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Racial and ethnic differences in a regular source of dental care and the oral health, behaviors, beliefs and services of low-income mothers

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Objective In a racial/ethnically-diverse sample of low-income mothers of children aged 3-6, we determine: 1) whether a regular source of dental care (RSDC), self-rated oral health, beliefs and behaviors differ by racial/ethnic group; 2) estimate whether a RSDC is associated with oral health, beliefs and behaviors, and whether these associations differ by racial/ethnic group; and 3) examine these relationships for mothers' dental utilization. ***Basic Research Design*** Cross-sectional survey. ***Participants*** From a population of 108,151 Medicaid children aged 3-6 in Washington state, U.S., 10,909 eligible children were sampled stratified by racial/ethnic group. Eligible mothers completed a mixed-mode survey in the following groups: Black (n=818), Hispanic (n=1,310), or White (n=1,382). ***Main Outcome Measures*** Measures were mothers' RSDC, personal characteristics, self-rated dental health, appearance of teeth, dental problems, brushing duration, flossing frequency, use of toothpicks or whiteners, belief that cleaning prevents cavities or loose teeth, and self-reported services at last dental visit. ***Results*** About 38-40% of mothers had a RSDC. For Black, Hispanic and White mothers, having a RSDC was associated consistently with better oral health, greater likelihood of a dental cleaning and less likelihood of tooth extraction. RSDC was not associated generally with oral health beliefs and behaviors. Oral health behaviors differ by racial/ethnic group. ***Conclusions*** Relationships between RSDC and self-reported oral health, health behaviors, beliefs and dental services are similar for Black, Hispanic and White low-income mothers of young children. Oral health behaviors differ across racial/ethnic groups, which may have implications for mother and child oral health.

Key words: Access, dental care, dental insurance, disparity, Medicaid, mothers, oral health, oral hygiene, race and ethnicity

The U.S. Surgeon General's report, *Oral Health in America*, indicates that tooth decay is a severe problem among low-income, minority preschool children that is compounded by limited access to dental care (U. S. Dept. of Health and Human Services, 2000). Solutions to this problem may exist through the biological connection between mother and child oral health and the mother's access to dental care (Caufield, 1997). Several studies indicate that caries-preventive technologies delivered to mothers effectively reduce their cariogenic bacteria and the caries experiences in their infants (Caufield, 1997; Kohler *et al*., 1982; Isokangas *et al*., 2000). If low-income mothers have a regular source of dental care (RSDC) and receive preventive services, oral health benefits may accrue to both mother and child through biological and dental care mechanisms.

Conceptually, "structural factors," such as income, race/ethnicity and other characteristics, capture an individual's social standing in society and influence whether a person has a RSDC (see Figure 1) (Grembowski *et al*., 1989). Having a RSDC, in turn, may lead to more preventive services and less extractions, as well as better oral health behaviors, which can have oral health benefits for mother and child (Grembowski *et al*., 1989).

Unfortunately, little evidence exists about these relationships for low-income mothers of preschool children, and whether these associations differ in racial and ethnically diverse populations. In one study of Black, Hispanic and White mothers of preschool children enrolled in Medicaid, the U.S. public dental insurance plan for low-income children, less than 4 in 10 mothers had a regular source of dental care, which varied little for Black, Hispanic and White mothers (Grembowski *et al*., 2007). In another study of low-income mothers of preschool children, a RSDC was associated with better self-rated oral health but not self-reported number of missing teeth (Skaret *et al*., 2001). Less is known about whether a RSDC is associated with better oral health across racial/ethnic groups of low-income mothers of preschool children.

In population-based samples of adults aged 35-44 years, Davidson *et al* report that, controlling for other factors, having a RSDC was associated with better brushing and flossing practices among Baltimore Blacks and Whites, San Antonio Hispanics and Navajo Native Americans, but not among San Antonio Whites and Lakota Native Americans (Davidson *et al*., 1997). They suggest these relationships exist because a usual source leads to more patient trust, greater delivery of oral hygiene information and training, as well as reinforcement of preventive practices across visits. However, mixed evidence exists about the relationship between race/ethnicity and preventive behaviors. Studies generally find that brushing frequency is nearly universal and is similar across racial/ethnic groups in the U.S (Davidson *et al*., 1997; Ronis *et al*., 1998; Lang *et al*., 1994). In contrast, African-Americans are less likely to brush and floss

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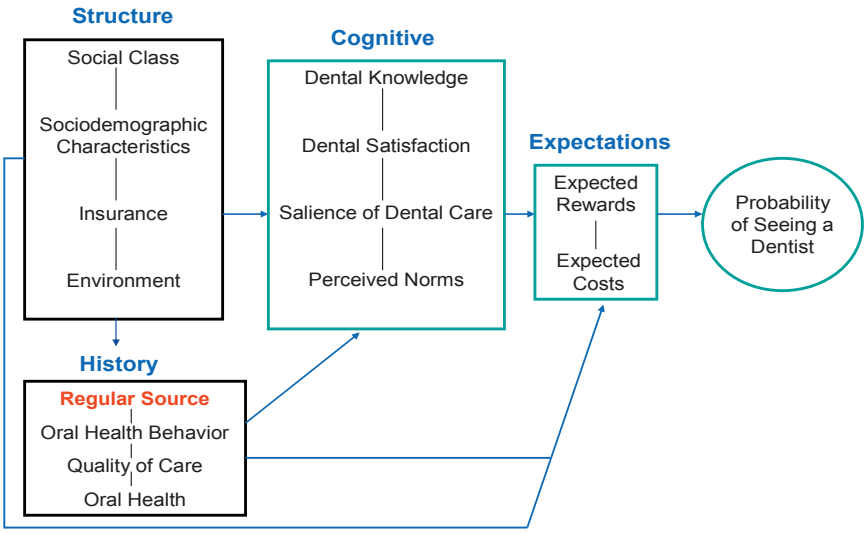

Figure 1. *Conceptual Model of the Determinants of Seeing a Dentist based on Grembowski, Andersen & Chen*[5]

thoroughly (Ronis *et al*., 1998), and Whites floss more frequently than ethnic minority groups (Davidson *et al*., 1997). Several studies report that dental knowledge of preventive practices and positive dental beliefs and attitudes are greater in Whites than racial/ethnic minority groups (Nakazono *et al*., 1997; Gift *et al*., 1994).

In a racial/ethnically-diverse sample of low-income mothers of children aged 3-6, we determine whether a regular source of dental care (RSDC), self-rated oral health, oral health behaviors and beliefs differ by racial/ethnic group. We estimate whether a RSDC is associated with oral health, behavior and beliefs, and whether these associations differ by racial/ethnic group. We also examine these relationships for mothers' self-reported dental utilization.

Methods

The population consisted of 108,151 children enrolled in Medicaid aged three to six and their mothers in Washington state (children's household income eligibility for Medicaid is 250% of Federal poverty level). On April 30, 2004, a disproportionate stratified random sample of 11,305 preschool children aged 3 to 6 was selected from Medicaid enrollment records in the following four racial/ethnic groups: 3,791 Black; 2,806 Hispanic (Medicaid's name for this group); 1,902 White; and 2,806 other racial/ethnic groups. If a household had more than one child in the age range, one child was selected randomly. Study protocols were approved by the Washington State Institutional Review Board.

Regular source of dental care (RSDC) was based on Starfield's (2000) definition of a regular source of care: one place, one provider, over time for preventive and therapeutic care. The RSDC measure that satisfied Starfield's criteria was constructed from usual source of health care items in previous medical and dental surveys (Grembowski *et al*., 2007).

A mother had a RSDC if she: a) responded 'yes' to "Is there a particular dental office, clinic, health center or other place that you usually go to for dental care?;" and b) the place where the mother goes was not a hospital emergency room; and c) she went to the place for 1 year or more; and d) the place was a source of preventive services, measured by having teeth cleaned in the past two years (Grembowski *et al*., 2007).

Mothers' oral health behaviors were measured by seven binary (yes/no) measures: brushing duration (spent a fair or a lot of time brushing vs. not long at all, just enough for a quick once-over, or did not brush teeth); flossing frequency and toothpick use (defined as daily or few times a week vs. less often or never), use of whiteners (bought toothpaste that whitens teeth, bought tooth whitener, or whether a dentist had whitened their teeth); and smoking status (some days or every day vs. not at all).

Mothers indicated whether they agreed or disagreed with each of the following statements: 1) you can prevent cavities if your teeth are cleaned regularly in a dental office; and 2) you can keep your teeth from getting loose if your teeth are cleaned regularly in a dental office.

Mothers rated their dental health on a 5-point scale of poor (1), fair, good, very good, excellent (5). We created a binary measure indicating whether mothers rated their dental health as poor or fair vs. good, very good, or excellent. We also asked mothers, "How do your teeth look to you?," and coded responses as poor or fair condition vs. good, very good or excellent condition. Mothers also reported whether they had each of the following dental problems when they completed the instrument: tooth ache, broken filling or broken tooth, discolored teeth, sore or bleeding gums, gum boil or abscess, a loose tooth, sensitive teeth, or a bridge or partial denture that does not fit. We also counted the number of distinct dental problems.

Mothers reported whether they received each of the following dental services at their last dental visit: dental exam, teeth cleaning, x-rays, tooth filled, tooth capped or crowned, tooth pulled, root canal, gum treatment, denture or bridges, braces to straighten teeth.

Race/ethnicity was measured by mothers' response to: "What race or ethnic background best describes you?,"

with responses of Hispanic, Latino, or Spanish; White, not Hispanic; Black or African American; American Indian; Alaska Native; Asian (such as Vietnamese, Korean, Japanese, Filipino, Chinese, Asian Indian); Pacific Islander (such as Hawaiian or Samoan); or some other race/ethnicity.

Socioeconomic status was measured by the mother's highest educational degree, employment status, and family income in 2003 (categorized by less than $10,000, between $10,000 - $20,000, and over $20,000). Dental insurance was measured by whether the mother had no dental insurance, Medicaid, or private dental insurance from an employer. Mother characteristics included mother's age, single parent (whether living with a spouse or partner, or not), employment status, and which mode of the survey the mother completed (Web, mail or telephone). Acculturation was measured by whether the mother was an immigrant (not born in the U.S.). Mental health symptoms in the past four weeks were assessed by averaging the mother's responses to a 6-item mental health scale, where each item's score ranged from 1 (best) to 6 (worst) (McHorney, *et al*., 1994).

On June 11, 2004, the Department of Social and Health Services (DSHS), which administers the Medicaid Program, mailed the parents of sampled children letters in English, Spanish, Vietnamese and Russian, the most prevalent primary languages in the population based on Medicaid records, describing the study and containing instructions to notify DSHS if they did not want to participate. By the July 14 deadline, 396 parents opted out of the study or had nondeliverable letters, leaving 10,909 participants.

The Social and Economic Science Research Center (SESRC) at Washington State University performed a mixed-mode, web-mail-telephone survey of mothers using methods developed by Dillman (2000), probably the first time the three-mode approach was used in a Medicaid population (de Leeuw, 2005). Medicaid eligibility files contained a child's name, address, telephone number, and primary language but did not indicate mother's name. Contact materials were addressed "To the Mother of [child's full name]," and all letters and instruments were at the 6-8th grade reading level. English instruments were translated into Spanish, Russian and Vietnamese by professional translators at Academy of Languages (www.aolti.com). All modes of the instrument contained the same 66 questions with 109 items.

Starting September 3, SESRC mailed invitation letters to the 10,909 mothers to complete the Web survey, with a Spanish letter also included for families with that primary language. Each letter contained a unique password for accessing the Web survey, and respondents were entered into a drawing for 25 $50 grocery certificates. The Web survey was closed on November 3.

Beginning September 27, mothers who had not completed a Web questionnaire were sent a mail questionnaire with letters in English and Spanish to everyone with a $2 bill incentive in the first mailing. Follow-ups to nonrespondents included a thank you/reminder postcard mailed two weeks later to everyone, and replacement questionnaires and cover letter mailed to nonrespondents of the Web and mail questionnaire four weeks later by U.S. Priority Mail. Questionnaires received by January 31, 2005 were included in the study.

Starting November 3 SESRC mailed letters in English and Spanish to mothers who had not responded to the Web or mail questionnaires that invited them to complete a telephone interview in English, Spanish, Russian or Vietnamese. If a contacted parent refused to participate, refusal conversions were not attempted, and calling ended on December 31, 2004. Completed instruments from the three modes were combined for the analysis.

Descriptive statistics were calculated for study measures. Pearson Chi-square test and ANOVA were performed to determine whether personal characteristics were significantly different for Blacks, Hispanics and Whites. Logistic regression models were used to assess whether self-reported oral health, oral health beliefs and behaviors, and dental services were significantly different for Black, Hispanic and White mothers, after adjusting for personal characteristics.

We computed logistic regression models to estimate whether having a RSDC was related to self-reported oral health, oral health beliefs and behaviors, and dental services, controlling for personal characteristics of the mothers. Separate models were estimated for Black, White, and Hispanic mothers. Regression models with all mothers and interaction terms for racial/ethnic group were estimated to determine whether the associations in the separate models were significantly different across the three racial/ethnic groups using the Wald test. Models were estimated with *R version 2.2.1*© 2005 statistical software.

Results

In total, 4,762 parents completed either the Web (n=306), mail (n=3,329) or telephone (n=1,127) instruments. Of the remaining 6,147 parents (10,909 – 4,762= 6,147), 695 parents refused to participate, 86% of those when contacted by telephone after the Web and mail surveys. Another 4,387 households had non-deliverable addresses, non-working telephone numbers, or ineligible individuals; and 1,065 parents were unreachable (no response to Web or mail questionnaire and telephone calls had no answer, busy signal, answering machine, parent not available), unable to interview (due to hearing difficulty, language barrier or disability), or deceased. The response rate was 44% (4,762/10,909), and excluding the 4,387 households with ineligible individuals or inaccurate contact information, the contact rate was 73% (4,762/6,522) (American Association for Public Opinion Research, 2005).

Eligible respondents were mothers who were Black (n=818), Hispanic (n=1,310), or White (n=1,382). We excluded from the analyses 562 mothers who defined their race/ethnicity as in other racial/ethnic groups, 301 who either declined to specify their racial/ethnic group (140) or who specified more than one (161). We also excluded 389 respondents who were not the mothers of a sampled child.

Table 1 compares the personal characteristics of Black, Hispanic and White mothers. Statistically significant differences exist for almost all of the characteristics. The percentage of mothers with a RSDC was similar across racial/ethnic groups (Black, 38%; Hispanic, 40%; White, 39%; p = .57). While mother's age is similar across groups, Hispanic mothers are more likely to be immigrants and live with another adult. The percentage of Hispanic

mothers without a high school education (48%) was about four times higher than Black and White mothers. A lower percentage of Black mothers are homemakers and a greater percentage are unemployed, have less than $10,000 annual household income, and have Medicaid coverage. The percentage without public or private dental insurance is greatest for Hispanic mothers (71%), followed by White mothers (47%), and lowest for Black mothers (24%). Mental health scores are better for Hispanic mothers than Black or White mothers. A higher percentage of Hispanic mothers participated in the telephone interviews.

Table 2 presents the relationship between mothers' racial/ethnic group and self-reported oral health, oral health beliefs and behaviors, and dental services, controlling for personal characteristics and having a RSDC. Self-rated oral health and the average number of dental problems was not significantly different across racial/ethnic groups, although the percentage of mothers rating their teeth in fair or poor condition was higher for Hispanic mothers (52%) than Black and White mothers (41-42%). Black and White mothers reported sensitive or discolored teeth more frequently than Hispanic mothers.

Racial/ethnic groups differ in oral health behaviors for all measures, except flossing. White mothers spent the most time brushing their teeth, followed by Black mothers, with Hispanic mothers reporting the least time. A similar order was found for whitening teeth using whitener or toothpaste, but the percentage of mothers whitening teeth at dentist office was similar across racial/ethnic groups. In contrast, toothpick use was highest among Hispanic mothers, and smoking prevalence was much lower among Hispanic mothers than Black and White mothers. Controlling for personal characteristics, significant differences were not found in dental care utilization and preventive dental beliefs across racial/ethnic groups.

Compared to Hispanic mothers completing the English instrument, Hispanic mothers completing the Spanish instrument were more likely to rate their dental health as fair or poor (35% vs. 65%; $p<.001$), have a broken tooth (33% vs. 50%, $p<.001$), brush less (87% vs. 71%; $p=.01$) and use toothpicks more (31% vs. 50%; $p=.02$), have a filling (34 vs. 44%; $p=.005$) or receive denture/bridge care (2% vs. 7%; $p=.01$) at their last dental visit, and believe that regular cleaning prevents cavities (83% vs. 91%; $p=.002$), controlling for personal characteristics and having a RSDC.

Table 3 present odds ratios and mean differences indicating whether having a RSDC is associated with self-reported oral health, oral health beliefs and behaviors, and dental services for Black, Hispanic and White mothers, controlling for personal characteristics. Having a RSDC is associated consistently with better self-rated oral health and fewer dental problems across racial/ethnic groups. A RSDC is generally not associated with oral health beliefs and behaviors. The exception is among White and Hispanic mothers: those with a RSDC have greater odds of flossing, and the interaction test indicates the flossing odds ratios vary significantly across racial/ethnic groups. Brushing duration and smoking were almost statistically significant for some racial/ethnic groups. For Hispanic mothers, a RSDC was associated with stronger belief that regular professional cleaning prevents loose teeth.

A RSDC was associated consistently across racial/ethnic groups with a greater odds of reporting having teeth cleaned at last dental visit and lower odds of a tooth extraction. The interaction test indicates the odds ratio for tooth extraction was significantly different across racial/ethnic groups but still well below 1.0. Odds ratios also differed significantly across groups for x-rays: a RSDC was associated with lower odds of x-rays for Black and White mothers, but greater odds for Hispanic mothers, although the odds ratio for Hispanic mothers is not statistically significant. Black mothers with a RSDC had greater odds of receiving a filling at their last visit, while White mothers with a RSDC had lower odds of receiving denture or bridge services.

Discussion

About 39% of low-income mothers with children aged 3-6 covered by Medicaid dental insurance have a RSDC, and the percentage is similar for Black, Hispanic and White mothers. For all racial/ethnic groups, having a RSDC is associated with better self-rated oral health and also with more teeth cleaning and fewer extractions at the last dental visit. The beneficial association between RSDC and fewer extractions is largest for mothers who are Black. Our results are based on a cross-sectional survey, and therefore, we cannot conclude from our study design that a RSDC causes better oral health, more cleanings and less extractions. However, the findings are consistent with our conceptual model and Skaret *et al* (2001), suggesting a RSDC may contribute to oral health and service patterns in our sample.

These relationships may be explained by several factors, particularly that mothers having a RSDC may differ from those who do not in observed and unobserved ways. However, in a previous analysis we identified personal characteristics associated with having a RSDC and controlled for these characteristics in our analyses, suggesting that the observed characteristics, as well as unobserved factors correlated with the observed characteristics, do not explain the associations (Grembowski *et al*., 2007).

Another explanation is that low income mothers with a RSDC received not only more cleanings but also more fluoride treatments, reducing oral disease and improving their self-reports of oral health. Based on the conceptual model, a RSDC also may contribute to beneficial oral health beliefs and behaviors, which may reduce oral disease and improve self-rated oral health. However, we found that a RSDC is generally not associated consistently across racial/ethnic groups with oral health beliefs and behaviors, except possibly flossing, suggesting that oral health beliefs and behaviors do not explain the relationship between RSDC and better self-rated oral health, more cleanings and less extractions. Our findings for a low-income sample of mothers are inconsistent with the conceptual model and Davidson *et al*, who report associations between a RSDC and more brushing and flossing in racially/ethnically diverse and representative samples of males and females aged 35-44 in Baltimore and San Antonio (Davidson *et al*., 1997). Differences in measures, sample characteristics, and the characteristics of respondent and nonrespondent mothers may account partly for the inconsistent findings.

Table 1. Descriptive statistics of mothers with a regular source of dental care and their personal characteristics by racial/ethnic group

	Black	*Hispanic*	*White*	
	(n= 818)	*(n= 1310)*	*(n= 1382)*	*p-value**
Regular Source of Dental Care (%)	38	40	39	0.57
Mother's age (mean ± sd)	31.2 ± 6.3	30.7 ± 6.0	30.7 ± 6.0	.08
Single Parent (%)	68	22	37	< .001
U.S. Immigrant	9	76	7	< .001
Education (%)				
Did not finish high school	12	48	11	< .001
High school diploma or GED	34	34	32	
Some college or 2-year associate degree	49	15	48	
4-year college degree or higher	5	3	9	
Employment Status (%)				
Employment full-time	38	31	31	< .001
Employed part-time or in school	26	23	26	
Homemaker	12	29	30	
Disabled	6	2	4	
Unemployed	19	15	9	
Annual Household Income (%)				
<$10,000	56	44	37	< .001
$10,000 - $20,000	25	31	27	
> $20,000	19	24	36	
Dental Insurance (%)				
None	24	71	47	< .001
Public (Medicaid)	54	14	31	
Private	22	15	22	
Mental health score (%)				
1 (Best)	16	19	10	< .001
2	38	41	44	
3	28	28	30	
4	13	8	13	
5-6 (Worst)	5	3	4	
Survey Mode (%)				
Web	6	3	10	< .001
Mail	73	63	72	
Telephone	21	34	18	

* Null hypothesis is no difference between racial/ethnic groups (Pearson Chi-square test for categorical variables, ANOVA for age)

Another possibility is the associations between RSDC and better self-rated oral health, more cleanings and less extractions are spurious. If race/ethnicity is associated with having a RSDC, self-rated oral health and dental services, race/ethnicity may explain the relationship between a RSDC and these oral characteristics. However, we found that a RSDC was similar across racial/ethnic groups. Furthermore, self-rated oral health, oral health beliefs, and dental services at last dental visit were not significantly different across racial/ethnic groups in our sample of low-income mothers, controlling for personal characteristics and having a RSDC.

We also found that racial/ethnic groups differ in oral health behaviors for all measures, except flossing, but the patterns are inconsistent across groups. White mothers spent the most time brushing their teeth, followed by Black mothers, with Hispanic mothers reporting the least time, which may reduce fluoride exposure and plaque removal. Hispanic mothers also used retail whiteners less often. In contrast, toothpick use was highest among Hispanic mothers, and smoking prevalence was lowest among Hispanic mothers. The off-setting behaviors may partly explain why most measures of self-reported oral

Table 2. Descriptive statistics of mothers' self-rated oral health, behaviors and beliefs, and self-reported dental services received at the last dental visit, by racial/ethnic group

	Blacks	*Hispanics*	*Whites*	*Adjusted p-value***
Self-Rated Oral Health & Number of Dental Problems				
Average self-rated dental health (1-5, 1=poor and 5=excellent)*	2.9	2.6	2.8	0.394
Percent self-rating dental health as fair or poor	41%	52%	42%	0.274
Percent self-rating teeth in fair or poor condition	42%	58%	41%	0.044
Average number of dental problems*	2.0	1.8	2.1	0.118
Percent mothers reporting each problem:				
Toothache	31%	30%	30%	0.607
Broken tooth	40%	43%	37%	0.367
Discolored teeth	38%	31%	53%	<.001
Bleeding gums	26%	26%	27%	0.926
Boil or abscess	6%	5%	4%	0.415
Loose teeth	8%	8%	5%	0.099
Sensitive teeth	48%	41%	57%	0.002
Ill fitting dentures	4%	7%	3%	0.196
Percent Mothers Reporting Each Oral Health Behavior				
Smokes some or all of the time	34%	7%	36%	<.001
Fair or lot of time brushing	85%	78%	91%	0.005
Uses toothpick daily or few times a week	31%	42%	20%	<.001
Flosses daily or few times a week	49%	61%	53%	0.274
Whitens teeth by dentist	7%	7%	8%	0.183
Whitens teeth by whitener	15%	10%	23%	<.001
Whitens teeth by toothpaste	31%	22%	37%	0.035
Percent Mothers Receiving Each Dental Service at Last Visit				
Teeth cleaning	69%	71%	66%	0.181
Dental exam	69%	61%	70%	0.206
X-rays	64%	65%	67%	0.700
Filling	33%	40%	33%	0.664
Crown	6%	10%	7%	0.422
Tooth extraction	23%	24%	20%	0.539
Toot canal	8%	10%	8%	0.342
Gum treatment	5%	6%	3%	0.549
Dentures or bridges	3%	5%	3%	0.293
Care for braces	2%	1%	1%	0.716
Percent Mothers with Each Oral Health Belief				
Believes regular cleaning prevents cavities	80%	87%	83%	0.263
Believes regular cleaning prevents loose teeth	57%	73%	62%	0.103

* Average scores. A mother could report a maximum of eight problems in the survey.

** Adjusted for RSDC, age, insurance, education, income, survey mode, immigration status, single parent, employment status, and mental health

health were not significantly different across racial/ethnic groups. Acculturation also may play a role: Hispanic mothers who completed the Spanish instrument had worse oral health, brushed less, used toothpicks more, and had more restorative and prosthodontic care at their last dental visit than Hispanic mothers completing the English instrument.

These findings are consistent with past studies that Whites brush more thoroughly than Blacks, (Ronis *et al*., 1998) but are inconsistent with evidence in Davidson *et al*., (1997) that Whites floss more frequently than ethnic minority groups. Although past studies report differences in oral health beliefs across racial/ethnic groups, we did not find similar relationships. The inconsistent findings may be due to the different population characteristics and measures of the studies. Given the diversity of American society and little information on this topic, additional studies are needed to examine the relationships between race/ethnicity and oral health beliefs, behaviors and knowledge in diverse racial/ethnic groups, and in turn, how these associations are related to oral health. Because few studies–including ours--have assessed the reliability and validity of oral health belief measures (Nakazono *et al*., 1997), future studies also are recommended to develop reliable and valid measures, which should then be used consistently across studies for comparison of their results.

Table 3. Associations** of regular source of sental care (RSDC) with mothers' self-rated oral health, behaviors and beliefs, and self-reported dental services received at last dental visit, by racial/ethnic group: adjusted odds ratios and mean differences

	Black		*Hispanic*		*White*		*Interaction*
	OR	*p***	*OR*	*p***	*OR*	*p***	*p****
Self-Rated Oral Health & Dental Problems							
Self-rated dental health (1-5, 1=poor and 5=excellent)*	0.57	<.0001	0.43	<.0001	0.63	<.0001	0.10
Self-rates dental health as fair or poor	0.43	<.0001	0.56	<.0001	0.38	<.0001	0.053
Self-rates teeth in fair or poor condition	0.41	<.0001	0.54	<.0001	0.44	<.0001	0.37
Number of dental problems*	-0.65	<.0001	-0.60	<.0001	-0.73	<.0001	0.50
Mothers reporting each problem:							
Toothache	0.55	0.001	0.49	<.0001	0.48	<.0001	0.70
Broken tooth	0.37	<.0001	0.58	<.0001	0.44	<.0001	0.11
Discolored teeth	0.51	<.001	0.60	0.001	0.65	<.001	0.45
Bleeding gums	0.70	0.06	0.53	<.0001	0.50	<.0001	0.48
Boil or abscess	0.12	<.001	0.32	0.003	0.26	0.003	0.36
Loose teeth	0.97	0.94	0.60	0.07	0.28	0.002	0.10
Sensitive teeth	0.70	0.03	0.88	0.39	0.60	<.0001	0.13
Ill fitting dentures	1.39	0.41	0.84	0.53	0.43	0.06	0.11
Oral Health Behaviors							
Smokes some or all of the time	0.88	0.47	1.53	0.13	0.77	0.06	0.03
Fair or lot of time brushing	1.58	0.06	1.08	0.67	1.57	0.06	0.11
Uses toothpick daily or few times a week	0.76	0.14	0.88	0.37	0.91	0.55	0.64
Flosses daily or few times a week	1.34	0.08	2.47	<.0001	1.41	0.007	0.005
Whitens teeth by dentist or whitener or toothpaste	0.96	0.82	1.21	0.22	1.03	0.80	0.36
Self-Reported Dental Services Received at Last Visit							
Teeth cleaning	2.16	<.0001	2.10	<.0001	1.75	<.0001	0.35
Dental exam	0.97	0.87	1.17	0.30	0.98	0.88	0.13
X-rays	0.59	0.003	1.25	0.15	0.71	0.01	<.001
Filling	1.49	0.02	0.99	0.93	0.93	0.58	0.16
Crown	1.41	0.31	0.87	0.56	1.08	0.75	0.84
Tooth extraction	0.35	<.0001	0.71	0.04	0.50	<.0001	0.05
Root canal	0.81	0.50	0.70	0.12	0.82	0.40	0.94
Gum treatment	0.60	0.22	1.06	0.85	1.06	0.87	0.80
Dentures or bridges	0.65	0.35	0.97	0.93	0.33	0.02	0.16
Care for braces	2.26	0.24	0.85	0.81	<.0001	0.99	0.45
Oral Health Beliefs							
Believes regular cleaning prevents cavities	0.94	0.77	1.26	0.29	0.99	0.95	0.59
Believes regular cleaning prevents loose teeth	0.87	0.42	1.40	0.04	1.15	0.28	0.16

* Coefficient is the estimated mean difference (not OR)

** Estimates and significance levels adjusted for age, insurance, education, income, survey mode, immigration status, single parent, employment status, and mental health

*** Test for significance of interaction between RSDC and race/ethnicity (that is, whether association with RSDC differs significantly by racial/ethnic group)

Oral health status based on self-report was low among mothers. Over 41-58% of mothers rated the condition of their teeth as fair or poor, 37-43% reported having a broken tooth, and over 20% had an extraction at their last dental visit. In comparison to national data, NHANES III (1988-94) for adults indicate that self-rated condition of teeth varies by racial/ethnic group: about 55% of Hispanics, 46% of Blacks, and 31% of Whites rated the condition of their teeth as fair or poor (National Center for Health Statistics, 2003). Our findings are similar, except that a higher percentage (42%) of White mothers rated their condition as fair or poor. The difference likely exists because our sample consists of low-income adults, while NHANES adults are representative of all U.S. incomes, and the percentage of NHANES adults with fair or poor teeth is lower in higher income groups (22% below federal poverty line (FPL), 18% for 101-200% FPL, and 9% above 200% FPL).

Our findings are important for public health because the ratings are indicators of unmet dental needs: the NHANES reports that more than half of the adults with fair or poor oral health have 1 or more untreated

decayed teeth (while only 5% of adults with excellent oral health have 1-2 decayed teeth). Given that self-rated oral health is worse than self-rated general health in the U.S. (about 11-20% of adults rated their general health as fair or poor) (Pleis *et al*., 2006), oral health is a priority public health issue.

Our findings have policy implications for the oral health and dental care of low-income mothers and their preschool children enrolled in Medicaid. Findings are consistent with the inverse care law: mothers who have worse oral health and need dental care the most are less likely to have a RSDC (Grembowski *et al*., 1989; Watt, 2002). Federal and state policies that increase the percentage of low-income mothers with a RSDC may improve the oral health of mothers and reduce mother-to-child transmission of bacteria that cause tooth decay (Grembowski *et al*., 2007).

Our findings are limited to low-income mothers of preschool children who are enrolled in Medicaid dental insurance in Washington state, and findings may not be generalizable to other states and countries. Mothers who responded to the survey may be different than mothers who did not respond, which may affect results. Findings are based on cross-sectional survey data, which do not indicate causal relationships.

We conclude that less than half of low-income mothers with children aged 3-6 covered by Medicaid had a RSDC, which was associated with better self-reported oral health and preventive dental care but generally not with oral health beliefs and behaviors. Oral health behaviors differ for Black, Hispanic and White mothers, except flossing, and the patterns are inconsistent across racial/ethnic groups.

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Disclaimer

Interpretations of results are the authors' own and do not necessarily represent the official opinion of the National Institute for Dental and Craniofacial Research, Social and Economic Sciences Research Center, Health and Recovery Services Administration, and WithinReach.

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