



Understanding Parental Supervised Toothbrushing in Early Childhood

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ABSTRACT

Objectives: To investigate factors associated with parental supervised toothbrushing (PSB) in preschool-aged children, integrating quantitative analysis from a community-based study and thematic data from a qualitative study.

Methods: The quantitative component used parent-reported questionnaires and clinical data from a community-based oral epidemiologic study among 3-5-year-old children in North Carolina to investigate associations of socio-demographic factors, oral hygiene habits, and ECC status with PSB. Bivariate analysis utilized chi-square and two-sample t-tests. Multivariable analysis used generalized estimating equations (GEE) accounting for complex study design using log-binomial regression. The qualitative component used semi-structured interviews with parents/caregivers recruited from pediatrics offices, to explore experiences and identify PSB facilitators and barriers. Thematic analysis relied on the Theoretical Domains Framework.

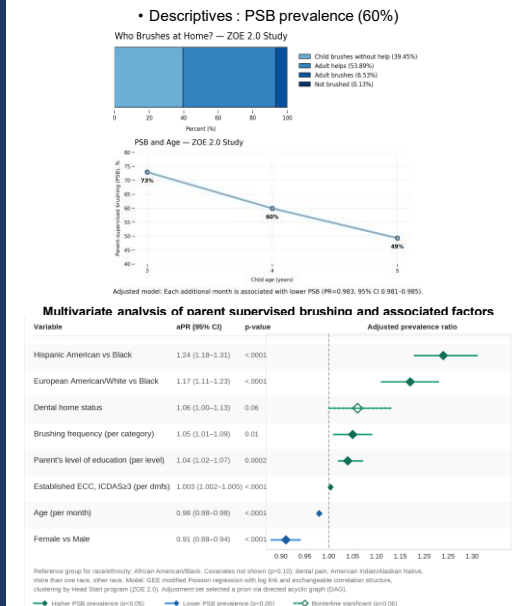
Results: Among 6,222 participants in the quantitative study, 61% reported PSB. In multivariable analysis, older age was associated with lower PSB ($P<0.0001$), while male gender ($P=0.0004$), higher parental education ($P=0.026$), and frequent brushing ($P=0.021$) were associated with higher PSB. Hispanics and Whites had greater PSB prevalence than African Americans ($P<0.0001$). Thematic analysis revealed that most parents valued and felt confident in PSB. Challenges included time constraints, child resistance, & competing priorities. Facilitators included professional guidance, routines, positive reinforcement, and social norms. Barriers were linked to environmental context, behavioral regulation, and child factors, while motivators centered on preventing dental problems.

Conclusion: This mixed-methods study integrated quantitative and qualitative data to study prevalence of PSB in a multi-ethnic community-based sample, identify relevant sociodemographic predictors, underlying values, contextual barriers and facilitators, informing targeted and theory-driven interventions for sustained PSB.

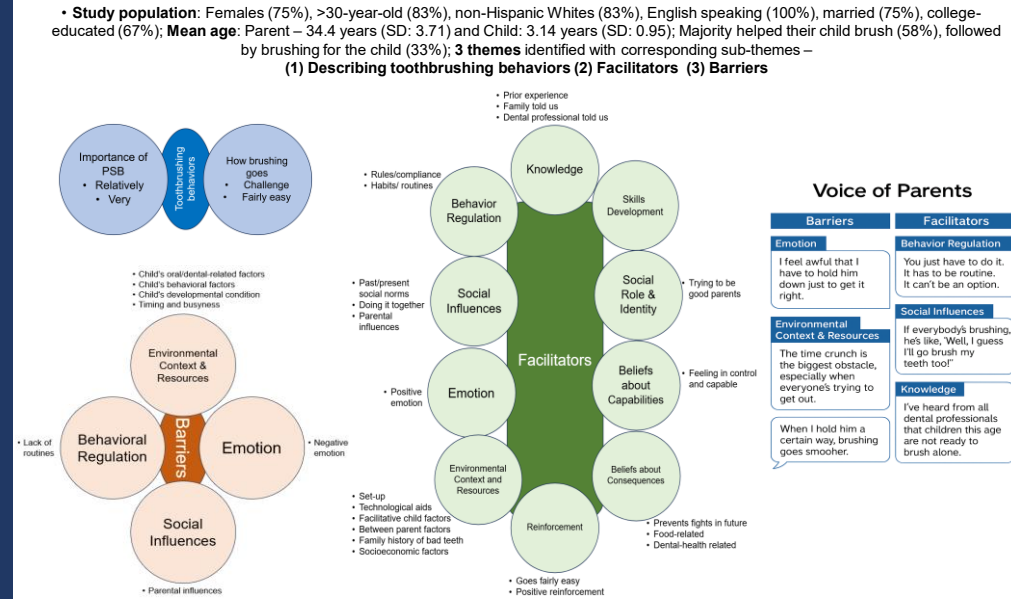
BACKGROUND & AIMS

- Parental supervised brushing (PSB)** is recommended and linked to lower caries risk, yet many families do not meet twice-daily brushing guidelines, and children often brush without needed adult support.
- PSB is difficult to implement consistently, and limited understanding of parental barriers and facilitators creates a gap between recommendations and real-world practice
- AIMS**
 - To quantify **socio-demographic and behavioral correlates** of PSB in a cross-sectional population-based study.
 - Explore parent-reported **barriers and facilitators** of sustained PSB using qualitative methodology.

QUANTITATIVE RESULTS



QUALITATIVE RESULTS



METHODS & MATERIALS

Convergent mixed methods: Findings from quantitative data from the ZOE 2.0 study & qualitative data from parent interviews were integrated to provide a more comprehensive understanding of factors influencing PSB.

Quantitative study (ZOE 2.0, 2016-19)

Sample: n=6,222; 3-5-yr-olds in Head Start centers, North Carolina (NC)

Outcome: Parent-supervised brushing (an adult helps OR brushes)

Exposures: age (months), sex, brushing frequency, parent education, race/ethnicity, dental home status, h/o dental pain, ECC

Analysis: Descriptive, Bivariate, GEE log-binomial prevalence ratios

Qualitative study (2024-25)

Sample: n=12, Parents of children aged 2-5 years living in NC

Design: Semi-structured phone interviews

Analysis: Theoretical Domains Framework (TDF) guided thematic analysis (MAXQDA)

Identified barriers, facilitators, and PSB behavior themes

Mixed Methods Integration

Convergent design - Side-by-side comparison of quantitative correlates and TDF-organized themes

Goal: Identify PSB implementation targets

INTEGRATING QUANTITATIVE AND QUALITATIVE FINDINGS

Target	Quantitative predictor	Qualitative domain (TDF)	Parent quote	Integrated insight
Age-tailored supervision	Age per month	Behavior regulation /description	"He brushes first... then I finish."	As autonomy rises with age, adult finishing erodes unless routines are explicit.
Address sex gap	Female vs Male	Social influences / expectations	"If everybody's brushing, he joins in."	Explicit norms are needed so all children get adult finishing to ~7-8 years.
Strengthen frequency and PSB loop	Brushing frequency	Behavior regulation / reinforcement	"You just have to do it... not negotiable." / "Two-minute song app helps."	Families who institutionalize routines + Cues sustain PSB more easily.
Build caregiver capability	Parent education	Knowledge / skills & capabilities	"When I hold him a certain way, it goes smoother."	Small technique coaching boosts perceived control and PSB.
Context-aware equity messaging	Hispanics vs African Americans	Environmental context & social norms	"The time crunch is the biggest obstacle." / "Group brushing helps."	Differences likely reflect context & norms rather than fixed traits.
Context-aware equity messaging	European Americans vs African Americans	Environmental context & social norms	"The time crunch is the biggest obstacle."	Contextual supports may reduce gaps; tailor counseling/resources.
Universal behavioral support	ECC status/dental pain /dental home (No association)	Cross-cutting behavioral theme	"If we miss a night, the next day is a battle."	Daily habits and context, not disease labels, drive PSB decisions in this sample.

CONCLUSIONS

- PSB is common but not universal (~60%);** declines with age; differs by sex, education, race/ethnicity, and brushing frequency.
- No clear association** of PSB with with ECC. Thus, implementation likely hinges on **behavioral and contextual** levers identified by parents.
- Practical steps:** build routines, simplify set-up, use technology/play, counsel both parents, and address time pressures with concrete morning/evening plans.
- Strengths:** relatively large community-based sample, theory-informed qualitative study, mixed-methods integration.
- Limitations:** cross-sectional design, selection and language biases, largely White interview sample, limited generalizability, limited cross-over between quantitative and qualitative samples

REFERENCES



ACKNOWLEDGEMENTS

This project was supported by the Department of Pediatric Dentistry and Dental Public Health, UNC ASOD

Abbreviations: PSB: Parent-supervised brushing; PR – Prevalence ratio, CI: Confidence interval; TDF: Theoretical Domain Framework