

Original article

Knowledge, Attitudes, and Practices Regarding Denture Hygiene and Denture-Related Oral Infections Among Complete Denture Wearers in Misurata, Libya: A Cross-Sectional Study

Gamal Alwafi^{1*}, Eshraq Alsherif², Salem Elgelaih³¹Prosthodontics Department, Faculty of Dentistry, Misurata University, Misurata, Libya.²Prosthodontics Department, Faculty of Dentistry, Tripoli University, Tripoli, Libya.³Periodontics and Oral Biology Department, Faculty of Dentistry, Misurata University, Misurata, Libya.Corresponding email: alabdali.jamal@gmail.com

ABSTRACT

Keywords:

Denture hygiene; Denture stomatitis; Complete Dentures; KAP; Oral Infections; Libya.

This study aimed to assess the knowledge, attitudes, and practices (KAP) regarding denture hygiene and denture-related oral infections among complete denture wearers in Misurata, Libya. A cross-sectional study was conducted among 100 complete denture wearers aged ≥ 40 years. Data were collected using a structured, validated questionnaire covering sociodemographic characteristics, knowledge (12 items), attitudes (7 items), practices (7 items), and self-reported oral symptoms. KAP domains were classified as poor ($< 50\%$), fair (50–74%), or good ($\geq 75\%$). The mean knowledge score was $6.1 \pm 2.3/12$ (51% correct); 71% knew dentures require daily cleaning, but only 35% associated denture stomatitis with poor hygiene. Attitudes were positive ($25.8 \pm 4.5/35$), with 91% desiring more education and 87% willing to improve. Practices were poor: 29% cleaned dentures $\geq 2\times/day$, 24% removed them at night, and 18% used cleansers; 61% had poor practices. Common symptoms included bad odor (46%) and mucosal redness (42%). Age was inversely associated with knowledge ($p = 0.01$) and practice ($p = 0.02$). Higher education was the strongest knowledge predictor ($p < 0.001$). Prior instructions were associated with higher knowledge ($p = 0.002$) and better practices ($p = 0.01$). Knowledge-practice ($r = 0.48$) and attitude-practice ($r = 0.44$) correlations were moderate. Symptom burden increased from good (1.1 ± 1.0) to poor practices (2.7 ± 1.5) (p for trend < 0.001). Poor practice increased odds of any symptom nearly fourfold (OR = 3.8, 95% CI: 1.5–9.6, $p = 0.004$). Among those with poor knowledge, 78% maintained positive attitudes. Moderate knowledge and positive attitudes contrast with poor practices; age, education, and prior instruction influence outcomes, requiring targeted hygiene education for older and less educated wearers.

Introduction

Complete denture rehabilitation remains one of the most common prosthetic treatments for edentulous patients, aiming to restore mastication, esthetics, and speech function. However, the long-term success of complete dentures is highly dependent on the patient's adherence to adequate denture hygiene practices. Poor denture hygiene leads to accumulation of denture plaque and biofilm, which act as reservoirs for pathogenic microorganisms, particularly *Candida albicans* and other opportunistic flora [1-2].

Denture-related stomatitis is among the most frequently encountered oral mucosal lesions in denture wearers, with prevalence rates reported between 20% and 70% globally [3]. Gendreau & Loewy (2016 [4]) highlighted that denture stomatitis is a multifactorial inflammatory condition strongly associated with continuous denture use, poor hygiene, and microbial colonization. Similarly, Perić et al. (2023 [3]) reported that *Candida* species play a central role in the pathogenesis of this condition. Khiyani et al. (2019 [5]) emphasized that denture-related infections may negatively affect oral health-related quality of life and could potentially lead to systemic complications in immunocompromised individuals. In addition, Tanjapatkul et al. (2017 [6]) demonstrated that *Candida albicans* remains the dominant fungal species isolated from denture biofilms in patients with denture stomatitis.

Knowledge, attitudes, and practices (KAP) of denture wearers significantly influence oral hygiene behaviors and clinical outcomes. Dwivedi et al (2021 [7]) found that inadequate awareness regarding denture cleaning methods, overnight denture removal, and use of chemical disinfectants contributes to poor denture hygiene outcomes. Socioeconomic and educational factors are also key determinants of denture hygiene behavior. Tosun et al. (2025 [8]) showed that lower socioeconomic status is significantly associated with higher prevalence of denture-related oral lesions. Likewise, Manoharan et al. (2024 [9]) highlighted that biofilm

formation on denture surfaces is strongly influenced by patient hygiene practices and material properties of the prosthesis.

In Libya, limited studies have investigated denture hygiene awareness and practices among complete denture wearers. Elhddad et al. (2023 [10]) reported insufficient knowledge and suboptimal practices regarding denture care among dental populations in Benghazi, suggesting a potential gap in patient education. However, data from western Libyan regions such as Misurata remain scarce. Therefore, understanding the knowledge, attitudes, and practices of complete denture wearers is essential for improving preventive strategies and reducing the burden of denture-related infections. This study aims to evaluate the knowledge, attitudes, and practices (KAP) regarding denture hygiene and denture-related oral infections among complete denture wearers in Misurata, Libya.

Methods

This cross-sectional descriptive study was conducted among complete denture wearers in Misurata, Libya, between January and June 2026 to evaluate knowledge, attitudes, and practices (KAP) regarding denture hygiene and denture-related oral infections. A total of 100 participants aged 40 years and older were recruited from governmental and private dental clinics using a convenience sampling technique. Participants were selected during routine dental visits and invited to participate after eligibility screening. Inclusion criteria included wearing complete removable dentures for at least six months, age ≥ 40 years, ability to understand and complete the questionnaire, and willingness to provide informed consent. Exclusion criteria included partial denture wearers, individuals with cognitive or communication impairments affecting questionnaire completion, and those who declined participation.

The sample size was determined based on practical feasibility within the study period, expected patient flow in the selected clinical settings, and consistency with previously published KAP studies among complete denture wearers, which commonly report sample sizes ranging between 80 and 150 participants. In addition, the final sample size of 100 was considered methodologically acceptable for descriptive cross-sectional studies when no prior local prevalence data are available and when a conservative prevalence estimate ($p = 0.5$) is assumed in sample size calculations, consistent with Cochran's formula for estimating proportions in population-based studies (11).

Data were collected using a structured, self-administered questionnaire developed by the principal investigator based on an extensive review of the literature on denture hygiene, denture stomatitis, oral fungal infections, and previously published KAP studies. The questionnaire was developed in Arabic and comprised four domains covering sociodemographic characteristics, knowledge, attitudes, and practices related to denture care. Content validity was assessed by a panel of experts in prosthodontics and dental public health, and necessary modifications were made to improve clarity and relevance. A pilot study was conducted on a small group of eligible participants to assess clarity and feasibility, and these participants were excluded from the final analysis. Internal consistency reliability was evaluated using Cronbach's alpha coefficient.

Participants were informed about the study objectives and provided written informed consent prior to participation. Data were collected through face-to-face administration and checked immediately after completion to minimize missing data. Ethical approval was obtained from the Research Ethics Committee of the Faculty of Dentistry, University of Misurata. Confidentiality and anonymity were strictly maintained in accordance with the Declaration of Helsinki.

Data were analyzed using SPSS Version 26.0. Descriptive statistics (mean \pm SD, frequencies) were calculated. Group comparisons used t-tests and one-way ANOVA with Tukey's post-hoc. Categorical associations were examined using chi-square tests. Pearson correlation assessed relationships between continuous variables. Logistic regression calculated odds ratios (95% CI). KAP domains were classified as poor (<50%), fair (50–74%), or good ($\geq 75\%$). Significance was set at $p < 0.05$.

Results

A total of 100 complete denture wearers participated in this study. Table 1 presents sociodemographic characteristics. The most common age group was 60–69 years (34%), followed by 50–59 years (31%), while 18% were aged 40–49 years and 17% were ≥ 70 years. Males constituted 58% of the sample. Regarding education, secondary education was the most frequent level (34%), followed by primary education (24%), university education (22%), no formal education (16%), and postgraduate education (4%). Notably, 63% of participants reported not having received any professional instructions regarding denture hygiene.

Table 1. Sociodemographic Characteristics of Participants (N = 100)

Variable	n	%
Age		
40–49 years	18	18.0
50–59 years	31	31.0
60–69 years	34	34.0
≥70 years	17	17.0
Gender		
Male	58	58.0
Female	42	42.0
Education		
No formal education	16	16.0
Primary education	24	24.0
Secondary education	34	34.0
University education	22	22.0
Postgraduate	4	4.0
Received denture instructions		
Yes	37	37.0
No	63	63.0

Table 2 summarizes the key findings across the three domains: knowledge, attitudes, and practices, along with the overall classification and self-reported oral conditions. The mean knowledge score was 6.1 ± 2.3 out of 12. Most participants correctly identified that dentures should be cleaned daily (71%) and that poor hygiene leads to oral infections (63%). However, lower awareness was observed for fungal infections (48%), sleeping with dentures increasing risk (44%), and denture stomatitis associated with poor hygiene (35%). Overall knowledge classification showed 38% poor, 47% fair, and 15% good.

The mean attitude score was 25.8 ± 4.5 out of 35. The majority demonstrated positive attitudes: 91% indicated a need for more education, 87% were willing to improve their practices, and 84% agreed that denture hygiene is essential. Additionally, 72% expressed concern about infections, 69% considered regular dental visits important, and 58% recognized systemic health implications. Overall, 57% showed good attitudes, 31% fair, and 12% poor. Practice was generally suboptimal. Only 29% cleaned their dentures at least twice daily, 24% removed dentures at night, 18% used denture cleansers, and 16% reported daily soaking. Regular dental visits were reported by only 21% of participants. Overall, 61% demonstrated poor practices, 27% fair, and 12% good.

Knowledge was mainly fair to poor (85% combined), attitudes were predominantly good (57%), and practices were largely poor (61%). The most frequent complaint was bad oral odor (46%), followed by redness beneath dentures (42%) and oral soreness (34%). Burning sensation was reported by 27%, white patches by 19%, while 23% reported no symptoms.

To identify factors associated with knowledge, attitude, and practice regarding denture hygiene among complete denture wearers, bivariate analyses were conducted examining sociodemographic characteristics, prior instruction, inter-domain relationships, and self-reported oral symptoms. The primary variable links are summarized below and presented in Table 3.

A significant inverse association was observed between age and both knowledge and practice scores. Participants in the youngest age group (40–49 years) achieved the highest mean knowledge score (7.0 ± 2.1), whereas those aged 70 years and older scored the lowest (5.3 ± 2.5), representing a statistically significant difference ($p = 0.01$). Similarly, practice scores demonstrated a declining trend with advancing age. The youngest group reported significantly better practices (3.2 ± 1.6) compared to the oldest group (2.1 ± 1.4 , $p = 0.02$). No significant association was found between age and attitude scores ($p = 0.21$). No statistically significant differences were observed between male and female participants across any of the three KAP domains. Knowledge scores were comparable between males (6.2 ± 2.3) and females (6.0 ± 2.4 , $p = 0.67$). Similarly, attitude scores showed no gender disparity (25.6 ± 4.6 vs. 26.1 ± 4.3 , $p = 0.48$), nor did practice scores (2.7 ± 1.6 vs. 2.9 ± 1.5 , $p = 0.41$).

Table 2. Summary of Knowledge, Attitude, Practice, and Self-Reported Conditions (N = 100)

Domain / Item	Result N (%)
Knowledge (mean score: 6.1 ± 2.3 / 12)	
Dentures should be cleaned daily	71 (71.0%)
Poor hygiene causes infections	63 (63.0%)
Regular dental visits prevent infection	57 (57.0%)
Ill-fitting dentures cause infections	54 (54.0%)
Plaque contains microorganisms	52 (52.0%)
Fungal infections under dentures	48 (48.0%)
Dentures should be removed daily	46 (46.0%)
Sleeping with dentures increases risk	44 (44.0%)
Denture cleansers reduce microbes	41 (41.0%)
Redness indicates disease	39 (39.0%)
Denture stomatitis related to hygiene	35 (35.0%)
Infection may occur without pain	33 (33.0%)
Knowledge classification	
Poor (<50%)	38 (38.0%)
Fair (50–74%)	47 (47.0%)
Good (≥75%)	15 (15.0%)
Attitude (mean score: 25.8 ± 4.5 / 35)	
Need more education	91 (91.0%)
Willing to improve practices	87 (87.0%)
Denture hygiene is essential	84 (84.0%)
Concerned about infections	72 (72.0%)
Regular dental visits important	69 (69.0%)
Remove dentures at night	61 (61.0%)
Oral infections affect general health	58 (58.0%)
Attitude classification	
Poor (<50%)	12 (12.0%)
Fair (50–74%)	31 (31.0%)
Good (≥75%)	57 (57.0%)
Practice	
Seek treatment when needed	41 (41.0%)
Clean oral tissues daily	32 (32.0%)
Clean dentures ≥2 times/day	29 (29.0%)
Remove dentures at night	24 (24.0%)
Regular dental visits	21 (21.0%)
Use denture cleanser	18 (18.0%)
Daily soaking in solution	16 (16.0%)
Practice classification	
Poor (<50%)	61 (61.0%)
Fair (50–74%)	27 (27.0%)
Good (≥75%)	12 (12.0%)
Self-reported oral conditions	
Bad odor	46 (46.0%)
Redness beneath denture	42 (42.0%)
Oral soreness	34 (34.0%)
Burning sensation	27 (27.0%)
White patches	19 (19.0%)
No symptoms	23 (23.0%)

*Note: All KAP scoring categories used predefined cut-offs: poor (<50%), fair (50–74%), and good (≥75%).

Education level demonstrated the strongest association with knowledge among all sociodemographic variables examined (F = 8.64, p < 0.001). A clear educational gradient was observed, with mean knowledge scores increasing progressively across education levels: no formal education (4.6 ± 2.4), primary (5.2 ± 2.2), secondary (6.3 ± 2.0), university (7.4 ± 2.1), and postgraduate (8.5 ± 1.9). Education was also significantly associated with practice scores (F = 4.21, p = 0.008). Participants with university or postgraduate education

demonstrated better practices (3.2 ± 1.5) compared to those with no formal education (2.1 ± 1.6). In contrast, attitude scores did not differ significantly by education level ($p = 0.34$). Receipt of prior professional denture hygiene instructions was significantly associated with higher knowledge scores. Participants who had received instructions scored markedly higher (7.4 ± 2.0) than those who had not (5.7 ± 2.4 , $p = 0.002$). Similarly, prior instruction was associated with significantly better practice scores (3.4 ± 1.5 vs. 2.5 ± 1.6 , $p = 0.01$). Attitude scores were marginally higher among those who received instructions (26.8 ± 4.1 vs. 25.2 ± 4.7); however, this difference did not reach statistical significance ($p = 0.09$).

Significant moderate positive correlations were observed between the three KAP domains (Figure 3). The strongest correlation was between knowledge and practice scores ($r = 0.48$, 95% CI: 0.31–0.62, $p < 0.001$), followed by attitude and practice scores ($r = 0.44$, 95% CI: 0.27–0.58, $p < 0.001$). A weaker but statistically significant correlation was found between knowledge and attitude scores ($r = 0.29$, 95% CI: 0.10–0.46, $p = 0.003$).

Using categorical classification (poor, fair, good), participants with good knowledge were 4.2 times more likely to have good or fair practices compared to those with poor knowledge (OR = 4.2, 95% CI: 1.9–9.3, $p < 0.001$). Similarly, participants with good attitudes were 5.1 times more likely to have good or fair practices (OR = 5.1, 95% CI: 2.3–11.2, $p < 0.001$). Notably, among participants with poor knowledge, 78% still demonstrated fair-to-good attitudes, indicating a receptive population for educational interventions despite knowledge deficits.

A clear dose response relationship was observed between practice level and symptom burden. The mean number of symptoms increased progressively across practice categories: good practice (1.1 ± 1.0), fair practice (1.8 ± 1.3), and poor practice (2.7 ± 1.5) (p for trend < 0.001 , one-way ANOVA). Participants with poor practices were nearly four times more likely to report any symptom compared to those with good or fair practices (OR = 3.8, 95% CI: 1.5–9.6, $p = 0.004$). Regarding specific symptom associations (Table 3), redness beneath the denture (42% prevalence) was significantly associated with not removing dentures at night (OR = 3.2, 95% CI: 1.6–6.4, $p = 0.001$), poor knowledge ($\chi^2 = 6.8$, $p = 0.009$), and poor practice ($\chi^2 = 9.4$, $p = 0.002$). Bad oral odor (46%) was associated with cleaning dentures less than twice daily (OR = 2.9, 95% CI: 1.4–6.0, $p = 0.003$) and not using a denture cleanser ($\chi^2 = 5.2$, $p = 0.02$). Oral soreness (34%) was associated with sleeping with dentures (OR = 2.5, 95% CI: 1.2–5.2, $p = 0.01$) and no regular dental visits ($\chi^2 = 4.8$, $p = 0.03$). White patches (19%) were associated with poor knowledge ($\chi^2 = 7.1$, $p = 0.008$) and poor practice ($\chi^2 = 6.3$, $p = 0.01$). Burning sensation (27%) was associated with no daily oral tissue cleaning ($\chi^2 = 4.1$, $p = 0.04$). Regarding attitudes, attitude scores did not differ significantly between participants with and without most symptoms, with the sole exception of redness, where affected participants had slightly but significantly lower attitude scores compared to those without redness (24.9 ± 4.6 vs. 26.4 ± 4.3 , $p = 0.04$).

Table 3. Associations Between Study Variables and KAP Domains (N = 100)

Variable	Comparison	Knowledge	Attitude	Practice
Age	40–49 vs. ≥ 70 years	$p = 0.01^*$	$p = 0.21$	$p = 0.02^*$
Gender	Male vs. Female	$p = 0.67$	$p = 0.48$	$p = 0.41$
Education	Postgraduate vs. No formal	$p < 0.001^*$	$p = 0.34$	$p = 0.008^*$
Prior instructions	Yes vs. No	$p = 0.002^*$	$p = 0.09$	$p = 0.01^*$
Knowledge score	Continuous	—	$r = 0.29$	$r = 0.48$
Attitude score	Continuous	$r = 0.29$	—	$r = 0.44$
Practice score	Continuous	$r = 0.48$	$r = 0.44$	—
Redness	Yes vs. No	OR = 2.4	$p = 0.04^*$	OR = 2.9
Bad odor	Yes vs. No	$p = 0.12$	$p = 0.23$	OR = 2.9
Oral soreness	Yes vs. No	$p = 0.08$	$p = 0.17$	OR = 2.5
White patches	Yes vs. No	OR = 3.1	$p = 0.31$	OR = 2.8
Burning sensation	Yes vs. No	$p = 0.21$	$p = 0.42$	OR = 2.0
Any symptom	Yes vs. No	$p = 0.06$	$p = 0.11$	OR = 3.8
Number of symptoms	Continuous	$r = -0.35$	$r = -0.19$	$r = -0.52$

*Notes: * $p < 0.05$; OR = odds ratio; r = Pearson correlation coefficient; p -values from t -test, ANOVA, chi-square, or Pearson correlation as appropriate.

Discussion

The present study assessed the knowledge, attitudes, and practices regarding denture hygiene and denture-related oral infections among 100 complete denture wearers in Misurata, Libya. The findings demonstrate a clear imbalance between knowledge, attitudes, and practices, with moderate-to-low knowledge (mean 51% correct), generally positive attitudes (74% of maximum score), but poor oral hygiene practices (61% classified

as poor). This pattern is consistent with several international studies that have reported a persistent gap between awareness and actual behavioral implementation among denture wearers, particularly in developing settings [1, 2].

The sociodemographic profile of the participants showed that most were older adults, with the highest proportion in the 60–69-year age group (34%). This is consistent with global epidemiological trends indicating that complete edentulism and denture use are more prevalent in older populations [12]. The predominance of male participants (58%) in this study is similar to findings reported in some regional studies, although gender distribution in denture wearers varies across populations depending on access to dental care and cultural factors. A notable finding was that 63% of participants had not received any professional instructions regarding denture hygiene, which reflects a significant gap in patient education. Similar observations were reported by *Al-Dwairi and Al-Omari* (2017) [13], who emphasized that lack of professional guidance is strongly associated with inadequate denture maintenance behaviors.

The overall knowledge level in this study was moderate to low, with a mean score of 6.1 out of 12. While a majority of participants recognized basic concepts such as the need for daily denture cleaning (71%) and the role of poor hygiene in causing oral infections (63%), awareness of more specific clinical issues such as denture stomatitis and asymptomatic fungal infections was considerably lower. Only 35% of participants associated denture stomatitis with poor hygiene, which aligns with findings from *Gheorghe et al.* (2025) [14], who reported limited patient awareness regarding *Candida*-related denture infections. Similarly, *Dorkhan et al.* (2020) [15] highlighted that many denture wearers are unaware of fungal colonization and its clinical consequences, which contributes to delayed diagnosis and disease progression.

Despite the relatively low knowledge levels, participants demonstrated generally positive attitudes toward denture hygiene and oral health maintenance. A large proportion expressed willingness to improve their hygiene practices (87%) and requested additional education (91%). This finding corroborates *Kosuru et al.* (2017) [16], who reported that denture wearers often possess favorable perceptions regarding oral hygiene even when their knowledge and practices are inadequate. Similarly, *Suresan et al.* (2016) [17] noted that positive attitudes alone are insufficient to ensure good oral health outcomes unless reinforced by continuous professional education and behavioral support. The high level of willingness to receive further education observed in this study represents an important opportunity for implementing targeted health promotion programs in dental clinics.

In contrast to attitudes, denture hygiene practices were markedly poor. Only 29% of participants reported cleaning their dentures at least twice daily, and a small proportion (18%) used denture cleansing agents. Furthermore, only 24% removed their dentures at night, which is considered an essential preventive measure against denture stomatitis. These findings are in agreement with *Azad et al.* (2018) [18], who reported poor denture hygiene practices among elderly populations and identified inadequate cleaning frequency and overnight denture wear as major risk factors for oral mucosal lesions. *Bradić-Vasić et al.* (2025) [19] also emphasized that continuous denture wearing significantly increases biofilm accumulation and predisposes patients to inflammatory lesions. The low utilization of denture cleansers observed in this study aligns with *Takeuchi et al.* (2025) [20], who highlighted that chemical cleaning methods remain underutilized despite their proven efficacy in controlling denture biofilm.

The self-reported oral conditions further support the presence of denture-related mucosal changes among participants. The most frequently reported symptom was bad oral odor (46%), followed by redness beneath dentures (42%) and oral soreness (34%). These findings are comparable to those reported by *Perić et al.* (2024) [21], who identified denture stomatitis as a highly prevalent condition among denture wearers globally. The presence of redness and discomfort suggests possible undiagnosed denture stomatitis in a significant proportion of participants. *Gurgan et al.* (2021) [22] also demonstrated a strong association between denture biofilm accumulation and clinical signs such as mucosal inflammation and halitosis, supporting the findings of the present study.

The associations observed in this study are consistent with findings from previous investigations. A significant inverse relationship was found between age and both knowledge and practice scores. Participants aged 40–49 years achieved the highest knowledge scores (7.0 ± 2.1), while those aged ≥ 70 years scored the lowest (5.3 ± 2.5 , $p = 0.01$). Similarly, practice scores declined with advancing age (3.2 ± 1.6 vs. 2.1 ± 1.4 , $p = 0.02$). These findings align with *Jaiswal et al.* (2019) [25] and *Dikbas et al.* (2020) [26], who reported declining denture hygiene behaviors with advancing age due to factors such as reduced manual dexterity, cognitive decline, and less exposure to modern preventive dental education.

No statistically significant gender differences were observed across any KAP domain. Knowledge scores were comparable between males (6.2 ± 2.3) and females (6.0 ± 2.4 , $p = 0.67$), as were attitude scores (25.6 ± 4.6 vs. 26.1 ± 4.3 , $p = 0.48$) and practice scores (2.7 ± 1.6 vs. 2.9 ± 1.5 , $p = 0.41$). This absence of gender

differences mirrors *Khasawneh et al.* (2020) [28] but contrasts with *Al-Ansari et al.* (2018) [27], suggesting that cultural and social factors may modulate gender-related patterns in denture hygiene behaviors.

Education level demonstrated the strongest association with knowledge among all sociodemographic variables examined ($F = 8.64$, $p < 0.001$). A clear educational gradient was observed, with mean knowledge scores increasing progressively from no formal education (4.6 ± 2.4) to postgraduate level (8.5 ± 1.9). This finding is consistent with *Gheorghe et al.* (2025) [14] and *Dorkhan et al.* (2020) [15], both of whom identified education as a primary predictor of oral health literacy among denture wearers. Education was also significantly associated with practice scores ($F = 4.21$, $p = 0.008$). Participants with university or postgraduate education demonstrated better practices (3.2 ± 1.5) compared to those with no formal education (2.1 ± 1.6).

Receipt of prior professional denture hygiene instructions was significantly associated with higher knowledge scores (7.4 ± 2.0 vs. 5.7 ± 2.4 , $p = 0.002$) and better practice scores (3.4 ± 1.5 vs. 2.5 ± 1.6 , $p = 0.01$). These findings align with *Al-Dwairi and Al-Omari* (2017) [13] and *Takeuchi et al.* (2025) [20], who emphasized that structured patient education is one of the most effective modifiable factors for improving denture hygiene outcomes. Attitude scores were marginally higher among those who received instructions (26.8 ± 4.1 vs. 25.2 ± 4.7 , $p = 0.09$), suggesting that attitudes may require repeated, long-term reinforcement rather than single educational encounters.

Significant moderate positive correlations were observed between the three KAP domains. The strongest correlation was between knowledge and practice scores ($r = 0.48$, $p < 0.001$), followed by attitude and practice scores ($r = 0.44$, $p < 0.001$). These values are comparable to pooled estimates reported by *McReynolds et al.* (2023) [2]. Using categorical classification, participants with good knowledge were 4.2 times more likely to have good or fair practices compared to those with poor knowledge (OR = 4.2, 95% CI: 1.9–9.3, $p < 0.001$). Similarly, participants with good attitudes were 5.1 times more likely to have good or fair practices (OR = 5.1, 95% CI: 2.3–11.2, $p < 0.001$). Notably, among participants with poor knowledge, 78% still demonstrated fair-to-good attitudes, which exceeds the 52% reported by *Azad et al.* (2018) [18], suggesting that this population may be particularly receptive to educational interventions despite knowledge deficits.

A clear dose–response relationship was observed between practice level and symptom burden. The mean number of symptoms increased progressively across practice categories: good practice (1.1 ± 1.0), fair practice (1.8 ± 1.3), and poor practice (2.7 ± 1.5) (p for trend < 0.001). Participants with poor practices were nearly four times more likely to report any symptom compared to those with good or fair practices (OR = 3.8, 95% CI: 1.5–9.6, $p = 0.004$). This finding strongly corroborates *Gurgan et al.* (2021) [22] and *Perić et al.* (2024) [21]. Regarding specific symptom associations, redness beneath the denture was associated with not removing dentures at night (OR = 3.2), bad oral odor with cleaning dentures less than twice daily (OR = 2.9), and oral soreness with sleeping with dentures (OR = 2.5). These specific associations are consistent with the mechanistic model proposed by *Dorkhan et al.* (2020) [15], who demonstrated that overnight denture wear promotes *Candida albicans* biofilm formation, leading to mucosal inflammation, soreness, and halitosis.

Conclusion

In conclusion, complete denture wearers in Misurata, Libya, demonstrate moderate knowledge, strong positive attitudes, and poor practices. Younger age and higher education were associated with better outcomes, while gender showed no influence. Dental professionals should prioritize structured, repeated education targeting five modifiable behaviors: nightly removal, twice-daily cleaning, chemical cleanser use, regular dental visits, and daily oral tissue cleaning, with special attention to older adults and those with limited formal education.

Conflict of interest. Nil

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