

Oral and kidney health: a neglected link in global disease burden

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The persistent disconnect between oral health and systemic disease management remains a critical oversight in primary care. While clinicians routinely manage chronic conditions like diabetes and cardiovascular disease, the foundational role of oral health in these broader pathologies often goes unaddressed. A recent systematic analysis for the Global Burden of Disease Study 2023, published in *The Lancet*, highlights this profound, yet frequently ignored, burden.¹

KEY TAKEAWAYS

- ° The Pivot: The Global Burden of Disease Study 2023 highlights oral diseases as significant contributors to overall health loss, often intertwined with systemic conditions like kidney disease.
- ° The Data: Oral conditions, including periodontitis and dental caries, are among the 375 diseases and injuries quantified, contributing to the global health loss framework.¹
- ° The Action: Clinicians should integrate oral health assessments into routine chronic disease management, particularly for patients with kidney disease, and advocate for collaborative care models.

The Global Burden of Disease Study 2023 (GBD 2023) provides a comprehensive audit of world health, meticulously quantifying health loss across 375 diseases and injuries and attributing burden to 88 risk factors.¹ This extensive analysis, spanning 204 countries and territories, including 660 subnational locations from 1990 to 2023, offers a granular view of evolving health metrics. It serves as a critical framework for informing public health priorities, especially in the post-COVID-19 era, where achieving global health ambitions faces persistent challenges.¹

Oral diseases, often perceived as isolated conditions, are integral to this global health market. The GBD 2023 framework explicitly includes oral conditions such as untreated dental caries, severe periodontitis, and other oral disorders within its 375 diseases and injuries.¹ These conditions contribute substantially to disability-adjusted life years (DALYs), reflecting years lived with disability and years of life lost due to premature mortality. The study's methodology involves a systematic synthesis of epidemiological data from various sources, including vital registration systems, surveys, and scientific literature, to estimate prevalence, incidence, mortality, and disability for each disease and injury.¹

The Interconnected Burden of Oral and Kidney Disease

While the GBD 2023 does not explicitly detail the direct causal pathways between specific oral diseases and kidney disease, its comprehensive nature allows for an understanding of their interconnected burden. Oral infections, particularly severe periodontitis, are known to induce systemic inflammation. This chronic inflammatory state can exacerbate or even initiate systemic conditions, including cardiovascular disease, diabetes, and chronic kidney disease (CKD). The GBD

2023's inclusion of periodontitis as a distinct disease entity highlights its recognition as a significant health burden in its own right, not merely a localised dental issue.¹

Patients with CKD frequently exhibit a higher prevalence and severity of oral health problems compared to the general population. This includes increased rates of periodontitis, dental caries, dry mouth, and oral mucosal lesions. The systemic inflammation and immune dysregulation characteristic of CKD contribute to this heightened susceptibility. Conversely, the chronic bacterial load and inflammatory mediators originating from periodontal disease can further burden an already compromised renal system, potentially accelerating CKD progression or increasing the risk of adverse cardiovascular events in this vulnerable patient group. The GBD 2023's broad scope, encompassing 375 diseases, implicitly captures these complex interdependencies by quantifying the overall health loss from each condition.¹

Quantifying the Health Loss

The GBD 2023 quantifies the burden of diseases using DALYs, a metric that combines years of life lost (YLLs) due to premature mortality and years lived with disability (YLDs).¹ For oral diseases, the burden is predominantly driven by YLDs, reflecting the chronic pain, functional impairment, and reduced quality of life associated with conditions like severe periodontitis and untreated dental caries. These conditions rarely cause direct mortality but impose a substantial, lifelong disability burden. The study's systematic analysis allows for a comparison of this burden across different age groups, sexes, and geographical locations, revealing disparities in access to oral healthcare and preventive measures.¹ For instance, untreated dental caries remains one of the most prevalent conditions globally, affecting billions of people. Its impact, while often not life-threatening, leads to significant pain, infection, and difficulty eating or speaking, contributing to a substantial portion of YLDs. Severe periodontitis, another major contributor, can lead to tooth loss and further systemic complications. The GBD 2023 methodology meticulously estimates the prevalence and severity of these conditions, translating them into DALYs, which then feed into the overall health loss framework. This granular data allows public health officials to pinpoint specific areas where interventions are most needed.¹

Risk Factors and Attributable Burden

The GBD 2023 also quantifies the risk-attributable health loss for 88 risk factors. While specific oral health risk factors are not detailed in the abstract, the overarching framework includes dietary risks (e.g., high sugar intake contributing to caries), tobacco use (a major risk factor for periodontitis and oral cancers), and poor hygiene practices.¹ These risk factors are not isolated; they often overlap and contribute to multiple disease burdens, including both oral and kidney health. For example, uncontrolled diabetes is a significant risk factor for both periodontitis and CKD. The GBD 2023's ability to disentangle the burden attributable to specific risks provides a powerful tool for targeted prevention strategies.¹ The study's systematic approach ensures that the burden estimates are comparable across different diseases and risk factors, allowing for a holistic understanding of global health challenges. This is particularly relevant for conditions like CKD, where multiple risk factors converge. The GBD 2023's framework helps to identify the proportion of CKD burden that could be averted by addressing modifiable risk factors, including those indirectly linked to oral health. This comprehensive view is essential for developing integrated public health policies that consider the full spectrum of disease determinants.¹

The Methodological Rigour of GBD 2023

The GBD 2023 study represents a monumental effort in epidemiological research, employing a highly standardised and transparent methodology.¹ The process involves several stages: data collection from diverse sources, including censuses, surveys, disease registries, and scientific literature; data standardisation and cleaning to ensure comparability; estimation of prevalence, incidence, mortality, and disability using sophisticated statistical models (e.g., DisMod-MR 2.1 for disease prevalence and incidence, and Cause of Death Ensemble model for mortality); and finally, calculation of YLLs, YLDs, and DALYs. The study also incorporates a rigorous uncertainty quantification, providing 95% uncertainty intervals for all estimates, which is critical for understanding the precision of the findings.¹

The collaborative nature of the GBD 2023, involving thousands of researchers globally, ensures a wide range of expertise and local knowledge is integrated into the analysis. This collaborative model enhances the validity and relevance of the findings for diverse geographical contexts. The continuous refinement of the GBD methodology over more than three decades has led to increasingly robust and reliable estimates, making it a cornerstone for global health policy and resource allocation. The inclusion of 660 subnational locations allows for a level of detail that is often missing in broader global analyses, enabling more targeted interventions at regional and local levels.¹

Where the Current Data Falls Short

The GBD 2023 abstract, while highlighting the overall burden of diseases and risk factors, does not provide specific, granular data on the direct epidemiological link between oral health conditions and kidney disease.¹ It quantifies the burden of each independently and attributes burden to various risk factors, but a detailed analysis of the causal pathways and the specific DALYs attributable to oral health issues in CKD patients is not presented in this summary. This represents a limitation for clinicians seeking precise numbers on the impact of oral interventions on renal outcomes. The study's focus is on the aggregate burden, which, while invaluable for policy, does not offer the mechanistic detail often desired for clinical practice. Still, the overarching message is clear: oral health is not an isolated domain. For a comprehensive understanding of patient health, clinicians should consider the interconnectedness of systemic conditions. The Oxford Handbook of Nephrology and Hypertension provides practical guidance across all forms of renal disease, often touching upon systemic links.

The GBD 2023 also reflects on the remaining post-COVID-19 challenges to achieving collective global health ambitions.¹ The pandemic exposed and exacerbated existing health inequalities and strained healthcare systems, potentially impacting access to routine dental care and, consequently, worsening oral health outcomes. This broader context is vital for interpreting the current burden estimates and planning future public health strategies. The study's comprehensive nature allows for a baseline against which the long-term impacts of such global health crises can be measured, providing a roadmap for recovery and resilience in health systems worldwide.¹

The absence of specific intervention data within the GBD 2023 framework means clinicians cannot directly infer the efficacy of particular oral health interventions on kidney disease progression from this paper alone. The study is an epidemiological audit, not an intervention trial. But it does provide the foundational evidence for the scale of the problem. Future research needs to focus on interventional studies that quantify the impact of improved oral hygiene and periodontal treatment on hard renal outcomes, such as eGFR decline, proteinuria, and progression to end-stage renal disease. This would provide the missing link for evidence-based clinical guidelines.¹

CLINICAL IMPLICATIONS

The GBD 2023 data reinforces a long-standing but frequently overlooked truth: oral health is not a separate entity from systemic health. For European GPs and specialists, this means the casual dismissal of dental complaints as 'just a toothache' is no longer tenable. The sheer scale of oral disease burden, as quantified by this global analysis, demands a more integrated approach to patient care, particularly in chronic conditions like kidney disease.

Clinicians managing patients with CKD should consider routine oral health screening and referral to dental professionals as a standard component of care. The systemic inflammatory load from untreated periodontitis is not a benign bystander; it is a contributing factor to the overall health decline in these vulnerable patients. Ignoring this link is to ignore a modifiable risk factor that could impact renal outcomes and overall quality of life.

The challenge lies in overcoming the historical silos between medical and dental practice. This requires education for both clinicians and patients, fostering a collaborative care model where oral health is seen as an integral part of chronic disease management. Without such integration, we will continue to see preventable health loss from conditions that are, in principle, manageable.

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