

Assessment of knowledge among Ayurveda Professionals on the interrelationship between periodontal health and systemic health and their attitude towards integrated clinical practice - A cross-sectional survey

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Abstract

Background: Periodontitis, a chronic inflammatory condition affecting the supporting structures of the teeth, has been increasingly recognized for its bidirectional relationship with various systemic conditions, including diabetes mellitus, cardiovascular diseases, adverse pregnancy outcomes, and respiratory disorders. Previous studies have indicated a knowledge gap among non-dental healthcare providers concerning periodontal-systemic interconnections. However, limited data exist regarding the awareness levels and attitudes of Ayurveda professionals in this context. Given the increasing emphasis on integrative health care models in India's national health policies, this study aims to assess the knowledge, perceptions, and attitudes of Ayurvedic practitioners towards the interrelationship between periodontal and systemic health and to explore their readiness for interdisciplinary collaboration.

Materials and Methods: Total 200 ayurveda practioners were included in this survey and the target population has been taken from licensed Ayurvedic practitioners working in private clinics, government Ayurvedic hospitals, and AYUSH centers in Kanpur. A structured, self-administered questionnaire was developed in English and Hindi consisting of both close-

ended and multiple-choice questions divided into four major sections. Data collection was carried out by Trained research assistants visited various Ayurvedic clinics and hospitals across Kanpur.

Results: 75% of participants correctly identified periodontal disease as a condition affecting the gums and supporting structures of the teeth. Regarding the recognition of symptoms, 60% identified at least four common symptoms, such as bleeding gums, gum recession, and bad breath. About 56% of participants correctly identified four or more risk factors for periodontal disease, including poor oral hygiene, diabetes, smoking, and stress. A high percentage (85%) acknowledged that periodontal disease can lead to tooth loss.

Regarding the Knowledge on the interrelationship between periodontal and systemic health 45% of the participants demonstrated correct knowledge on at least 7 of the 10 knowledge-based questions, which depicts a moderate to high knowledge level. Attitudes towards Integrated Clinical Practice They had favorable attitude among Ayurveda practitioners toward integrated care models, despite the moderate level of actual knowledge.

Conclusion: Ayurveda practitioners demonstrated a moderate understanding of the interrelationship between periodontal and systemic health, their positive attitude towards interdisciplinary collaboration presents a meaningful opportunity to integrate oral health into holistic care. Strengthening the inclusion of periodontal-systemic health education in Ayurvedic training programs and continuing education workshops could significantly bridge existing knowledge gaps and enhance patient outcomes.

Key words: Interrelationship, Interdisciplinary health care, Ayurveda professionals, periodontitis, knowledge, attitude.

Introduction

Oral health, particularly periodontal health, plays a critical role in maintaining overall systemic health. Periodontitis, a chronic inflammatory condition affecting the supporting structures of the teeth, has been increasingly recognized for its bidirectional relationship with various systemic conditions, including diabetes mellitus, cardiovascular diseases, adverse pregnancy outcomes, and respiratory disorders [1,2]. The inflammatory mediators and bacterial pathogens involved in periodontitis are known to disseminate systemically, contributing to a state of chronic inflammation and disease susceptibility [3].

In recent years, the paradigm of health care has shifted toward a more holistic and integrative approach, recognizing the interconnectedness of bodily systems. Ayurveda, the traditional system of medicine practiced widely in India, emphasizes the balance between body, mind, and spirit and incorporates individualized preventive and therapeutic strategies [4]. Ayurvedic texts acknowledge the importance of oral hygiene and the impact of oral health on systemic well-being through practices such as *Gandusha* (oil pulling), *Dantadhavana* (brushing), and *Kavala* (gargling) [5]. However, despite this holistic view, the explicit understanding among Ayurvedic professionals regarding modern concepts of periodontal-systemic interrelationships remains underexplored.

Integrating Ayurvedic principles with contemporary periodontal knowledge may offer novel, complementary avenues for patient care. It is essential, therefore, to assess the level of knowledge and attitudes of Ayurvedic practitioners regarding the link between periodontal and systemic health and to evaluate their openness to integrated clinical practices. Such integration could enhance interdisciplinary collaboration and improve health outcomes, particularly in communities with limited access to conventional dental services.

Previous studies have indicated a knowledge gap among non-dental healthcare providers concerning periodontal-systemic interconnections [6]. However, limited data exist regarding the awareness levels and attitudes of Ayurveda professionals in this context. Given the increasing emphasis on integrative health care models in India's national health policies [7], this study aims to assess the knowledge, perceptions, and attitudes of Ayurvedic practitioners towards the interrelationship between periodontal and systemic health and to explore their readiness for interdisciplinary collaboration. This cross-sectional study aims to fill a critical gap in the literature and may serve as a foundation for future integrative educational and clinical initiatives.

Materials and Methods

This study was a descriptive, cross-sectional survey conducted among registered Ayurveda practitioners in Kanpur, Uttar Pradesh, India. The objective was to assess their knowledge and awareness regarding the interrelationship between periodontal and systemic health and their attitude towards integrated clinical practice. Total number of 200 ayurveda practitioners

included in this survey and the target population has been taken from licensed Ayurvedic practitioners working in private clinics, government Ayurvedic hospitals, and AYUSH centers in Kanpur. Written informed consent was obtained from all participants. Confidentiality and anonymity were strictly maintained throughout the study.

Inclusion criteria:

- Holding a minimum qualification of BAMS (Bachelor of Ayurvedic Medicine and Surgery)
- Actively practicing for at least two years
- Providing informed consent to participate in the study

Practitioners who were not available during the study period or who declined to participate were excluded.

A structured, self-administered questionnaire was developed in English and Hindi after an extensive literature review and expert consultation [8,9,10]. The tool included both close-ended and multiple-choice questions divided into three major sections: The questionnaire was pre-tested among 20 Ayurveda practitioners in a pilot study in Kanpur to ensure clarity, relevance, and reliability. Modifications were made based on feedback. Reliability analysis showed good internal consistency with a Cronbach's alpha of 0.81 [11]. The study protocol was approved by the Institutional Ethics Committee of Rama Dental College, Hospital & research centre, Kanpur.

The tool included both close-ended and multiple-choice questions divided into four major sections:

Section A: Demographic Information

- Age
- Gender
- Years of Clinical Practice
- Type of Practice: ☐ Private ☐ Government ☐ Both
- Highest Qualification: ☐ BAMS ☐ MD (Ayurveda) ☐ PhD ☐ Other

Section B: General Knowledge of Periodontal Health

1. What is periodontal disease?
 - ☐ A condition affecting the gums and supporting structures of the teeth
 - ☐ A disease of the bones
 - ☐ A disease that only affects the teeth
 - ☐ None of the above
2. Which of the following are common symptoms of periodontal disease? (Select all that apply)
 - ☐ Bleeding gums
 - ☐ Swollen or red gums
 - ☐ Bad breath (halitosis)
 - ☐ Gum recession
 - ☐ Pain in the jaw
 - ☐ Tooth mobility
3. Which of the following are risk factors for periodontal disease? (Select all that apply)
 - ☐ Smoking or tobacco use
 - ☐ Diabetes
 - ☐ Poor oral hygiene
 - ☐ Stress
 - ☐ Age
 - ☐ Pregnancy

4. Can periodontal disease lead to tooth loss?
 - ☐ Yes
 - ☐ No
 - ☐ Not sure

Section C: Knowledge of the Interrelationship between Periodontal Health and Systemic Health

5. Are you aware of the connection between periodontal disease and systemic health conditions?
 - ☐ Yes ☐ No
6. Which of the following systemic conditions are linked to periodontal disease? (Select all that apply)
 - ☐ Diabetes
 - ☐ Cardiovascular diseases (e.g., heart disease, stroke)
 - ☐ Respiratory diseases (e.g., pneumonia, chronic obstructive pulmonary disease)
 - ☐ Adverse pregnancy outcomes (e.g., preterm birth, low birth weight)
 - ☐ Kidney disease
 - ☐ Rheumatoid arthritis
 - ☐ Alzheimer's disease
 - ☐ Cancer
7. Which of the following mechanisms is believed to be responsible for the link between periodontal disease and systemic health? (Select all that apply)
 - ☐ Bacterial spread through the bloodstream
 - ☐ Chronic inflammation
 - ☐ Immune system dysfunction
 - ☐ Oral hygiene products
 - ☐ Genetic predisposition
8. Do you believe untreated periodontal disease can worsen systemic conditions like diabetes?
 - ☐ Yes ☐ No ☐ Not sure
9. In your opinion, how does periodontal disease affect cardiovascular health?
 - ☐ Increases the risk of heart disease by contributing to inflammation
 - ☐ No effect
 - ☐ Not sure
10. Do you think there is sufficient scientific evidence supporting the link between periodontal disease and systemic health?
 - ☐ Yes
 - ☐ No
 - ☐ Not sure

Section D: attitude towards integrated clinical practice

11. During clinical consultations the periodontal health condition of all the patients should be examined?.
 - ☐ Agree
 - ☐ Disagree
12. If periodontal disease was suspected during consultation then those patients should be referred to dental professionals?.
 - ☐ Agree
 - ☐ Disagree
13. In your opinion, should healthcare professionals from different disciplines collaborate to improve patient outcomes concerning periodontal and systemic health?
 - ☐ Agree
 - ☐ Disagree
14. All health care professionals should receive adequate knowledge related to the connection between periodontal health and systemic diseases?

- ☐ Agree
- ☐ Disagree

Scoring and Analysis: To assess the knowledge level of healthcare professionals, responses to the questions can be scored as follows:

- Correct answers for Knowledge Questions (e.g., Q1–Q10) = 1 point
- Incorrect answers = 0 points

The total score can then be classified as:

- 0 – 3 points: Low knowledge
- 4 – 6 points: Moderate knowledge
- 7 – 10 points: High knowledge

Data Collection Procedure

Data collection was carried out over a period of one month. Trained research assistants visited various Ayurvedic clinics and hospitals across Kanpur and administered the printed questionnaires. Practitioners were given 15–20 minutes to complete the survey, and any doubts were clarified without influencing responses.

Results

A total of 200 Ayurveda practitioners participated in the study. All participants completed the questionnaire in full, resulting in a 100% response rate. The results are presented under the categories of demographic characteristics, knowledge of periodontal health, knowledge of its interrelationship with systemic health, and attitudes towards integrated clinical practice.

Demographic Characteristics

The demographic distribution of the participants is presented in Table 1. The majority of respondents (39%) were in the age group of 25–35 years, followed by 32% in the 36–45 years age group. Most participants were male (61%), and female respondents constituted 39% of the sample. With regard to clinical experience, 38% had 5–10 years of practice, followed by 37% with more than 10 years. Most practitioners were from the private sector (54%), while 31% were from government institutions and 15% had mixed practices. In terms of academic qualifications, 66% held a BAMS degree, 29% had MD (Ayurveda), and a small proportion had attained a PhD (3%) or other qualifications (2%).

Knowledge of Periodontal Health.

When asked about periodontal disease, 75% of participants correctly identified it as a condition affecting the gums and supporting structures of the teeth. Regarding the recognition of symptoms, 60% identified at least four common symptoms, such as bleeding gums, gum recession, and bad breath. About 56% of participants correctly identified four or more risk factors for periodontal disease, including poor oral hygiene, diabetes, smoking, and stress. A high percentage (85%) acknowledged that periodontal disease can lead to tooth loss.

Knowledge of the Periodontal-Systemic Health Link

Knowledge on the interrelationship between periodontal and systemic health was assessed through several specific items. Overall, 45% of the participants demonstrated correct knowledge on at least 7 of the 10 knowledge-based questions, which qualified them as having a moderate to high knowledge level. The breakdown is as follows:

- 62% were aware that periodontal disease is linked to systemic health conditions.

- 52.5% correctly identified at least five systemic diseases associated with periodontal disease, such as diabetes, cardiovascular disease, respiratory diseases, and adverse pregnancy outcomes.
- 49% recognized key mechanisms responsible for the interrelationship, including chronic inflammation, bacterial spread, and immune system dysregulation.
- 61% agreed that untreated periodontal disease can worsen conditions like diabetes, while 54% understood the inflammatory pathway connecting periodontitis with cardiovascular diseases.
- However, only 48% believed there is sufficient scientific evidence supporting these associations, indicating a gap in access to or understanding of current literature.

Based on the cumulative scores of responses to knowledge-based questions (Q1–Q10), participants were classified into knowledge levels:

- 25% had low knowledge (0–3 score range)
- 55% had moderate knowledge (4–6 score range)
- 20% demonstrated high knowledge (7–10 score range) (Table 2).

Attitudes towards Integrated Clinical Practice

Participants' responses to attitude related questions suggested a positive outlook toward interdisciplinary integration of oral health in general and Ayurvedic clinical settings:

- 65% agreed that it is necessary to examine periodontal health during all patient consultations.
- 75% supported referring patients to dental professionals when periodontal disease is suspected.
- A large proportion (80%) expressed agreement with the need for collaboration across disciplines (e.g., Ayurveda and dentistry) to improve health outcomes.
- Furthermore, 85% agreed that all healthcare professionals should receive adequate training on the connection between periodontal and systemic health (Table 3). These findings suggest a favorable attitude among Ayurveda practitioners toward integrated care models, despite the moderate level of actual knowledge.

Tables

Table 1: Demographic Characteristics of Study Participants (N = 200)

Variable	Category	Frequency (n)	Percentage (%)
Age (in years)	25–35	78	39.0%
	36–45	64	32.0%
	46–55	38	19.0%
	>55	20	10.0%
Gender	Male	122	61.0%
	Female	78	39.0%
Years of Practice	<5 years	50	25.0%
	5–10 years	76	38.0%
	>10 years	74	37.0%
Type of Practice	Private	108	54.0%
	Government	62	31.0%
	Both	30	15.0%
Highest Qualification	BAMS	132	66.0%
	MD (Ayurveda)	58	29.0%
	PhD	6	3.0%
	Other	4	2.0%

Table 2: Response Pattern to Knowledge Questions (Q1–Q10)

Questions	Correct (n, %)	Incorrect/Not Sure (n, %)
Q1: What is periodontal disease?	150 (75.0%)	50 (25.0%)
Q2: Which of the following are common symptoms of periodontal disease?	120 (60.0%)	80 (40.0%)
Q3: Which of the following are risk factors for periodontal disease?	112 (56.0%)	88 (44.0%)
Q4: Can periodontal disease lead to tooth loss?	170 (85.0%)	30 (15.0%)
Q5: Are you aware of the connection between periodontal disease and systemic health conditions?	124 (62.0%)	76 (38.0%)
Q6: Which of the following systemic conditions are linked to periodontal disease?	105 (52.5%)	95 (47.5%)
Q7: Which of the following mechanisms is believed to be responsible for the link between periodontal disease and systemic health?	98 (49.0%)	102 (51.0%)
Q8: Do you believe untreated periodontal disease can worsen systemic conditions like diabetes?	122 (61.0%)	78 (39.0%)
Q9: In your opinion, how does periodontal disease affect cardiovascular health?	108 (54.0%)	92 (46.0%)
Q10: Do you think there is sufficient scientific evidence supporting the link between periodontal disease and systemic health?	96 (48.0%)	104 (52.0%)

Table 3: Distribution of Knowledge Levels Among Participants (N = 200)

Knowledge Level	Score Range	Frequency (n)	Percentage (%)
Low Knowledge	0–3	50	25.0%
Moderate Knowledge	4–6	110	55.0%
High Knowledge	7–10	40	20.0%
Total		200	100.0%

Table 4: Attitudes towards Integrated Clinical Practice (Q11–Q14)

Statement	Agree (n, %)	Disagree (n, %)
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Q1: During clinical consultations the periodontal health condition of all the patients should be examined?.	130 (65.0%)	70 (35.0%)
Q2: If periodontal disease was suspected during consultation then those patients should be referred to dental professionals?.	150 (75.0%)	50 (25.0%)
Q3: In your opinion, should healthcare professionals from different disciplines collaborate to improve patient outcomes concerning periodontal and systemic health?	160 (80.0%)	40 (20.0%)
Q4: All health care professionals should receive adequate knowledge regarding the connection between periodontal health and systemic diseases?	170 (85.0%)	30 (15.0%)

Discussion

The present cross-sectional study aimed to assess the knowledge of Ayurveda practitioners regarding the interrelationship between periodontal health and systemic health, along with their attitudes toward integrated clinical practice. Findings revealed that while a majority (55%) of the participants exhibited a moderate level of knowledge, only 20% demonstrated high knowledge, indicating a considerable gap in advanced understanding of periodontal-systemic connections among Ayurvedic healthcare providers.

The association between periodontal disease and systemic conditions such as diabetes, cardiovascular disease, respiratory infections, and adverse pregnancy outcomes is now well-documented in biomedical literature. Chronic inflammation originating from periodontal tissues has been implicated in the pathogenesis or worsening of systemic conditions through the release of pro-inflammatory cytokines and the systemic dissemination of periodontal pathogens [12,13]. However, in the current study, only 48% of participants believed that there is sufficient scientific evidence supporting this connection. This highlights the need for greater inclusion of oral-systemic health education in Ayurvedic curricula and continued professional development.

Encouragingly, the majority of participants correctly identified several systemic diseases associated with periodontal health, such as diabetes and cardiovascular diseases. Studies have shown that individuals with diabetes mellitus are at increased risk of developing periodontitis, and conversely, treating periodontal disease can help in better glycemic control [14,15]. Similarly, periodontal inflammation has been linked to endothelial dysfunction and atherogenesis, which could explain the increased cardiovascular risk among individuals with chronic periodontitis [16].

Despite moderate knowledge levels, the attitude of Ayurveda practitioners towards integrated clinical practice was overwhelmingly positive, with 85% agreeing that all healthcare professionals should be educated on the periodontal-systemic health connection. This suggests a readiness among this group to adopt collaborative, interdisciplinary approaches to patient care. The willingness to refer patients to dental professionals and to consider oral examination as a routine part of systemic health assessment reflects a constructive shift toward integrative health models, which has also been advocated in prior research [17].

Comparable studies among medical and dental professionals have also identified knowledge gaps in recognizing oral-systemic health connections, but with similarly positive attitudes toward collaboration [18,19]. However, limited literature exists evaluating this domain among Ayurvedic professionals, making this study an important step in exploring this under-researched group. Previous integrative health models have emphasized the synergistic value of combining traditional and modern healthcare systems to enhance public health outcomes, particularly in regions like India where Ayurveda remains widely practiced [20].

The findings of this study should be interpreted in the context of its limitations. Being cross-sectional, the study captures knowledge and attitudes at a single point in time, without evaluating long-term behavioral patterns or clinical practices. Additionally, while the sample size was adequate, it was geographically limited to Kanpur, and therefore, may not be generally applied to Ayurveda practitioners across India. Nevertheless, the study offers valuable baseline data and underscores the need for policy-level integration of oral health awareness in alternative and traditional medicine systems.

Conclusion

Ayurveda practitioners demonstrated a moderate understanding of the interrelationship between periodontal and systemic health, their positive attitude towards interdisciplinary collaboration presents a meaningful opportunity to integrate oral health into holistic care. Strengthening the inclusion of periodontal-systemic health education in Ayurvedic training programs and continuing education workshops could significantly bridge existing knowledge gaps and enhance patient outcomes.

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