A scoping review of the links between early childhood caries and clean water and sanitation: the WHO's Sustainable Development Goal 6 (SDG 6)

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Background/Aim

Early childhood caries (ECC), which refers to dental caries in children younger than 6 years of age, is one of the most prevalent chronic oral diseases among children worldwide. Visible plaque on the teeth, as result of poor oral hygiene, has been cited as a major risk factor for ECC in multiple systematic reviews.

An estimated 26% of the world population is struggling for drinking water and 46% for sanitation impacting mostly populations living in poverty. United Nations' Sustainable Development Goal 6, aims to ensure access to clean and safe drinking water and sanitation for all. There appears to be a complex relationship between water and ECC that varies based on the local/country/regional trajectory along with economic development and the nutrition transition, which is further mediated by family practices – children's consumption of cariogenic foods and beverages, oral hygiene, fluoridation, and dental care.

There is little known about the impact of having access to clean water and sanitation and prevalence of ECC. The aim of this scoping review was to systematically map and synthesize current evidence on the links between access to clean water and sanitation and the prevalence of ECC.

Material and Methods

A scoping literature review was conducted to explore the existing evidence on the links between access to clean water and sanitation and ECC. This review was registered on the Open Science Framework and follows PRISMA-ScR guidelines. Thorough search in five databases and gray literature was completed in November 2023. The search targeted studies in both English and Spanish. Exclusions were made for studies solely focusing on ECC without a direct connection to clean water and sanitation. Descriptive statistics summarized the retrieved papers, ensuring a robust review process.

Results

Figure 1: PRISMA Flow Chart

There were no studies reporting a direct association between access to clean water and sanitation and the prevalence ECC.

Nine studies showed indirect associations through the links of:

- Water and sanitation access as a marker for poverty (n=1)
- Water consumption as a feeding practice (n=4)
- Effectiveness of water fluoridation (n=4).

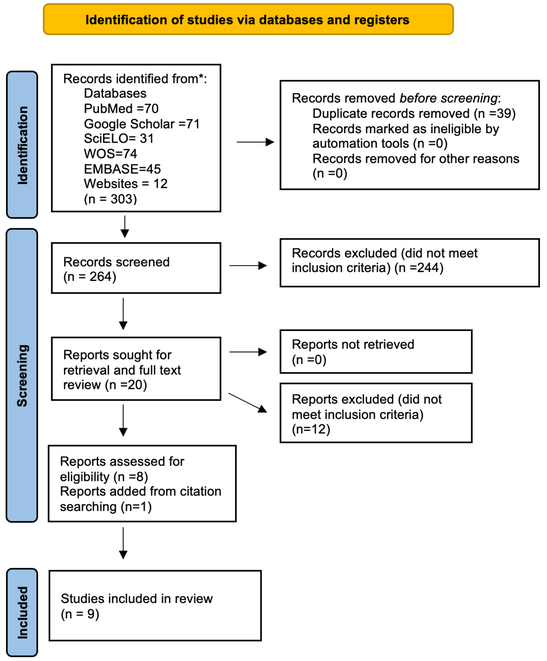
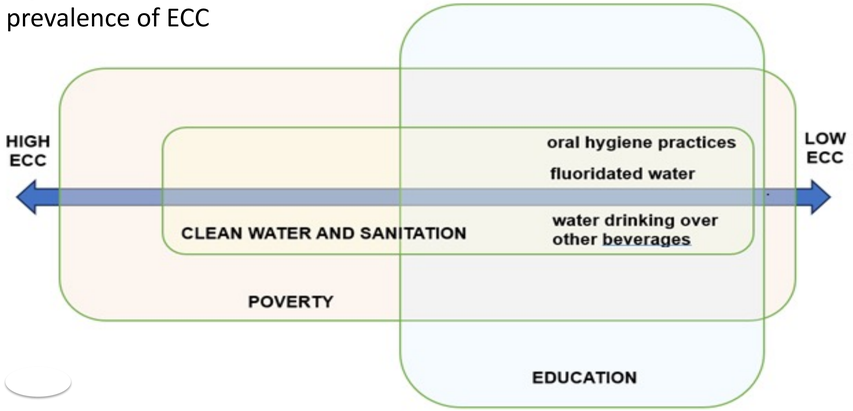


Figure 2: Conceptual model of clean water and sanitation's impact on the prevalence of ECC



Discussion

- ECC has low prevalence in low-income countries, highest prevalence in middle-income countries and lower prevalence in high income countries.
- ECC prevalence is high among people living in poverty even in high-income nations where access to clean water and sanitation is universal.
- Poverty is a dual risk factor affecting access to clean water and sanitation and education.
- Water fluoridation reduces the risk of ECC.
- Preventive education to parents may mediate the link between water access and ECC via the prioritization of water consumption over other beverages as well as adherence to practice good oral hygiene.
- Even though clean water and sanitation facilitates establishing oral hygiene practices and water drinking over other beverages, these factors seem to be more strongly related to education and in turn to poverty.

Conclusions

- Though it is plausible for there to be a direct association between ECC and access to clean water and sanitation, the current body of research-based evidence only provides evidence on indirect associations.
- The complexities identified underscore the importance of holistic strategies that address various determinants, aligning with the comprehensive goals of SDG 6.
- Further research and tailored interventions are essential for achieving sustainable improvements in water, sanitation, and hygiene which will also lead to better oral health outcomes.