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Abstract

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Keywords: Intergenerational caries; Migration; Immigrant; Refugee health

Introduction

It is well established that dental caries is the single most reported disease among children in the US [1,2]. Caries experience of immigrant children upon migration shows substantial variation to the US average when considering country of origin or parental preferred language [3,4]. Yet within several years post-migration, a common nding is that caries, particularly untreated caries, has increased to surpass the US average by age group(1). Factors associated with this increase include, but are not limited to, adapting a Western diet, lower socioeconomic status (SES), and limited access to care. Several studies also link poor oral status of immigrant mothers to high caries experience in their children [1,5-7]. Indeed, compelling evidence links the caries experience of mothers and their children residing in the same geographic areas [8-11]. While these studies describe the genetic and familial relationships attributed to oral disease, there is a paucity of data available to demonstrate the strength of intergenerational caries relationships when lifestyle and environmental factors are dramatically altered as is o en the case with migration due to resettlement. Of available studies comparing the oral health outcomes of immigrant mothers and their children, no studies, to our knowledge, use the same measures of oral health for both mothers and children. Maternal oral health o en uses self-reported oral health status or edentualism and child oral health is directly assessed through clinical measures.

e purpose of this study was to use the same clinical measures for both mothers and their children. We sought to answer three questions: 1) What is the correlation of maternal-child caries experience post-migration, 2) What is the di erence in caries experience between immigrant mothers post-migration, and 3) What is the di erence in caries experience of immigrant children by preferred maternal language? e study was conducted as part of a needs assessment to determine if a targeted intervention was indicated to address children's oral health for speci c immigrant and refugee patient groups in an urban health care clinic.

Methods

e study was conducted at an urban Federally Quali ed Health Center (FQHC) with a large immigrant and refugee patient base a liated with the University of Minnesota-Minneapolis. We used the clinic's electronic dental records to identify children with a dental visit for any reason between the study period of July 1, 2012 and June 30, 2013. Children eligible for study inclusion were less than 18 years of age at the index visit and had a diagnostic dental record for the full dentition. We then checked administrative records to determine if the child's mother was also a clinic patient. If the mother was not a dental patient or if her dental record did not include enough information to determine caries experience, the pair was excluded from the study. Families with more than one child qualifying for study inclusion included only the oldest child following the methods established in previous intergenerational caries studies [8,10].

We identi ed 1,244 children with dental visits within the one-year study period. Cases were excluded for the following reasons: 927 children had mothered with no a dental record, 17 children had an older sibling were already identi ed for study inclusion, seven were aged 18 or older, and seven had mothers with incomplete dental records. Two hundred eighty-six mother-child pairs were available for analysis.

Approval to conduct the study was granted by the University of Minnesota Institutional Review Board.

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Study variables

e dependent variable was dental caries experience recorded by dental sta during clinical visits and abstracted from participants' electronic dental and administrative records. Data were used to calculate the defs(decayed, extracted due to decay, lled surfaces) index for primary teeth, and the DMFS (decayed, missing, lled surfaces) index for permanent teeth following standard methods [12]. We calculated "total caries" for children with mixed dentitions by adding their defs and DMFS scores. Our primary independent variable was mother's caries experience by her primary language. We used mother's primary language as a proxy for foreign birth, i.e. whether mothers were immigrants or refugees. While not ideal, primary language was shown by Maserijian et al. [3] to be more predictive of caries prevalence than country of origin. We abstracted mothers' self-identi ed preferred language from administrative records. Languages included English, Spanish, Vietnamese, Khmer (Cambodian), Laotian, Hmong, and Somali. An "other" category was created following data abstraction as an aggregate group for languages occurring fewer than ve times. Vietnamese, Hmong, Laotian and Khmer (Cambodian) were collapsed into the category described as "Southeast Asian" (SE) due to the small number in each category.

Additional variables were date of the "most recent dental visit "for both mother and child, and number of "years as a patient" calculated by subtracting the date of most recent visit from the date of rst dental visit. Were corded "reason for rst dental visit" (emergency, regular check-up, other, not recorded),"annual recalls" within each of the last three years including the baseline appointment (yes, no), "dental insurance" at the most recent appointment (yes, no), "sealants" on any of the child's permanent teeth (yes/no/not noted), and any " uoride treatment" for the child (yes/no/not noted). Additional demographic variables recorded were "age" in years for both the child and mother, "gender" (M/F), and "race" (Black, White, Asian, Paci c Islander, American Indian, Alaskan Native, more than one race, refused to report), and "ethnicity" (Hispanic, non-Hispanic).

A code book was created to guide data abstraction. ree graduate students with varying levels of dental experience were calibrated using 21 records. Seven discrepancies in abstraction were found between abstractors, di erences were clari ed through discussion, and the code book was modi ed accordingly to assure clarity. Records were randomly selected throughout the study to assure calibration with an acceptable level of agreement between the abstractor and the principle investigator [13].

Statistical analysis

Descriptive statistics (means and standard deviations for continuous variables; counts and percentages for categorical variables) were used to describe the study sample. A Pearson's correlation coe cient was calculated to assess the relationship of total caries within the child-mother pairs. Multiple linear regressions was used to see how this relationship changed while controlling for maternal language group, child's age, gender, dental insurance status, uoride use, sealant presence, and years as a patient. In addition mother's age, dental insurance status, and years as a patient were included. Analysis of variance (ANOVA) and chi-square tests were used to compare child variables between maternal language groups. ANOVA and multiple linear regression models were used to compare caries outcomes between maternal language groups and child age groups. If the overall ANOVA test was signi cant, pair wise comparisons were made with a Tukey-Kramer multiple comparison adjustment. e level of statistical signi cance was set at $P<0.05$. SAS® 9.3 (SAS Institute, Inc., Cary, NC) was used for the statistical analysis.

Results

We included 286 children aged 0 through 17 years of age paired with their mothers. Table 1 reports descriptions of children and their mothers in the sample. e majority of mothers indicated that English (45.5%) was their primary language followed by Spanish (29.0%), a Southeast Asian language (16.3%), and Somali (10.1%). Statistically signi cant di erences were found between mother-child pairs as children were more likely to have dental insurance ($p= .0208$), an annual dental visit ($p=.0017$), and a non-emergency rst visit ($p<.0001$) compared to their mother. As a group, slightly over half of all children (54.7%) had sealants on at least one permanent tooth and almost all (91.3%) had received a uoride treatment.

Correlation between mother and child caries

Pearson's correlation coe cient (r) for maternal caries compared to total child caries was -0.025 ($p=0.6699$) indicating almost no correlation between the two variables. A perfect correlation would be re ected by a correlation coe cient of 1, whereas 0 indicates no correlation [14]. In the multiple linear regression model, the association between mother's caries and child caries (dependent variable) was not signi cant ($\beta=0.001$; $SE=0.03$; $p=0.96$).

Mother caries results

Results of ANOVA found statistically signi cant di erences between SE Asian mothers mean caries experience and all other maternal groups. Mean DMFS (SD) by maternal language group was SE Asian=44.1 (31.9), English=22.7 (22.8), Spanish=24.8 (24.0), and Somali (20.3 (14.8). When adjusting for age, insurance, and years as a patient in a multiple regression model, di erences between primary language remained statistically signi cant ($P=0.04$), and age was signi cant ($P<0.0001$). Southeast Asian language group mothers were older with a mean age (SD) of 42.5 (10.1) compared to Somali (34.6, 9.2), English (34.6, 8.5), and Spanish groups (33.8, 5.5).

Child caries results

For the overall sample, mean caries experience (SD) for primary teeth (defs) was 6.2 (10.2), for permanent teeth (DMFS) was 2.8 (5.7), and total caries experience (defs + DMFS) was 6.92 (10.0). To determine if there were di erences in child age by maternal language that would in uence caries experience comparisons between groups, we conductedan analysis of variance (ANOVA) and found no statistically signi cant di erences.

Table 2 presents child caries experience (defs, DMFS, and total caries) and additional variables of interest by maternal language. Only one statistically signi cant di erence was found between groups with children of Spanish-speaking mothers least likely to have dental insurance compared to all others ($P=0.001$).

Discussion

Perhaps our most compelling nding was that almost no correlation existed between maternal-child caries experience. Our results di er from several studies reporting a strong relationship between maternal and child dental caries in non-migratory populations [8-11,15,16]. However, comparisons are di cult as there is a paucity

assessments of caries experience and untreated caries. erefore, using caries experience for both mothers and their children provide a more accurate comparison compared to previous studies of mother-child oral health among immigrant populations.

Our nding of caries experience between maternal groups was8s a 5n ndas

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