

Impact of socioeconomic inequalities on dental caries in deprived children: a multilevel analysis

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Objectives: Inequalities have been reported between high, middle and low socioeconomic position (SEP) children. However, the effect of contextual and individual SEP on existing inequalities among socioeconomically deprived children varies between local contexts. The aim of this study was to assess the impact of contextual and individual SEP on individual caries experience among socioeconomically deprived children in Chile. **Methods:** Cross-sectional multilevel analysis of data from the 2015 electronic register of the National Board of School Aid and Scholarships (JUNAEB) of Chile. The contextual variables were the municipality Human Development Index (HDI) and rurality index. Individual variables included gender, living in extreme poverty and school grade. Multilevel negative binomial models assessed their impact on DMFT/dmft. **Results:** 112,429 children in 255 municipalities were included. Overall, contextual SEP (HDI) was not associated with caries experience in the primary or permanent dentition. Individual SEP (living in extreme poverty) was associated with caries experience in both dentitions. The proportion of children living in extreme poverty with caries experience in the primary teeth was 17% higher than children not living in extreme poverty (PR 1.17; 95% CI 1.15-1.19), while for children with permanent teeth it was 9% higher (PR 1.09; 95% CI 1.08-1.11). **Conclusion:** These findings could support the development of health strategies focused on individual SEP to efficiently reduce oral health inequalities among socioeconomically deprived children.

Keywords: Socioeconomic factors, child, poverty, caries

Introduction

Dental caries is considered a major public oral health problem worldwide, with severe and long-lasting consequences on children and their families (Peres *et al.*, 2007; Zaror *et al.*, 2022). Its distribution varies worldwide, with prevalence in up to 90% of children and adolescents in South America (Kassebaum *et al.*, 2017).

Current caries control is focused on eliminating etiological factors. However, this biological approach has been insufficient to address the prevalence of the disease in the broader population. From this perspective, knowing the social determinants that influence the process can be helpful in controlling this disease in the population. The social determinants framework for oral health inequalities provides contextual structural determinants an essential role in shaping the behaviours that cause oral diseases among populations (Watt and Sheiham, 2012). These contextual factors shape the individual socioeconomic position (SEP), which in turn influences behavioural, psychosocial and biological factors resulting in oral health inequalities. Contextual factors that have been associated with dental caries inequalities include the Human Development Index (HDI) and Rurality Index, among others. The latter with strong evidence of its association with dental caries in Chile (Giacaman *et al.*, 2018).

The relationship between individual SEP and dental caries has been studied extensively (Costa *et al.*, 2012). Evidence has been found of an association between low levels of education, social class and income with poor oral health. However, the association between contextual SEP and oral conditions varies across communities. A systematic review by Schwendicke *et al.* (2015) found that caries experience was distributed more disproportionately in high-income than low-income countries. Contextual differences can also be found within countries. Pattussi *et al.* (2006) found that individual SEP was associated with dental caries among Brazilian adolescents, rather than neighbourhood poverty. Conversely, Poon *et al.* (2015) reported that caries rates were lower in high-SEP neighbourhoods than low-SEP among 4-6-year-olds in British Columbia. Multilevel models allow investigation of the effects of both individual and contextual SEP on oral health independently. In studies using this approach, the socioeconomic context has been associated with dental caries at regional, municipality and neighbourhood level after adjusting for individual-level SEP. However, there are differences in the magnitude of dental caries inequalities between geographical areas and age groups (Priestnitz *et al.*, 2016; Lee *et al.*, 2012). Although the evidence shows that social determinants explain inequalities in the general population, it is not clear whether these