Exploring Relationships Between Medication and Supplement Intake and Childhood Caries

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Background

- Caries is the most common chronic disease of childhood – early childhood caries (ECC) is characterized by the decay of primary teeth in children under 6 years of age
- The etiology of caries is multifactorial – it involves complex interactions among host factors, dietary habits, and microbial communities within the oral cavity
- The diverse ecosystem of the oral microbiome is influenced by various factors, including diet and environmental exposures
- Dysbiosis within the oral cavity may favor proliferation of cariogenic bacteria, increasing risk of ECC
  - Dysbiosis and decreased heterogeneity within the gut microbiome are linked to disease and may be influenced by drug interactions
- Antibiotic and over-the-counter (OTC) drug and vitamin administration, particularly those with high sugar content, may contribute to imbalances in the oral microbiome that are conducive to tooth decay

Purpose

To investigate relationships between medication and supplement intake (antibiotics, OTC medications, vitamins) and caries in young children. This study is a part of a pilot study exploring associations between oral and gut microbiomes, dietary intake, environmental exposures, and early childhood caries.

Methods

24 children (age 36-47 months) and their parents/caregivers (>18 years) were recruited at Columbia University's pediatric dental clinic

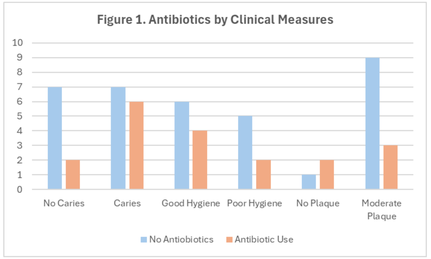
A verbally-administered survey assessed parent-reported behavioral (e.g., diet, medication and supplement use), dental and general health history, demographic, and socio-environmental exposures (e.g., household characteristics, adverse experiences)

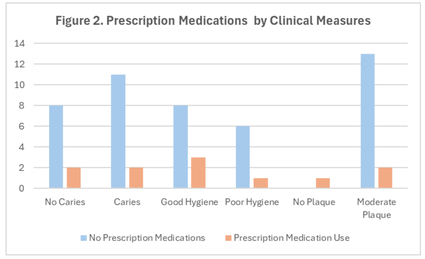
Caries status (dmfs: decayed/missing/filled tooth surfaces), oral hygiene index (good or poor), and visible plaque (none, moderate, severe) were documented per clinic protocol during routine dental exams

Clinical data were abstracted from electronic health records. Key variables were descriptively analyzed, and Chi-square and t-tests were conducted to assess relationships.

Findings

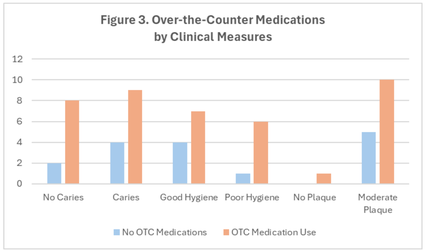
- 14 children had clinically-evident ECC, with an average dmfs of 8.5 (range: 1-26)
- Over 1/3 of all children have reportedly ever taken antibiotics (35%; n = 8)
- Differences were observed, including lower caries and plaque levels, but they were not statistically significant

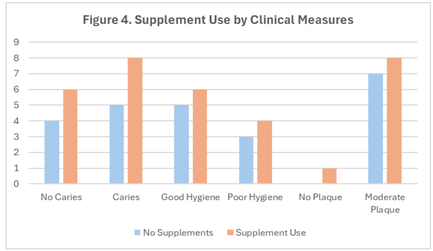




- Few children had reportedly ever taken prescription medications (17%; n = 4)
- Differences observed in clinical measures were not statistically significant

- Nearly 3/4 of children had reportedly ever taken over-the-counter medications (74%; n = 17)
- OTC medications included reports of Tylenol, Ibuprofen, and Benadryl use
- Differences observed in clinical measures were not statistically significant





- Over half of children have reportedly ever taken supplements (61%; n = 14)
- Supplements included daily multivitamins and Vitamin D
- Differences observed in clinical measures were not statistically significant

Findings (continued)

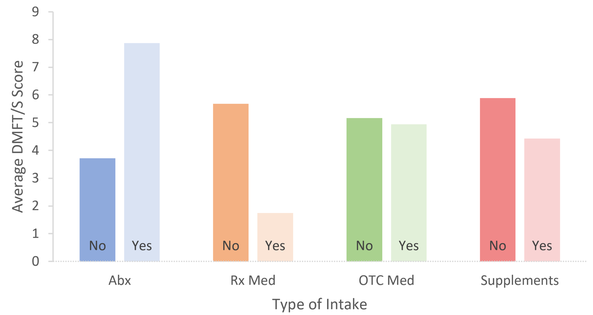


Figure 5. Average **dmft/s** scores per Medication and Supplement Intake

- No statistically significant associations were found between medication and supplement intake and caries severity (dmfs score)

Limitations

- Small sample size limits the study's power to detect statistically significant differences in measures and limits generalizability of findings
- Survey responses may present recall biases
- Missing data regarding types of antibiotics and prescription medications, and limited parental recall of administration timing preclude ability to assess likely impacts of exposures on clinical outcomes
- This small pilot of single measure assessment does not permit assessment of causal relationships

Conclusions

- Medication and supplement use appears very common among 3-year-old children, providing important insight, as supplements and OTC medications may be underreported in clinical records
- Though not statistically significant, findings suggest a potential relationship between antibiotic and medication use and caries, warranting further exploration
- Oral hygiene and environmental factors (diet, home care practices) may also modulate these associations, making their inclusion in follow-on research essential
- Data highlight the importance of further investigation into pharmacologic exposures and oral health in early childhood, particularly among those supplements and medications high in sugars (e.g., gummy and chewable vitamins, and cough, cold, and allergy syrups)