Socioeconomic And Behavioral Factors Associated With Salivary Cortisol

Haizel Botwe, DMD, MSc
Howard University/College of Dentistry

INTRODUCTION

Dental anxiety is a common barrier to care in pediatric patients and is associated with increased physiologic stress. Salivary cortisol is a well-established biomarker used to assess stress and hypothalamic-pituitary-adrenal axis activation. In pediatric dental settings, isolation technique may function as a sensory exposure during treatment and may influence a child's physiologic stress response. At the same time, broader social and behavioral factors may also shape baseline stress before treatment. Understanding these relationships may help improve behavior guidance strategies, patient-centered care, and future research in underserved pediatric populations.

Purpose: To evaluate the association between socioeconomic and behavioral factors and salivary cortisol levels in pediatric dental patients, while also comparing cortisol change between cotton roll and Isolite isolation during sealant placement.

METHODS

- **Study Design and Setting**: Split-mouth randomized pilot study conducted at the Howard University College of Dentistry Pediatric Clinic.
- **Population**: Pediatric patients ages 6 to 18 years scheduled for bilateral sealants.
- **Inclusion Criteria**: Patients able to provide saliva samples with corresponding clinical and demographic data.
- **Exclusion Criteria**: Medical conditions or medications affecting cortisol levels; incomplete or unusable data.
- **Study Structure:** Each participant underwent two visits, one with cotton roll isolation and one with Isolite isolation. The order of isolation technique was randomized.
- **Ethics**: Study conducted under an IRB-approved protocol.

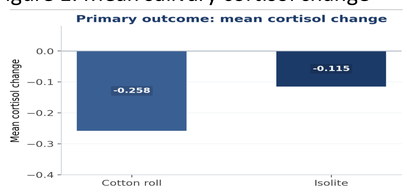
METHODS

- **Primary Variable**: Stress compared using cotton roll isolation vs Isolite (within-subject).
- **Primary Outcome:** Salivary cortisol collected pre/post procedure, stored on ice, analyzed by **ELISA**.
- **Patient Preference:** Preference for isolation technique obtained following treatment.
- **Secondary Variables:**
  - **Insurance** category as a proxy for SES status
  - **Ward** as a neighborhood-level SES proxy
  - **Appointment compliance** as a behavioral/access variable
  - **BMI** as a physiologic/contextual variable
- **Analysis** performed in SPSS

RESULTS

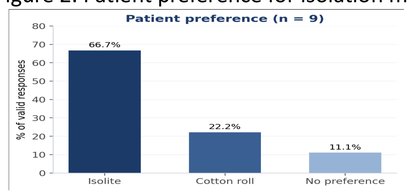
A total of **15 participants** were included in the study.

Figure 1. Mean salivary cortisol change



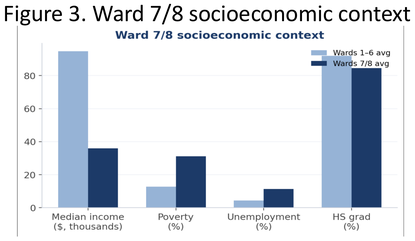
Cortisol decreased under both isolation conditions, with **no significant difference** between cotton roll and Isolite (**p = 0.515**).

Figure 2. Patient preference for isolation method



Among participants with valid responses (n = 9), 66.7% preferred Isolite, 22.2% preferred cotton roll, and 11.1% reported no preference.

Figure 3. Ward 7/8 socioeconomic context



Among participants with valid ward data (**n = 14**), **42.9% lived in Wards 7 and 8**. Compared with the average of Wards 1 to 6, Wards 7 and 8 had **lower median income, higher poverty, higher unemployment, and lower educational attainment**.

RESULTS

Secondary analyses: Baseline pre-treatment salivary cortisol before cotton roll isolation showed:

- **Missed appointments:** weak positive correlation, **r = 0.278, p = 0.336**
- **BMI:** very weak positive correlation, **r = 0.179, p = 0.541**
- **Ward of residence:** no significant difference across wards, **H(5) = 3.352, p = 0.646**
- **Insurance category:** no significant difference across groups, **H(2) = 0.985, p = 0.611**
- **Ward context:** Of 14 participants with valid ward data, **6 (42.9%)** lived in **Wards 7 and 8**, the most socioeconomically vulnerable wards in DC.
- **Additional exploratory analysis:** Mean BMI was higher among participants from **Wards 7/8** than all other wards combined (**23.68 vs 21.03**), though the difference was not statistically significant (**Mann-Whitney U = 16.00, p = 0.302**).
- **Preference:** Among 9 participants with valid responses, **66.7% preferred Isolite, 22.2% preferred cotton roll**, and **11.1% reported no preference**.

CONCLUSION

- No statistically significant difference in salivary cortisol change was observed between cotton roll and Isolite isolation during sealant placement. Secondary analyses also did not identify statistically significant associations between baseline salivary cortisol and missed appointments, BMI, insurance category, or ward of residence. However, a substantial proportion of participants with valid ward data lived in **Wards 7 and 8**, highlighting the importance of considering neighborhood-level socioeconomic vulnerability in pediatric dental stress research. Although this pilot study was underpowered, the findings suggest that larger, fully funded studies should continue to investigate how social and behavioral factors influence physiologic stress, dental anxiety, and oral health outcomes in underserved pediatric populations.

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- American Academy of Pediatric Dentistry. Behavior guidance for the pediatric dental patient.
- Relevant District of Columbia ward-level socioeconomic data source. https://censusreporter.org/profiles/61000US11007-ward-7-dc/

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