

Prevalence and Pattern of Systemic Diseases Among Adult Dental Patients in Ibadan Nigeria: A Retrospective Cross-Sectional Study

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ABSTRACT

Background

Oral health is an essential component of systemic health and significantly impacts quality of life and overall well-being. Oral health status reflects systemic health, as many diseases and medications affect the oral cavity; conversely, oral pathologies can also influence systemic health. This clinical audit aimed to determine the prevalence and pattern of systemic diseases among adult patients attending a tertiary dental clinic.

Methods

A retrospective study was conducted using records of adult dental patients who presented at the Oral Diagnosis Clinic of the University College Hospital, Ibadan, Nigeria, between January and June 2024. Demographic and systemic disease data were extracted from hospital records. Data were analyzed using SPSS version 25.

Results

Out of 1,885 patients seen during the study period, 274 had one or more systemic conditions, yielding a prevalence of 14.5%. There were more females (193, 70.4%) than males (81, 29.6%); the mean age (\pm SD) was 51.7 ± 18.1 years. Hypertension was the most common comorbidity, followed by peptic ulcer disease and diabetes mellitus. Single comorbidities were more frequent (216, 78.8%) than multiple comorbidities (58, 21.2%), though a higher proportion of males had multiple conditions. The majority (87.9%) of patients with multiple systemic diseases were above 40 years of age ($p = 0.002$).

Conclusion

This study found a 14.5% prevalence of systemic diseases among adult dental patients, with hypertension being the most common. Multiple comorbidities were significantly more prevalent in patients above 40 years. These findings are limited by the retrospective design and reliance on record quality.

Keywords: Oral health, Systemic diseases, Dental clinic

INTRODUCTION

Oral health is an essential component of systemic health with a significant impact on quality of life and overall well-being.¹ Systemic diseases are conditions that affect the entire body or multiple organ systems rather than being localized to a single area.² These include autoimmune diseases, inflammatory conditions, endocrine and metabolic disorders, as well as cardiovascular, renal, respiratory, genitourinary, gastrointestinal, and central or peripheral nervous system disorders. Oral health status reflects systemic health, as many diseases and medications impact the oral cavity, while oral pathologies can also significantly affect systemic health.³ Many systemic diseases are non-communicable, and their prevalence has risen globally over the past two decades, with a notable surge in sub-Saharan Africa. This increase is driven by growing rates of cardiovascular risk factors such

as unhealthy diets, reduced physical activity, hypertension, obesity, diabetes, dyslipidemia, and air pollution.⁴ Systematic reviews of Nigerian studies report hypertension prevalence rates of 28.9% (95% CI: 25.1–32.8)⁵ and diabetes mellitus prevalence of 5.77% (95% CI: 4.3–7.1),⁶ though global variation exists across different countries.^{7–11}

The burden of systemic diseases among dental patients has direct clinical implications, as conditions such as diabetes and hypertension can significantly influence oral health outcomes. Many patients in Nigeria and across Africa present to dental clinics without comprehensive medical histories, making dental consultations a potential opportunity for early detection and referral.¹² This aligns with the World Health Organization (WHO) and World Dental Federation (FDI) vision of integrating oral health into primary health systems, particularly in

low- and middle-income countries where oral and systemic health challenges are prevalent.^{13,14} In Nigeria, two studies conducted among dental patients in Lagos¹⁵ and Ile-Ife¹² reported systemic disease prevalence rates of 25.9% and 11.7%, respectively. Some patients present with one or more previously diagnosed systemic conditions, which may be well- or poorly controlled, while in others, medical conditions are first identified during dental visits.¹² A comprehensive understanding of systemic conditions among dental patients enables practitioners to better anticipate treatment implications, manage drug side effects, and improve interdisciplinary collaboration—ultimately leading to enhanced patient outcomes, reduced morbidity and mortality, and greater healthcare efficiency.^{12,16}

Understanding the prevalence of systemic diseases among adult dental patients is vital for improving treatment planning, ensuring patient safety, and fostering collaboration between dental and medical professionals. Such data can inform clinical practice, enhance patient outcomes, and guide healthcare policies related to integrated oral–systemic health.¹⁷ Although systemic disease rates have been reported from other tertiary dental clinics in Southwest Nigeria, data from Ibadan—a major tertiary dental center in the region—are lacking. Therefore, this study aimed to determine the prevalence and patterns of systemic diseases among adult dental patients attending a tertiary dental clinic in Ibadan, Southwest Nigeria.

METHODS

Study design: This was a retrospective cross-sectional study designed to document the prevalence and pattern of systemic diseases among adult dental patients at a tertiary dental center in Ibadan, Nigeria. Systemic diseases were defined as chronic conditions affecting the entire body or multiple organ systems. The study aimed to describe prevalence and patterns rather than identify independent predictors.

Study setting and population: The study was conducted at the Oral Diagnosis Clinic of the Dental Centre, University College Hospital (UCH), Ibadan—a tertiary referral center serving Ibadan, its environs, and beyond. The study population consisted of adult dental patients seen between January and June 2024. The sample size was determined by the total number of available records; no a priori sample size calculation was performed. The study was conducted and reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)

guidelines and the Declaration of Helsinki. This study is a subset of a decade-long retrospective study assessing patterns of oral diseases among dental patients. Ethical approval was obtained from the University of Ibadan/University College Hospital Ethics Committee (Approval Number: UI/EC/23/0674).

Selection criteria: Inclusion criteria comprised adult patients (aged >16 years) who presented at the dental clinic between January and June 2024 and had one or more documented systemic diseases. Exclusion criteria included patients with no history of systemic disease and those with incomplete documentation of systemic conditions. Systemic diseases were retrieved from self-reported medical histories. (Figure 1)

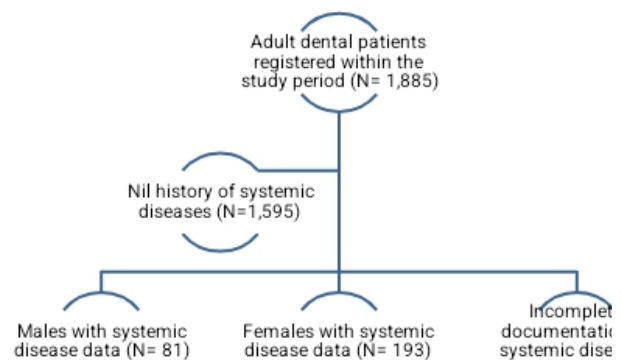


Figure 1 STROBE Flowchart of the study participants

Data Collection: Patient details were manually obtained from hospital records housed in the medical records unit of the dental clinic. Data retrieved included sex, age, occupation, tribe, religion, and systemic diseases.

Data Sources and Handling of Missing Data: Of the 290 patients with a history of systemic diseases, 16 were excluded from data analysis due to incomplete documentation. Systemic disease data were retrieved from patients' self-reported medical histories. To minimize selection bias, all patient records with complete information were included. Only 16 of the 1,885 records were excluded for incompleteness—a negligible percentage. Information bias resulting from poor documentation was mitigated through thorough record review and is acknowledged as a study limitation. The risk of misclassification bias due to self-reporting could not be mitigated given the retrospective study design.

Data Analysis: Data were analyzed using SPSS version 25. Continuous variables (e.g., age) are summarized as mean and standard deviation (SD). Categorical variables (sex, age groups, occupation, and individual systemic diseases) are summarized as counts and percentages. Prevalence and proportions

are presented with 95% confidence intervals (Wilson method). For bivariate comparisons of multiple versus single morbidity across sex and age (≤ 40 vs. >40 years—a categorization adopted for analytical convenience), risk ratios (RRs) with 95% CIs were calculated using the Katz log method. Fisher's exact test was used when expected cell counts were <5 ; otherwise, χ^2 tests were employed. A two-sided α of 0.05 was used for statistical significance.

RESULTS

Of the 1,885 adult patients seen during the six-month period, 274 had one or more documented systemic conditions, yielding a prevalence of 14.5% (95% CI: 13.0–16.2). Females comprised 70.4% (193/274) of this group, while males accounted for 29.6% (81/274). Ages ranged from 16 to 93 years, with a mean age of 51.7 (SD: 18.1). (Table 1)

Table 1: Socio-demographic features of the study participants

Characteristics	Frequency (N)	Percentage (%)
sex		
Male	81	29.6
Female	193	70.4
Age group		
16-30 years	49	17.9
31-45 years	48	17.5
46-60 years	77	28.1
61-100 years	100	36.5
Religion		
Christianity	219	81.1
Islam	51	18.9
Tribe		
Yoruba	249	91.5
Igbo	11	4.0
Edo/ Delta	11	4.0
Hausa	1	0.5
Occupation		
Business/ Trading	80	29.2
Entrepreneur/ Artisan	14	5.1
Professionals	45	16.4
Civil servants	18	6.6
Retired/ unemployed	60	21.9
Clergy	10	3.6
Students/ Corp members	33	12.0
Unidentified	14	5.2

Percentages sum to 100% including an 'Unidentified' category.

A total of 333 systemic conditions were identified from self-reported medical histories. Cardiovascular diseases, including hypertension, were the most frequently reported (153, 45.9%). This was followed by peptic ulcer disease/gastro-esophageal reflux disease (GERD) (98, 29.4%), Type 2 diabetes mellitus (38, 11.4%), asthma/allergy (16, 4.8%), arthritis/glaucoma (10, 3.0%), mental/neurological diseases (8, 2.4%), hemoglobinopathies (6, 1.8%), and hepatitis/human immunodeficiency virus (HIV) (4, 1.2%) (Figure 2).

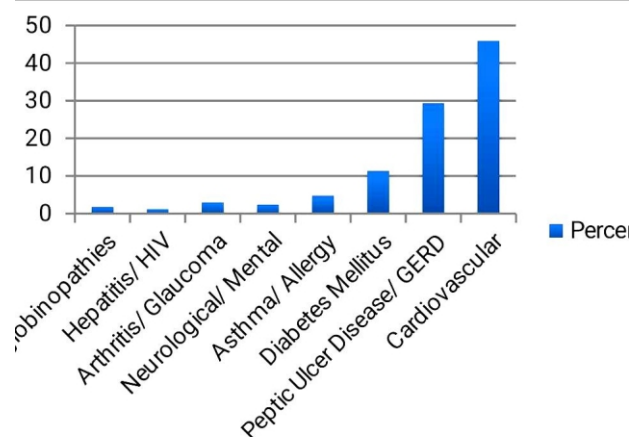


Figure 2 Pattern of systemic diseases among the study participants

Percentages represent the proportion of total conditions (n=333), not persons. For per-person prevalence among all 1,885 attendees and among the 274 with ≥ 1 condition. Single morbidity occurred in 216/274 patients (78.8%), while multiple morbidity was present in 58/274 (21.2%, 95% CI: 16.6–26.7). The most frequent combination of conditions was

hypertension with diabetes. Patients over 40 years of age had a significantly higher risk of multiple morbidity compared to those aged ≤ 40 years (RR 2.85, 95% CI: 1.35–6.00; Fisher's $p=0.0017$). In contrast, no statistically significant difference in risk was observed by sex (RR 1.25 for males vs. females, 95% CI: 0.78–2.02; $p=0.418$) (Table 2).

Table 2: Relationship between systemic disease pattern, age and sex of the study participants

Parameters	Systemic Diseases		p-value (*significant)	Risk ratio	95% Confidence Interval	
	Single N (%)	Multiple N (%)			Lower	Upper
Sex						
Male	61 (28.2)	20 (34.5)	0.418	1.25	0.78	2.02
Female	155 (71.8)	38 (65.5)				
Age group						
40years and below	70 (32.4)	7 (12.1)	*0.002	2.85	1.36	6.00
Above 40years old	146 (67.6)	51 (87.9)				

Row percentages shown; RR compares the risk in the second category with that in the first (e.g., >40 vs ≤ 40 ; male vs female). And note “p from Fisher’s exact (age) and χ^2 (sex); $\alpha=0.05$.

DISCUSSION

Findings: It is of utmost importance to ensure holistic assessment for adults seeking dental treatment who often may present with medical comorbidities, which could complicate the safety and effectiveness of their dental management. The prevalence of systemic diseases among adult dental patients in this study was 14.5%, which was slightly higher than the rates found by Oyetola et al.¹² and Tabrizi et al.¹⁸ but lower than that reported by Oluwarotimi et al.¹⁵ Hypertension was the most recurring medical condition found in this study which was in tandem with other study findings from Nigeria,^{12,15} India,^{7,19} Iran/Pakistan,^{10,18,20} and Australia.²¹ Periodontal disease, one of the foremost oral diseases, has been identified as contributing to the global burden of chronic diseases, particularly heart disease, which represents a major public health problem.²² Hence, management of hypertensive patients in a dental setting should be carefully addressed to avoid further cardiovascular complications. More importantly, the side-effects of the anti-hypertensive medication such as xerostomia, dysgeusia, gingiva hyperplasia, and oral lichenoid reaction may necessitate dental clinic visitation.^{21,23} Likewise, prolonged use of non-steroidal anti-inflammatory agents for pain control can attenuate the effects of anti-hypertensive medications and the use of local anaesthetic agents with vasoconstrictors could increase blood pressure.²³ Blood pressure measurement is an essential vital sign check prior to dental treatment. It is an opportunity for detecting undiagnosed

hypertension and facilitating early management thereby reducing the possibility of complications during and after dental treatment.²³

Peptic ulcer disease (PUD), a gastrointestinal disorder, was the second most common systemic comorbidity found in this study which few authors^{11,24} documented as the commonest among their dental patients. The peculiarity of this systemic condition necessitates utmost care in prescribing medications for dental treatment so as not to aggravate the PUD, particularly with non-steroidal anti-inflammatory agents. With recent advances in medical research, gastrointestinal diseases have recently been linked to periodontal infection. *Helicobacter pylori*, a major etiologic factor for gastritis and peptic ulcer disease, has been detected in subgingival oral biofilm, thereby acting as a reservoir for and leading to gastric reinfection.^{25–27} Diabetes mellitus (DM) is a chronic and complex metabolic disorder characterized by anomalies in either secretion or action of insulin on targeted tissues, or both. Some DM-related complications include impaired wound healing, neuro-sensory disorder, increased susceptibility to infections due to altered immune system, microvascular and macrovascular dysfunctions.²² In this study, DM was the third most common systemic disease as a single presentation pattern but was also found in co-existence with hypertension in one-tenth of our study population. Whereas, some studies documented DM as the most common systemic condition among their dental population.^{28–30} People with DM are prone to oral disorders such as fungal and bacterial infections, compromised oral wound healing, salivary gland dysfunction, halitosis,

burning mouth sensation, taste dysfunction, dental caries, and periodontal diseases resulting in tooth loss.³¹ Imperatively, dentists have a vital role in educating patients about glycemic control which could be a significant factor in predicting the severity and likelihood of oral complications. It is important to note that no adjustment for confounders was done.

The emerging evidence on the detrimental interrelationship of comorbidities and oral diseases is of marked significance.²² Multi-morbidities among dental patients pose a significant risk, not only to their dental treatment but also to their systemic health. One-fifth of the participants in this study had two or more combinations of systemic conditions, which is slightly higher than the reports by Siddiqi et al.¹⁰ Javali et al.¹¹ and Balkaran et al.³² In this study, there were more patients in the 6th decade of life and above which was similar to the study population reviewed by Oluwarotimi et al.¹⁵ but lower decades were more reported by Hamouda et al.⁸ Ali et al.³³ and Tabrizi et al.¹⁸ Significantly in this study, both single and multiple patterns of systemic diseases were seen among those above 40 years of age. Similarly, an Iranian study reported a significantly higher frequency of systemic diseases in those above 45 years of age compared to individuals younger than 45 years.¹⁸ Regarding single to multi-morbidity distribution, majority had single compared to multiple systemic conditions which was similarly reported by Siddiqi et al.¹⁰ A community-based study which assessed age and sex differences alongside pattern of comorbidities among DM patients revealed that persons aged ≥ 60 years were significantly more likely to have DM with other three comorbidities.³³ This emphasizes the necessity for routine medical screening for common systemic conditions among adult dental patients because this may allow early detection and prompt referral for management of unknown systemic diseases as documented by Oyetola et al.¹² Alternately, systemic conditions already diagnosed but uncontrolled may complicate dental treatment and vice versa. Hence, necessary precautionary measures should be properly instituted before commencing dental treatment for adult patients so as to avoid complications from either unknown or existing comorbid disease status.

The bi-directional association between oral health and systemic health has been well documented, revealing the significant impact of chronic diseases on the oral health status. Conversely, poor oral health can also worsen systemic conditions such as diabetes, cardiovascular diseases, peptic ulcer disease, renal disease, as well as HIV/AIDS.^{21,22,34,35} Promoting screening for systemic diseases by dental practitioners can facilitate an integrated health

promotion and early disease detection. A study which evaluated dentists' attitudes and practices on chairside screening for systemic diseases indicated that most dentists accepted medical screening as essential and were willing to incorporate it in their dental practices.³⁶ Continuing medical and dental education forums for relevant healthcare providers would help establish alliances to coordinate holistic care and to reduce the risk of medical emergencies in dental practice.³⁷

Implications: It is essential to ensure routine systemic health evaluation among adult dental patients. Adult patients who are above forty years of age presenting at the dental clinic, should be routinely screened for common systemic diseases like hypertension and diabetes. This would aid early diagnosis of those with unknown status, appropriate management of existing conditions and prevention of disease complications.

Trade-offs (Limitations): The findings from this study are limited to the documented clinical records of the patients. The findings are limited by the potential for incomplete and variable quality of documentation in clinical records. Some patients may have denied or refused to acknowledge their systemic disease status, with an attendant risk of underreporting. Also, variability in record-keeping among different dental practitioners may have introduced inconsistency, while the retrospective design limited control over the type and accuracy of data collected, increasing the risk of information bias. In addition, since the study population was drawn from a single tertiary dental facility, the results may not be generalizable to broader populations. Only descriptive and bivariate analysis was performed and we considered this adequate for a purely descriptive point of view. The limited inferential statistics was only significant for age, making multivariate analysis superfluous. Additionally, we also acknowledge the potential for misclassification since some patients might have denied systemic conditions or had undocumented diagnoses. Our single center design also limits generalizability beyond Ibadan, Nigeria.

Take-home (Conclusion): This study found a prevalence of systemic diseases of 14.5% among adult dental clinic attendees within a period of 6 months. Though hypertension was the most common singly occurring condition, one-fifth had a combination of it with other systemic conditions notably diabetes mellitus. A significantly higher proportion of those over forty years of age presented with multiple systemic diseases. This study highlights the importance of routine systemic evaluation for adult dental patients which could serve as an effective strategy for preventing systemic

complications through dental treatment and vice versa.

Expectations for Future Research: Cross-sectional or prospective studies with standardized data collection tools could improve the accuracy and completeness of information regarding patients' systemic health. A multi-center approach involving diverse population would enhance generalizability of the study findings. Also, metagenomic studies to assess bidirectional relationship between oral health and systemic disease through oral microbiome assay, may be the future direction of research.

Recommendations: Routine systemic evaluation for common comorbid conditions like hypertension, diabetes and peptic ulcer disease should be ensured among adult patients who present at the dental clinic. Furthermore, integrating electronic health records with standardized medical histories could minimize missing data and variability in documentation. We also recommend prospective multicenter studies with standardized tools for higher validity.

Conflicts of Interest: The authors declare no conflict of interest.

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