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Caries disparities among Medicaid-enrolled young children from pediatric primary care settings

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Abstract

Objectives: The objectives of this study are to determine the overall and racial differences in the extent of caries experience and to examine the association between child and parent/caregiver characteristics and caries among 3–6-year-old Medicaid-enrolled children.

Methods: This study reports baseline cross-sectional data from a larger pragmatic clinical trial in pediatric primary care practices. Child-level clinical dental exams included decayed and filled teeth (dft) using ICDAS criteria and parent/caregiver questionnaire collected information on socio-demographics, child oral health behaviors, oral health related quality of life (OHQoL), and food environment.

Results: A total of 1,024 parent/caregiver-child dyads participated in the study. The overall caries experience (dft) was 49 percent and untreated decay was 42 percent. Children who were Black had 1.3 and 1.2 times significantly higher frequency of untreated primary decay and caries experience compared to non-Black children. An overall logistic regression model predicted that race, increased age, receiving dental care in the past 12 months for a cavity/toothache, and lower caregiver OHQoL was significantly associated with increased odds of the child having caries. Non-Black caregivers with less education, whose child was older, and lower child OHQoL had increased odds of having a child with caries, but these same variables were not predictive for the Black children.

Conclusions: Racial disparities exist with respect to caries experience and untreated decay within a Medicaid-enrolled population of young children attending well-child visits. Pediatric primary care offices are well-positioned to provide dental surveillance and preventive care and could play an important role in decreasing oral health inequities.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Keywords

dental caries; pediatrics; Medicaid; primary care

Introduction

Low income and minority children face the highest burden of dental caries (cavities, tooth decay).[1] Specifically, minority children, who are Black and Hispanic have a 1.5 and 2 times higher rate of caries experience and untreated decay, respectively, when compared to their White peers across all income levels.[1] In Northeast Ohio, previous community-based school studies showed that 42 percent of 5–6-year-old children had untreated decay,[2] which is much higher than the national average of 10 percent in 2–5 year olds.[1] Further, national median dental utilization for Medicaid enrolled children was only 48 percent compared to 64 percent for privately insured children.[3] In Ohio, dental care utilization in Medicaid children ≤20 years old was only 42 percent.[3] Even with improvements in oral health in the United States in the past decades,[4] disparities in untreated decay and caries experience still exist among low-income and minority children nationally and in Ohio.

Due to low pediatric dental care access[5] and low participation rates of dentists in state Medicaid programs (20 percent in Ohio and 42 percent Nationally),[3] pediatricians' offices have been recommended by the United States Preventative Services Task Force (USPSTF) to fill the gaps in preventative dental care.[6] More low-income families with young children go to well-child visits (WCVS) (88 percent for ≤6 years old) compared to preventive dental visits,[7,8] which provides an ideal venue to estimate dental caries extent in these settings. Previous studies in pediatricians' offices have reported caries experience in low-income children ≤6 years of age to be around 25 percent for decayed and filled teeth (dft)[9] and 48 percent for decayed, missing or filled teeth (dmft),[10] which is higher than the national average of 23 percent in 2–5 year olds.[1] A previous study also conducted in pediatricians' offices has reported untreated decay in low-income children ≤6 years to be 25 percent,[10] which is 2.5 times higher than the national average.[1]

Several social and behavioral risk factors contribute to caries disparities in poor and minority young children.[6] There is an increased risk for dental caries among those with lower socioeconomic status (SES) and a differential risk of caries among racial and ethnic groups.[9,11] It has also been shown that oral health behaviors such as early dental office visits,[12] and regular tooth brushing with fluoride-containing tooth paste[13] are associated with significantly less caries experience in young children. A previous study of young children in primary care practices reported no statistically significant differences in brushing habits with fluoridated toothpaste by race or Medicaid status; frequency of dental visits were significantly higher in the Medicaid-enrolled group compared to those not-enrolled; and there was no significant difference in dental visit frequency by race.[14] Additionally, parent/caregivers who were Black reported higher levels of caries in their children than caregivers who were non-Black, and Medicaid-enrolled caregivers reported higher levels of caries than non-Medicaid enrolled caregivers in this study.[14]

Other factors such as poorer oral health quality of life (OHQoL), as measured by the Early Childhood Oral Health Impact Scale (ECOHIS), has also been associated with untreated caries and caries experience in previous studies.[15,16] In Brazil, one cross-sectional study reported poorer OHQoL in children with lower SES.[17] The relationship between caries and food environment is less known, but a prospective cohort study in Canada found permanent caries experience (DMFS) to be lower among 8–10-year-old children from schools with a favorable food environment and high SES compared to schools with unfavorable food environments and low SES.[18] Additionally, a cohort study in low-income African-American caregivers of young children found that the caregiver caries rate increased as the number of grocery stores in the neighborhood increased, but the authors indicated that the quality of foods available in these grocery stores was not evaluated.[19]

To our knowledge, the extent of racial disparities among Medicaid-enrolled young children from primary care settings is sparse, and only a few have reported on the predictors of caries in these settings. A better understanding of these factors are necessary if primary care providers are required to fill the gaps in providing preventive dental care for low-income children. Therefore, the objectives of this study are to: a) determine the child and parent characteristics (socio-demographic, oral health behavior, oral health quality of life, food environment) and child caries experience among 3–6 year-old Medicaid-enrolled children from pediatric primary care practices; b) assess the association between child and parent/caregiver characteristics and child caries experience; and c) identify whether race is a moderator for the association between child and parent/caregiver characteristics and caries experience.

Methods

The Institutional Review Board of University Hospitals Cleveland Medical Center approved the study protocol. Consent was obtained from parent/caregivers in English. The protocol follows the STROBE guidelines for cross-sectional investigations.[20]

Study design

The present study utilized cross-sectional baseline data from a larger pragmatic, parallel two-arm, cluster randomized clinical trial to assess the effectiveness of multilevel interventions at the practice- (EMR incorporation of oral health questions) and provider-level (theory based education and skills training to deliver oral health facts) versus enhanced usual care (American Association of Pediatrics based education for providers) to increase dental utilization among 3–6 -year-old Medicaid-enrolled children.[21] The study sites included 18 pediatric primary care practices in Northeast Ohio. Pediatric primary care providers and parent/caregiver-child dyads from these practices were recruited over a 21-month period, from November 2017 to August 2019.

Eligibility and recruitment

Parent/caregiver-child dyads were eligible to participate if the child was 3–6 years old at the time of enrollment, was Medicaid enrolled, and seeing one of the participating providers at a WCV. Children with serious medical conditions that would prevent them from receiving

a dental screening were excluded from the study. In addition, the parent/caregiver was required to be a legal guardian, 18 years of age, speak English, plan to stay in the area during the study duration and provide a signed informed consent. All participating parent/caregiver-child dyads were given an incentive of $40 for the baseline visit.

Data collection

Parent/caregivers completed a baseline questionnaire at the WCV of the child. The questionnaire required responses to questions on child and parent/caregiver socio-demographics, child oral health behaviors, child oral health related quality of life (OHQoL), and food environment.

Socio-Demographics—The parent/caregiver and child sociodemographic questions were adapted from NHANES.[22] Child and caregiver variables included gender (male, female), race (Black, non-Black), ethnicity (Hispanic, Non-Hispanic), and mean age. Additional caregiver variables included education (>High School or ≤ High School), and marital status (Married, Other).

Oral health behaviors—Oral health behaviors included questions on how often the child brushed their teeth (never, sometimes, at least once a day), ever visited a dentist (yes, no), had a preventive dental visit in the past 12 months (yes, no), had a dental visit in past 12 months due to toothache or cavity (yes, no), if the child went to the emergency room to receive dental care (yes, no), and if the child had a personal dentist (no, 1 personal dentist, more than 1 person).

Oral health quality of life—The parent/caregiver completed the Early Childhood Oral Health Impact Scale (ECOHIS)[23] a 13-item instrument to report their child's experience with pain, difficulty eating, difficulty drinking, difficulty pronouncing words, missed school, trouble sleeping, irritability, avoiding smiling or laughing and avoiding talking due to a dental problem (9 items). Regarding the parents experience of their child's dental caries, the ECOHIS asked about the parent/caregiver being upset, feeling guilty, having to take off work and the financial impact of their child's dental problems (4 items). Each item was scored on a Likert Scale ranging from 1 (Never) to 5 (Very Often), with higher scores indicating a lower OHQoL.

Food environment—The parent/caregiver also completed the 5-item Multi-Ethnic Study of Atherosclerosis (MESA)[24] food environment questionnaire. Four items (on a 5 point likert scale ranged from Strongly Disagree to Strongly Agree) asked the parent/caregiver about the availability of fruits and vegetables, the quality of fruits and vegetables, the availability of a large selection of low-fat items, and the availability of fast food in their neighborhood. The fifth item asked about how much of a problem access to adequate food shopping was in their neighborhood scored on a 4 point Likert scale ranging from 1 (Very Serious Problem) to 4 (Not Really a Problem). Items were totalled and a higher food environment score represented a higher quality food environment.

Clinical dental exams—Child dental exams were conducted by six licensed dental hygienists who were trained and calibrated in the International Caries Detection and Assessment System (ICDAS).[25] Teeth were cleaned with a toothbrush, dried with gauze and assessed using a headlamp without magnification. No dental radiographs were used. ICDAS lesion codes for decay ranged from 0 for sound, 1–2 for noncavitated early decay, and 3–6 for localized to extensive cavitation. Untreated decay was assessed as an ICDAS lesion codes ≥2 on one or more teeth (dt). Caries experience (dft) was determined by ICDAS lesion code ≥2, and ICDAS filling codes ≥3 (included tooth colored restoration, amalgam restoration, stainless steel crown, gold, ceramic and porcelain crown) on one or more teeth. If a tooth had both a decayed lesion and a filling, the lesion took precedence and was used for the dft. The dental hygienist examiners were calibrated against a gold standard dentist examiner, with a weighted Kappa of 0.67–0.83 for lesions and unweighted Kappas of 0.85–0.92 for fillings indicating good to excellent reliability.

Data analysis

The sample for analysis was limited to those children who had a baseline dental exam. Descriptive statistics (means, frequencies) was used to determine the extent of primary untreated decay (dt) and decayed and filled teeth for caries experience (dft), permanent untreated decay (DT) and decayed and filled teeth (DFT) for the overall sample and stratified by race. Descriptive statistics was also used to describe the child and parent/caregiver characteristics overall and by race.

Bi-variate analysis (t-test, chi-square) investigated the sociodemographic, oral health behaviors, oral health quality of life, and food environment differences between children with and without caries experience overall and by race. Subsequently, a logistic regression model with statistically significant covariates from the bi-variate analysis was used to predict primary caries experience (dft) overall and by race. To test for the moderating effects of race, we performed further analysis by adding interaction terms between race and each model variable (looking at one interaction at a time). Since only a small proportion of children had permanent teeth, logistic regression analysis was not conducted for permanent DFT. All analysis was completed using SAS statistical software (Version 9.4). Statistical significance was assessed at an alpha of <0.05.

Results

A total of 1,024 parent/caregiver-child dyads were enrolled in the larger clinical trial. Of those enrolled, 1,023 children completed the baseline dental exam and were used for the present study. Table 1 indicates that overall, the children were 46 percent female, 92 percent non-Hispanic, and 46 percent Black and had a mean age of 4.3 ± 1.1 years. The parent/caregivers had a mean age of 31.3 ± 7.8 years, were 44 percent Black, 95 percent non-Hispanic, 29 percent married, and 55 percent had greater than a high school education (Table 1).

Table 1 suggests that overall, the majority of the children brushed their teeth at least once daily, had visited the dentist or a dental clinic, had a preventive dental visit in the past 12 months, and did not have a personal dentist. About 19 percent visited the dentist because

of a cavity or toothache and 2 percent visited the ER for toothache during the past 12 months. The ECOHIS child experience scores ranged from 9 to 45, and caregiver experience ranged from 4 to 20. Overall ECOHIS scores were toward the lower end for both child and caregiver experience (Table 1). About 43 percent of caregivers reported problems with adequate food shopping in their neighborhoods.

For the stratified analysis by race, the sample consisted of 451 Black and 538 non-Black children (Table 1). A significantly higher frequency of non-Black caregivers were Hispanic, married, had poorer caregiver OHQoL, better quality food environment, and higher mean age. Caregivers who are Black reported a significantly higher proportion of child's regular brushing, emergency room visits for a cavity/toothache, a lower OHQoL for their child, and problematic access to regular food shopping (Table 1).

The children had an overall mean of 19.1 ± 1.8 primary teeth and 4.8 ± 3.0 permanent teeth, with non-Black children having a significantly higher number of primary teeth compared to Black children (Table 2). Overall, only 26 percent (261 out of 1,023) of children had at least one permanent tooth. The extent of caries experience in the primary teeth among 3–6-year-old children was 49 percent with a mean of 2.0 ± 3.0 decayed and filled teeth, and untreated decay was 42 percent with a mean of 1.5 ± 2.6 decayed teeth (Table 2). Children who were Black had 1.3 and 1.2 times significantly higher frequency of untreated primary decay and caries experience compared to children who were non-Black (Table 2). The extent of caries experience in permanent teeth was 17 percent with 0.3 ± 0.7 decayed and filled teeth, and untreated decay was 16 percent with a mean of 0.3 ± 0.7 decayed teeth (Table 2). Children who were Black had 2.6 and 2 times higher frequency of untreated permanent decay and caries experience compared to non-Black children.

The bi-variate results in Table 3 indicate that child caries experience differed significantly ($P \leq 0.05$) from those without caries with more Black children in the caries experience group (51 percent versus 41 percent), and greater proportion of caregivers also being Black and non-Hispanic. Children with caries also had a significantly higher mean age (4.5 versus 4.2 years) compared to children without caries. The stratified analysis by race revealed some differences: within children who were Black, those with caries had a significantly higher mean age and being non-Hispanic, and caregivers who were Black and non-Hispanic compared to those without caries; and within children who are non-Black, those with caries had a significantly higher mean age compared to those without caries.

The bi-variate association of child's oral health behavior, OHQoL, food environment with caries experience (Table 4) showed the following: for the overall sample those with caries experience had a significantly greater proportion who had ever visited a dentist (73 percent versus 66 percent), received care in the past 12 months because of a cavity or toothache (30 percent versus 8 percent), and had lower OHQoL (i.e., higher scores) compared to those without caries. Within stratified analysis for children who are Black and non-Black, the results were similar to the overall sample except for ever visiting a dentist. Non-Black children with caries had a significantly higher proportion who had ever visited a dentist compared to those without caries, but this association was not found for Black children.

Table 5 shows the logistic regression model predicting primary caries experience for the overall sample and stratified for children who are Black and non-Black. The covariates that were considered for inclusion in the final model were either supported by the literature (caregiver education, food access) or found to be significant in the bi-variate analysis (child's race, age, ever been to the dentist, received dental care in the past 12 months due to cavities or toothache, child and caregiver OHQoL). Ethnicity was not included due to a very small sample of Hispanic children. In the overall model, race, increased age, receiving dental care in the past 12 months for a cavity/toothache, and lower caregiver OHQoL was significantly associated with increased odds of the child having caries. In Black children, receiving dental care for a cavity/toothache and lower caregiver OHQoL was associated with significantly increased odds of the child having caries. For non-Black children, additional significant covariates included increased child's age, lower caregiver education, and lower child OHQoL which were associated with increased odds of the child having caries. Interestingly, a test for moderation effects of race using interaction terms indicated that race was not significantly moderating the effects of model covariates (Suporting Information Table S1).

Discussion

The findings of our study indicate that the extent of early childhood caries (ECC) experience is 49 percent among low income 3–6-year-old Medicaid-enrolled children attending WCVs, and much higher than the national rate of 23 percent reported in the same age group of children.[1] The majority of this caries experience (dft) was contributed by untreated decay (dt). In our study, the much higher rate of caries experience is due to the inclusion of early noncavitated lesions, while the NHANES national data used only cavitated lesions. The caries experience in our study was still 37 percent using frank cavitation (ICDAS lesion codes 3 or greater) and greater than national estimates. One other prior study in primary care settings reported caries experience to be 25 percent in low-income 4 year olds, but they used parent reports rather than a clinical exam. [9] Our reasons for including noncavitated lesions are as follows: First, according to AAPD the definition of early childhood caries (ECC) includes both noncavitated and cavitated lesions[26]; second, noncavitated lesions progress quickly to a cavitated lesion in young children[27]; third, noncavitated lesions can be reversed with appropriate preventive measures such as tooth brushing with fluoridated paste and fluoride varnish applications, both of which can be advocated and applied by primary care physicians and nurse practitioners.[28] These results reinforce that lower income children face a higher burden of untreated decay and caries experience, and that lesions have to be identified earlier during the noncavitated stage. In fact, primary care providers can be educated to assess early noncavitated (white) and cavitated (brown) lesions, as they are the front line clinicians who can assess, advice, and communicate to parents about ECC and the importance of oral health to overall health and well-being.

An interesting finding from our data is that there are racial disparities even among children within a lower SES. The logistic regression model predicting caries presence for the overall sample indicated that race, child's age, problematic dental visits, and poorer OHQoL were associated with increased odds of the child having caries. Importantly, race did not moderate the independent effects of these covariates. While the overall national estimates show a

higher burden of caries experience by race contributing to disparities,[1] Black children in our sample had increased rates of caries experience in primary and permanent teeth compared to children who are non-Black. Dental utilization did not seem to explain racial disparities as our bi-variate analysis showed that dental visit frequencies for preventive and problematic visits was similar for children who are Black and non-Black. Medicaid claims data also supports our finding that racial differences were minimal in dental care utilization. [29] Disparities in caries experience by race may partly be explained by the fact that routine dental visits may have been delayed for Black children since our results showed that Black children had 4.5 times higher hospital emergency rooms visits for a cavity or toothache compared to their non-Black counterparts. For young children, later age at first dental visit is shown to be predictive of ECC. [30] In our sample, caregivers who were Black and non-Black were similar in educational status, therefore public health strategies such as tailoring educational messages to include the chronicity of dental caries is needed. In particular, it is important to give consistent messages about the importance of carious free baby teeth for future healthy permanent teeth. [31]

Our multivariate findings are also consistent with previous literature in pediatric primary care practices[9] and are similar to the national trend of caries experience being higher in older children,[1] and lower OHQoL for children and parents.[15,16] But, only child dental visits because of a problem (cavity/toothache) and lower caregiver OHQoL were consistently predictive for children who are Black and non-Black. Interestingly, increased child's age, lower parental education, and lower child OHQoL were additionally predictive for the non-Black children. These racial differences should be taken into account when designing behavioral or clinical interventions.

We did not find a relationship between food environment and caries experience overall or by race even though bi-variate analysis showed that a significantly greater proportion of caregivers who are Black reported lack of access to adequate food shopping. We are unable to compare our results to the two prior studies since the age group and settings were different. [18,19] In investigating predictors for caries, parent reported neighborhood level variables such as food access may not adequately capture the type of quality foods that the children actually consume. Further analysis of food environment and the quality of foods found in these neighborhoods are needed to determine the association between food environment and caries experience.

The limitation of this study is that we used cross-sectional data and therefore are unable to delineate the causal link between the covariates and caries experience. Although our sample size is large with inclusion of diverse primary care practices in Northeast Ohio, we can generalize the results only to Medicaid-enrolled young children in similar settings. Nonetheless, as recommend by the USPSTF, pediatric primary care offices may be able to better integrate oral health services by improving caries surveillance and implementing interventions in low-income and minority children to help lower oral health disparities. In conclusion, low income and minority children in Northeast Ohio still face a disproportionate burden of untreated decay and caries experience.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Parent/Caregiver and Child Characteristics for the Overall Sample and by Child's Race

		Child's race[†]		
	Overall sample (*n* = 1,023)	**Black (*n* = 451)**	**Non-Black (*n* = 538)**	***P*-value**
Socio-demographics				
Child				
Gender				
1 (Female)	45.6% (466)	46.8% (211)	44.6% (240)	0.494
2 (Male)	54.4% (555)	53.2% (240)	55.4% (298)	
Ethnicity				
1 (Non-Hispanic)	92.1% (882)	96.2% (406)	89.4% (465)	0.000*
2 (Hispanic)	7.9% (76)	3.8% (16)	10.6% (55)	
Race				
0 (Non-Black)	54.4% (538)	0.0% (0)	100% (538)	
1 (Black)	45.6% (451)	100% (451)	0.0% (0)	
Age [Mean age ± SD (years)]	4.3 ± 1.1 (1022)	4.4 ± 1.1 (451)	4.3 ± 1.1 (538)	0.661
Caregiver				
Education				
0 (≤ High School)	44.7% (450)	44.7% (201)	45.8% (241)	0.719
1 (>High School)	55.3% (557)	55.3% (249)	54.2% (285)	
Marital status				
0 (Other)	71.2% (716)	85.6% (380)	58.8% (311)	0.000*
1 (Married)	28.8% (290)	14.4% (64)	41.2% (218)	
Race				
0 (Non-Black)	55.6% (548)	5.6% (25)	98.1% (519)	0.000*
1 (Black)	44.4% (438)	94.4% (424)	1.9% (10)	
Ethnicity				
1 (Non-Hispanic)	94.7% (913)	96.7% (412)	93.7% (490)	0.033*
2 (Hispanic)	5.3% (51)	3.3% (14)	6.3% (33)	
Gender				

	Overall sample (*n* = 1,023)	Child's race†		
		Black (*n* = 451)	Non-Black (*n* = 538)	*P*-value
1 (Female)	90.1%(920)	92% (415)	89.2% (479)	
2 (Male)	9.9%(101)	8% (36)	10.8% (58)	0.133
Age [Mean age ± SD (years)]	31.3 ± 7.8 (1019)	30.6 ± 7.2 (449)	31.8 ± 8.2 (537)	0.023*
Oral health behaviors - Child				
Tooth brushing frequency				
0 (Never)	0.1% (1)	0.0% (0)	0.2% (1)	0.022*
1 (Sometimes)	3.1% (31)	1.6% (7)	4.5% (24)	
2 (≥ 1)	96.8% (979)	98.4% (439)	95.3% (509)	
Has your child ever been to the dentist or a dental clinic?				
0 (No)	30.8% (308)	32% (141)	29.8% (158)	0.468
1 (Yes)	69.2% (692)	68% (300)	70.2% (372)	
During the past 12 months, has your child been to the dentist for preventive dental care				
0 (No)	39.4% (385)	42.3% (183)	37.1% (191)	0.104
1 (Yes)	60.6% (592)	57.7% (250)	62.9% (324)	
During the past 12 months, did your child receive care at a dental office or clinic because of a cavity or toothache?				
0 (No)	81.1% (806)	79.4% (350)	82.2% (430)	0.261
1 (Yes)	18.9% (188)	20.6% (91)	17.8% (93)	
During the past 12 months, was your child seen at a hospital emergency room because of a cavity or toothache?				
0 (No)	97.9% (982)	96.4% (425)	99.2% (528)	0.002*
1 (Yes)	2.1% (21)	3.6% (16)	0.8% (4)	
Do you have one or more persons that you think of as your child's personal dentist?				
0 (No)	52.5% (520)	57.8% (253)	47.9% (251)	0.007
1 (Yes, 1 person)	41.5% (411)	37.4% (164)	44.8% (235)	
2 (Yes >1 person)	6.0% (60)	4.8% (21)	7.3% (38)	
ECOHIS	10.3 ± 2.7 (968)	10.7 ± 3.1 (433)	10.1 ± 2.3 (506)	0.001*
Child's experience				
Mean score ± SD				
Caregiver's Experience	4.9 ± 1.8 (968)	4.8 ± 1.7 (433)	5 ± 1.9 (506)	0.046*
Mean score ± SD				

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	Overall sample (*n* = 1,023)	Child's race†		
		Black (*n* = 451)	Non-Black (*n* = 538)	*P*-value
Food environment				
Child's food environment (4-items)	13.6 ± 2.6 (1000)	13.3 ± 2.7 (440)	13.8 ± 2.5 (529)	0.003*
Mean score ± SD				
Lack of access to adequate food shopping is in your neighborhood?				
0 (Not really a problem)	57.4% (569)	47.2% (205)	66.2% (348)	0.000*
1 (Any problem)	42.6% (422)	52.8% (229)	33.8% (178)	

*Significant at a *P*-value < 0.05.

†Does not add up to 1,023 due to missing race data.

Table 2

Extent of Caries Experience and Untreated Decay for the Overall Sample and According to Child's Race

Extent of dental caries	Overall sample (*n* = 1,023)	Child's race†		
		Black (*n* = 451)	Non-Back (*n* = 538)	*P*-value
No. of primary teeth (mean + SD)	19.1 ± 1.8 (1023)	18.9 ± 2.1 (451)	19.4 ± 1.5 (538)	0.000*
No. of permanent teeth (mean + SD)	4.8 ± 3.0 (261)	5.1 ± 3.2 (138)	4.4 ± 2.8 (115)	0.066
Primary decayed teeth (dt) (mean + SD)	1.5 ± 2.6 (1023)	1.8 ± 3 (451)	1.2 ± 2.3 (538)	0.001*
Frequency of primary dt				
(% No)	58.2% (595)	52.5% (237)	62.5% (336)	0.002*
(% Yes)	41.8% (428)	47.5% (214)	37.5% (202)	
Primary decayed and filled teeth (dft) (mean + SD)	2.0 ± 3.0 (1023)	2.3 ± 3.3 (451)	1.7 ± 2.8 (538)	0.003*
Frequency of primary dft				
(% No)	51.5% (527)	45.9% (207)	55.8%(300)	0.002*
(% Yes)	48.5% (496)	54.1% (244)	44.2%(238)	
Permanent decayed teeth (DT) (mean + SD)	0.3 ± 0.7 (261)	0.3 ± 0.7 (138)	0.1 ± 0.5 (115)	0.012*
Frequency of permanent DT				
(% No)	83.9% (219)	77.5% (107)	91.3% (105)	0.003*
(% Yes)	16.1% (42)	22.5% (31)	8.7% (10)	
Permanent decayed and filled teeth (DFT) (mean + SD)	0.3 ± 0.7 (261)	0.3 ± 0.7 (138)	0.2 ± 0.6 (115)	0.04*
Frequency of permanent DFT				
(% No)	82.8% (216)	77.5% (107)	88.7%(102)	0.02*
(% Yes)	17.2% (45)	22.5% (31)	11.3% (13)	

*Significant at a *P*-value < 0.05.

†Does not add up to 1,023 due to missing race data.

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Table 3

Association of Caries Experience with Socio-Demographic characteristics for the Overall Sample and according to Child's Race

	Overall sample (n = 1,023)			Child's race					
				Black (n = 451)†			Non-Black (n = 538)†		
Socio-demographics	**No caries**	**Caries**	***P*-value**	**No caries**	**Caries**	***P*-value**	**No caries**	**Caries**	***P*-value**
Child									
Gender									
1 (Female)	45.9% (242)	45.3% (224)	0.854	50.2% (104)	43.9% (107)	0.175	43.0% (129)	46.6% (111)	0.399
2 (Male)	54.1%(285)	54.7%(270)		49.8% (103)	56.1% (137)		57.0% (171)	53.4% (127)	
Race									
0 (Non-Black)	59.2% (300)	49.4% (238)	0.002*						
1 (Black)	40.8% (207)	50.6% (244)							
Ethnicity									
1 (Non-Hispanic)	90.7% (451)	93.5% (431)	0.116	93.9% (186)	98.2% (220)	0.022*	89.3% (259)	89.6% (206)	0.925
2 (Hispanic)	9.3% (46)	6.5% (30)		6.1% (12)	1.8% (4)		10.7% (31)	10.4% (24)	
Age	4.2 ± 1.1 (527)	4.5 ± 1.1 (495)	<0.001*	4.2 ± 1.1 (207)	4.5 ± 1.1 (244)	0.002*	4.1 ± 1.1 (300)	4.6 ± 1.0 (238)	<0.001*
Mean age ± SD (years)									
Caregiver									
Education									
0 (≤ High School)	43.4% (225)	46.0% (225)	0.411	44.2% (91)	45.1% (110)	0.847	44.0% (129)	48.1% (112)	0.356
1 (> High School)	56.6% (293)	54.0 (264)		55.8% (115)	54.9% (134)		56.0% (164)	51.9% (121)	
Marital status									
0 (Other)	69.3% (359)	73.2% (357)	0.178	82.8% (169)	87.9% (211)	0.129	59.5% (175)	57.9% (136)	0.701
1 (Married)	30.7% (159)	26.8% (131)		17.2% (35)	12.1% (29)		40.5% (119)	42.1% (99)	
Race									
0 (Non-black)	61.5% (312)	49.3% (236)	0.001*	8.8% (18)	2.9% (7)	0.007*	98.7% (293)	97.4% (226)	0.299
1 (Black)	38.5% (195)	50.7% (243)		91.2% (187)	97.1% (237)		1.3% (4)	2.6% (6)	
Ethnicity									
1 (Non-Hispanic)	93.2% (465)	96.3% (448)	0.029*	94.5% (188)	98.7% (224)	0.015*	92.8% (271)	94.8% (219)	0.351
2 (Hispanic)	6.8% (34)	3.7% (17)		5.5% (11)	1.3% (3)		7.2% (21)	5.2% (12)	

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Socio-demographics	Overall sample (n = 1,023)			Child's race					
				Black (n = 451)[†]			Non-Black (n = 538)[†]		
	No caries	Caries	*P*-value	No caries	Caries	*P*-value	No caries	Caries	*P*-value
Gender									
1 (Female)	90.7% (477)	89.5% (443)	0.525	92.8% (192)	91.4% (223)	0.595	89.6% (268)	88.7% (211)	0.717
2 (Male)	9.3% (49)	10.5% (52)		7.2% (15)	8.6% (21)		10.4% (31)	11.3% (27)	
Age	31.4 ± 7.9 (524)	31.1 ± 7.7 (495)	0.598	30.7 ± 7.2 (205)	30.7 ± 7.3 (244)	0.803	32.0 ± 8.3 (299)	31.4 ± 8.1 (238)	0.413
Mean age ± SD (years)									

[*] Significant at a *P*-value < 0.05.

[†] Does not add up to 1,023 due to missing race data.

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Table 4

Association of Caries Experience with Child Oral Health Behavior and Food Environment for Overall Sample and according to Child's Race

	Overall sample (*n* = 1,023)			Child's race					
				Black (*n* = 451)†			Non-Black (*n* = 538)†		
Characteristics	**No caries**	**Caries**	***P*-value**	**No caries**	**Caries**	***P*-value**	**No cCaries**	**Caries**	***P*-value**
Tooth brushing frequency									
0 (Never)	0.2% (1)	0.0% (0)	0.619	0.0 (0%)	0.0 (0%)	0.526	0.3% (1)	0.0 (0%)	0.574
1 (Sometimes)	3.1% (16)	3.0% (15)		2.0% (4)	1.2% (3)		4.0% (12)	5.0% (12)	
2 (≥ 1)	96.7% (500)	97.0% (479)		98.0% (198)	98.8% (241)		95.7% (284)	95.0% (225)	
Has your child ever been to the dentist/dental clinic?									
0 (No)	34.3% (175)	27.1% (133)	0.014*	34.7% (69)	29.8% (72)	0.270	33.6% (99)	25.1% (59)	0.035*
1 (Yes)	65.7% (335)	72.9% (357)		65.3% (130)	70.2% (170)		66.4% (196)	74.9% (176)	
During the past 12 months, has your child been to the dentist for preventive dental care									
0 (No)	42.2% (210)	36.5% (175)	0.064	44.6% (87)	40.3% (96)	0.370	40.2% (115)	33.2% (76)	0.101
1 (Yes)	57.8% (287)	63.5% (305)		55.4% (108)	59.7% (142)		59.8% (171)	66.8% (153)	
During the past 12 months, did your child receive care at a dental office/clinic because of a cavity or toothache?									
0 (No)	91.9% (468)	69.7% (338)	<0.001*	90.0% (181)	70.4% (169)	<0.001*	92.8% (270)	69.0% (160)	<0.001*
1 (Yes)	8.1% (41)	30.3% (147)		10.0% (20)	29.6% (71)		7.2% (21)	31.0% (72)	
During the past 12 months, was your child seen at a hospital ER because of a cavity or toothache?									
0 (No)	98.2% (506)	97.5% (476)	0.432	96.5% (194)	96.2% (231)	0.881	99.3% (295)	99.1% (233)	0.814
1 (Yes)	1.8% (9)	2.5% (12)		3.5% (7)	3.8% (9)		0.7% (2)	0.9% (2)	
Do you have one or more persons that you think of as your child's personal dentist?									
0 (No)	52.6% (269)	52.3% (251)	0.830	57.9% (117)	57.6% (136)	0.985	48.0% (140)	47.8% (111)	0.810
1 (Yes, 1 person)	40.9% (209)	42.1% (202)		37.1% (75)	37.7% (89)		44.1% (129)	45.7% (106)	
2 (Yes >1 person)	6.5% (33)	5.6% (27)		5.0% (10)	4.7% (11)		7.9% (23)	6.5% (15)	
Child's experience-ECOHIS	9.8 ± 1.9 (504)	10.9 ± 3.3 (464)	<0.001*	10.1 ± 2.4 (203)	11.2 ± 3.5 (230)	<0.001*	9.6 ± 1.5 (284)	10.7 ± 2.9 (222)	<0.001*
Mean score ± SD									

Characteristics	Overall sample (n = 1,023)			Child's race					
				Black (n = 451)†			Non-Black (n = 538)†		
	No caries	Caries	P-value	No caries	Caries	P-value	No cCaries	Caries	P-value
Caregiver experience - ECOHIS	4.5 ± 1.3 (504)	5.3 ± 2.2 (464)	<0.001*	4.4 ± 1.2 (203)	5.1 ± 2.0 (230)	<0.001*	4.5 ± 1.4 (284)	5.6 ± 2.3 (222)	<0.001*
Mean score ± SD									
Child's Food Environment (4-items)	13.6 ± 2.6 (512)	13.6 ± 2.7 (488)	0.685	13.3 ± 2.9 (199)	13.4 ± 2.6 (241)	0.702	13.9 ± 2.3 (295)	13.8 ± 2.7 (234)	0.698
Mean score ± SD									
Lack of access to adequate food shopping is in your neighborhood?									
0 (Not really a problem)	59.6% (302)	55.2% (267)	0.161	51.0% (100)	44.1% (105)	0.152	65.2% (191)	67.4% (157)	0.597
1 (Any problem)	40.4% (205)	44.8% (217)		49.0% (96)	55.9% (133)		34.8% (102)	32.6% (76)	

*Significant at a P-value < 0.05.

†Does not add up to 1,023 due to missing race data.

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Table 5

Logistic Regression Model for Caries Experience for the Overall Sample and According to Child's Race

			Child's race			
	Overall sample (n = 879)†		Black (n = 405)		Non-Black (n = 474)	
Independent variables	**Odds ratio (95% CI)**	***P*-value**	**Odds ratio (95% CI)**	***P*-value**	**Odds ratio (95% CI)**	***P*-value**
Child's race (Ref = Non-Black)	1.66 (1.24–2.24)	<0.001*				
Child's age (Years)	1.28 (1.11–1.48)	<0.001*	1.21 (0.98–1.49)	0.072	1.36 (1.11, 1.66)	0.003*
Parent's education (Ref = ≤ High School)	0.81 (0.60–1.08)	0.148	0.95 (0.63–1.46)	0.829	0.66 (0.44, 1.00)	0.050*
Has your child ever been to the dentist or a dental clinic? (Ref = No)	0.87 (0.62–1.22)	0.407	0.91 (0.56–1.49)	0.710	0.82 (0.51, 1.32)	0.413
During the past 12 months, did your child receive care at a dental office or clinic because of a cavity or toothache? (Ref = No)	3.82 (2.46–5.95)	<0.001*	2.79 (1.49–5.21)	0.001*	5.35 (2.85, 10.06)	<0.001*
Child's experience -ECOHIS	1.09 (1.01–1.18)	0.027*	1.04 (0.94–1.15)	0.440	1.17 (1.04, 1.33)	0.010*
Caregiver's experience- ECOHIS	1.23 (1.12–1.36)	<0.001*	1.25 (1.06–1.48)	0.010*	1.21 (1.07, 1.37)	0.003*
How much of a problem would you say that lack of access to adequate food shopping is in your neighborhood? (Ref = No Problem)	0.88 (0.66–1.19)	0.413	1.11 (0.73–1.69)	0.615	0.68 (0.44, 1.05)	0.081

*Significant at a *P*-value < 0.05.

†Does not add up to 1,023 due to missing race data and covariate data.