Evaluating the Association Between Hyperuricemia and Periodontitis: Evidence from a Targeted Literature Review

EPH21

Jayraj Patil, M.Pharm[1]; Manasa Vishnubhotla, MS[1]; Mahendra Kumar Rai, PhD[2]
[1]Trinity Life Sciences, Mumbai, India ; [2]Trinity Life Sciences, Singapore

INTRODUCTION

Background

- Globally, the prevalence of hyperuricemia ranges from 10–30% in Western countries to over 25% in some Asian populations, with higher rates in those consuming purine- and fructose-rich diets or those with obesity and insulin resistance.[1]
- Periodontitis is a highly prevalent condition, with advanced forms affecting 10–15% of the global population, leading to severe loss of supporting structures and substantial tooth loss, with higher prevalence among older adults and individuals with diabetes or cardiovascular diseases.[2]
- Like hyperuricemia, periodontitis is associated with chronic inflammation and oxidative stress, which are key drivers of tissue damage and systemic disease. Given these shared pathways, Hyperuricemia may contribute to the initiation and progression of periodontitis; however, the degree and relevance of this link are yet unclear.[3]

Objective:

To evaluate evidence on the association between serum uric acid abnormalities, including hyperuricemia and hypouricemia, and periodontitis in adults.

METHODS

A targeted literature review was conducted to identify and narratively synthesize PubMed-indexed evidence evaluating the association between serum uric acid abnormalities and periodontitis in adults.

Search strategy

- A targeted literature search was conducted in **PubMed** for studies published up to the May 2026**.**
- The search strategy incorporated both **MeSH terms** and **free-text keywords** related to Serum uric acid exposure and periodontal outcomes.
- **Search terms included:**
  - **Serum uric acid exposure:** “hyperuricemia,” “elevated uric acid,” and “serum uric acid”
  - **Periodontal outcomes:** “periodontitis” and “periodontal disease”
- Search terms were combined using the Boolean operators AND and OR.
- To ensure a comprehensive review, neither language nor article type limits were applied.

Eligibility criteria

Inclusion criteria

- Included adults aged (≥18 years)
- Biochemically assessed serum uric acid or clinically defined hyperuricemia/hypouricemia.
- Examined the association between hyperuricemia and periodontitis.
- Periodontitis assessed using clinical periodontal measures, diagnostic classifications, or periodontal indices, including clinical attachment loss (CAL) and probing pocket depth (PPD).
- Peer-reviewed

Exclusion criteria

- Included paediatric-only populations.
- Lacked an appropriate comparison or control group.
- Did not report a specific periodontal outcome.
- Were reviews, case series, or conference abstracts.

RESULTS

Screening and study inclusion

Using a thorough search across several databases, 187 records were found in total.

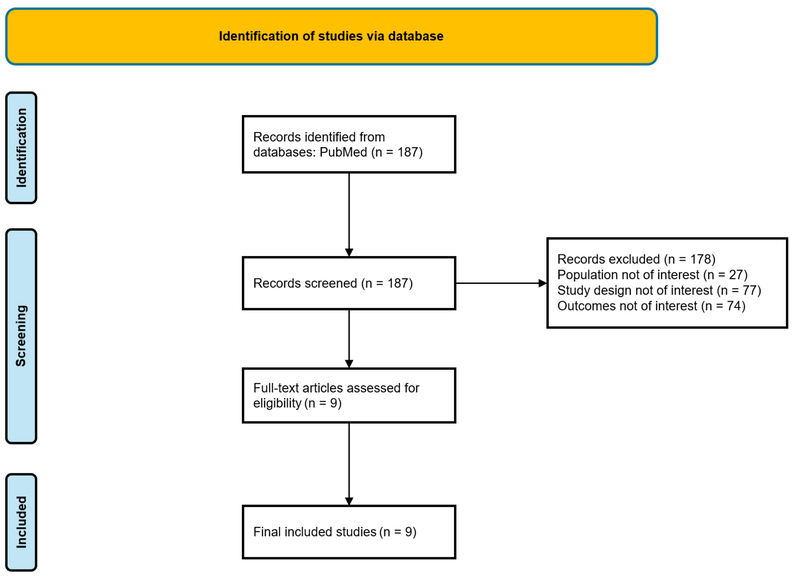

Figure 1. PRISMA flow diagram of study selection.

Study Characteristics

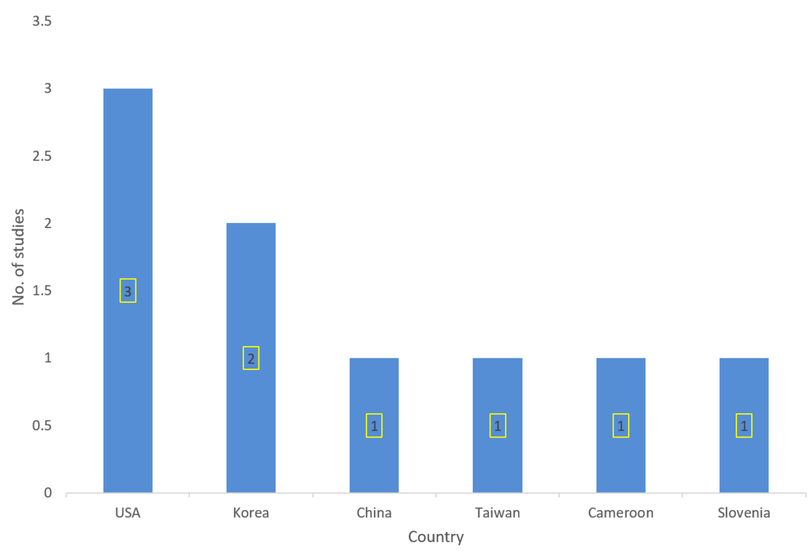

Figure 2. Geographic distribution of the studies.

Study Characteristics

- Nine studies comprising **205,180** participants from **6** countries were included: the USA, Korea, China, Taiwan, Cameroon, and Slovenia.
- Eight studies were **cross-sectional**, including one retrospective cross-sectional study, and one was reported as a prospective cohort study.
- Sample sizes ranged from **52 to 173,209 participants**, with study populations spanning national health surveys, community and clinical populations, adults with type 2 diabetes, and young military adults.
- Periodontitis assessment varied across studies and included **CDC/AAP criteria, CPI, PISA, CAL, PPD, and self-reported periodontal information**.
- Adjustment for potential confounders varied considerably, including demographic, metabolic, lifestyle, dietary, and oral-health-related factors.

Association Between SUA and Periodontitis

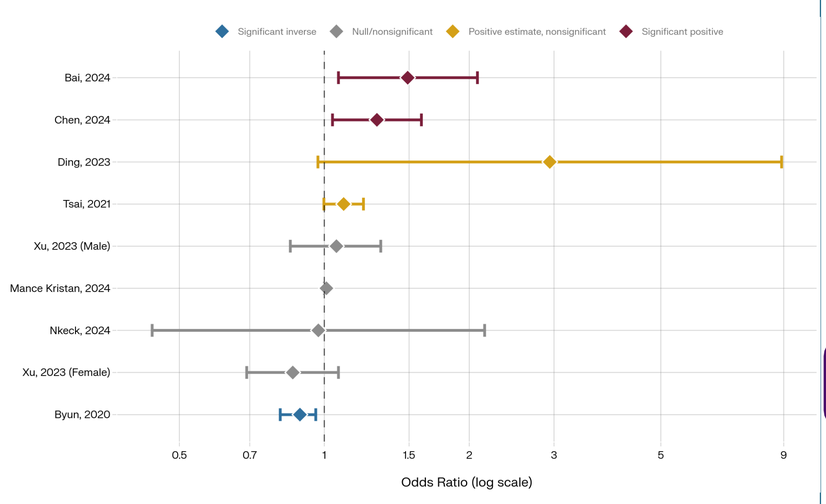

Figure 3: Forest-style summary of reported study-level odds ratios for periodontitis.

(**Note:** *Diamonds represent study-level odds ratios and horizontal lines represent 95% confidence intervals. No pooled estimate was calculated because of heterogeneity across studies. Joo et al. was not plotted because the effect estimate corresponding to the reported hypouricemia association was not available*.)

- Two US cross-sectional studies reported significantly higher odds of periodontitis with elevated SUA or hyperuricemia: Bai et al., OR 1.49 (95% CI 1.07–2.08), and Chen et al., OR 1.286 (95% CI 1.040–1.591).
- Positive but nonsignificant estimates were reported by Ding et al., OR 2.940 (95% CI 0.970–8.909), and Tsai et al., OR 1.097 (95% CI 0.998–1.206).
- Mance Kristan et al., Nkeck et al., and Xu et al. reported null or nonsignificant associations. In Xu et al., findings were nonsignificant in both females, OR 0.86 (95% CI 0.69–1.07), and males, OR 1.06 (95% CI 0.85–1.31).
- The only prospective cohort, Byun et al., reported modestly lower odds of periodontitis among participants with hyperuricemia: OR 0.89 (95% CI 0.81–0.96).
- Joo et al. found no significant association between hyperuricemia and periodontitis, OR 0.89 (95% CI 0.67–1.17), but reported increased periodontitis prevalence among individuals with hypouricemia.

Discussion

- Overall, study-level findings ranged from positive to null and inverse associations, indicating **no consistent direction of association** between SUA abnormalities and periodontitis.
- Differences in population characteristics, SUA definitions and thresholds, periodontal assessments, metabolic comorbidities, and confounder adjustment likely contributed to variability across studies.
- Although shared inflammatory, oxidative, and metabolic pathways provide biological plausibility, the current evidence does not establish a consistent or causal relationship between SUA dysregulation and periodontitis.

Limitations

- The targeted search was restricted to PubMed, and relevant studies indexed in other databases or reported in grey literature may have been missed.
- Eight of the 9 included studies were cross-sectional, limiting assessment of temporality and causality.
- Considerable heterogeneity was observed in: SUA exposure definitions and thresholds, periodontitis diagnostic criteria, study populations and clinical characteristics, adjustment for metabolic, behavioral, dietary, and oral-health confounders.
- Periodontitis assessment ranged from clinical criteria and indices to self-reported information, limiting direct cross-study comparability.
- Some studies had small or highly selected populations, which may limit generalizability.

Conclusion

- The available evidence does not demonstrate a consistent association between SUA abnormalities and periodontitis. Standardized longitudinal research is required before clinical or preventive implications can be established.

Abbreviations

AAP, American Academy of Periodontology; AL, attachment loss; BOP, bleeding on probing; CAL, clinical attachment loss; CDC, Centers for Disease Control and Prevention; CI, confidence interval; CPI, Community Periodontal Index; KNHANES, Korea National Health and Nutrition Examination Survey; KoGES, Korean Genome and Epidemiology Study; NHANES, National Health and Nutrition Examination Survey; NR, not reported; NS, not statistically significant; OR, odds ratio; PD, probing depth; PISA, periodontal inflamed surface area; PPD, probing pocket depth; PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses; SD, standard deviation; SE, standard error; SUA, serum uric acid; T2DM, type 2 diabetes mellitus; TLR, targeted literature review.

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- Disclosures: All authors are employees of Trinity Life Sciences and declare no other conflicts of interest.

References

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Contact

Manasa Vishnubhotla
mvishnubhotla@trinitylifesciences.com

Poster session 2 | Poster Code: EPH21 | Poster Session Date/Time: Monday, 7 September, 12:15-16:15