



COVER STORY

Noxious family environments in relation to adult and childhood caries

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Dental caries is a disease with a broad range of biological, physical, social and behavioral determinants.¹ However, social pathways have received less attention than have the others. We conducted a study to determine whether noxious family environments—those marked by high levels of verbal and physical conflict between family members—are associated with increased caries experience and subjectively poorer oral health–related quality of life in adults and children.

Aggression is common in American families. For example, 90 percent of families reported parent-to-child aggression, couple aggression or both in Slep and O’Leary’s² community sample. Moreover, severe interparental and parent-to-child physical aggression (for example, hitting or kicking) was reported by 24 percent and 13 percent of the couples, respectively. At least some form of emotional aggression (for example, insults and verbal threats) is found in nearly all families.^{3,4}

Noxious family environments typically are chronic stressors.⁵ Evidence suggests that there are consequences for several child and adult physical health outcomes,^{6,7} but it is unclear whether oral health is among them. Family oral health may suffer because noxious behaviors create an emotional environment that undermines organized routines such as regular toothbrushing, parents’ socialization of children’s toothbrushing and healthy eating. For example, after intense conflict, a parent may be more preoccupied with his or her own emotional state than with enforcing a child’s toothbrushing or preparing a healthy meal. The stress of family hostility also may promote “stress eating,” which may include sugars and other cariogenic foods.⁸

Noxious family environments also may affect oral health by means of compromising immune function.

ABSTRACT

Background. The authors tested hypotheses that more noxious family environments are associated with poorer adult and child oral health.

Methods. A community sample of married or cohabiting couples (N = 135) and their elementary school–aged children participated. Dental hygienists determined the number of decayed, missing and filled surfaces via oral examination. Subjective oral health impacts were measured by means of questionnaires completed by the parents and children. The parents completed questionnaires about interparental and parent-to-child physical aggression (for example, pushing) and emotional aggression (for example, derision), as well as harsh discipline. Observers rated the couples’ hostile behavior in laboratory interactions.

Results. The extent of women’s and men’s caries experience was associated positively with their partners’ levels of overall noxious behavior toward them. The extent of children’s caries experience was associated positively with the level of their mothers’ emotional aggression toward their partners.

Conclusions. Noxious family environments may be implicated in compromised oral health. Future research that replicates and extends these findings can provide the foundation to translate them into preventive interventions.

Practical Implications. Noxious family environments may help explain the limitations of routine oral health preventive strategies. Interprofessional strategies that also address the family environment ultimately may prove to be more effective than are single modality approaches.

Key Words. Caries; aggression; hostility; family environment; child.

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Evidence suggests that noxious family environments decrease the body's ability to fight off pathogens⁹—perhaps oral bacteria—and trigger low-grade systemic inflammation.⁶ The role of inflammation in periodontal disease is well established.¹⁰ The accruing tissue damage associated with environmentally triggered low-grade systemic inflammation is consistent with Repetti and colleagues'⁷ “allostatic load” hypothesis.

In summary, noxious family environments may compromise oral health by increasing the level of fermentable carbohydrates that feed cariogenic bacteria, compromising the body's ability to fight these bacteria and increasing oral tissue destruction via inflammatory processes, as well as by preventing the behaviors that buffer these threats. Thus, we hypothesized that for adults, partner hostility (that is, physical aggression, emotional aggression and observed verbal hostility) would be associated with increased caries and poorer oral health–related quality of life, and for children, that both interparental hostility and parent-to-child noxious behavior (physical aggression, emotional aggression and harsh or over-reactive parental discipline) would be associated with increased caries and poorer oral health–related quality of life. We expected to see evidence of these associations in objectively measured decayed, missing and filled surfaces and in subjective oral health impacts that reflect a combination of decay and periodontal problems. Taken together, the existing body of research suggests the possibility that noxious family environments affect oral health; however, to our knowledge our investigation is the first to test this hypothesis directly.

METHODS

Participants. The institutional review boards at New York University, New York City, and Stony Brook University, The State University of New York, approved the study, as we collected data at the two separate institutions. In 2010 and 2011, 135 heterosexual couples (mean [standard deviation {SD}] male age, 44.25 [4.93] years; mean [SD] female age, 42.81 [4.59] years) and their children (mean [SD] age, 10.01 [1.59] years; 47 percent girls) residing in the New York City suburbs participated. Ninety-nine percent of the couples were married, and the median family income was \$100,000 (interquartile range, \$75,000–\$147,000). Ninety percent of the fathers and 33 percent of the mothers were employed full time. The study children had a median of two siblings. The mothers and fathers, respectively, self-identified as white (96 percent, 94 percent), black (4 percent, 3 percent), Asian (1 percent, 1 percent) or multiracial (0 percent, 2 percent); 5 percent and 2 percent, respectively, were Latino of any race. The children were 94 percent white, 3 percent black, 3 percent multiracial and 1 percent Asian; 6 percent were Latino of any race. In the 2010 U.S. census data for the study participants' county of residence, median household income was \$87,187, and 32.4 percent

of adults had a bachelor's degree or higher; 80.8 percent described their race as white, 7.4 percent black and 3.4 percent Asian; and 16.5 percent indicated Latino ethnicity.¹¹

The families in our study had been participants in a previous study.¹² We recruited them via telephone by using random-digit dialing (with an oversample of telephone numbers in areas with high levels of minorities provided by a sampling firm). Inclusion criteria for that study were being married or cohabitating for at least one year, one or more parent's being a biological parent of a 4- to 8-year-old child living at home and having the ability to speak and read English. By means of telephone and mail, we invited all 399 families who participated in the original study to participate in our study. The response rate was 33.83 percent. The 135 families who participated did not differ significantly from the 264 who did not on 23 demographic and family functioning measures that were available in both waves of data collection (shown in eTable 1 in the supplemental data to the online version of this article [found at <http://jada.ada.org/content/145/9/924/suppl/DC1>]). In our study, families (mother, father and child; $n = 117$) participated in a 2.5-hour laboratory protocol including questionnaires, observed couples' conflicts and oral examinations. At least one member of the remaining 18 families (18 mothers, 10 fathers and six sons) completed only the study questionnaires via the Internet. We obtained written informed consent by following the institutional review boards' guidelines.

Dental caries examination and variables. Two dental hygienists under the supervision of one of the authors (M.S.W.) assessed the participants' oral health by conducting clinical examinations. They conducted visual and noncompression examinations and rated caries with lesions exhibiting exposed dentin (International Caries Detection and Assessment System [ICDAS] stages 4, 5 and 6¹³) as “caries.” They were trained and their ratings were calibrated over two days by one of the authors (M.S.W.). Examinations involved nonexplorer examination under magnification, bright lights and air-drying. Calibration included interrater agreement on two independent examinations of a subset of three adult participants (Cohen $\kappa = 0.98$ for each rater) and intrarater agreement for examiner A ($\kappa = 0.97$) and examiner B ($\kappa = 1.00$). κ scores were based on agreement for frank cavitation (ICDAS stages 4, 5 and 6). The dental hygienists were masked to each other's findings as they conducted their examinations independently and conducted

ABBREVIATION KEY. COHIP: Child Oral Health Impact Profile. DMFS: Decayed, missing and filled surfaces. FM: Family Maltreatment. ICDAS: International Caries Detection and Assessment System. OHIP-14: Oral Health Impact Profile (14-item version). PS: Parenting Scale. RMICS: Rapid Marital Interaction Coding System.

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