

Pediatric Nutritional Drink Supplement Consumption and Early Childhood Caries

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Introduction:

- Dental decay has multifactorial etiology; existing research has shown that caries is associated with sugar consumption. While there is evidence demonstrating the cariogenic effects of sugar-containing and sugar-sweetened beverages such as juice and soda, there is no research specifically investigating the effect of Nutritional Drink Supplements (NDS) usage on oral health.
- NDSs have been recommended by the American Academy of Pediatrics to provide nutrients for individuals with undernutrition and growth faltering¹. Parents or guardians may purchase NDSs for their child with or without a pediatrician's recommendation. NDSs are increasingly marketed toward and consumed by healthy children despite their original formulation for undernourished children.
- One serving of Pediasure, a popular NDS, contains 9-12 grams of sugar²; multiple servings of NDS a day may exceed the American Heart Association's limit of 25 grams of added sugar a day for children over age 2³.

Purpose:

- The purpose of this study is to determine the association between pediatric NDS usage and dental caries in the pediatric population.

Materials and Methods:

Study Population and Analysis:

- This study is a retrospective chart review of Boston Medical Center patients ages 6 or younger who had a dental exam between June 2015 and June 2023.
- Medical, dental, and demographic data was gathered through Boston Medical Center's Clinical Data Warehouse and analyzed through manual data entry.
- Cases were identified as patients who consume any formulation of the popular NDSs "Pediasure", "Ensure", or "Boost". Controls were identified as patients who did not have NDS consumption recorded in their medical record.
- 694 subjects were included in this data set.
- Data analysis was conducted using Microsoft Excel.

Definitions and Abbreviations:

- NDS:** Nutritional Drink Supplement
- Early Childhood Caries (ECC):** presence of 1 or more decayed (noncavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child 71 months of age or younger⁴.
- Severe Early Childhood Caries (S-ECC):** In children younger than 3 years of age, any sign of smooth-surface caries; From ages 3 through 5, 1 or more cavitated, missing (due to caries), or filled smooth surfaces in primary maxillary anterior teeth or a decayed, missing, or filled score of ≥ 4 (age 3), ≥ 5 (age 4), or ≥ 6 (age 5) surfaces⁴.

Results:

Table 1. Description of sample (n=694)

Pediasure status	
Cases (NDS)	36.7% (n=255)
Controls (non-NDS)	63.3% (n=439)
NDS average starting age (n=255)	2.3 years (SD=1.3)
Gender	
Female	35.6% (n=247)
Male	64.4% (n=447)
Language spoken	
English	60.1% (n=417)
Haitian Creole	18.7% (n=130)
Spanish	7.6% (n=53)
Other	12.1% (n=84)
Caries status	
% with ECC	41.9% (n=291)
% with S-ECC	26.2% (n=182)

Table 2. Bivariate Analysis

	% with ECC	P value*	% with S-ECC	P value*
NDS	49.4%	0.0023	34.1%	0.0003
non-NDS	37.6%		21.6%	
* Statistical significance based on chi-square test, with $P \leq 0.05$ in bold text				
	Average age of ECC onset	P value**	Average age of S-ECC onset	P value**
NDS	4.31 years (SD=1.4)	0.0166	4.13 years (SD=1.4)	0.34
non-NDS	4.69 years (SD=1.3)		4.31 years (SD=1.2)	
** Statistical significance based on unpaired T-test, with $P \leq 0.05$ in bold text				

References:



Conclusions:

- These results indicate that children ages 6 and under who consume NDSs have higher rates of ECC and SECC than those so do not consume NDSs.
- Children who frequently consume NDSs should receive dental preventative care and education to mitigate their heightened caries risk.
- This study did not collect data regarding duration or frequency of NDS consumption, important factors in caries initiation and progression.
- Further research is needed to determine existence of a causal relationship between NDS consumption and caries and to investigate the roles of factors such as social determinants, medications, and medical conditions which may contribute to caries risk in this population.

