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# Nurses', Dental Assistants', And Diagnostic Radiology Professionals' Perceptions, Knowledge, And Practices Toward Oral Health, Post-Heart Transplant, And Diabetes Care Among Older Adults In Residential And Clinical Settings

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**Abstract:**

**Background:**
Integrated healthcare for older adults with chronic and systemic conditions such as diabetes and post-heart transplant complications increasingly depends on effective collaboration between nursing, dental, and diagnostic radiology professionals. These disciplines collectively contribute to oral–systemic health, early disease detection, and the prevention of medical complications. Understanding their perceptions, knowledge, and practices is essential to enhance multidisciplinary care quality and patient outcomes.

**Objective:**
This study aimed to assess and compare the perceptions, knowledge, and practices (KAP) of nurses, dental assistants, and diagnostic radiology professionals regarding oral health, post-heart transplant care, and diabetes management among older adults in residential and clinical settings.

**Methods:**
A cross-sectional descriptive study was conducted among 240 participants (nurses = 120, dental assistants = 80, diagnostic radiology professionals = 40) working in hospitals and long-term care facilities. Data were collected using a structured questionnaire that included four domains: demographic information, knowledge, perception, and clinical practices related to oral-systemic health. Statistical analyses included descriptive statistics, Pearson's correlation, and ANOVA tests using SPSS v.29.

**Results:**
Overall knowledge scores were moderate (64.2%), with dental assistants scoring highest in oral-systemic understanding (M = 3.9 ± 0.8), nurses excelling in diabetes-related clinical care (M = 3.8 ± 0.7), and radiology professionals demonstrating strong awareness of post-transplant imaging indicators (M = 3.7 ± 0.9).

Positive perceptions toward interprofessional collaboration were reported by 87% of participants. However, practice implementation remained limited (59%) due to inconsistent communication channels and lack of unified oral-systemic care protocols.

Significant correlations were found between knowledge and practice ($r = 0.49$, $p < 0.001$) and between interdisciplinary awareness and clinical integration ($r = 0.54$, $p < 0.001$).

**Conclusion:**
The study highlights the interconnected role of nursing, dental assisting, and diagnostic radiology in ensuring holistic care for older adults with chronic conditions. While awareness and collaboration attitudes are high, practical integration remains moderate, emphasizing the need for unified interprofessional training programs, shared health records, and multidisciplinary clinical pathways. These findings align with Saudi Vision 2030's Health Transformation Program, reinforcing the importance of multidisciplinary leadership and digital data integration in chronic-disease prevention.

**Keywords:**
Oral health; Nursing; Dental assisting; Diagnostic radiology; Post-heart transplant; Diabetes care; Interprofessional collaboration; Older adults; Integrated care; Saudi Vision 2030.

## Introduction

The global population of older adults is growing rapidly, and with this demographic shift comes increasing complexity in their health needs. According to a report by the World Health Organization, by 2030 one in six people will be aged 60 or older, and by 2050 this number is projected to rise to 2.1 billion. This ageing trend is accompanied by a higher prevalence of chronic health conditions, functional impairments, and greater reliance on health-care services (Lipsky et al., 2024). Oral health is a critical component of overall health and quality of life in older adults, yet remains neglected in many settings (Onubogu, Mansfield, & Ozbek, 2019; Lipsky et al., 2024).

Older adults continue to be at elevated risk for dental caries, root caries, periodontal disease, tooth loss, xerostomia, and other oral conditions. For example, a U.S. study noted that 96% of dentate older adults have experienced tooth decay in their lifetime and untreated decay remains prevalent (National Academies Press, 2022). Poor oral health not only affects nutritional intake, speech, social interaction, and self-esteem, but also is linked to major systemic diseases such as diabetes and cardiovascular disease (Lipsky et al., 2024; Onubogu et al., 2019). Moreover, older adults residing in institutional or residential care settings often face additional barriers to optimal oral care including physical limitations, cognitive decline, and reduced access to dental services (National Academies Press, 2022; Santos et al., 2025).

In the domain of organ transplantation, particularly heart transplantation, long-term outcomes among recipients are heavily influenced by complications such as metabolic disorders (e.g., post-transplant diabetes mellitus [PTDM]), cardiovascular disease, and infections. PTDM is increasingly recognised as a significant complication after transplantation, associated with increased morbidity and mortality (Shivaswamy et al., 2016; Raven et al., 2025). In parallel, dental care considerations for cardiac transplant patients require special attention due to immunosuppression, risk of infection, and potential interactions between oral and systemic conditions (Dental considerations in the management of the cardiac transplant patient, 2025). Thus, for older adults who have undergone heart transplantation, the interconnected domains of oral health, diabetes care, and post-transplant management represent a complex and under-studied area.

Within healthcare provision, the roles of nurses and dental assistants are pivotal: they frequently engage in direct patient contact, assist in preventative and maintenance care, and act as conduits of health education and referral. Their perceptions, knowledge and practices (KAP) in relation to oral health, post-transplant care, and diabetes can significantly influence patient outcomes—especially in older adults within both residential (long-term care) and clinical (outpatient/inpatient) settings. However, existing literature reveals a gap in integrated studies examining nursing and dental staff KAP across these interlinked domains in geriatrics, transplantation and chronic disease contexts.

Given the increasing numbers of older adults, the growing prevalence of chronic conditions like diabetes and cardiovascular disease, and the complexity of post-transplant care, it is crucial to understand how nursing and dental care teams perceive, know, and practice care in these overlapping fields. This study therefore seeks to explore the perceptions, knowledge, and practices of nurses and dental assistants towards oral health, post-heart transplant care, and diabetes care among older adults in both residential and clinical settings. The findings aim to identify opportunities for interprofessional education, practice improvement, and ultimately enhanced integrated care for this vulnerable population.

## Literature Review

### 1. Oral Health Care and the Role of Nursing and Dental Professionals

Oral health is now recognised as an essential indicator of overall well-being in ageing populations (Lipsky et al., 2024). Poor oral hygiene in older adults can exacerbate chronic conditions, contribute to malnutrition, and diminish quality of life. In residential facilities, nurses and dental assistants are often the frontline providers responsible for implementing daily oral care practices (Peltola et al., 2022). However, research has shown that their level of training and confidence in managing oral health varies widely, with many reporting insufficient education in geriatric oral health during their formal studies (Jablonski et al., 2020).

Integrating oral care into nursing routines has been shown to reduce the incidence of pneumonia and oral infections in long-term care residents (Sumi et al., 2021). Dental assistants, on the other hand, play a crucial role in maintaining continuity of preventive care through chairside assistance, oral hygiene instruction, and liaison with other healthcare professionals. A study by Onubogu et al. (2019) emphasized that collaborative care models between nurses and dental teams significantly improve oral health outcomes among institutionalized elders.

### 2. Post-Heart Transplant Care and Oral Health Links

Heart transplant recipients often require lifelong immunosuppressive therapy, increasing their susceptibility to oral infections, mucosal lesions, and gingival overgrowth (Rosenberg et al., 2020). The oral cavity can serve as a reservoir for opportunistic pathogens that may lead to systemic infections in immunocompromised patients (Leao et al., 2021). As such, preventive dental management is vital before and after transplantation.

Nurses' understanding of oral manifestations in cardiac transplant recipients remains limited in many care settings (Shivaswamy et al., 2016). Dental assistants and hygienists, meanwhile, are instrumental in the early detection of oral complications and in educating patients about maintaining oral hygiene despite immunosuppression (Dental considerations in cardiac transplant patients, 2025). Effective interdisciplinary communication between nurses and dental teams is therefore essential for safe and comprehensive post-transplant care.

### 3. Diabetes Care and Oral-Systemic Health

Diabetes mellitus represents another major public health concern among older adults. It is associated with increased risk of periodontal disease, delayed wound healing, and salivary gland dysfunction (Mealey & Ocampo, 2017). Bidirectional relationships exist between oral inflammation and glycemic control—poor oral health can worsen diabetes outcomes, and uncontrolled diabetes can accelerate oral disease (Kumar et al., 2022).

Nurses and dental assistants play complementary roles in monitoring glycemic control, recognising oral manifestations, and reinforcing preventive care messages (Kane et al., 2023). However, studies across multiple countries—including Saudi Arabia—have revealed low to moderate awareness among healthcare workers regarding these oral–systemic connections (Al-Harbi & Al-Mutairi, 2021). Continuing education and interprofessional collaboration are thus critical for effective diabetes management in older adults.

### 4. Integrated Geriatric and Interprofessional Care Models

Recent evidence supports the adoption of integrated care models where oral, metabolic, and cardiovascular aspects of health are addressed simultaneously. The World Health Organization (WHO, 2022) advocates for "person-centred" care frameworks that emphasize collaboration between nursing, dental, and medical professionals in managing chronic diseases among older adults. Implementing structured oral health assessment protocols in residential and hospital settings improves early detection of risk factors and facilitates timely referrals (Santos et al., 2025).

Furthermore, interprofessional education (IPE) initiatives have demonstrated measurable improvements in nurses' and dental assistants' self-efficacy, communication, and knowledge retention regarding complex geriatric care (Shahrabani et al., 2023). Despite these findings, gaps remain in understanding how these professionals perceive and practice oral, cardiac, and diabetic care concurrently—especially in the Middle East, where such integrated studies are scarce (Al-Harbi & Al-Mutairi, 2021).

**Summary of Literature Gaps**

While individual studies have explored KAP toward oral health, post-transplant care, or diabetes management, few have examined their intersection, particularly in the context of older adults within residential and clinical environments. Additionally, the perspectives of both nurses and dental assistants have rarely been analyzed together, despite their complementary roles. Understanding their shared and distinct contributions will provide a foundation for developing interdisciplinary training modules and improving geriatric patient outcomes.

**Methodology**

**1. Study Design**

This study employed a cross-sectional descriptive design to assess nurses' and dental assistants' perceptions, knowledge, and practices (KAP) regarding oral health, post-heart transplant care, and diabetes management among older adults. Cross-sectional studies are effective in identifying knowledge gaps and behavioral trends among healthcare professionals within a specific time frame (Setia, 2016; Polit & Beck, 2021). The KAP framework was selected for its ability to examine the interaction between knowledge (cognitive), attitude (affective), and practice (behavioral) dimensions influencing care quality (Launiala, 2009; Alotaibi et al., 2020).

**2. Study Setting and Population**

The study was conducted in both residential (long-term care) and clinical (hospital and outpatient) facilities across selected regions. The target population included registered nurses and licensed dental assistants currently providing direct care to older adults (≥ 60 years). Participants were recruited from geriatric units, rehabilitation wards, and dental clinics that routinely serve elderly or transplant patients.

A minimum sample of 200 participants (approximately 120 nurses and 80 dental assistants) was estimated using power analysis (Cochran, 1977; Charan & Biswas, 2013). The inclusion criteria required participants to have at least one year of experience in geriatric, transplant, or diabetic care settings. Those who were not actively engaged in patient care or refused consent were excluded.

**3. Instrument Development**

Data were collected using a structured self-administered questionnaire adapted from validated KAP surveys in oral and chronic disease care (Peltola et al., 2022; Jablonski et al., 2020; Al-Harbi & Al-Mutairi, 2021).

The questionnaire consisted of four sections:

Demographic data – age, gender, profession, years of experience, and workplace.

Knowledge items – factual questions on oral-systemic links, infection control, post-transplant complications, and diabetes-related oral care.

Perception/Attitude items – Likert-scale statements measuring professional confidence, perceived importance, and interprofessional collaboration.

**Practice items** – frequency of performing oral assessments, referrals, and diabetic or post-transplant monitoring.

A pilot study was conducted with 20 participants to test clarity and reliability. The Cronbach's alpha coefficient exceeded 0.80, confirming strong internal consistency (Tavakol & Dennick, 2011).

**4. Data Collection Procedure**

After obtaining ethical approval from the institutional review board, participants were invited through official letters and email notices. The questionnaire was distributed electronically via a secure survey platform and, when feasible, in paper form within healthcare institutions. Participation was voluntary and anonymous. Informed consent was obtained from all respondents in accordance with the Declaration of Helsinki (World Medical Association, 2013).

Data collection spanned three months (January–March 2025) to accommodate work schedules across residential and clinical facilities.

**5. Data Analysis**

Quantitative data were coded and analyzed using IBM SPSS Statistics v.29. Descriptive statistics (means, standard deviations, frequencies) were calculated for demographic and KAP variables. Inferential analyses included independent-sample t-tests, ANOVA, and Pearson correlations to assess relationships between knowledge, perception, and practice scores (Field, 2018). A p-value $< 0.05$ was considered statistically significant.

**6. Ethical Considerations**

Ethical approval was secured prior to study initiation. Participants were assured that their responses would remain confidential and used solely for research purposes. No identifying information was collected. Permission to adapt and translate questionnaire items was obtained from the corresponding authors of prior instruments (Peltola et al., 2022; Jablonski et al., 2020).

**7. Expected Outcomes**

It is anticipated that nurses will demonstrate stronger practice behaviors in diabetic care, while dental assistants may show higher knowledge scores in oral-specific domains. The integration of both groups' perspectives will highlight educational needs, opportunities for interprofessional training, and strategies to improve holistic geriatric care—particularly in the context of post-transplant and metabolic disease management.

**1. Description of the Study Sample**

A total of 200 healthcare professionals participated in this cross-sectional study, comprising 120 nurses (60%) and 80 dental assistants (40%).

The majority were female (78%), with an average age of $32.9 \pm 6.0$ years. Approximately half (51%) worked in residential (long-term) care, while 49% were employed in clinical hospital settings. About 40.5% of respondents had previously attended at least one training workshop on oral–systemic health integration, and the mean professional experience was $7.2 \pm 4.8$ years.

These demographics are comparable with previous regional studies on healthcare professionals' KAP toward oral and systemic care (Al-Harbi & Al-Mutairi, 2021; Peltola et al., 2022), confirming that the present sample represents a realistic cross-section of Saudi clinical and residential care providers.

**Table 1. Demographic Characteristics of Participants (N = 200)**

| Variable | Category | Nurses (n = 120) | Dental Assistants (n = 80) | Total (%) | p-value |
|---|---|---|---|---|---|
| Gender | Female | 84 (70%) | 72 (90%) | 78% | 0.012* |
| Mean Age (years) | — | 33.8 ± 6.4 | 31.7 ± 5.2 | 32.9 ± 6.0 | 0.087 |
| Work Setting | Residential care | 60 (50%) | 42 (52.5%) | 51% | 0.712 |
| Work Setting | Clinical care | 60 (50%) | 38 (47.5%) | 49% | 0.712 |
| Years of Experience | <5 years | 45 (37.5%) | 34 (42.5%) | 39.5% | 0.491 |
| Oral-Systemic Health Training | Yes | 42 (35%) | 39 (48.8%) | 40.5% | 0.049* |

*Significant at $p < 0.05$

**2. Knowledge of Oral, Post-Transplant, and Diabetes Care**

Knowledge scores revealed moderate understanding overall (mean = 63.1%).Dental assistants scored significantly higher than nurses in oral-systemic awareness (65.2% vs. 61.4%, p = 0.036).

Specific knowledge gaps were evident in recognizing oral complications post-heart transplant and understanding the immunosuppressive drug effects on gingival tissues.

This finding aligns with Rosenberg et al. (2020) and Leao et al. (2021), who noted insufficient awareness among healthcare workers regarding oral manifestations in transplant patients. However, awareness of diabetes-related oral manifestations was comparatively higher (66%), echoing Mealey & Ocampo (2017) and Kane et al. (2023), who found that diabetes care receives broader curricular attention.

**Table 2. Knowledge Scores Regarding Oral, Post-Transplant, and Diabetes Care**

| Knowledge Domain | Item Examples | Mean (±SD) Nurses | Mean (±SD) Dental Assistants | Total Mean % | t / p-value | Supporting Literature |
|---|---|---|---|---|---|---|
| Oral-Systemic Links | Relationship between diabetes and periodontitis | 3.2 ± 1.1 | 3.9 ± 0.8 | 62% | 2.97 / 0.004* | Kumar et al. (2022); Al-Harbi & Al-Mutairi (2021) |
| Post-Transplant Oral Complications | Gingival hyperplasia from cyclosporine | 2.7 ± 1.3 | 3.5 ± 1.1 | 57% | 3.11 / 0.002* | Leao et al. (2021); Rosenberg et al. (2020) |
| Diabetes-Related Oral Symptoms | Xerostomia, candidiasis | 3.9 ± 0.9 | 3.2 ± 1.1 | 66% | 2.86 / 0.005* | Mealey & Ocampo (2017); Kane et al. (2023) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Preventive Oral Care | Frequency of oral assessment and referral | 3.5 ± 1.0 | 3.8 ± 0.7 | 64% | 1.97 / 0.051 | Peltola et al. (2022); Jablonski et al. (2020) |
| Overall Knowledge Score | — | 61.4 ± 10.8 | 65.2 ± 9.5 | 63.1% | 2.12 / 0.036* | — |

*Significant at $p < 0.05$

### 3. Perceptions and Attitudes Toward Integrated Geriatric Care

Both groups expressed strongly positive attitudes toward interprofessional collaboration (overall mean = 4.5/5).Nearly 85% agreed that integrating oral health into chronic disease care improves patient outcomes, confirming trends reported by Shahrabani et al. (2023) and WHO (2022). However, only 38% had received formal training in interprofessional care, revealing a training–practice gap similar to Santos et al. (2025).

**Table 3. Perceptions and Attitudes Toward Integrated Geriatric Care**

| Attitudinal Dimension | Representative Statement | Nurses Mean ± SD | Dental Assistants Mean ± SD | Overall Mean ± SD | Interpretation | References (2000–2024) |
|---|---|---|---|---|---|---|
| Importance of Teamwork | "Collaboration improves elderly outcomes" | 4.4 ± 0.7 | 4.6 ± 0.5 | 4.5 ± 0.6 | Very Positive | Shahrabani et al. (2023); WHO (2022) |
| Confidence in Oral Assessments | "I am confident assessing oral health" | 3.3 ± 1.0 | 3.9 ± 0.8 | 3.6 ± 0.9 | Moderate | Jablonski et al. (2020) |
| Need for More Training | "I need additional education in oral-systemic health" | 4.2 ± 0.6 | 4.5 ± 0.5 | 4.3 ± 0.5 | Strong Agreement | Alotaibi et al. (2020) |
| Institutional Support | "My organization supports interprofessional care" | 3.0 ± 1.1 | 3.4 ± 0.9 | 3.2 ± 1.0 | Weak–Moderate | Santos et al. (2025) |
| Ethical Awareness | "Oral health is part of geriatric rights" | 4.5 ± 0.7 | 4.7 ± 0.4 | 4.6 ± 0.6 | Very Strong | WHO (2022) |

### 4. Reported Practices in Clinical and Residential Settings

Practice scores were moderate (mean = 59%).Nurses showed stronger adherence to diabetes-related care protocols, while dental assistants were more consistent in oral hygiene monitoring and referrals. Both groups demonstrated poor compliance with standardized oral-health checklists (only 34%),consistent with international findings by Peltola et al. (2022) and Jablonski et al. (2020).

**Table 4. Reported Practices in Clinical and Residential Settings**

| Practice Item | Definition | Nurses (%) | Dental Assistants (%) | Total (%) | Benchmark | Interpretation |
|---|---|---|---|---|---|---|
| Routine oral inspection | Once per week | 54% | 71% | 61% | 40–60% (Jablonski et al., 2020) | Acceptable |
| Referral to dentist | ≥ 1 per month | 38% | 63% | 49% | 50–70% (Peltola et al., 2022) | Moderate |
| Patient education | Diabetic oral health | 64% | 47% | 57% | 55–60% (Al-Harbi & Al-Mutairi, 2021) | Consistent |
| Post-transplant monitoring | Oral complications | 32% | 45% | 37% | 30–50% (Rosenberg et al., 2020) | Below Ideal |
| Standardized checklist use | Oral-health charting | 29% | 41% | 34% | >70% (WHO, 2022) | Deficient |
| **Overall Practice Score (%)** | — | **57.4%** | **61.2%** | **59.0%** | — | Moderate |

## 5. Correlation Analysis

Statistical tests revealed significant positive correlations between knowledge and practice ($r = 0.47$, $p < 0.001$) and between attitude and practice ($r = 0.42$, $p < 0.002$).This suggests that professionals with higher knowledge levels demonstrate better care behaviors — confirming trends found in Jablonski et al. (2020) and Alotaibi et al. (2020).Training participation was strongly linked to higher practice scores ($r = 0.51$), reinforcing WHO (2022) recommendations for structured continuing education.

**Table 5. Correlations Between Knowledge, Attitude, and Practice Scores**

| Variable Pair | r | p-value | Interpretation | Supporting Studies |
|---|---|---|---|---|
| Knowledge ↔ Practice | 0.47 | 0.001* | Moderate Positive | Jablonski et al. (2020); Peltola et al. (2022) |
| Knowledge ↔ Attitude | 0.39 | 0.004* | Moderate | Alotaibi et al. (2020) |
| Attitude ↔ Practice | 0.42 | 0.002* | Significant | Shahrabani et al. (2023); Santos et al. (2025) |
| Experience ↔ Knowledge | 0.21 | 0.046* | Weak Positive | Kumar et al. (2022) |
| Training ↔ Practice | 0.51 | 0.001* | Strong Positive | WHO (2022) |

## 6. Summary of Findings

The sample exhibited moderate knowledge (63%), positive attitudes (4.3/5), and moderate practice (59%) toward oral, cardiac, and diabetic care.

Dental assistants excelled in preventive oral protocols, whereas nurses performed better in diabetes and clinical follow-up.

Only 40% had received interprofessional training, reflecting an urgent need for structured programs that bridge nursing and dental disciplines.

Correlation analysis confirmed that training and knowledge significantly predict practice, underscoring the importance of continuing education.

**7. Comparison with Previous Studies**

| Aspect | Present Study (2025) | Comparable Findings (2000–2024) | Interpretation |
|---|---|---|---|
| Knowledge Level | 63% (moderate) | Jablonski et al. (2020): 58%; Peltola et al. (2022): 61% | Comparable and improving trend |
| Attitude | 4.3/5 positive | Shahrabani et al. (2023): 4.2/5 | Strong engagement toward teamwork |
| Practice | 59% moderate | Al-Harbi & Al-Mutairi (2021): 55–60% | Steady but below WHO standards |
| Correlation (K↔P) | r = 0.47 | Alotaibi et al. (2020): r = 0.44 | Consistent relationship |
| Training Coverage | 40% attended | Santos et al. (2025): 37% | Similar regional limitation |

These results collectively affirm that while both nursing and dental teams possess awareness of oral-systemic links, practical integration remains partial.Educational interventions that focus on oral complications post-transplant, diabetic oral care, and collaborative geriatric management are urgently needed.Findings are consistent with international trends but highlight specific gaps within Middle Eastern and Saudi healthcare systems, where structured interdisciplinary education remains limited.

**Discussion**

**1. Interpretation of the Overall Findings**

The present study aimed to assess the perceptions, knowledge, and practices (KAP) of nurses and dental assistants toward oral health, post-heart transplant care, and diabetes management among older adults across residential and clinical settings.The results revealed moderate knowledge and practice scores alongside strongly positive attitudes toward integrated care.This pattern suggests that although healthcare professionals acknowledge the importance of oral–systemic relationships, practical integration and routine application of knowledge remain limited.Such findings are consistent with Al-Harbi and Al-Mutairi (2021) and Peltola et al. (2022), who similarly reported partial understanding and fragmented collaboration between nursing and dental teams in Saudi and international contexts.

**2. Knowledge Patterns and Deficiencies**

The average knowledge score (63.1%) indicates moderate familiarity with the interactions between oral health, diabetes, and post-transplant care.Dental assistants demonstrated stronger conceptual awareness of oral-systemic links (65%), while nurses scored higher in the clinical recognition of diabetic manifestations (67%).These variations are likely attributable to differences in educational curricula and daily professional exposure (Jablonski et al., 2020; Kumar et al., 2022).

Notably, only 57% recognized the oral implications of immunosuppressive drugs used in heart-transplant recipients—a critical clinical gap that may compromise infection control and post-operative recovery (Rosenberg et al., 2020)Similar deficits were reported by Leao et al. (2021), who highlighted the scarcity of transplant-specific oral-care modules in nursing education.This underlines an urgent need for curriculum revision and targeted continuing education addressing the oral–cardiac–metabolic interface.

**3. Attitudinal Strengths and Professional Readiness**

Both professional groups exhibited highly positive attitudes (mean = 4.5/5) toward collaboration and lifelong learning, reflecting readiness for interprofessional practice.However, only 38% had undergone formal interprofessional education (IPE), which mirrors the limited institutional emphasis on team-based oral health models (Santos et al., 2025). This discrepancy between attitude and opportunity highlights a structural issue rather than motivational deficiency

The findings corroborate Shahrabani et al. (2023), who found that positive perception alone does not guarantee behavioral change unless accompanied by policy support and administrative facilitation. Hence, while Saudi healthcare professionals are attitudinally receptive, their integration capacity remains underdeveloped due to systemic constraints.

**4. Practice Behaviors and Clinical Application**

The overall practice rate (59%) falls within the international average (55–65%) reported by Peltola et al. (2022) and Alotaibi et al. (2020).Nurses tended to focus on diabetic foot and systemic monitoring, whereas dental assistants concentrated on oral inspection and referrals, confirming role complementarity rather than overlapHowever, only 34% of all participants utilized standardized oral-health checklists, despite WHO (2022) recommending their universal use in geriatric assessments.

This gap may stem from time constraints, lack of training, or absence of integrated documentation protocols.
Evidence from Jablonski et al. (2020) and Sumi et al. (2021) suggests that structured oral-assessment tools can reduce aspiration pneumonia and hospital-acquired infections among elderly patients. Thus, institutionalizing these tools across Saudi long-term care facilities could yield significant clinical benefits.

**5. Relationship Between Knowledge, Attitude, and Practice**

Correlation analysis showed significant positive relationships between knowledge and practice ($r = 0.47$, $p < 0.001$) and between attitude and practice ($r = 0.42$, $p < 0.002$).This implies that improving knowledge through training can directly enhance practice outcomes—a trend also documented by Alotaibi et al. (2020) and Peltola et al. (2022).The strongest relationship was between training participation and practice ($r = 0.51$), emphasizing that structured professional development has the most tangible impact on real-world behavior.

Consequently, continuous education and competency-based workshops should be mandatory components of healthcare licensing systems, ensuring sustained competence in oral-systemic care.

**6. Comparative Analysis with Previous Literature (2000–2024)**

| Aspect | Current Findings (2025) | Comparable Literature (2000–2024) |
|---|---|---|
| Knowledge (63%) | Jablonski et al. (2020): 58%; Peltola et al. (2022): 61% | Similar moderate levels across contexts |
| Attitude (4.5/5) | Shahrabani et al. (2023): 4.3/5 | Consistent positivity toward teamwork |

| | | |
|---|---|---|
| Practice (59%) | Al-Harbi & Al-Mutairi (2021): 55–60% | Comparable but below optimal benchmarks |
| Correlation (K↔P = 0.47) | Alotaibi et al. (2020): 0.44 | Reinforces knowledge-practice linkage |
| Training Coverage (40%) | Santos et al. (2025): 37% | Persistent regional limitation |

The overall pattern situates Saudi healthcare professionals within the global average yet indicates potential for rapid improvement through national policy alignment and intersectoral collaboration.

**7. Contextual Implications for Saudi Arabia**

In Saudi Arabia, the ongoing Health Transformation Program under Vision 2030 prioritizes integrated, preventive, and patient-centered care.

Findings from this study support these goals by highlighting the necessity of bridging the gap between oral and systemic healthcare services.

Implementing interdisciplinary protocols in hospitals, nursing homes, and community centers will advance preventive strategies, reduce hospitalization rates, and improve geriatric quality of life. Moreover, given the rising number of heart-transplant and diabetic patients, investing in oral-systemic education can reduce post-surgical complications and enhance chronic disease control—aligning directly with the Saudi National Strategy for Oral Health (MOH, 2023).

**8. Study Limitations**

Although this study offers valuable insight, it remains cross-sectional, limiting causal inference. Data were self-reported, which may introduce recall or social-desirability bias. Nevertheless, the use of a validated, pilot-tested instrument and the inclusion of participants from both residential and hospital settings enhance reliability and generalizability. Future research could employ longitudinal or mixed-methods approaches to explore how interprofessional interventions impact patient outcomes over time.

**Conclusion**

This study underscores the vital but underdeveloped link between nursing and dental practice in managing oral, post-transplant, and diabetic care among older adults.Both professions demonstrated enthusiasm and awareness but lacked consistent application due to limited institutional support and fragmented training structures.Empowering these healthcare providers through education, policy integration, and unified care pathways is essential to advancing geriatric health outcomes.

**Recommendations**

**A. For the Ministry of Health (MOH)**

1. Integrate oral-systemic health modules into national continuing education programs for all nursing and allied health professionals.

2. Adopt standardized oral assessment forms within electronic health records (EHR) across hospitals and long-term care centers.

3. Mandate interprofessional workshops between nursing, dental, and medical departments under Vision 2030 preventive health initiatives.

4. Develop national clinical guidelines for oral monitoring in post-transplant and diabetic patients.

**B. For Educational Institutions**

1. Revise nursing and dental assistant curricula to include oral-systemic health, transplant immunology, and chronic disease management.

2. Promote joint simulation labs and interdisciplinary case-based learning to strengthen teamwork and communication.

3.Encourage undergraduate research projects exploring the oral–systemic link in geriatric populations.

**C. For Clinical Practice**

1. Implement routine oral screenings for all elderly and post-transplant patients upon admission and discharge.

2. Establish referral pathways between dental and medical units for early detection of systemic or oral complications.

3. Ensure infection-control training related to immunocompromised patients is periodically updated and assessed.

**D. For Future Research**

1. Conduct interventional longitudinal studies to evaluate the impact of integrated training programs on KAP improvement.

Explore patient-centered outcomes, such as quality of life, infection reduction, and readmission rates, following interprofessional interventions.2.

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