Maternal Factors and Birth Delivery Impact on Severe Early Childhood Caries

Ines Lau[1], Leda Mugayar[1], Scott Tomar[2], Sobia Bilal[2], Khatija Noorullah[2], Majd Alsaleh[1]

[1]Department of Pediatric Dentistry , UIC College of Dentistry, Chicago, IL
[2]Department of Prevention and Public Health Sciences, UIC College of Dentistry, Chicago , IL

Background

- Early Childhood Caries (ECC) is defined as the presence of one or more decayed (non-cavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth of a child under six years of age.
- Severe Early Childhood Caries (SECC) is characterized by any sign of smooth-surface caries in a child younger than three years.
- It is a significant public health issue linked to pain, feeding and sleep difficulties, school attendance, emotional & social problems, and financial strain on families and healthcare systems.
- SECC is multifactorial in origin, and early intervention and prevention efforts rely on identifying potential contributing factors as early as possible.

Objectives and Hypotheses

- The study examined the association between SECC and maternal illness during pregnancy, cesarean vs. vaginal delivery, and preterm vs. full-term birth in a university-based infant oral health clinic.
- We hypothesized that there is a difference in the likelihood of developing Severe Early Childhood Caries (SECC) based on maternal illness during pregnancy, mode of delivery (vaginal vs. cesarean), or gestational age at birth (full-term vs. preterm).

Methods

- A retrospective review of axiUm® electronic health records from patients aged 0 to 3 years who received a COE or POE between 8/1/2021 and 8/31/2023.
- 521 out of 801 patient records were analyzed using SPSS statistical software.
- Associations between dmfs scores /categories and each predictor were evaluated using Kruskal-Wallis rank sum & Fisher's exact tests.
- p-values were reported, with values <= 0.05 being statistically significant distributions in the subgroups being compared.

Results

- The study cohort had a nearly equal gender distribution,(Male; n=262, 50.3%, Female; n=259, 49.7%).
- Regarding maternal health during pregnancy, the majority were healthy (Non-Sick mothers; n=407, 79.5%, Sick, n=105, 20.5%). For pregnancy term, most births were full-term, (full term, n=448, 86.8%, Preterm, n=68, 13.2 %). For the mode of delivery, vaginal births were predominant, (Vaginal, n=375, 74.4%, C-section, n=129, 25.6%).
- The mean dmfs score across the cohort was 0.1 (SD 0.1) with a range from (0.0-0.5), as follows (Figure 1)

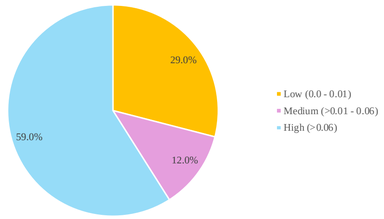

Figure 1: dmfs score categorical.

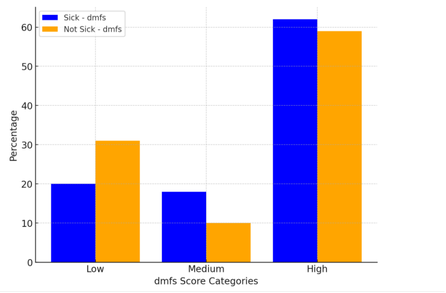

Figure 2: Comparison of dmfs score categories by maternal health during pregnancy. p= 0.017 using Fisher exact test.

Results

Maternal illness and dmfs score

- The analysis of dmfs scores indicates that children born to mothers who were ill during pregnancy had slightly higher scores (median: 0.13, mean: 0.16) compared to those born to healthy mothers (median: 0.10, mean: 0.13).
- The Kruskal-Wallis test yielded a significant p-value (0.042), suggesting a potential association between maternal health during pregnancy and children's dental health.

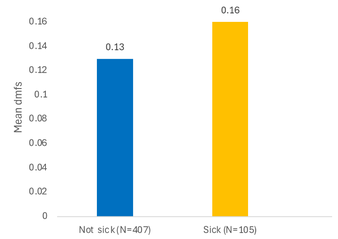

Figure 3: Maternal illness and mean dmfs score with p value = 0.042.

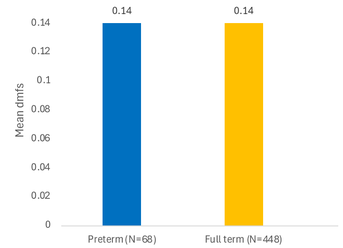

Figure 4: Pregnancy term and mean dmfs score with p value = 0.65.

Pregnancy Term and dmfs score

- The analysis of dmfs scores indicates that children born to mothers who were ill during pregnancy had slightly higher scores (median: 0.13, mean: 0.16) compared to those born to healthy mothers (median: 0.10, mean: 0.13).
- The Kruskal-Wallis test yielded a significant p-value (0.65), suggesting no significant association between maternal health during pregnancy and children's dental health.

Birth Mode and dmfs score

- The analysis indicates that dmfs scores are similar between children born via vaginal delivery and C-section, with slight differences in medians (0.12 vs. 0.08) and means (0.15 vs. 0.13).
- The Kruskal-Wallis test (p = 0.076) suggests no statistically significant difference between the groups, though the result is close to significance.

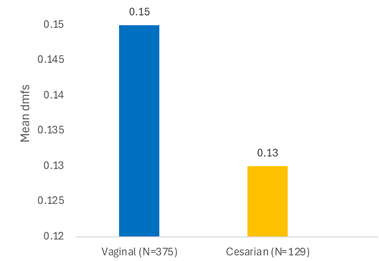

Figure 5: Birth mode and mean dmfs score with p value = 0.076.

Conclusions

From the results of this study, the following conclusions can be made:

- Maternal health during pregnancy may influence children's dental health, with higher dmfs scores observed in children born to mothers who were ill during pregnancy.
- No significant differences in dmfs scores were found based on pregnancy term (PT vs. FT) or mode of delivery (vaginal vs. C-section).
- Other confounding factors such as socioeconomic status, dietary habits, oral hygiene, access to dental care, and genetic predisposition may also play a role in early childhood dental health.

Acknowledgements

- Rachel Lane, MS CCTS – Biostatistics Core
- The statistical analysis presented was supported by the University of Illinois Chicago Center for Clinical and Translational Science (CCTS). CCTS is supported by the National Center for Advancing Translational Sciences, National Institutes of Health (NIH), through Grant UL1TR002003. The content is solely the responsibility of the authors.
- IRB Protocol STUDY2023-0609

References