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Oral hygiene practices and dental service utilization among pregnant women

Kim A. Boggess, MD; Diana M. Urlaub, MPH; Katie E. Massey, MSW, MSPH; Merry-K Moos, BSN MPH; Matthew B. Matheson, MS; Carol Lorenz, PhD

Improving oral health and reducing the negative effect of oral disease on overall health and well-being are major health priorities for medical and dental care providers in the United States.^{1,2} Oral diseases such as dental caries, gingivitis and periodontal infection are prevalent conditions that affect a person's oral health and can lead to tooth loss. The prevalence of oral diseases is not distributed evenly among the U.S. population. People of racial or ethnic minorities and those who are economically disadvantaged are affected disproportionately by dental caries, gingivitis and periodontal infection.³⁻⁵

Dental care providers have recognized for decades that pregnant women have a higher incidence of gingival inflammation than do women who are not pregnant.⁶ Clinical periodontal disease also is prevalent during pregnancy, particularly among women in racial or ethnic minorities and those of low socioeconomic status.^{7,8} The reasons for this likely are multifactorial and include inadequate oral hygiene, limited access to oral health care, medical comorbidities that increase oral disease risk, and limited knowl-

ABSTRACT

Background. Daily oral hygiene and regular dental visits are important components of oral health care. The authors' objective in this study was to examine women's oral hygiene practices and use of dental services during pregnancy.

Methods. The authors developed a written oral health questionnaire and administered it to 599 pregnant women. They collected demographic information, as well as data on oral hygiene practices and use of dental services during pregnancy. They used χ^2 and multivariable logistic regression models to assess associations between oral hygiene practice and dental service use during pregnancy and to identify maternal predictor variables.

Results. Of the 599 participants, 83 percent ($n = 497$) reported brushing once or twice per day. Twenty-four percent ($n = 141$) reported flossing at least once daily; Hispanic women were more likely to floss than were white or African American women (28 percent [52 of 183] versus 22 percent [54 of 248] versus 19 percent [23 of 121], respectively, $P < .001$). Seventy-four percent ($n = 442$) of the participants reported having received no routine dental care during pregnancy. Hispanic women were significantly less likely than were black or white women to receive routine dental care during pregnancy (13 percent versus 21 percent versus 36 percent, respectively, $P < .001$). The authors found that being older than 36 years, being of Hispanic race or ethnicity, having an annual income of less than \$30,000, flossing infrequently and receiving no dental care when not pregnant were significantly associated with lack of routine dental care during pregnancy (adjusted odds ratios, 95 percent confidence intervals: 2.56 [1.33-4.92]; 2.19 [1.11-4.29]; 2.02 [1.12-3.65]; 1.86 [1.13-3.07]; and 4.35 [2.5-7.69], respectively). A woman's lack of receiving routine dental care when not pregnant was the most significant predictor of lack of receiving dental care during pregnancy.

Conclusion. Racial, ethnic and economic disparities related to oral hygiene practices and dental service utilization during pregnancy exist.

Clinical Implications. Medical and dental care providers who treat women of reproductive age and pregnant women need to develop policy strategies to address this population's access barriers to, and use of, dental care services.

Key Words. Pregnancy; oral hygiene; dental care utilization.

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edge of the relationship between oral and general health among prenatal care providers and their patients.^{9,10}

Mothers with a regular source of dental care are more likely to take their children to the dentist and to develop attitudes and behaviors that promote good oral health for themselves and their children.¹¹ However, while dental treatment is an important part of the prevention and treatment of oral diseases, access to and utilization of dental services are not universal or distributed evenly among people.¹²⁻¹⁴ We conducted a study to examine oral hygiene practices and dental service utilization during pregnancy and to provide a basis for future study to develop policies to reduce disparities in oral health among women in racial and ethnic minorities.

PARTICIPANTS, MATERIALS AND METHODS

The institutional review board of the University of North Carolina (UNC) at Chapel Hill approved the conduct of this study, and women who participated provided written informed consent in their native language. During the study period, we approached women 18 years and older who were visiting the UNC Women’s Clinic Ultrasound Unit for a clinically indicated prenatal ultrasound and asked them to participate in the study. If they agreed, we asked them to complete a self-administered questionnaire. The primary investigators (K.A.B., M.-K.M. and C.L.) developed the questionnaire, which consisted of 39 questions designed to assess the respondent’s knowledge, beliefs and health practices regarding oral health for herself and her child or children. The survey instrument is provided as online supplemental data to this article (available at “http://jada.ada.org”). Our study team included bilingual staff members who were available to read the questionnaire to women who needed assistance. Women were compensated with a \$10 cash incentive for completion of the

TABLE 1

Characteristics and oral hygiene practices of study cohort.	
PARTICIPANTS’ CHARACTERISTICS (N = 599)*	NUMBER (%)†
Age Group, in Years	
18 to 20	58 (10)
21 to 25	122 (20)
26 to 30	184 (31)
31 to 35	139 (23)
36 or older	91 (15)
Data missing	5 (1)
Race or Ethnicity	
White	248 (41)
African American	121 (20)
Hispanic	184 (31)
Other	25 (4)
More than one race or ethnicity	20 (3)
Data missing	1 (0.2)
Marital Status	
Married or living with partner	494 (82)
Single or not living with partner	81 (14)
Data missing	24 (4)
Educational Attainment	
Less than a high school diploma	152 (25)
High school diploma	89 (15)
Some college or two-year college degree	116 (19)
Four-year college degree	128 (21)
Some graduate or professional study	103 (17)
Data missing	11 (2)
Annual Household Income	
Less than \$30,000	253 (42)
\$30,000 to \$60,000	91 (15)
More than \$60,000	151 (25)
Data missing	104 (17)
Dental Insurance Status	
Has dental insurance	209 (35)
Has no dental insurance	390 (65)
Source of Payment for Dental Care	
Private insurance	167 (28)
Medicaid	105 (18)
Out of pocket	135 (23)
Other	19 (3)
More than one response	79 (13)
Data missing	94 (16)

* Respondents were allowed to select more than one response to a question.
 † Totals may vary from 100 percent because of rounding.

questionnaire. We excluded from the study women who were not pregnant, who were younger than 18 years or whose primary language was not English or Spanish.

We collected data regarding participants’ characteristics, including age, race or ethnicity, level of education, annual household income and insurance coverage. We gathered data regarding race or ethnicity because of the racial or ethnic disparities in the prevalence of oral diseases.³ Women

ABBREVIATION KEY. PRAMS: Pregnancy Risk Assessment Monitoring System. UNC: University of North Carolina.

TABLE 1 (CONTINUED)

PARTICIPANTS' CHARACTERISTICS (N = 599)*	NUMBER (%)†
Self-reported Oral Health Status	
Excellent or good	353 (59)
Fair, poor or very poor	246 (41)
Frequency of Toothbrushing	
Never	0
Once per week	2 (0)
A few times per week	12 (2)
About once per day	147 (25)
Two or more times per day	352 (59)
More than twice per day	86 (14)
Frequency of Flossing	
Never	108 (18)
Less than once per day	349 (58)
One or more times per day	141 (24)
Data missing	1 (0)
Frequency of Use of Mouthwash or Dental Rinse	
Never	145 (24)
Less than once per week	156 (26)
One to six times per week	115 (19)
At least once per day	182 (30)
Data missing	1 (0)
Frequency of Receipt of Routine Dental Care	
Never	88 (15)
Less than once per year	91 (15)
Once per year	134 (22)
Two or more times per year	215 (36)
Only when experiencing an oral health problem	67 (11)
Data missing	4 (1)
Children Living in the Home Who Are Aged 2 to 6 Years	
Yes	267 (45)
No	324 (54)
Data missing	8 (1)

self-characterized their race or ethnicity by choosing one or more of the following categories to describe themselves: Asian; American Indian or Alaska Native; black or African American; Hispanic/Latina; Native Hawaiian or other Pacific Islander; white; or other, in which case we asked them to specify. We ascertained participants' oral hygiene practices (frequency of toothbrushing and use of dental floss) by means of self-report in answers to forced-choice questions. We collected data regarding participants' use of dental services during pregnancy. To determine participants' reasons for not receiving dental care during pregnancy, we asked multiple-choice questions that offered participants the options of selecting more than one response and writing in responses.

The primary outcome of interest for this analysis was participants' dental service utilization during pregnancy, dichotomized as whether or not a woman reported having had a routine dental visit during pregnancy. We defined a routine dental visit as a dental checkup or dental prophylaxis.

We developed a logistic regression model describing dental service utilization during pregnancy. We analyzed data from completed questionnaires and generated descriptive frequency tables. We performed bivariate analyses to test the association between the primary outcome and participants' characteristics. We fit the initial full model with all of the participants' characteristics, then reduced the model sequentially by removing variables whose results were not significant at the $P = .20$ level; the final model reported here accounted for the cumulative effect of significant participant characteristics on dental service utilization during pregnancy. We then tested for confounding variables at the overall group and individual variable levels. We used statistical analysis software (SAS, version 9.13, SAS Institute, Cary, N.C.) to perform statistical analyses.

RESULTS

Between April and July 2008, 1,292 women visited the UNC Women's Clinic in Chapel Hill for the purpose of undergoing antenatal ultrasonography. Of those women, 436 (34 percent) were in the first trimester of pregnancy and 856 (66 percent) were in the second or third trimester. Study personnel recruited women into the study two to three days per week of the study period; thus, they invited 701 (54 percent) of 1,292 women who visited the clinic to participate. Of these 701 women, 86 (12 percent) declined participation, and 615 enrolled and provided written informed consent. We excluded from the study 16 women who had enrolled because they no longer met eligibility criteria, had completed the questionnaire twice in two visits or were unable to complete the questionnaire; thus, we evaluated a total of 599 completed surveys for this analysis. Of these surveys, participants had self-administered 582 (97 percent). Almost three-quarters (442; 74 percent) of the questionnaires were in English and 157 (26 percent) were in Spanish. The mean (\pm standard deviation) age of women participating in the study was 28.9 ± 6.0 years. At the time they com-

TABLE 2

Reasons for lack of routine dental care utilization during pregnancy among 442 participants.	
STATED REASON	n (%) LACKING ROUTINE DENTAL CARE DURING PREGNANCY*
"I was not having a dental problem"	200 (45)
"I do not have dental insurance"	136 (31)
"I can't afford to go to the dentist"	110 (25)
"I was told not to go to the dentist during pregnancy"	32 (7)
"I am afraid to go to the dentist"	34 (8)
"I can't find a dentist who treats pregnant women"	21 (5)
Other reasons	152 (34)
* Total exceeds 100 percent because some participants selected more than one reason.	

pleted the questionnaire, 591 (99 percent) of 599 women reported their gestational trimester; 165 (28 percent) were in the first trimester of pregnancy and 426 (72 percent) were in the second or third trimester. Table 1 (pages 554-555) shows participants' characteristics and oral hygiene practices.

Overall, 353 women (59 percent) reported having excellent or good oral health, and 246 (41 percent) reported having fair, poor or very poor oral health. Hispanic women were significantly more likely than white or black women to report having fair, poor or very poor oral health (70 percent [n = 129] versus 24 percent [n = 60] versus

TABLE 3

Participants' characteristics stratified according to routine utilization of dental care during pregnancy.*			
CHARACTERISTIC	RECEIVED ROUTINE DENTAL CARE DURING PREGNANCY (n = 150)	RECEIVED NO ROUTINE DENTAL CARE DURING PREGNANCY (n = 442)	P
Mean (Standard Deviation) Age in Years	28.9 (5.9)	28.8 (6.0)	.823
Age Group, in Years			
18 to 20	16 (28)	42 (72)	.704
21 to 25	29 (24)	93 (76)	
26 to 30	46 (25)	135 (75)	
31 to 35	40 (29)	96 (71)	
36 or older	18 (20)	72 (80)	
Data missing	1 (20)	4 (80)	
Race or Ethnicity			
White	89 (36)	157 (64)	< .001
African American	25 (21)	95 (79)	
Hispanic	24 (13)	156 (87)	
Other or more than one race or ethnicity	12 (26)	34 (74)	
Marital Status			
Married or living with partner	128 (26)	364 (74)	.229
Single or not living with partner	16 (20)	65 (80)	
Data missing	6 (32)	13 (68)	
Educational Attainment			
Less than a high school diploma	19 (13)	132 (87)	< .001
High school diploma	16 (18)	73 (82)	
Some college or two-year college degree	32 (28)	84 (72)	
Four-year college degree	46 (36)	82 (64)	
Some graduate or professional study	34 (33)	68 (67)	
Data missing	3 (50)	3 (50)	
Annual Household Income			
Less than \$30,000	49 (19)	204 (81)	< .001
\$30,000 to \$60,000	18 (20)	73 (80)	
More than \$60,000	66 (44)	84 (56)	
Data missing	17 (17)	81 (83)	
Dental Insurance Status			
Has dental insurance	84 (41)	123 (59)	< .001
Has no dental insurance	66 (17)	319 (83)	
* Data presented as row number (percentage).			

38 percent [n = 46], respectively, $P < .001$). The results for oral hygiene practices overall were significantly different among races and ethnicities. Twenty-seven percent (n = 161) of the respondents reported brushing their teeth one or fewer times per day, and black women were more likely than white and Hispanic women to brush one or fewer times daily (51 percent [62 of 121] versus 25 percent [62 of 248] versus 13 percent [24 of 184], respectively, $P < .001$). However, Hispanic women were more likely to floss daily than were white and black women (28 percent [52 of 183] versus 22 percent [54 of 248] versus 19 percent [23 of 121], respectively, $P < .001$).

When asked about their dental care utilization when they were not pregnant, 349 participants (58 percent) reported going to the dentist at least once per year; 155 (26 percent) reported “never” going to the dentist for routine dental care such as checkups and prophylaxes or that they went

only when they had an oral health problem. Among participants who indicated that they received routine dental care, most commonly they visited a private dentist’s office, followed by a health department or community clinic, the UNC School of Dentistry clinic or other sites (50 percent [n = 175] versus 12 percent [n = 42] versus 4 percent [n = 14] versus 6 percent [n = 21], respectively). Hispanic and black women were more likely than were white women to never have received dental care (25 percent [46 of 184] versus 16 percent [19 of 121] versus 5 percent [12 of 248], respectively, $P < .001$). Women with annual incomes of less than \$30,000 were less likely than those with annual incomes of more than \$30,000 to receive routine dental care (19 percent [48 of 253] versus 35 percent [85 of 242], respectively, $P < .001$).

Twenty-five percent (n = 150) of participants reported having visited a dentist for routine care

TABLE 3 (CONTINUED)

CHARACTERISTIC	RECEIVED ROUTINE DENTAL CARE DURING PREGNANCY (n = 150) (%)	RECEIVED NO ROUTINE DENTAL CARE DURING PREGNANCY (n = 442) (%)	P
Source of Payment for Dental Care*			
Private insurance	66 (40)	99 (60)	$< .001$
Medicaid	21 (20)	84 (80)	
Out of pocket	29 (22)	105 (78)	
Other/More than one response	12 (11)	101 (89)	
Data missing	22 (29)	53 (71)	
Self-reported Oral Health Status			
Excellent or good	111 (32)	239 (68)	$< .001$
Fair, poor or very poor	39 (16)	203 (84)	
Frequency of Oral Hygiene Practices			
Toothbrushing			
Less than once per day	34 (21)	125 (79)	.180
More than once per day	116 (27)	317 (63)	
Flossing			
Less than once per day	96 (21)	356 (79)	$< .001$
More than once per day	54 (39)	86 (61)	
Use of mouthwash or dental rinse			
Less than once per day	103 (25)	309 (75)	.775
More than once per day	47 (26)	133 (74)	
Frequency of Receipt of Routine Dental Care			
Never	4 (5)	83 (95)	$< .001$
Less than once per year	10 (11)	78 (89)	
Once per year	14 (11)	119 (89)	
Two or more times per year	116 (54)	99 (46)	
Only when experiencing an oral health problem	6 (9)	61 (91)	
Data missing	0	2 (100)	
Children Living in the Home Aged 2 to 6 Years			
Yes	59 (22)	206 (78)	.162
No	91 (28)	233 (72)	
Data missing	0	3 (100)	

TABLE 4

Logistic regression model to predict lack of routine dental care visit during pregnancy.				
MATERNAL CHARACTERISTIC	FULL MODEL*		REDUCED MODEL†	
	OR‡ (95% CI§)	P	OR (95% CI)	P
Age Group, in Years				
18 to 35	Referent group	NA¶	Referent group	.005
36 or older	2.55 (1.33-4.92)	< .001	2.56 (1.33-4.92)	
Race or Ethnicity				
White	Referent group	NA	NA	NA
African American	1.41 (0.73-2.73)	0.310	1.38 (0.73-2.61)	.322
Hispanic	2.29 (1.02-5.16)	0.046	2.19 (1.11-4.29)	.023
Other/More than one race or ethnicity	1.48 (0.62-3.54)	0.374	1.39 (0.59-3.30)	.451
Marital Status				
Married or living with partner	Referent group	NA	NA	NA
Single or not living with partner	0.96 (0.44-2.47)	.909		
Educational Attainment				
High school diploma or above	Referent group	.934	NA	NA
Did not complete high school	1.04 (0.44-2.47)			
Annual Household Income				
Less than \$30,000	1.85 (0.90-3.81)	.004	2.02 (1.12-3.65)	.020
\$30,000 to \$60,000	2.67 (1.36-5.23)	.096	2.76 (1.43-5.33)	.002
More than \$60,000	Referent group	NA	Referent group	NA
Source of Payment for Dental Care#				
Private insurance	Referent group	NA		
Medicaid	1.32 (0.63-2.76)	.469		
Out of pocket	1.24 (0.75-2.07)	.405	NA	NA
Other	1.62 (0.41-6.37)	.487		
Do not know	0.89 (0.35-2.26)	.807		
Could not pay	1.19 (0.31-4.57)	.805		
Receives Routine Dental Care				
Yes**	Referent group	< .001	Referent group	< .001
No	4.54 (2.44-8.33)		4.35 (2.5-7.69)	
Self-reported Oral Health Status				
Excellent or good	Referent group	.534	NA	NA
Fair, poor or very poor	0.83 (0.45-1.51)	NA		
Frequency of Oral Hygiene Practices				
Toothbrushing				
Less than once per day	1.12 (0.65-1.93)	.695	NA	NA
More than once per day	Referent group			
Flossing				
Less than once per day	1.88 (1.10-3.24)	.022	1.86 (1.13-3.07)	.015
More than once per day	Referent group			
Use of mouthwash or dental rinse				
Less than once per day	1.02 (0.58-1.79)	.941	NA	NA
More than once per day	Referent group			

* Adjusted for all variables listed.
 † Adjusted for age, race, income, receipt of routine dental care and flossing frequency.
 ‡ OR: Odds ratio.
 § CI: Confidence interval.
 ¶ NA: Not applicable.
 # Multiple responses not taken into account.
 ** Defined as one or more visits per year.

common reasons for not visiting the dentist among the 442 participants who reported not having received routine dental care during pregnancy. Many participants cited a financial reason; however, of the 207 participants who reported having private dental insurance, only 41 percent (n = 84) received routine dental care during pregnancy. Notably, 7 percent (n = 32) of the 442 respondents who did not receive routine dental care during pregnancy reported having been told “not to go to the dentist” during pregnancy. Thirty-four percent (n = 152) of these 442 participants cited “other reasons” for not having received routine dental care during pregnancy. The most common other reasons cited were “I had a recent dental visit before becoming pregnant” or “I’m not due yet for a routine dental visit” (29 participants); “I don’t have a dentist” (15 participants); “I don’t know why I haven’t gone” (nine participants); and “I don’t have time to go to the dentist” (eight participants).

Table 3 (pages 556-557) shows the bivariate (unadjusted) results for the association between participants’ characteristics and oral hygiene practice and receipt of rou-

during pregnancy, and 74 percent (442) reported having made no routine dental visits during pregnancy. Table 2 (page 556) shows the most

tine dental care during pregnancy. Hispanic women and women who had an annual income of less than \$30,000, had an educational level of less than a high school diploma, had insurance other than private, lacked dental insurance, lacked routine dental care when not pregnant and flossed infrequently were the least likely to receive routine dental care during pregnancy. Only 41 percent ($n = 86$) of 209 participants with private dental insurance reported having received routine dental care during pregnancy.

Table 4 (page 558) shows the multivariable model we developed to determine participants' characteristics associated with a lack of routine dental care utilization during pregnancy. An age of 36 years or older, Hispanic ethnicity, annual income of less than \$30,000 and of \$30,000 to 60,000, and infrequent flossing remained significantly associated with a lack of routine use of dental care during pregnancy. We found no confounding in the relationship between the participant variables and the primary outcome when we considered the entire group of variables in the final model ($P = .09$). We also found no significant confounding when we examined all pairwise interactions; of specific interest is our finding that there was no confounding of the relationship between race and ethnicity and income on the primary outcome ($P = .1$).

DISCUSSION

We found that participants' oral hygiene practices were associated with routine dental care utilization during pregnancy. Women who flossed infrequently were less likely to seek routine dental care during pregnancy. We cannot discern from our analysis whether this represents an overall decrease in attention to oral health or a lack of understanding of the importance of flossing or of routine dental care. Our data suggest, however, that educating women of reproductive age and pregnant women regarding the importance of flossing as part of proper oral hygiene is warranted, as only a minority of our respondents reported flossing regularly (at least once per day) regardless of whether they were pregnant. We also demonstrated that racial or ethnic differences in oral health behaviors and dental service utilization exist among pregnant women. Hispanic women were more likely to floss than were

white or black women. Hispanic women were significantly less likely than were black or white women to have received routine dental care during pregnancy. An age of 36 years or older, Hispanic race or ethnicity, an annual income of less than \$30,000, infrequent flossing and receiving no dental care when not pregnant were associated significantly with a lack of routine dental care during pregnancy.

The characteristics of the women in our study cohort reflect the demographic characteristics of women who seek prenatal care at UNC, including a high proportion of women of racial or ethnic minority descent and who are economically disadvantaged; this is a strength of our study. In addition, we examined not only family income but also whether or not a woman had dental insurance, which allowed us to further explore financial barriers to dental service utilization.

Despite these strengths, our study also had limitations. Reporting income data was optional, and almost 20 percent of the cohort did not provide household income data. This lack has the potential to bias our findings, particularly because financial barriers were the most significant predictor of lack of routine use of dental care during pregnancy. We did not have income data for a similar proportion

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of respondents who were black, Hispanic or of other races or ethnicities, but these data were missing for significantly fewer white participants (24 percent [29 of 121] versus 27 percent [50 of 184] versus 24 percent [six of 25] versus 6 percent [15 of 248], respectively, $P < .001$). Given the significant relationship between income and race or ethnicity among our cohort, it is likely that the reported risks are underestimated in our cohort. Income information was missing for 18 percent ($n = 81$) of 442 participants who had not received routine dental care during pregnancy versus 11 percent ($n = 17$) of 150 participants who had received care; this lack was not statistically significantly different and, therefore, was unlikely to bias our findings significantly. Another possible limitation is the effect of gestational age on seeking routine dental care. We asked participants, "Since you became pregnant, have you visited the dentist?"; it is possible that a woman asked early in her pregnancy could reply "No" because she had had a routine dental visit shortly

before becoming pregnant. However, we also asked women why or why not they had visited the dentist, which we assumed would eliminate women who recently had visited the dentist before pregnancy. In addition, women who received routine dental care when they were not pregnant were more likely to report having had routine care during pregnancy. This reduced the potential for gestational age at the time of study participation to be a confounding variable.

Although dental treatment is an important part of the prevention and treatment of oral diseases, access to and use of dental services are not universal or evenly distributed among the population.¹²⁻¹⁴ In 2004 in North Carolina, for example, 59 percent of black adults, compared with 73 percent of non-Hispanic white adults, reported having visited a dentist in the preceding year.

The proportion of people receiving dental services decreased with decreasing family income.¹² The prevalence of reported dental visits during pregnancy among our cohort was 25 percent (n = 159) of 599 participants, which is comparable with the findings in some studies and lower than the findings in others.¹²⁻¹⁴

The Pregnancy Risk Assessment Monitoring System (PRAMS), conducted by the Centers for Disease Control and Prevention, Atlanta, is a state-specific data source for maternal and child health issues.

PRAMS data have indicated that state prevalence rates of dental visits during pregnancy range between 23 and 48 percent.¹³⁻¹⁵ In Washington, the prevalence of dental visits during pregnancy was reported to be 48 percent¹⁵; however, that population is different from the one in our study, as only 12 percent of its participants were Hispanic and almost 60 percent had a monthly income of more than \$3,000 (which equates to an approximate annual income of more than \$36,000). Only 23 to 43 percent of pregnant women participating in PRAMS in North Carolina in 2004 reported having received dental care during pregnancy, and only one-half of the women reporting dental problems sought treatment during pregnancy.^{13,14} However, unlike our study, PRAMS does not involve the collection of information regarding dental insurance coverage, which has been suggested as a primary determinant of receipt of dental care.¹⁶ When we examined the

effect of dental insurance coverage, we found that only 35 percent (n = 209) of the participants in our study had dental insurance and that 31 percent (n = 136) of participants who did not obtain routine dental care during pregnancy cited the lack of insurance as the reason for not having obtained routine dental care during pregnancy. Whereas our bivariate analysis indicated that lack of dental insurance was associated with the lack of routine dental care during pregnancy, we did not include lack of insurance in the final regression model owing to the greater relative contribution of income to the primary outcome. In addition, 60 percent (n = 125) of 209 participants with dental insurance did not receive routine dental care during pregnancy, which suggests that having insurance is only one contributor to the receipt of routine dental care. Perhaps even

women who possess private dental insurance lack the time, motivation or understanding of the importance of dental health to prompt them to seek dental care.

Previous research has demonstrated that the burden of oral disease is worse for people who have restricted access to preventive and treatment services as a result of their inability to pay for services, their lack of dental insurance coverage and the limited availability of dental care providers who are willing to accept third-party reim-

bursements from public assistance programs.¹⁷ Although we did not measure the burden of oral disease among our study cohort, we did find among our participants some significant financial barriers to routine dental care utilization during pregnancy. The challenge for those who provide health care to women is how to address barriers to oral health care for pregnant women. Previous studies have examined the role of dental care management and use of a “dental home” to improve use of dental care services.^{18,19} In a study conducted in New York, investigators compared trends in the use of dental services by Medicaid beneficiaries and found an increased number of Medicaid beneficiaries in one county who received dental services as a result of a dental case management program.¹⁸ In addition, dental case management reduced the rate of missed appointments, minimized administrative burdens of Medicaid participation for dental offices, and

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Although we did not measure the burden of oral disease among our study cohort, we did find among our participants some significant financial barriers to routine dental care utilization during pregnancy.

improved oral health literacy and treatment compliance among low-income participants.¹⁸ In a community program designed to address access to dental care, providing a dental home for pregnant women resulted in 56 percent of eligible pregnant women's receiving care and a missed-appointment rate of only 9 percent.¹⁹

CONCLUSION

We found that dental care utilization during pregnancy was limited, with significant disparities among women of various racial or ethnic backgrounds and economic status. We found that the most significant predictor of a lack of routine dental care among women during pregnancy was a lack of routine dental care when they were not pregnant. Lack of financial resources and the inability to pay for care also were associated significantly with the lack of use of routine dental services during pregnancy, and it is likely that these factors influenced these participants' dental care utilization when they were not pregnant. Thus, addressing a woman's access to dental health care only during pregnancy is likely to have limited utility in affecting the oral health of the woman and her children. However, during pregnancy, women often are motivated to receive messages regarding their health. Therefore, providers of prenatal care can use the frequent visits made during the prenatal period to emphasize good oral hygiene practices and the importance of oral health. This is an important opportunity for dentists to affect a woman's oral health behaviors and use of dental care during and after pregnancy. Dental and prenatal medical care providers should develop policies that address access to care to improve routine dental care use before and during pregnancy for these vulnerable women and their families. Although we did not assess whether pregnancy had a direct effect (either positive or negative) on seeking or avoiding dental care, we did determine that some women either believed that dental care during pregnancy was unsafe or were told not to seek dental care during pregnancy. Our findings emphasize the need for policy strategies that will improve women's use of dental care during pregnancy and reduce the racial and ethnic and economic disparities in oral health care. ■

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1. U.S. Department of Health and Human Services, National Institute of Dental and Craniofacial Research. Oral Health in America: A Report of the Surgeon General. Rockville, Md.: U.S. Public Health Service, Department of Health and Human Services; 2000.
2. Boggess KA; Society for Maternal-Fetal Medicine Publications Committee. Maternal oral health in pregnancy. *Obstet Gynecol* 2008; 111(4):976-986.
3. Centers for Disease Control and Prevention. Promoting oral health: interventions for preventing dental caries, oral and pharyngeal cancers, and sports-related craniofacial injuries—a report on recommendations of the task force on community preventive services. *MMWR Recomm Rep* 2001;50(RR-21):1-13.
4. Albandar JM, Brunelle JA, Kingman A. Destructive periodontal disease in adults 30 years of age and older in the United States, 1988-1994. *J Periodontol* 1999;70(1):13-29.
5. Albandar JM, Kingman A. Gingival recession, gingival bleeding, and dental calculus in adults 30 years of age and older in the United States, 1988-1994. *J Periodontol* 1999;70(1):30-43.
6. Lõe H, Silness J. Periodontal disease in pregnancy, I: prevalence and severity. *Acta Odontol Scand* 1963;21(6):533-551.
7. Jeffcoat MK, Geurs NC, Reddy MS, Cliver SP, Goldenberg RL, Hauth JC. Periodontal infection and preterm birth: results of a prospective study. *JADA* 2001;132(7):875-880.
8. Lief S, Boggess KA, Murtha AP, et al. The oral conditions and pregnancy study: periodontal status of a cohort of pregnant women. *J Periodontol* 2004;75(1):116-126.
9. Wilder R, Robinson C, Jared H, Lief S, Boggess K. Obstetricians' knowledge and practice behaviors concerning periodontal health and preterm delivery and low birth weight. *J Dent Hyg* 2007;81(4):81.
10. Zanata RL, Fernandes KB, Navarro PS. Prenatal dental care: evaluation of professional knowledge of obstetricians and dentists in the cities of Londrina/PR and Bauru/SP, Brazil, 2004. *J Appl Oral Sci* 2008;16(3):194-200.
11. Grembowski D, Spiekerman C, Milgrom P. Disparities in a regular source of dental care among mothers of Medicaid-enrolled preschool children. *J Health Care Poor Underserved* 2007;18(4): 789-813.
12. Hughes E, McCracken M, Roberts H, et al. Surveillance for certain health behaviors among states and selected local areas: behavioral risk factor surveillance system, United States, 2004. *MMWR Surveill Summ* 2006;55(7):1-124.
13. Gaffield ML, Gilbert BJ, Malvitz DM, Romaguera R. Oral health during pregnancy: an analysis of information collected by the pregnancy risk assessment monitoring system. *JADA* 2001;132(7): 1009-1016.
14. Ressler-Maerlender J, Krishna R, Robison V. Oral health during pregnancy: current research. *J Womens Health (Larchmt)* 2005;14(10): 880-882.
15. Lydon-Rochelle MT, Krakowiak P, Hujoel PP, Peters RM. Dental care use and self-reported dental problems in relation to pregnancy. *Am J Pub Health* 2004;94(5):765-771.
16. Skaret E, Milgrom P, Raadal M, Grembowski D. Factors influencing whether low-income mothers have a usual source of dental care. *ASDC J Dent Child* 2001;68(2):136-139, 142.
17. U.S. Department of Health and Human Services. A National Call to Action to Promote Oral Health. Rockville, Md.: U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute of Dental and Craniofacial Research; 2003. NIH publication 03-5303.
18. Greenberg BJ, Kumar JV, Stevenson H. Dental case management: increasing access to oral health care for families and children with low incomes. *JADA* 2008;139(8):1114-1121.
19. Milgrom P, Ludwig S, Shirliff RM, et al. Providing a dental home for pregnant women: a community program to address dental care access—a brief communication. *J Public Health Dent* 2008;68(3): 170-173.

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