# Knowledge and Behaviors Regarding Early Childhood Caries Among Low-Income Women in Florida: A Pilot Study

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## Abstract

**Purpose:** This study evaluated the oral health knowledge and behaviors in pregnant women and mothers of young children in relation to early childhood caries to assess the need for an educational oral health program.

**Methods:** Interviews were conducted from a sample of 103 Medicaid-eligible participants; 56 pregnant women and 47 mothers with children under the age 6 in Florida. The data were collected using a 4-page questionnaire with closed-ended questions and analyzed using SAS/STAT 9.22.

**Results:** Overall, 79 of 101 study participants (78%) did not receive any dental care during pregnancy. There was a significant relationship between the frequencies of mother's tooth brushing and how frequently toddlers' teeth were brushed (C=0.29; p=0.04), and the mothers' self-reported oral health ratings and how frequently they brushed their toddlers' teeth (r2=0.29; p=0.03).

**Conclusion:** Mothers' oral hygiene habits are significantly related to the oral hygiene habits of their children. Oral health education, during and after pregnancy, would be beneficial to promote healthier mouths for the mothers and their children.


**Keywords:** dental caries, early childhood caries, WIC, oral health

This study supports the NDHRA priority area, **Health Promotion/Disease Prevention:** Investigate the effectiveness of oral self-care behaviors that prevent or reduce oral diseases among all age, social and cultural groups.

## Introduction

Dental caries is the most prevalent and untreated chronic disease of children in the U.S.[1] Early childhood caries (ECC), formerly known as baby bottle decay, affects the primary dentition of those less than 72 months of age, and currently children ages 2 to 5 have approximately 30% untreated dental decay.[2,3] It is estimated that 17 million low-income children received no dental care in 2009.[4] Dental caries is prevalent in children from low-income households and minority populations.[1,4]

ECC is a major public health problem, and if left untreated can cause pain, infection and swelling from abscess, eating problems, and esthetic concerns.[1-4] Untreated dental caries can lead to loss of school time, learning difficulties, impaired nutrition and health, and in severe cases can result in life-threatening infection.[3] Each year children miss 51 million hours of school due to dental related problems.[4] Hospitalization for treatment under general anesthesia is most often necessary to treat severe ECC.[3]

Major risk factors for ECC are minority racial status and low family income, poor access to dental care, and mothers' poor knowledge about the importance of oral health.[1,5] Poor oral health behaviors of the mothers and their young children are also factors in developing ECC.[6] Frequent exposures to sweetened drinks and milk in baby bottles and sippy cups, as well as nursing during sleep have been linked to the development of severe ECC.[7] Studies find that ECC can have an overall negative effect on the oral health related quality of life of preschool children.[8] Toddlers affected by ECC tend to grow slower than caries-free toddlers, may be underweight due to difficulty eating and are more likely to have dental problems as adults.[9]

Since ECC is prevalent among children between 2 to 5 years old of low socioeconomic status,[10] a special supplemental nutrition program for Women, Infants and Children (WIC) can provide a target group for preventive dental services. WIC programs are offered through county health departments and provide nutritious foods, nutritional counseling and referrals to health care and social services to low-income pregnant, postpartum and breastfeeding women, as well as children up to age of 5.[10] Studies find that oral health literacy levels in WIC mothers are a significant factor in the oral health of their children.[11,12] Investigators report that children who seek preventive dental care at an early age have fewer dental problems as children and are more likely to continue the utilization of preventive care in the future.[13,14] New mothers who lack knowledge about oral health and proper oral hygiene are more

likely to have young children with ECC than new moms with better dental hygiene habits and oral health knowledge.[15]

Many women are also unaware of the effects of their oral health behavior on themselves and their babies prior to, during and after pregnancy.[16] Although dental care during pregnancy is safe and can prevent long-term health problems for both mother and child, many women do not seek dental care during pregnancy and many dentists are uncomfortable treating pregnant patients.[17-23] Shortage of dental providers for Medicaid populations is among the challenges concerning dental care for mothers and pregnant women. Other challenges include state budget cuts to Medicaid dental programs, fewer dentists having experience with Medicaid population and pregnant women, no-show rates, and low reimbursements and scope of dental coverage.[20] Oral diseases may affect the health of a woman and an unborn child.[18] Although the Seminole County Health Department offers full dental services free of charge to Medicaid recipients up to age 21, it is important to understand the behavior and knowledge of Medicaid-eligible patients in relation to dental caries to promote preventive dental care and reduce the need for future treatment.

The purpose of this study was to evaluate the oral health knowledge and behaviors among Medicaid-eligible pregnant women and mothers of young children in relation to early childhood caries, and to assess the need for an educational oral health program in Seminole County Health Department clinics in Florida.

## Methods and Materials

### Subjects

This study was approved by an A. T. Still University Institutional Review Board. Study subjects were recruited from 3 separate departments: pre-natal clinic, the primary clinic and the WIC's mandatory breastfeeding classes at the Seminole County Health Department in Florida. Informed consent was obtained from participants who filled out the study survey. Inclusion criteria were pregnant women and mothers of children under age 6, enrolled in the WIC program, and were enrolled in Medicaid or Medicaid eligible. Women were approached by the researcher in the clinics and asked to participate in the study. The exclusion criteria were participants with private dental insurance, had children older than 6 or did not qualify for government assisted programs or Medicaid. At baseline, there were 103 participants, 56 pregnant women and 47 non-pregnant mothers, with 55 of the women with children under age 6.

### Data Collection

The data for this study was collected using a 4-page questionnaire in paper format with closed-ended questions administered to pregnant women and mothers (n=101) of children under the age of 6. Pregnant, first time mothers were given a questionnaire regarding their own oral health and mothers of children under age 6 were given an additional survey about their children's oral health. The questionnaire was modified from other oral health questionnaires used for similar studies.[24] No personal identifying information was collected. Since all women were in low SES and educational level in this clinic, education was not indicated as an important additional variable to be included. There was no compensation for participating in this survey. The information collected was about parents' oral health knowledge, attitudes, behaviors and beliefs. The questionnaire also evaluated the child's diet, frequency of dental visits and bottle-feeding habits. To assess oral health behavior of the mothers, participants were asked to select answers to behavior-related items, such as: "How often do you brush your teeth?" and "How often do you receive routine dental care?" Response items included "once per day," "twice per day," "a few times per week" and "never." Similar questions were asked to assess oral health behavior of the toddlers, such as: "How often do you brush your toddler's teeth?" or "How often does your toddler receive routine dental care?" Similar response items are reported in Table I. After completion of the oral health questionnaires, participants were provided oral hygiene education and material. Referrals to participating adult Medicaid dental homes were also available upon request.

### Data Analysis

Data from the questionnaire were evaluated using SAS 9.3. Mantel-Haenszel chi-square statistics were used to determine the relationship between mothers' oral health behavior and children's oral health behavior using mid-ranks. Associations were considered statistically significant at $p<0.05$.

## Results

All women who consented to this survey were interviewed. A sample of 103 participants completed the questionnaires but only 101 questionnaires were included in analysis. Incomplete questionnaires (n=2) were removed from the analysis. Most of the participants were 21 to 30 years of age (65%). Distribution of the age of the participants is presented in the Table II. There were 56 pregnant participants (55%) at the time of the study, but

only 22 participants (22%) had a dental visit during pregnancy. Fifty-five mothers (54%) had children under the age of 6. In total, 79 participants (78%) did not receive dental care during pregnancy. Multiple reasons were given for not having dental visits during pregnancy, which included: "did not have dental pain or problems" (27%), "no insurance" (14%), "inability to pay" (5%), "were told not to go to the dentist"(8%), "were afraid of the dentist" (9%) or "could not find a dentist who treated pregnant patients" (8%). Over half of the participants (53%) did not provide a reason for not visiting a dentist during pregnancy (Figure 1).

Of all participants (n=101), only 7 rated their oral health as excellent (7%), 51 as good (50%), 34 as fair (34%) and 9 rated their oral health as poor (9%). Over half of mothers (58%) reported to brush their teeth 2 or more times per day, with fewer than 30% using dental floss once per day (Table I). There was a significant correlation ($r^2$=0.27; p=0.008) between how the mothers rated their oral health and how often they brushed their teeth. Mother's reported oral health was significantly positively associated with the reported flossing ($r^2$=0.35; p<0.001), and there was a significant correlation between mother's perceived oral health and the frequency of their dental visits ($r^2$=0.32; p=0.002).

The questions regarding the children's oral health habits included the frequency of brushing and dental visits, as well as the toddler's bottle contents. Twenty-four out of 51 mothers (47%) reported to brush their toddler's teeth twice per day, 20 mothers brushed once a day (39%), 5 few times a week (10%) and only 2 mothers never brushed their toddler's teeth (4%). There was a significant positive relationship between a mother's teeth-brushing frequency and the teeth-brushing frequency of the toddler performed by the mother ($r^2$=0.29; p=0.04). There was a significant positive relationship between the mother's self-reported oral health rating and the teeth-brushing frequency given by the mother to the toddler ($r^2$=0.29; p=0.03).

Although 46 (90%) mothers with children under age 6 responded that it is important for toddlers to receive routine dental check-ups, only 14 (27%) admitted that their toddlers receive routine dental check-ups 2 times a year. Mothers who reported their oral health as fair or poor corresponded to brushing their toddler's teeth less frequently.

In response to questions regarding bottle-feeding and its contents, the majority of mothers (42, 82%) reported that they do not put their children to bed with a bottle. Of the mothers that respond-

Table I: Caregivers' Oral Health Characteristics and Behavior

| Caregiver | Frequency Numbers (n=101) | Frequency Percent |
|---|---|---|
| **Oral Health** | | |
| • Excellent | 7 | 6.93% |
| • Good | 51 | 50.50% |
| • Fair | 34 | 33.66% |
| • Poor | 9 | 8.91% |
| **Brushing Frequency** | | |
| • A few times per week | 4 | 3.96% |
| • About once a day | 38 | 37.62% |
| • Two or more times per day | 60 | 59.41% |
| **Flossing Frequency** | | |
| • Never | 23 | 22.77% |
| • Less than once per week | 50 | 49.50% |
| • Once to six times per week | 27 | 26.73% |
| **Mouthwash and Dental Rinse Frequency** | | |
| • Never | 15 | 14.85% |
| • Less than once per week | 28 | 27.72% |
| • Once to six times per week | 27 | 26.73% |
| • At least once per day | 29 | 28.71% |
| **Routine Dental Care** | | |
| • Never | 13 | 12.87% |
| • Less than once per year | 25 | 24.75% |
| • Once per year | 21 | 20.79% |
| • Two or more times per year | 17 | 16.83% |
| • Only when experiencing dental problem | 21 | 20.79% |
| **Dental Care During Pregnancy** | | |
| • Yes | 22 | 21.78% |
| • No | 79 | 78.22% |
| ***If Not, Why?** | | |
| • I was not having dental problems | 27 | 26.73% |
| • I do not have dental insurance | 14 | 13.86% |
| • I can't afford to go to the dentist | 5 | 4.95% |
| • I was told not to go to the dentist during pregnancy | 8 | 7.92% |
| • I am afraid to go to the dentist | 9 | 8.91% |
| • I can't find a dentist who treats pregnant women | 8 | 7.92% |
| • No reason | 53 | 52.48% |

*Multiple answers were selected by participants

ed to bottle-feeding during the day, 43 selected multiple answers. The liquid of choice selected for bottle feeding during the day included: water (29, 67%), milk (28, 65%) and juice (23, 53%).

Bivariate association between the mothers' oral health rating, the frequency of tooth brushing and the frequency of tooth brushing of their toddlers showed a significant positive association. Mothers who rated their oral health as good or excellent brushed and flossed their teeth and their toddler's teeth more frequently than mothers that rated their oral health as fair or poor. The frequency of mothers' brushing, flossing, mouthwash use and dental visits showed a positive correlation with the self-reported oral health rating ($r^2$=0.39; $p<0.001$).

## Discussion

The oral health of infants and toddlers is dependent on mothers' knowledge of oral health and oral hygiene behavior.[6] In 2000, the Surgeon General's Report on Oral Health in America stressed it was necessary for parents to be familiar with the importance and care of children's primary teeth, and to take appropriate actions to prevent ECC.[25]

The primary finding of this study was that the mothers' oral hygiene habits and frequency of dental visits are significantly related to the oral hygiene habits and frequency of dental visits of toddlers. Studies show that perception of oral health is of higher level than perception of oral disease which can influence a person's behavior to seek dental care.[26,27] Questionnaires regarding pregnant woman and mothers of young children can show the level of dental and oral health awareness.[26,27] This study found a positive correlation between the self-perceived oral health of mothers and their oral hygiene habits. This study supports the findings of a prior study that poor oral health behaviors can be contributing factors to poor oral health in adults and their children.[6] Good oral health behavior is dependent on individual's understanding of oral health and their ability to act on the information.[11] It has been shown that frequent use of dental care can provide higher knowledge of oral health for this population.[11] Studies conducted on the effectiveness of motivational interviewing with regular reinforcements of dental caries prevention in pregnant mothers and mothers of infants, has shown promise in reducing early childhood decay by the time children reached age 2 years.[25,28,29] Thus, oral health education of WIC participants designated to cater to patients with a lower level of oral health literacy is an important factor to prevent ECC. It has been shown that children whose mothers emphasize oral health have fewer cavities than children without proper oral hygiene habits at home.[6,15] Because parents are responsible for the oral hygiene habits and diet of young children at home, parental knowledge of oral health and oral hygiene habits are of great importance.[6]

Table II: Age Distribution of Participants

| Age | n=101 | Percent |
|---|---|---|
| Under18 | 4 | 3.96% |
| 18 to 20 | 16 | 15.84% |
| 21 to 25 | 30 | 29.70% |
| 26 to 30 | 35 | 34.65% |
| 31 to 35 | 5 | 4.95% |
| 36 and older | 11 | 10.90% |

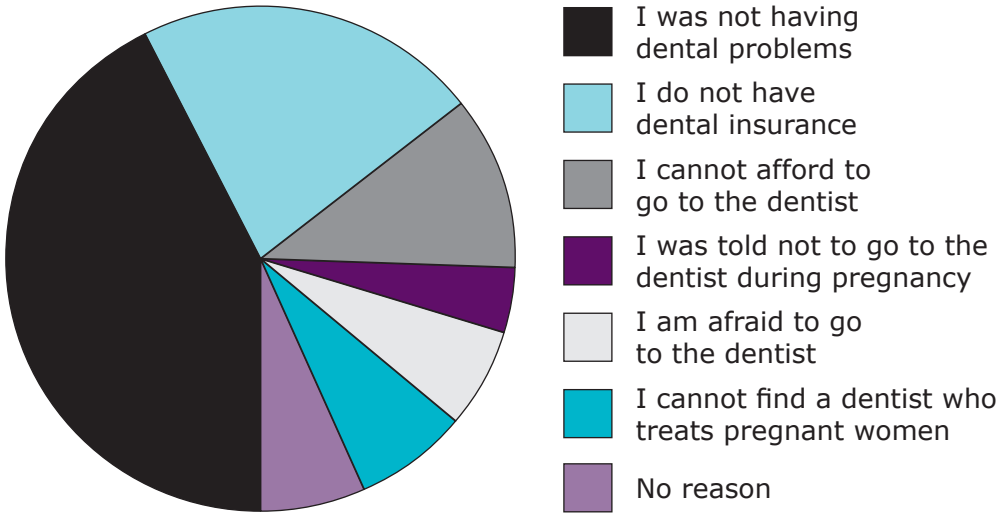
Oral health knowledge, attitudes and behaviors of Medicaid parents largely affect their use of preventive dental care.[30] Although these parents believe it is important for toddlers to receive dental care, they may not place high value on receiving preventive care. Studies suggest that the rate of no-shows or missed appointments among Medicaid patients is a large contributing factor to lack of Medicaid dental providers.[14,20] Many Medicaid participants equate lack of dental pain to a healthy mouth and do not seek care unless treatment is needed for immediate pain relief.[14] Another contributing factor for lack of dental care utilization may be the shortage of Medicaid providers in the area.[20,21] Poor access to dental care, knowledge and behavior of mothers, as well as consumption of sugary drinks in the first few years of life, are contributing factors to ECC in Medicaid children.[6,12,14,15,19]

Early preventive visits are more effective in children at higher risk, and because children of Medicaid and WIC are at higher risk for ECC, promoting early visits should be practiced by WIC staff or pediatric Medicaid healthcare physicians.[11,24] Prevention of ECC can be provided by promoting good oral hygiene habits, good nutrition, establishing of a dental home at an early age and preventive practices such as applications of fluoride by health professionals.[13] Prenatal and postpartum counseling of mothers on oral health is necessary to promote healthy dental behaviors that continue into the adulthood of Medicaid-enrolled children. Also promoting dental care for pregnant women is important due to the strong relationship between oral health status of the mother and child.

The limitation of this study is that participants were selected from 1 public health department in 1 state and only English speaking caregivers completed the questionnaire. Because ECC is affected

by many different social and environmental risk factors, this survey may not be a predictor of all Medicaid and WIC participants.[14] Other limitations of this survey were the possible volunteer bias since women participated voluntarily and a relatively small sample size. Our study sample was a convenience sample from 1 clinic consisting self-reported data, which was not confirmed by clinical data. This study is the first oral health study of Seminole County WIC participants and its results can be used to evaluate the need for preventive dental program for this population. Further research is necessary to better understand the factors related to oral health of children and women enrolled in the WIC programs.

Figure 1: Reasons for Not Receiving Routine Dental Care During Pregnancy




*Multiple answers were selected by participants

## Conclusion

This study reports that mothers' oral hygiene habits were related to the oral hygiene habits of their children, and many pregnant women do not have dental care during their pregnancies. These results support the need for preventive oral health education program for pregnant women and mothers of young children. However, oral health education alone may not be effective enough so including other preventive approaches, such as fluoride varnish applications, and finding a dental home is important in reducing disease burden in low-income risk populations. A comprehensive preventive approach and an interprofessional collaboration with other health care professionals could be the future model to help improve oral health of this vulnerable population.

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