild plaque (25% denture area), score 2 moderate plaque (26%-50% denture area), score 3 extreme plaque (51-75% denture area), and score 4 very extreme plaque (76-100% denture area) [5,6].

3. RESULTS

In entirety, 120 denture users participated in the study. The average age of participants was 65.33±8.72 years. There were 65 females (54.2%) and the remaining people were males. 72.3% of females scored a 1 (mainly clean dentures with minor discoloration), compared to only 30.9% of males. Severe staining (score 3) was present in only 3.08% of females and 21.8% of males. There were no calculus deposits (score 4) in females, whereas 3.64% in males. The findings of statistical analysis (Chi-square test: $\chi^2=27.19$, $p=0.001$) show a substantial correlation between gender and denture hygiene and confirm that the gender differences in cleanliness levels are highly significant (Table 1A).

According to the outcome of this study, toothpaste (75%) and denture cleaners (60%) produced the highest proportion of clean dentures (score 1). Brushing with toothpaste resulted in the fewest cases of severe discoloration (5%) and no calculus deposits. Denture cleaners (tablets) had the highest percentage of perfectly clean dentures (score 0), with 13.3%. The worst cleaning method is brushing with only water. No one who brushed with only water had perfectly clean dentures (score 0). 46.8% had mild staining (score 2), while 9.3% had calculus deposits (score 4), the highest of any approach (Table 1B).

In this study, higher education had the highest percentage of perfect denture cleaning (21.8%) (Score 0). The majority of people with secondary education (66.6%) and higher education (68.7%) have reasonably clean dentures (Score 1). Primary education has the highest percentage (44.8%) of intermediate cleanliness (Score 2) and the greatest number of people with poor hygiene (Scores 3 and 4) (Table 1C).

4. DISCUSSION

Denture hygiene and gender were substantially correlated; female participants had lower DCI scores and better cleaning practices than male participants. Smoking and dietary habits, which are more common in men, can contribute to poor denture hygiene. Furthermore, women may be more likely to visit dentists for denture care and ex¬pert cleaning. This is corresponding to Baran and Nalçaci's belief that a person's sex influences den¬ture hygiene care [7]. Regular dental check-ups should be promoted, particularly for men, to mini¬mize plaque development and staining. Lifestyle changes, such as quitting smoking and eating a healthier diet, may help keep dentures clean. The current study revealed that brushing dentures with just water was the least effective cleaning ap¬proach.

However, the general opinion is that the best way to maintain the hygiene of dentures is to use a combination of chemical cleaning with solu¬ble tablets and mechanical cleaning with a tooth¬brush and paste [8]. Education has a major impact on denture cleanliness, with more education asso¬ciated to better oral hygiene practices [9].

Table 1A

Gender	Score 0	Score 1	Score 2	Score 3	Score 4	Total N=120
Males	- (0%)	17 (30.9%)	24 (43.6%)	12 (21.8%)	2 (3.6%)	55
Female	2 (3%)	47 (72.3%)	14 (21.5%)	2 (3%)	- (0%)	65

*Chi-Square test result: $x^2 = 27.19$, p=0.001

Table 1B

Hygiene habits (Cleaning Method)	Score 0	Score 1	Score 2	Score 3	Score 4	Total N=120
Brushing with water only	- (0%)	9 (28.1%)	15 (46.8%)	5 (15.6%)	3 (9.3%)	32
Brushing with soap	- (0%)	14 (87.5%)	2 (12.5%)	2 (12.5%)	- (0%)	18
Brushing with toothpaste	2 (5%)	30 (75%)	6 (15%)	2 (5%)	- (0%)	40
Denture cleaners (tablets)	4 (13.3%)	18 (60%)	6 (20%)	2 (6.7%)	- (0%)	30

*Chi-Square test result: $x^2 = 35.08$, p=0.001

Table 1C

Level of education	Score 0	Score 1	Score 2	Score 3	Score 4	Total N=120
Primary	2 (3.4%)	18 (31%)	26 (44.8%)	8 (13.7%)	4 (6.9%)	58
Secondary	1 (3.3%)	20 (66.6%)	8 (26.6%)	- (0%)	1 (3.3%)	30
Higher education	7 (21.8%)	22 (68.7%)	3 (9.3%)	- (0%)	- (0%)	32

*Chi-Square test result: $x^2 = 37.30$, p=0.001

Zhanina concluded that education is a more important factor influencing patients' cleanliness behaviors than other subjective characteristics such as age and gender [10]. We assumed that education improves access to dental health resources. As a result, oral health education should be focused among those with lower levels of education in order to enhance denture

cleanliness and general oral health. These results underline the necessity of more extensive and thorough research to gain a deeper understanding of the oral microbiota of the elderly.

5. CONCLUSION

This study demonstrates the considerable impact of gender, cleanliness practices, and education level on DCI results. The results indicate that females, people with higher education, and those who use correct cleaning procedures (such as toothpaste and denture cleansers) have better denture hygiene than others. In order to improve denture hygiene, tailored education programs for men should be conducted, as males have lower denture cleanliness than females. Denture users should be encouraged to utilize toothpaste or denture cleaning tablets rather than water alone, as these methods are substantially more successful at keeping cleanliness. Educational efforts should concentrate on persons with lesser levels of education, offering clear and understandable information on appropriate denture care.

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CONFLICT OF INTEREST STATEMENT
The authors declare no conflicts of interest.

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