



## ABSTRACT

Objective: To investigate the potential link between Body Mass Index (BMI) and dental caries prevalence in children ages 0 to 18, using data from the National Health and Nutrition Examination Survey (NHANES) 2017– March 2020. It is hypothesized that higher BMI is correlated with an increased prevalence of dental caries due to shared risk factors such as diet, socioeconomic conditions, and lifestyle behaviors. Methods: Retrospective analysis performed of NHANES database, with dental caries prevalence as primary outcome of interest, measured using the Decayed, Missing, and Filled Teeth (DMFT) index for permanent teeth and the dmft index for primary teeth. A random forest algorithm identified significant predictors of dental caries, including BMI and other potential confounders, which were controlled for in this study. Results: BMI had a small but significant negative association with caries prevalence. Specifically, for each unit increase in BMI, the odds of the outcome decreased by 1.56%. Thus, higher BMI is associated with a slightly lower likelihood of caries. Higher family poverty levels were linked to a 7.64% increase in the odds of having caries (p < 0.0001). Oral hygiene also played a role, with each additional time per day of brushing reducing the odds of having caries by 12.58% (p < 0.0001). Finally, higher total daily sugar intake was associated with a small increase in odds (0.37%, p = 0.001), and being born outside of the country increased the odds by 11.43%(p = 0.020). A Pearson correlation test found a significant positive association between BMI and sugar intake, but the effect was negligible.

Conclusions: Higher BMI is associated with lower caries prevalence. Higher family poverty levels are associated with higher caries prevalence. Individuals born outside of the USA experience greater caries prevalence than those born in the USA.

## BACKGROUND

- The World Health Organization (WHO) reports that 60–90% of schoolchildren worldwide experience caries, with the greatest prevalence in Asian and Latin American countries .<sup>(4)</sup>
- Dental caries and overweight/obesity share several predisposing factors such as diet, lifestyle, genetics, socioeconomic status, and other environmental factors. Frequent consumption of sugar and refined carbohydrates has been proven to be the predominant cause of dental caries.<sup>(4)</sup>
- However, one study finds that underweight children are more likely to have more severe caries; two reasons are that 1) untreated caries might cause severe discomfort in children and thus reduce food intake, and 2) caries can also lead to irritability and disturbed sleeping habits, which might reduce the quality of life and affect growth. In addition, underweight children may be picky eaters, thus leading to ingestion of more carious, unhealthy foods. Malnutrition could also predispose children to dental caries, as deficiencies in protein may lead to decreased salivary flow, calculus formation, enamel hypoplasia, high levels of caries and reduced growth. <sup>(1,2,4)</sup>

## OBJECTIVE

This study aims to investigate the potential link between BMI and dental caries prevalence in children ages 0 to 18, using data from the National Health and Nutrition Examination Survey (NHANES) 2017–March 2020. It is hypothesized that higher BMI is correlated with an increased prevalence of dental caries due to shared risk factors such as diet, socioeconomic conditions, and lifestyle behaviors.

## METHODS

Retrospective analysis using data from the NHANES 2017–2020 database. •The primary outcome of interest was dental caries prevalence, measured using the Decayed, Missing, and Filled Teeth (DMFT) index for permanent teeth and the dmft index for primary teeth. The study included thousands of children randomly selected from the database. Confounding variables, including demographics, dietary factors, oral hygiene practices, and physical activity were controlled for in the analysis.

A random forest algorithm was employed to identify significant predictors of dental caries, including BMI and other potential confounders.

# **The Correlation between BMI and Caries Prevalence** in Pediatric Populations

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## RESULTS

- BMI had a small but significant negative association with caries prevalence. For each unit increase in BMI, the odds of the outcome decreased by 1.56%.
- Higher family poverty levels were linked to a 7.64% increase in the odds of having caries (p < 0.0001).
- With each additional time brushing per day, the odds of having caries decreased by 12.58% (p < 0.0001).</p>
- Being born outside of the country increased the odds of having caries by 11.43% (p = 0.020). • A Pearson correlation test was conducted to assess the relationship between BMI and sugar – there was a
- significant positive association but with negligible effect.



Table 1: This table presents the odds ratios, 95% confidence intervals, and p-values for key variables associated with health outcomes. In ascending order of significance from bottom to top, the variables include family poverty level, Body Mass Index (BMI), frequency of teeth brushing, daily sugar intake, and country of birth. Statistical significance is indicated by p-values less than 0.05, with confidence intervals not including 1, providing insights into the relationships between these factors and the outcome of interest.

## CONCLUSIONS

- Higher BMI is associated with lower caries prevalence.
- Higher family poverty levels are associated with higher caries prevalence.
- Individuals born outside of the USA experience greater caries prevalence than those born in the USA.

### **References:**

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Higher total daily sugar intake was associated with a small increase in caries experience (0.37%, p = 0.001)