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ORIGINAL ARTICLE

# ASSESSING THE NEED FOR INTEGRATION OF PERIODONTAL-SYSTEMIC DISEASE EDUCATION AMONG MEDICAL PRACTITIONERS; A CROSS-SECTIONAL STUDY AT TERTIARY CARE HOSPITAL IN LAHORE

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## ABSTRACT

**Objective:** *Periodontal disease is linked to systemic health, yet knowledge gaps remain among medical practitioners. This study assessed practitioners' awareness, knowledge, and clinical practices regarding these associations.*

**Methodology:** *A cross-sectional questionnaire was administered to 101 medical practitioners, exploring awareness of periodontal–systemic links, clinical practices, training, and attitudes toward interdisciplinary care.*

**Results:** *86.1% acknowledged periodontal disease impacts systemic health. Although 82% practitioners knew the link between diabetes and periodontal disease, fewer than half recognized links with cardiovascular disease, chronic kidney disease, respiratory illness, or adverse pregnancy outcomes. Only 34.7% routinely assessed oral health and 36.6% discussed systemic implications. Confidence in identifying oral issues was reported by 40.6%, while 81.2% lacked formal training and 68.4% lacked access to guidelines. Despite this, 94.1% expressed willingness to pursue training and 88.1% would implement new knowledge.*

**Conclusion:** *Practitioners show good baseline awareness but limited clinical integration and institutional support. Strong interest in training highlights the need to embed oral–systemic health into medical curricula and continuing education to enhance interdisciplinary care.*

**Keywords:** *Periodontal disease, Systemic health, medical practitioners, Awareness, Clinical practice, Oral-systemic link, Interdisciplinary training*

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## INTRODUCTION

Periodontal disease or periodontitis, a multifactorial disease; is the second most prevalent oral condition in the human population after dental caries[1,2,3]. It is defined as "chronic inflammation of Periodontium and destruction of surrounding alveolar bone which may or may not result in tooth loss."[3] If left untreated, it could lead to recession, loss of attachment, tooth mobility and eventually tooth loss[4]. Primary cause of periodontal disease is accumulation of plaque and calculus which causes formation of periodontal pockets and eventually destruction of periodontal tissues[5].

Oral cavities lie at the intersection of medicine and dentistry. Recent advances in stomatology reveal a crucial link between periodontal health and the immune system, to maintain optimum health of the body[6]. Recent studies suggest that there is potential bidirectional relationship between periodontal disease and systemic health[7,23]. This highlights a cyclical pattern: a systemic disease can increase an individual's risk of oral infections, and once these oral infections occur, they can further aggravate the systemic condition[8] Studies suggest that periodontitis is a risk factor for systemic conditions, including CVD, diabetes mellitus, CKD, rheumatoid arthritis, respiratory disorders, adverse pregnancy outcomes, etc[9]. A 2024 meta-analysis of 16 case–control studies involving over 6,000 patients

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reported that individuals with periodontitis had nearly three times greater risk of developing oral cancer[10]. Most probable cause behind this correlation can be systemic dissemination of bacterial products (endotoxins) and inflammatory cytokines such as CRP and IL-6 into circulation. These bacterial products originate from bacteria in periodontium[11].

Periodontal disease, due to its high prevalence, can pose a significant public health concern that adds to the global burden of chronic diseases. The Global Burden of Disease Study and the World Health Organization (WHO) Global Oral Health Report (2022) identified periodontitis as the 6th most prevalent disease worldwide[12]. Early stages of periodontal disease is often ignored by patients due to its "silent" behavior and low dental awareness among patients. Limited awareness about periodontal disease may delay early diagnosis and appropriate management, potentially aggravating both dental and systemic health outcomes[13].

While systemic diseases are complex and multifactorial, the presence of periodontal disease alongside other chronic inflammatory systemic conditions suggests a potential underlying link or common risk factors between these disorders[1,14]. Treatment of periodontal disease can significantly reduce the risk factors that can cause CVD, diabetes mellitus, pre-term birth, CKD, etc. due to decrease in inflammatory markers in peripheral blood supply[15,16].

The first step in addressing the burden of periodontal-systemic disease is to educate medical professionals about the crucial link between oral health and overall health. This knowledge would equip them to inform patients and make appropriate referrals to dentists for comprehensive oral evaluations.

Therefore, the aim of this study was to collect baseline data to assess the awareness, clinical practices, and implementation readiness of medical practitioners regarding the relationship between periodontal health and systemic diseases. This information can help guide the development of interdisciplinary training programs and support the integration of periodontal-systemic education into medical practice, ultimately improving patient outcomes.

## METHODOLOGY

This descriptive cross-sectional, questionnaire-based study was conducted at Chaudhry Muhammad Akram Teaching and Research Hospital (CMATRH), Lahore, in collaboration with the Department of Periodontology, Azra Naheed Dental College. Convenience sampling was employed. Ethical approval was obtained from the Ethics Review Committee of Azra Naheed Dental College (Approval No. ANDC/RAC/2025/54, dated 4th February 2025), and informed consent was obtained from all participants prior to data collection.

A structured, self-administered questionnaire comprising 23 items was developed after a literature review and expert validation. Content validity was established through expert review by three specialists in periodontology and public health. The questionnaire was piloted on 10 medical practitioners to ensure clarity and comprehension, and minor modifications were made based on feedback.

The questionnaire consisted of two sections:

1. Demographic and professional details (designation: postgraduate trainee or consultant, and years of practice).
2. Awareness, knowledge, clinical practices, confidence, and training needs regarding the relationship between periodontal and systemic diseases.

The sample size was calculated using the WHO sample size calculator for cross-sectional studies (URL/version: https://cdn.who.int/media/docs/default-source/ncds/ncd-surveillance/steps/sample-size-calculator.xls), assuming a 50% prevalence of knowledge of the periodontal-systemic disease relationship, a 95% confidence level, and a 7% margin of error. This yielded a minimum required sample size of 100 participants. To improve precision and account for non-response, 110 eligible medical practitioners were invited, of whom 101 completed the questionnaire, giving a response rate of almost 92%. Oversampling ensured adequate data for analysis, consistent with similar single-hospital studies such as Abid and Javed (2018), which used a sample size of 100 participants.

Inclusion criteria were postgraduate trainees and consultants (FCPS, MD, MS) working at CMATRH. Exclusion criteria were dentists, physiotherapists, house officers, medical officers, and medical students.

Data was analyzed using SPSS version 29. Descriptive statistics (mean, standard deviation, median, frequencies, and percentages) were calculated. Internal consistency of the final questionnaire was assessed on the complete dataset, yielding a Cronbach's alpha □ of 0.88, indicating good reliability.

## RESULTS

A total of 101 medical practitioners participated in this study, yielding a 92% response rate. Participants included both postgraduate trainees and consultants (FCPS, MD, MS) from various clinical specialties. Most participants had ≤10 years of clinical experience (n = 69), Most respondents held mid- to senior-level positions, including Senior Registrars (n = 37), Assistant Professors (n = 22), Associate Professors (n = 18), and

Consultants and Professors (n = 24). Participants were nearly evenly distributed between Medicine & Allied (n = 55) and Surgical & Allied (n = 46) specialties. Table 1 shows demographic details.

Medical practitioners demonstrated strong awareness of periodontal disease and its clinical signs, with over 80% correctly identifying gingival bleeding, gum recession, and tooth mobility (Median = 1.00 ± 0.88) and approximately 75% recognizing its systemic implications (Median = 1.00 ± 1.02) (Table 2). Knowledge of specific oral–systemic associations varied notably (Table 3). Awareness was highest for the link with diabetes mellitus (78%; Median = 1.00 ± 0.96) but substantially lower for pregnancy outcomes (38%; Median = 3.00 ± 1.40), respiratory conditions (40%; Median = 3.00 ± 1.37), and chronic kidney disease (42%; Median = 3.00 ± 1.31). Moderate understanding was observed for cardiovascular disease, rheumatoid arthritis, and certain cancers (Median = 2.00 ± 1.26–1.33). Compared with awareness, clinical implementation remained weak (Table 3), as only about one-third screened for periodontal disease (Median = 4.00 ± 1.39) or provided oral–systemic education (Median = 2.30 ± 1.37), while confidence and referral behaviors were inconsistent (SD > 1.3). Institutional support was limited (Table 5), with fewer than 25% reporting formal training (Median = 4.00 ± 1.14) or access to resources (Median = 4.00 ± 1.25). Despite this gap, practitioners displayed positive attitudes (Table 6): over 90% expressed interest in workshops (Median = 1.00 ± 0.87), believed training would improve patient management (Median = 1.00 ± 0.87), and were willing to apply new knowledge (Median = 1.00 ± 0.94). However, perceptions of institutional collaboration were mixed, as reflected by higher response variability (Median = 1.00 ± 1.39). Details are in the tables below:

## DISCUSSION

The present study reveals a noticeable gap between medical practitioners' awareness and the real-world application of that knowledge in clinical practice. As seen in our results, awareness of periodontal disease and recognition of its signs were quite high (Table 1), with relatively low variability among respondents. This aligns with previous work showing that medical practitioners typically recognize basic periodontal conditions and their importance[8]. Nonetheless, awareness appears selective: while the link with diabetes

TABLE 1: DEMOGRAPHIC DETAILS

| Variables | Years of Practice | Responses (N) |
|---|---|---|
| Years of Practice | 0-10 years | 69 |
| | 10-20 years | 11 |
| | 20-30 years | 5 |
| | 30-40 years | 16 |
| Professional Rank | Senior Registrar | 37 |
| | Assistant Professor | 22 |
| | Associate Professor | 18 |
| | Professor | 12 |
| | Consultant | 12 |
| Specialty | Surgery | 46 |
| | Medicine and Allied | 55 |

TABLE 2: AWARENESS OF PERIODONTAL DISEASE

| Statement | Strongly Agree (%) | Agree (%) | Neutral (%) | Disagree (%) | Strongly Disagree (%) | Median ± SD |
|---|---|---|---|---|---|---|
| I am aware of periodontal (gum) diseases. | 55.0 | 33.1 | 2.0 | 6.9 | 3.0 | 1.00 ± 0.97 |
| I recognize gum bleeding, gum recession, and tooth loss as signs of periodontal disease. | 60.4 | 29.7 | 5.0 | 2.0 | 3.0 | 1.00 ± 0.88 |
| I understand that periodontal disease can impact systemic health. | 51.5 | 34.6 | 2.0 | 7.9 | 4.0 | 1.00 ± 1.02 |

TABLE 3: KNOWLEDGE OF LINKS BETWEEN PERIODONTAL AND SYSTEMIC DISEASES

| Statement | Strongly Agree (%) | Agree (%) | Neutral (%) | Disagree (%) | Strongly Disagree (%) | Median ± SD |
|---|---|---|---|---|---|---|
| I am aware that diabetes mellitus is linked with periodontal disease. | 50.5 | 31.7 | 10.9 | 4.0 | 2.9 | 1.00 ± 0.96 |
| I am aware that cardiovascular disease is linked with periodontal disease. | 35.6 | 23.8 | 22.8 | 10.9 | 6.9 | 2.00 ± 1.26 |
| I am aware that chronic kidney disease may be associated with periodontal disease. | 25.7 | 20.8 | 30.7 | 13.9 | 8.9 | 3.00 ± 1.31 |
| I am aware that respiratory conditions may be influenced by periodontal disease. | 27.7 | 19.8 | 24.8 | 15.8 | 11.9 | 3.00 ± 1.37 |
| I believe periodontal disease can increase the risk of premature birth or low birth weight. | 23.8 | 20.8 | 20.8 | 19.8 | 14.9 | 3.00 ± 1.40 |
| I believe rheumatoid arthritis is associated with periodontal disease. | 30.7 | 26.7 | 19.8 | 13.9 | 8.9 | 2.00 ± 1.32 |
| I am aware that chronic gum inflammation may increase the risk of certain cancers. | 29.7 | 25.7 | 21.8 | 13.9 | 8.9 | 2.00 ± 1.33 |
| I consider periodontal disease a risk factor for multiple systemic conditions. | 33.7 | 23.7 | 18.8 | 13.9 | 9.9 | 2.00 ± 1.34 |
| I believe periodontal treatment can reduce systemic inflammation. | 45.5 | 24.8 | 14.9 | 9.9 | 5.0 | 2.00 ± 1.19 |
| I understand that some systemic diseases may show oral manifestations. | 54.5 | 32.6 | 9.9 | 2.0 | 1.0 | 1.00 ± 0.89 |

TABLE 4: CLINICAL PRACTICE

| Statement | Strongly Agree (%) | Agree (%) | Neutral (%) | Disagree (%) | Strongly Disagree (%) | Median ± SD |
|---|---|---|---|---|---|---|
| I assess patients for signs of gum disease during routine medical evaluations. | 10.9 | 12.9 | 10.0 | 21.8 | 44.5 | 4.00 ± 1.39 |
| I educate patients about the link between oral health and systemic diseases. | 11.9 | 12.9 | 11.9 | 25.7 | 37.6 | 4.00 ± 1.37 |
| I have referred patients to a dentist before initiating certain medical or surgical procedures. | 20.8 | 19.8 | 16.8 | 22.8 | 19.8 | 3.00 ± 1.43 |
| I feel confident in identifying oral health concerns during clinical assessments. | 15.8 | 14.9 | 16.8 | 26.7 | 25.8 | 4.00 ± 1.42 |

TABLE 5: TRAINING AND RESOURCES

| Statement | Strongly Agree (%) | Agree (%) | Neutral (%) | Disagree (%) | Strongly Disagree (%) | Median ± SD |
|---|---|---|---|---|---|---|
| I have received formal training on the relationship between periodontal and systemic diseases. | 8.9 | 9.9 | 0.0 | 40.6 | 40.6 | 4.00 ± 1.14 |
| I have access to guidelines or resources that support oral-systemic health integration. | 10.9 | 14.8 | 5.9 | 32.7 | 35.7 | 4.00 ± 1.25 |

TABLE 6: ATTITUDES TOWARD TRAINING AND COLLABORATION

| Statement | Strongly Agree (%) | Agree (%) | Neutral (%) | Disagree (%) | Strongly Disagree (%) | Median ± SD |
|---|---|---|---|---|---|---|
| I am interested in participating in training or workshops on oral-systemic health. | 67.3 | 26.7 | 1.0 | 4.0 | 1.0 | 1.00 ± 0.87 |
| I believe additional training would improve my ability to manage patients with oral-systemic concerns. | 67.3 | 26.7 | 1.0 | 4.0 | 1.0 | 1.00 ± 0.87 |
| My healthcare institution promotes collaboration between physicians and dental professionals. | 20.8 | 21.8 | 15.8 | 19.8 | 21.8 | 1.00 ± 1.39 |
| I would apply new knowledge about oral-systemic health if training and tools were made available. | 57.4 | 30.7 | 5.9 | 4.0 | 2.0 | 1.00 ± 0.94 |

mellitus is well understood, associations with other systemic conditions (e.g. chronic kidney disease, adverse pregnancy outcomes) are less consistently recognized (Table 2). Similar patterns have been documented in cross-sectional surveys assessing physicians' and dentists' awareness of periodontal-systemic links[8,24].

Despite relatively strong knowledge, the translation into clinical practice is weak (Table 3). Only a small proportion of respondents routinely assess gum disease, educate patients, or make dental referrals. The high standard deviations in practice items suggest wide inconsistency: some practitioners may integrate oral health into their workflow, but many do not. This "knowing–doing gap" has been similarly observed in other health settings: for example, a mixed-methods pilot of medical–dental integration in the U.S. reported that clinician buy-in and referral network development were significant barriers[11]. In contexts of prenatal care, healthcare providers have expressed logistical, structural, and interprofessional challenges in integrating oral health assessments into standard practice[17,26].

A key explanatory factor is the lack of formal training and resources (Table 4). Very few practitioners in our sample reported receiving structured education on periodontal–systemic relationships or having access to clinical guidelines. This insufficient training likely contributes to low confidence in oral assessment and referral. Prior studies in Saudi Arabia and Kuwait similarly identified limited awareness and inadequate educational exposure among physicians and dentists concerning periodontal–systemic association[24]. A recent study from Jazan, Saudi Arabia, demonstrated that a webinar intervention significantly improved knowledge among medical practitioners, underlining the potential role of continuing education interventions in bridging this gap[25].

On a positive note, practitioners expressed strong willingness to receive further training and adopt new practices (Table 5). High interest in workshops and belief in their effectiveness, with relatively low variability, suggest latent capacity for change[24,25]. However, institutional support and formal collaboration with

dental professionals were weaker, as indicated by lower means and higher variability. Systemic or organizational barriers such as separation of medical and dental services, funding constraints, and professional silos likely impede operational integration.

In sum, our findings underscore a common theme: awareness and conceptual knowledge among medical practitioners are necessary but not sufficient for meaningful clinical uptake. For true integration, multiple elements must align enhanced curricula, continuing professional development, clear guidelines, institutional pathways for referral, and interprofessional collaboration mechanisms. Future research should investigate specific barriers (time constraints, perceived scope of practice, reimbursement, culture) and evaluate interventions (e.g. workshops, integrated care models) to measure their effect on changing behavior and ultimately improving patient outcomes.

## LIMITATIONS OF THE STUDY

This study had limitations including the sample bias. The sample was limited to a specific Chaudhry Muhammad Akram teaching hospital, potentially restricting the findings that reflect the experiences and practices of healthcare providers in other institutions or regions Additionally, the cross-sectional design captures a single moment in time, not accounting for changes in awareness and practice over time. To address these limitations, future research should consider longitudinal study designs with a more diverse sample to assess the long-term impact of periodontal education on clinical practice and patient outcomes.

## CONCLUSION

The findings of this study highlight a critical gap in medical practitioners' understanding of systemic implications of periodontal disease. While the knowledge of its association with diabetes and cardiovascular disease was satisfactory, significant deficiencies remain in understanding its impact on other systemic conditions such as pregnancy outcomes, respiratory diseases, and chronic kidney disease. Initiatives should be taken to bridge these gaps through targeted educational programs, interdisciplinary workshops, and policy-driven changes in medical training.

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|---|---|
| **1. Mariam Mahmood:** | Conception and design of work, data collection, manuscript drafting of the final version to be published |
| **2. Mehreen Khaliq:** | Supervision and guidance in conceptualization and design if work, final approval of the manuscript |
| **3. Hafsa Qayyum:** | Data collection, manuscript drafting |
| **4. Amina Anis:** | Data collection, manuscript drafting |