Total Breast-Feeding Duration and Dental Caries in Healthy Urban Children

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ABSTRACT

OBJECTIVE: To determine if there is an association between longer breast-feeding duration and dental caries in healthy urban children.

METHODS: We conducted a cross-sectional study of urban children aged 1 to 6 years recruited through The Applied Research Group for Kids (TARGet Kids!) practice-based research network between September 2011 and August 2013. The main outcome measure was parental report of dental caries.

RESULTS: The adjusted predicted probability of dental caries was 7%, 8%, 11%, and 16% with total duration of breast-feeding duration of 12, 18, 24, and 36 months, respectively. In the adjusted logistic regression analyses, relative to breast-feeding 0 to 5 months, the odds of dental caries with total breast-feeding duration >24 months was 2.75 (95% confidence interval 1.61–4.72).

CONCLUSIONS: Among healthy urban children, longer breast-feeding duration was associated with higher odds of dental caries. These findings support heightened awareness and enhanced anticipatory guidance for preventive dental care, particularly among children who breast-feed beyond 2 years of age.

KEYWORDS: breast feeding; dental caries; early childhood; nutrition; oral health

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WHAT'S NEW

Childhood dental caries is a public health challenge. Longer total breast-feeding duration is associated with dental caries. Findings support heightened awareness and enhanced anticipatory guidance for preventive dental care particularly among children who breast-feed beyond 2 years of age.

DENTAL CARIES IS the most common chronic disease of childhood and a public health challenge.[1] Caries can affect both physical and psychosocial aspects of child well-being,[2] resulting in pain, poor nutritional status, behavioral problems, and poor learning.[3] The pathogenesis of dental caries include frequent consumption of carbohydrates that can be metabolized by cariogenic bacteria, inadequate oral hygiene to remove or disrupt cariogenic biofilms or plaque, and inadequate exposure to fluoride.[4]

Breast-feeding has been hypothesized to contribute to the development of dental caries.[5] However, the contribution of extended breast-feeding duration is unclear. The World Health Organization recommends exclusive breast-feeding for the first 6 months of life with introduction of complementary foods at 6 months and continued breast-feeding up to 2 years and beyond,[6] based on systematic review evidence.[7] Similar recommendations have been endorsed by the United States,[8] Canada,[9] and the United Kingdom.[10] Correlating factors for childhood dental caries and early breast-feeding cessation are alike including low socioeconomic status, ethnic and racial minorities, maternal smoking, young mothers, and low parental education.[11]

The benefit of breast-feeding on infant health has been clearly demonstrated. However, in developed countries, less consensus exists around the optimal duration.[12,13] Total breast-feeding duration is highly variable,[14] with little evidence to guide practice beyond the first year of life.[15–17] With previous conflicting findings, a better understanding

of the relationship between longer total breast-feeding duration and caries may assist parents and clinicians in optimizing the benefits of breast-feeding while minimizing risks.

Given the importance of both breast-feeding and the prevention of caries, the primary objective of this study was to determine whether there is an association between longer total breast-feeding duration and caries in young healthy urban Canadian children. The secondary objective was to assess factors that might modify the association between total breast-feeding duration and caries.

METHODS

This was a cross-sectional study of healthy urban children aged 1 to 6 years who attended routine primary health care visits at The Applied Research Group for Kids (TARGet Kids!) participating pediatric or family medicine primary care practice in Toronto, Canada, between September 2011 and August 2013, a jurisdiction with fluoridated drinking water. TARGet Kids! is a primary care practice–based research network in Toronto, Canada, created to examine health and development trajectories of infants and preschool-age children. It is a partnership between researchers at the Hospital for Sick Children and St Michael's Hospital, primary care physicians in the Section of Community Paediatrics of the Department of Paediatrics, and the Department of Family and Community Medicine at the University of Toronto.[18]

SUBJECT RECRUITMENT AND DATA COLLECTION

Healthy children were recruited between September 2011 and August 2013 by research personnel embedded in 7 pediatric and family medicine practices. Children were excluded if they had a condition affecting growth (eg, failure to thrive, cystic fibrosis), a chronic illness (excluding asthma), or severe developmental delay. Data were collected at one time point for each subject through a standardized parent-completed survey instrument based on the Canadian Community Health Survey.[19] MediData Rave (MediData Solutions, New York, NY, USA) was used as the secure electronic data capture system and data repository for all TARGet Kids! data.[18]

EXPOSURE AND OUTCOME VARIABLES

The primary exposure variable was total breast-feeding duration, which was determined from the response to the question, "For how long has your child been breast-fed?" Maternal recall has been found to be a valid and reliable estimate of breast-feeding duration for recall up to 3 years.[20] Those who had never breast-fed were classified as having total breast-feeding duration of 0 months. Those currently breast-feeding were classified as having total breast-feeding duration equal to the child's current age.

Our primary outcome measure was parental report of dental caries, which was determined from the response to the question, "How many dental cavities has your child had?" Parental or caregiver perception of preschool children's oral health has been previously used as a measure of oral health.[21–23]

Covariates were defined a priori and were identified through detailed review of the literature as potentially confounding the relationship between total breast-feeding duration and caries. Covariates included age, sex, maternal age, birth weight, maternal ethnicity, self-reported family income, single parent, maternal employment, household smoke exposure, bedtime bottle use, only child, sugar-sweetened beverage consumption, and snacking of sweets, candy, chips, or fried foods. Maternal ethnicity was determined from the country where the biological mother was born and was categorized as European, East Asian, South and Southeast Asian, and other (which included Arab, African, Latin American, mixed ethnicity, and Canadian aboriginal). Self-reported family income was determined from the response to the question, "What was your total family income before taxes last year?" and categorized as $0 to $59,999, $60,000 to $99,999, $100,000 to $149,999, and over $150,000 (in Canadian dollars). Household smoke exposure was determined from response to the question, "Does anyone in your household smoke cigarettes regularly?" Bedtime bottle use was determined from the question, "Does your child use a bottle in bed?" Sugar-sweetened beverage consumption was measured from parental report based on response to the question, "How many cups of sweetened drinks does your child have in a typical day?" Snacking was measured from the question, "How many servings of sweets or candy, chips, or fried snacks does your child have in a typical day?"

STATISTICAL ANALYSIS

Descriptive statistics were performed for the primary exposure, outcomes, and covariates. Univariate logistic regression was used to determine the unadjusted association between total breast-feeding duration and caries. Total breast-feeding duration was modeled as a continuous variable and as a categorical variable (0–5 months, 6–11 months, 12–23 months, and >24 months). For the primary analysis, multivariable logistic regression was performed to determine the odds of one or more teeth affected by caries, with total breast-feeding duration assessed as a continuous and categorical variable in separate models as above. The adjusted logistic regression model was used to predict the probability of caries with 12 months', 18 months', 24 months', and 36 months' total breast-feeding duration. All covariates (specified above) were thought to be clinically important and were included in the final models regardless of associated P values to prevent biased regression coefficients and falsely inflated R^2 values from data-driven variable selection techniques.[24] All covariates had <15% missing values, with the majority of covariates missing <10%. Multiple imputation was performed for missing data using chained equations.[25] The variance inflation factor was computed for each covariate to test for multicollinearity.

To explore factors that might modify the association between total breast-feeding duration and caries, two biologically plausible interactions were considered strategically