Scientific Article

Pediatric Oral Health Knowledge of African American and Hispanic of Mexican Origin Expectant Mothers

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Abstract: ***Purpose:*** *This study assessed the impact of a lecture on children's oral health knowledge of pregnant women from vulnerable African American (AA) and Hispanic of Mexican origin (HM) populations utilizing the same urban community health center prenatal education program.* ***Methods:*** *Participants heard one 45-minute lecture in English or Spanish on children's oral health, and completed a survey (English or Spanish) before and after the lecture.* ***Results:*** *Seven sessions provided 60 participants: (a) 30 AA; and (b) 30 HM. These two groups differed on: (1) educational attainment; (2) preferred language; (3) country of origin; and (4) baseline scores. They were similar in: (1) age; (2) frequency of first mothers; and (3) final scores. Oral health knowledge significantly rose from baseline to the end of the lecture (ANOVA, P<.001). Educational attainment was associated with HM baseline scores (P=.04), whereas age was associated with AA final scores (P=.01).* ***Conclusions:*** *An oral health lecture within a prenatal program improved oral health knowledge for African American and Hispanic of Mexican origin pregnant women, though associated factors varied between the two groups. Further study is needed to explore long-term knowledge retention and effect on the future babies' oral health. (Pediatr Dent 2007;29:287-92)*

KEYWORDS: INFANT HEALTH, ORAL HEALTH, DENTAL HEALTH EDUCATION, PARENTING EDUCATION, PRENATAL CARE

The extent and severity of early childhood caries (ECC) as a major health problem in US children five years and younger has been well documented.[1-4] Beyond the expense and personal trauma for young children with dental caries,[5-8] ECC is associated with caries experience in the permanent dentition.[9-11] Thus, targeting high-risk groups at an early stage of dental development is crucial in preventing dental caries.

Lower income, Mexican American, and African American children are more likely to have a higher prevalence of dental caries and more unmet dental needs than the general population.[1-3] Dental disease evident in infants has been attributed at least in part to: (1) the lack of proper oral hygiene; (2) inadequate nutrition; and (3) frequent or prolonged use of baby bottles that contain a fermentable liquid during the day or night.[4,12]

Parents need to be engaged in their parental roles and responsibilities to ensure that proper infant oral health practices are employed. Prenatal dental education is an important potential point of intervention for the prevention of infant dental problems.

While studies have measured the dental knowledge of expectant mothers[13] and have shown prenatal program effectiveness in the United States and other countries,[14-20] few studies have assessed expectant mothers of minority populations at high-risk for caries and other low socioeconomic status consequences in the United States.[21]

This study's purpose was to assess the impact of a minimal intervention of providing one lecture on children's oral health on short-term oral health knowledge gain of pregnant women from vulnerable African American (AA) and Hispanic of Mexican origin (HM) populations utilizing the same urban community health center prenatal education program.

Methods

In this institutional review board-approved study, the study sample was drawn from AA and HM pregnant women seeking prenatal health care at a community health center serving neighboring AA and HM communities in urban Chicago. Participants were those who volunteered to attend a prenatal dental health education class from December 2002 through February 2003. Immigration status identification was not required by the health center and the study. Therefore, designation of "Mexican American" was not deemed appropriate and "Hispanic of Mexican origin" was agreed upon with

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the health center following the identification of all the Hispanic participants originating from Mexico.

A prenatal dental education lecture was offered as part of an ongoing series of classes in the community health center's prenatal education program. The lecture was offered seven times by the same presenter to obtain the final sample size; three of the classes were conducted in English and four in Spanish to match the participants' needs. The presenter was a female pediatric dentistry resident, who was a member of a minority group that was neither AA nor HM. For the classes in Spanish, the center's maternal health educator concurrently translated the English presentation into Spanish.

The prenatal dental education lecture ran 45 minutes and covered the following oral health topics: (1) baby bottle use; (2) breast-feeding practices; (3) oral hygiene instructions; (4) age of the first dental visit; (5) use of bottled water; (6) nutrition; (7) fluoride/prevention; and (8) non-nutritive sucking habits. The information presented was based on American Academy of Pediatric Dentistry (AAPD) guidelines,[22] and consistency was sought across the seven lectures by following these guidelines and a written script.

Immediately before the lecture, the participants received: (1) an information sheet explaining the research project; (2) a pre-survey (taken before the lecture); and (3) a sealed envelope containing a post-survey (taken after the lecture).

A child's toothbrush was provided as an incentive for participating in the assessment. The women were invited to stay for the lecture if they did not want to participate in the research. The pre- and post-surveys were identified by the same unique number and by, respectively, "A" or "B." The numbers were not linked to the women. Both surveys contained the same questions regarding the subjects' demographics and pediatric oral health knowledge. A total dental knowledge score of 19 was possible. Questions covered the following content areas:

1. fluoride;
2. cariogenic bottle use (age to discontinue, healthy content at night, impact of free access to bottle or breast);
3. cariogenic snacks/nutrition;
4. non-nutritive sucking habits;
5. oral hygiene practices;
6. the first dental visit (age and the perceived importance); and
7. dental sealants.

The questions were multiple choice or yes/no, except for one open-ended question on the age at which a baby should be weaned from the bottle. The surveys and information were provided in both English and Spanish for the participants' language preference.

Results

As a convenience sample of women taking the existing prenatal classes, a total of 60 women participated during the sessions offered within the study time frame. No one present for any of the sessions declined the invitation to take part in the research. Data were collected from 30 pre- and post-surveys of AA pregnant women and 30 pre- and post-surveys of HM pregnant women. The final balance of the same number of AA and HM was coincidental.

Table 1 provides a demographic description of the AA and HM expectant mother groups. While similar in age and percentage of first-time mothers, the two groups had several distinctive differences. The HM group had less formal

Table 1. DEMOGRAPHICS OF EXPECTANT MOTHERS: AFRICAN AMERICAN (AA) AND HISPANIC OF MEXICAN ORIGIN (HM) ATTENDING A PRENATAL ORAL HEALTH EDUCATION LECTURE

VARIABLE	TOTAL N=60	AA N=30	HM N=30	*P*-VALUE (TEST)
Mean age* (SD)	24.5±5.8	25.6±5.3	23.4±6.1	.135 (*t* test)
Educational attainment †				
<Ninth grade	18%	0%	38%	.012 (Mann-Whitneey U test)
Ninth-12th grade, no diploma	34%	47%	21%	
HS diploma or GED	20%	13%	28%	
Associate degree, some college	20%	33%	7%	
≥ Bachelor's degree	7%	7%	7%	
First-time mother (%)	57%	47%	67%	.118 (chi-square)
Language used				
English	50%	100%		<.001 (chi-square)
Spanish	50%		100%	
Born in the USA (%)	58%	100%	17%	<.001 (chi-square)

* One AA did not respond. † One HM did not respond.

education, with 59% of the HM women having less than a high school diploma and, strikingly, 38% not completing the ninth grade. While almost half of the AA women had less than a high school diploma, all had completed the ninth grade. All the HM women spoke Spanish at home and all the AA women spoke English at home. Only 17% of the HM women were born in the United States, while 100% of the AA women were.

Both the AA and HM groups improved in scores from the pre- to post-test, as tested with planned contrasts in the analysis of variance (ANOVA; $P<.001$) and confirmed by paired t tests on each group (Table 2). At baseline, the AA women were more knowledgeable. At the post-test, however, the AA and HM women did not differ significantly. The interaction between race/ethnicity and change from pre- to post-scores was nonsignificant ($P=.076$). None of the participants received a perfect score; 43% of the overall group, however, scored above 14 (>79% correct) on the post-test (data not shown).

Table 2. PRE- AND POST-MEAN DENTAL KNOWLEDGE SCORES (±SD) FOR AFRICAN AMERICAN (AA) AND HISPANIC OF MEXICAN ORIGIN (HM) EXPECTANT MOTHERS ATTENDING A PRENATAL DENTAL EDUCATION LECTURE

	Contrast (N)	Mean dental knowledge Score±(SD)	P-value (test)
Within groups			
AA	Pre-lecture (30)	9.47±1.91	<.001 (paired t test)
	Post-lecture (30)	13.93±3.16	
HM	Pre-lecture (30)	6.80±2.25	<.001 (paired t test)
	Post-lecture (30)	12.53±3.42	
Total			
	Pre-lecture (60)	**8.13±2.47**	**<.001 (ANOVA)**
	Post-lecture (60)	**13.23±3.34**	
Between groups			
Pre-lecture	AA (30)	9.47±1.91	<.001 (t test)
	HM (30)	6.80±2.25	
Post-lecture	AA (30)	13.93±3.16	.105 (t test)
	HM (30)	12.53±3.42	

Distributions of knowledge on pre-lecture content areas are presented in Figure 1. The HM women had particular difficulty with fluoride, non-nutritive sucking, at-will breast-feeding, oral hygiene practices and dental sealants. The group scored at or below 50% on all content areas. The areas that appeared most challenging for the AA women with scores below 50% were: (1) at-will breast-feeding; (2) oral hygiene practices; (3) the first dental visit; and (4) dental sealants.

Several topics remained challenging for many participants, even after the lecture and the opportunity to ask questions, considering both content area (Figure 2) and specific items detailed as follows. Well under 50% of both groups could not answer whether bottled water is always a good source of fluoride and were unclear about the cariogenic status of fruit (nondried) and breakfast bars. Just over 50% of the HM women remained unclear about the caries preventive advantages of fluoridated toothpaste or dental sealants. Several topics had declines in the percentage of women obtaining correct answers, including the cariogenicity of nuts and milk.

Linear regression (Table 3) examined: (1) the relationships of race/ethnicity, age; (2) whether this was the mother's first child; and (3) the mothers' educational attainment level. The pre-lecture scores revealed only race/ethnicity to be significant ($P<.001$). When the AA and HM women were examined separately, age was significantly related to pre-lecture scores for AAs with older age associated with a higher score mothers ($P=.014$). The same analysis with total post-lecture scores revealed that educational attainment approached statistical significance with more education associated with a higher score ($P=.057$), while race/ethnicity was no longer significant. No variables were significantly related to post-lecture scores for AA women alone, while educational attainment was significantly and positively related to post-lecture scores for HM women ($P=.044$).

Discussion

Both AA and HM expectant mothers who attended a single prenatal lecture on infant oral health as part of a prenatal program increased their knowledge from the information

presented, at least in the short term. Initially, the HM mothers scored lower than the AA mothers, but after the lecture the groups statistically had the same knowledge scores. Thus suggesting that having a health care provider or health educator point out basic oral health prevention information to pregnant women, even for groups with different levels of baseline knowledge, can raise dental knowledge. This finding implies that a simple, convenient, low-cost intervention may help address disparities in the knowledge of infant and early childhood oral health among particularly disadvantaged groups.

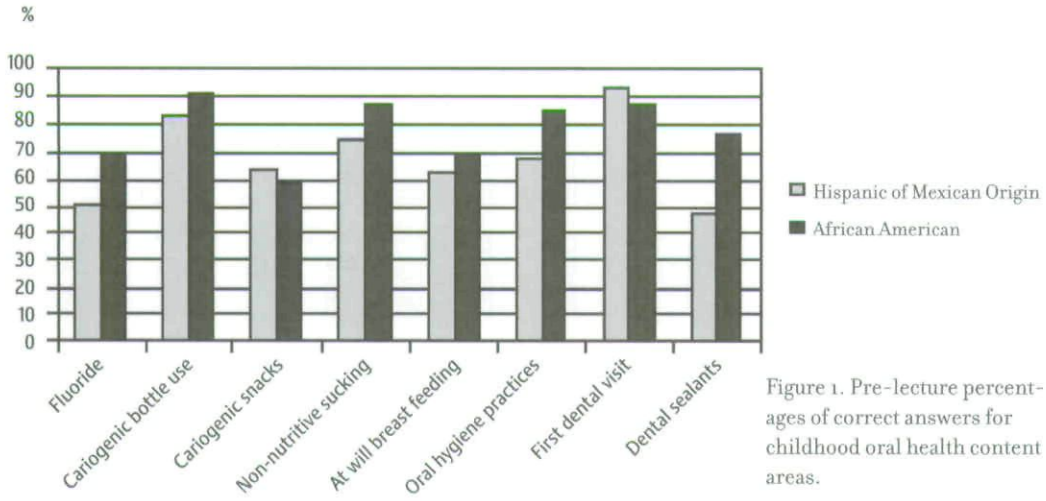

Figure 1. Pre-lecture percentages of correct answers for childhood oral health content areas.

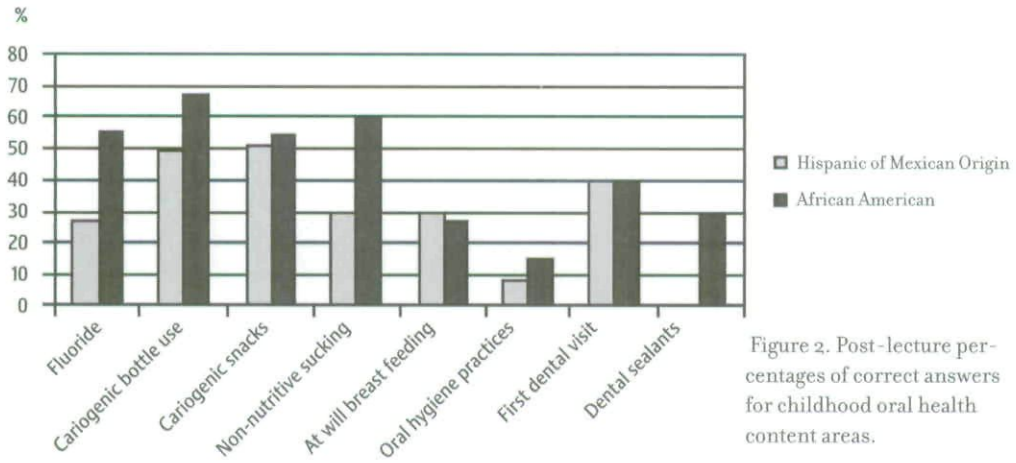

Figure 2. Post-lecture percentages of correct answers for childhood oral health content areas.

There are strengths and weaknesses with this study occurring at a single community clinic. The clinic is located between two neighboring communities of diverse, low-income populations and provides an equal opportunity for health care for both communities. Resources are present at the clinic to support access for speakers of either English or Spanish, thus facilitating the opportunity to study two diverse populations sharing a health care facility.

The convenience sample of women attending the prenatal programs was relatively small. The sample may be biased towards women especially interested in promoting their future children's oral health, which would be equally expected for the two groups. The findings' generalizability was possibly limited by: (1) the limited range of diversity of backgrounds among these study participants; and (2) unmeasured traits of the participants and the community.

Information on the potential study population of pregnant women at the clinic from where the participants arose was not attainable. This study does not address many other literacy and health literacy issues, as it is limited to low-income women from two racial/ethnic groups at a specific location interested in prenatal education. Yet, for the women attending the session in conjunction with other prenatal education, there was a rise in at least short-term knowledge. This study allows for limited interpretation of specific content areas. Identifying areas that appear particularly challenging would help focus further lectures, evaluation methods, and research. Specific areas of knowledge deficits for both groups were: (1) at-will breast-feeding; (2) oral hygiene practices for infants; (3) timing of the first dental visit; and (4) dental sealants.

Areas of deficient knowledge varied by racial /ethnic group, with some gaps retained after the lecture, providing support of the profound effect of differing backgrounds on health knowledge and a need for tailoring interventions. Fluoride and dental sealants remained a particular challenge for the HM women. Additional research is necessary to see what aspects contribute to the lag in comprehension, including: (1) modes of learning; (2) language barriers; (3) cultural norms; and (4) acceptance of intervention focused on the mother vs the healthcare provider.

The questions used in this study were based on AAPD guidelines,[22] and may be improved by assessment for cross-

cultural understanding. The expectation for linguistic misunderstanding in the current study is minimized by the clear improvements made by participants in all the areas. Further study on the effectiveness in communication and acceptance of information, however, is warranted.

Table 3. MULTIPLE LINEAR REGRESSION MODELS FOR VARIABLES ASSOCIATED WITH DENTAL KNOWLEDGE SCORES FOR AFRICAN AMERICAN AND HISPANIC OF MEXICAN ORIGIN EXPECTANT MOTHERS PRE- AND POST-ATTENDING A PRENATAL DENTAL EDUCATION LECTURE

	Pre-lecture		Post-lecture	
Total	Beta	*P*-value	Beta	*P*-value
Constant	6.163	.000	10.088	<.001
Race/ethnicity	1.170	.000	0.525	.196
Age	0.064	.248	0.066	.440
First child	-0.327	.294	-0.380	.424
Educational attainment	0.221	.328	0.667	.057
African American				
Constant	5.923	.001	11.509	<.001
Age	0.163	.014	0.091	.382
First child	-0.061	.851	-0.503	.350
Educational attainment	-0.151	.578	0.148	.382
Hispanic of Mexican Origin				
Constant	6.489	.007	8.521	.018
Age	-0.024	.790	0.062	.654
First child	-0.572	.315	0.014	.987
Educational attainment	0.514	.153	1.120	.044

While it was beyond this study's scope to determine whether the expectant mothers were able to retain their knowledge or act on it, other studies suggest positive results. Shein and colleagues found that a prenatal education class improves oral health knowledge for two years.[19] Prenatal education as part of a preventive program has been associated with improved oral health outcomes in children.[14-16] It remains to be seen whether a single prenatal class has enough impact to improve child oral health. Similar studies in varying sites or a multicenter study with follow-up capacity would be able to determine the long-term outcomes and generalizability of an educational session on knowledge, behavior, and caries rates. While justifiable to encourage participation in prenatal dental education for parents whose children will be at high-risk for dental caries, further assessment of the potential of increased benefit for the integration of oral health education with overall health education is merited.

Conclusions

Based on this study's results, the following conclusions can be made:

1. Pre-lecture scores on infant oral health differed for the Hispanic of Mexican origin and African American women participating in prenatal education classes, even though they were from the same community health center.
2. Providing the same oral health content in a single lecture yielded improved dental knowledge scores and decreased disparities in knowledge between Hispanic of Mexican origin and African American expectant women.
3. Further study is needed to explore long-term knowledge retention and the impact on the future babies' oral health.

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