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Letter to Editor
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Challenges and Complexity of Dependency in Oral Data Analysis

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Letter to Editor

Creating oral health status indexes presents a range of theoretical and methodological hurdles. While the research and development in the field of oral health indexes are considerably less extensive compared to general health indexes, the ones that have been created so far often adhere to similar theoretical principles.

Analyzing dental data is challenging due to the likelihood of partial data dependence. In a study involving n patients as a subset of your research and N (where N > n) teeth in the analysis, how can we consider this sample to be purely independent? Many published articles treat such scenarios as independent data and select statistical methods to draw conclusions about the questions they raise. While it is acknowledged that the effect may not be highly significant, this approach may not be the most appropriate way of analysis in theory. What adds complexity to this task is that we are not just working on the tooth itself, but also on its surfaces and the surrounding oral and dental structures. In this context, I will discuss four to five specific surfaces, using tooth wear or caries as an example, which further complicates the issue of dependency. After 24 years of working as a biostatistician at the College of Medicine and dealing with data, it is evident that in research involving subjects (such as patients or organs), particularly in dentistry, the data often exhibit nesting, with multiple observations for everyone. This nesting can significantly impact the estimated parameters as well as their variances and covariances during the analysis. After 10 years of handling oral health data, I have come to understand that the nature of this data is distinct, and the methods by which indices estimate the prevalence of oral problems, such as the Decay, Missed, Filled Tooth Index (DMFT or dmft) or the Community Periodontitis Index (CPI), along with various other oral impairments, remain subjects for ongoing research and refinement.

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