

Relationship Between BMI and Caries Risk in Pediatric Dental Patients

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Purpose

The objective of this study is to assess for possible relationships between body mass index (BMI) and caries risk status (CRS) in pediatric patients 7-14 years of age, receiving oral health care at BronxCare Health System Pediatric Dental Clinic.

Introduction

- The CDC reports as children grow older, obesity prevalence gradually increases. During the years 2017-2020, the CDC reported obesity prevalence of 12.7% among 2- to 5- year-olds, 20.7% among 6- to 11- year-old, and 22.2% among 12- to 19-year-olds.
- Childhood obesity and early childhood caries have been prioritized as a health focus for the last 20 years according to Healthy People 2020 and 2030 health initiatives.^{2,4}
- Many studies have correlated BMI and presence of caries with varying outcomes, but few studies have associated BMI with caries risk status. Additionally, the focus of various studies have been on early age children (6 years of age), but more data is needed to describe associations in preteen and adolescents.³
- It is hypothesized for this study that as BMI increases there is a positive correlation with high caries risk status in children ages 7-14 years of age.

Methods

Inclusion Criteria

- A retrospective chart review of dental records from BronxCare Health System Pediatric Dental Clinic between August 2022 and January 2023.
- Pediatric patients between the ages of 7-14 years old presenting for comprehensive oral exam (COE) or periodic oral exam (POE).
- Patients with ASA I or II classification.
- Charts were limited to a 6 months interval in order to avoid duplication of the visit.
- Charts with documented BMI (classifications: Underweight, Healthy weight, Overweight or Obese).
- Charts with diagnosed CRS (classifications: Low, Moderate or High).

Exclusion Criteria

- Pediatric patients younger than 7 years old and older than 14 years old.
- Pediatric patients who were seen by a dental provider less than 6 months prior to COE or POE visit.
- Pediatric patients who received dental cleaning at less than 6 months frequency.
- Patients with ASA III or IV classification, or who have a physical or mental disability.
- Charts with unrecorded height and weight.
- Charts with undiagnosed CRS.

A total of 1835 charts were reviewed and 1473 charts met the criteria for the study.

Tests

- Data was analyzed using chi-square and Fischer exact test, with a significance level of p value < .05.

Results

- Due to lack of patients in the underweight, overweight, low CRS and moderate CRS categories, the study was limited to compare patients categorized as healthy weight or obese with high CRS across all ages and biological sex. (Figures 1 and 2).
- Chi-square showed no statistical significance (p value = .208) for healthy weight vs obese high caries risk status patients by biological sex.
- When assessing the female vs male high CRS population, only the male population showed statistical significance (p value = .026; Figure 3) between the healthy weight and obese high caries risk patients.
- Furthermore, within the male population, it was identified that 10 year olds was a potential transitional age from obesity to healthy weight in high CRS patients (p value = .009; Figures 4 and 5).

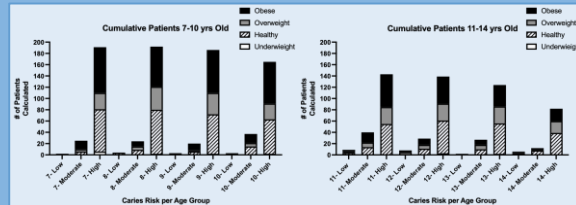
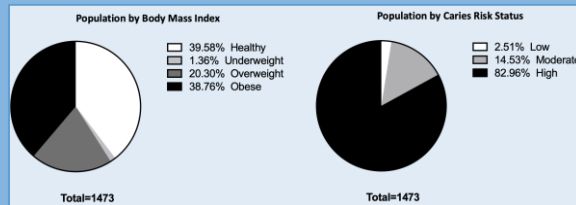


Figure 1. Distribution of BMI and CRS in BronxCare Health Systems Pediatrics Dental Population

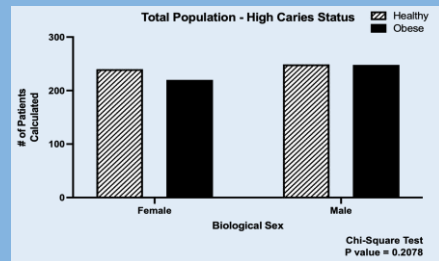


Figure 2. Total population categorized by biological sex

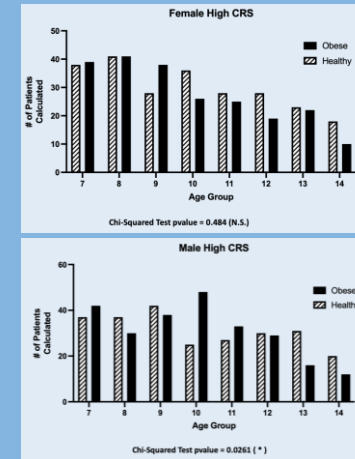


Figure 3. Distribution of healthy and obese high CRS patients by age and biological sex

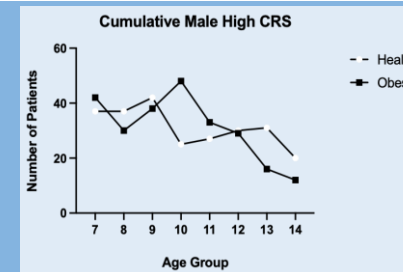


Figure 4. Trend of age and BMI in high CRS male patients

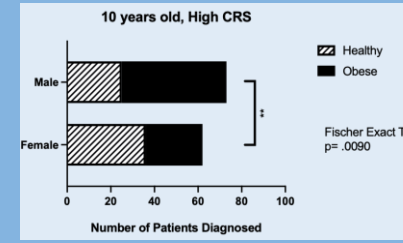


Figure 5. Healthy and obese ratio in 10-year-old male patients statistically differ when compared to the female population

Discussion

- There was a limited number of patients seen in the 7-14 years of age category that were classified as underweight, overweight, low CRS or moderate CRS.
- Approximately 83% of the cumulative 7-14 year olds was classified as high CRS and 80% was confirmed as healthy weight or obese. Therefore, a true correlation could not be observed for 7-14 year olds.
- Comparisons drawn from the collected population showed that 10 year old males with high CRS may be at higher risk of being obese. All other age categories did not show a significant difference.
- Confounding factors to this project are differing diet, socioeconomic education of households, family income, pubertal growth, religion, cultural background, and immigrant status.
- A longitudinal study observing the same patients across multiple years may be a better design.

Conclusion

- Pediatric dental patients 7-14 years of age seen at BronxCare Health System Pediatric Dental Clinic, are at high risk for caries, regardless of biological sex.
- Obese 10 year old pediatric dental male patients can be at an increased risk for high CRS.
- More studies are needed to confirm a correlation of BMI and CRS.

References

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