Oral Health Literacy and Dental Care among Low-Income Pregnant Women

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Objectives: In this study, we sought to determine the impact of oral health literacy (OHL) on use of prenatal dental care and knowledge, understanding, and practices related to preventing dental caries (tooth decay) among low-income pregnant women in Maryland. Methods: We conducted a mixed methods study using a survey and a structured guide for one-on-one interviews or focus groups. The study included 117 pregnant women and was conducted between July 2016 and April 2018 in Maryland. Results: Respondents had a low level of OHL. Maryland Medicaid covers prenatal dental care, but only 53% of participants reported seeing a dentist during their pregnancy. Most women were unaware of the Medicaid dental program for pregnant women and the importance of prenatal dental care. They could not afford care if there was an associated cost and had difficulty finding a Medicaid dental provider. Importantly, they lacked understanding of how to prevent caries and did not practice behaviors to prevent this disease. Conclusions: To decrease caries rates, policies and programs must be implemented to increase the OHL of low-income pregnant women because the OHL of caregivers is associated with their children's oral health status.

Key words: oral health literacy; dental caries; barriers to prenatal dental care
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Almost 40% of pregnant women have active periodontal (gum) disease and/or dental caries (tooth decay).[1] Scientific evidence supports the safety of dental care during pregnancy.[2,3] For optimal oral health, pregnant women should seek and receive dental care during pregnancy and dental service use is a primary predictor of oral health outcomes.[4] However, the most recent national data indicate that only 44% of women in the United States (2004-2006) reported they had a dental visit during pregnancy,[5] while in Maryland (2015), only 52.6% women reported having their teeth cleaned during pregnancy.[6] Many women, especially low-income pregnant women, do not know that prenatal dental care is available to them.[7] Also, they do not know that poor oral health affects their overall health as well as the health of their baby.[8] Moreover, they do not understand they can transmit caries causing bacteria to their child.[9] Overall, most low-income women do not know how to prevent dental caries, and as a result, they do not practice behaviors to prevent dental caries in themselves and their children.[10,11]

Early childhood caries (ECC) is tooth decay in children less than 6 years of age.[12] ECC is the most common chronic disease and the most significant unmet health need among children in the United States.[13,14] Frequently, ECC is rampant and devas-

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tating and has serious and costly consequences that affect children, their families, and the community.[15] The consequences include pain and suffering; problems eating and sleeping; missed school for children, and missed work for parents. Additionally, these children are often treated under general anesthesia which is detrimental to their cognition.[16] ECC also sets the stage for emergency department visits, higher risk for caries later in life, even after restoration or removal of carious teeth, and possibly, death.[12-15,17] Whereas ECC is preventable, 21.4% of children aged 2-5 years have ECC and 8.8% are untreated.[18] Notably, important health disparities exist. Children from low-income families, rural areas, and those who are minorities have disproportionately higher rates of ECC.[19-22]

The oral health literacy (OHL) of caregivers is associated with the oral health status of their children.[23-25] Thus, it is critical for pregnant women to have the OHL necessary to practice health promoting behaviors to prevent oral diseases in their children. Women primarily receive oral health information and guidance from their dental provider, but many low-income women do not see a dentist during pregnancy.[11,26] Consequently, they neither receive treatment that can decrease the level of caries-causing bacteria in their mouth nor the education and counseling that can improve their own oral health and prevent caries in their child.[2,3,27] Health education can dispel myths that dental care is unsafe during pregnancy.[27] Also, it can help women understand the importance and practice of recommended oral health behaviors that reduce the risk of transmitting caries-causing bacteria from mother to child.[28] When mothers practice caries preventive behaviors, their child's risk for developing ECC is decreased.[2,3,9,27,28]

Low OHL is a public health concern because those with low OHL are more likely to have low rates of dental insurance, lack a usual source of care, report difficulty in finding a healthcare provider, miss dental appointments, and have poorer health outcomes compared to persons with higher levels of OHL.[23-25,29,30] Similarly, lower levels of health literacy make it difficult to navigate the health system to access information and care.[29] Caregivers with low OHL are more likely to engage in practices that increase their child's risk for developing ECC.[10,11,31] These behaviors include putting their child in bed with a liquid other than water, using non-fluoridated tap water to mix formula or for drinking, and not brushing teeth with fluoride toothpaste as soon as teeth erupt.[31] Children of women who have higher levels of OHL are more likely to have better oral health status than children of women with lower levels of OHL.[23-25] Moreover, in one study, a caregiver's OHL was a determinant of children's Medicaid enrollment gaps, which results in poorer oral health outcomes for these children.[32]

The Maryland Healthy Smiles Dental Program (MHSDP) has increased access to dental care for many low-income pregnant women by providing a comprehensive dental benefit. All Maryland Medicaid enrollees under age 21 and pregnant women are eligible.[33] However, the MHSDP presents challenges for some pregnant women. A critical issue is that non-pregnant women age 21 years and older may be enrolled in a Medicaid managed care organization plan that has limited or no dental benefits before becoming pregnant. Many women are unaware they are eligible for more comprehensive dental coverage when they become pregnant, and thus, do not take advantage of MHSDP benefits.[33] Furthermore, some pregnant women are aware of MHSDP but cannot find a dental provider who accepts their insurance and many have difficulties navigating the system. The purpose of this study was to determine the impact of OHL on access to prenatal dental care and knowledge, understanding, and practices related to preventing dental caries among low-income pregnant women in Maryland. This information will be used to foster improved access to information and care.

METHODS

This study used a mixed methods approach[34] to assess a broad range of barriers and facilitators to prenatal dental care. We used one-on-one interviews or focus groups to examine pregnant women's awareness, attitudes and beliefs about the importance and safety of prenatal dental care, oral health messages they received from medical and social service providers, awareness of Maryland's prenatal dental insurance program, access to prenatal dental care, and personal barriers and facilitators to care. We used a paper survey to assess other potential barriers to care including knowledge, understanding, opinions and practices related to prevention

of dental caries, opinions of their dental provider's communication practices, OHL, and social supports. We used 2 methods (surveys and interviews/focus groups) to gather different types of information, with interviews/focus groups providing greater depth and context about barriers to prenatal care than a survey alone could provide.[34]

Sample

We partnered with the Maryland Women, Infant and Children (WIC) program to recruit participants. We presented our planned study to all 18 WIC program directors at their June 2016 monthly meeting to ask for their support. We emailed all program directors after the meeting and followed up by phone to discuss their participation in the study, which was voluntary. Nine of 18 WIC program directors agreed to participate. Some program directors did not respond to our emails or phone calls and a few said they could not participate because of other priorities in their program. Each program director decided at which clinics and in which dates we were on site. Some directors arranged for us to do one visit at multiple clinics in their program, whereas other directors arranged for us to visit one clinic multiple times. We completed 21 visits at 11 clinics.

Because we did not recruit as many women as we planned, we recruited participants at 2 large community baby showers held at a church in Baltimore, MD. Over 400 pregnant women attended each baby shower. The women attending the baby showers were similar in demographic characteristics to the women at the WIC locations. A procedural difference between the WIC locations and baby showers is that we conducted focus groups at the baby showers instead of interviews, using a focus group guide based on the one-on-one interview questions. Using focus groups allowed us to collect information from more participants than if we had used one-on-one interviews. To be included in the study, participants had to be pregnant, at least 18 years of age, and English-speaking.

Study Protocol

Participants completed a survey and then participated in either a one-on-one interview (WIC clinics) or a focus group (community baby showers). At most WIC clinics, a member of the research team approached pregnant women in the waiting area, told them about the study, and asked if they would like to participate. At 3 WIC clinics, staff recruited women by phone and scheduled appointments for them to meet with the research team. At the community baby showers, a member of the research team approached pregnant women waiting in line to enter the large room, explained the study, and asked if they would like to participate. If the women agreed to participate, they were allowed to go to the beginning of the line to get into the baby shower.

The study protocol involved: (1) review study procedures with participants; (2) obtain signed informed consent; (3) administer a 56-item survey that took approximately 15 minutes to complete; (4) conduct a 15-20 minute one-on-one interview or a 60-minute focus group; (5) review educational materials; (6) correct any misconceptions about oral health or dental care during pregnancy; and (7) provide incentives for the woman's participation in the study. For the consent procedure, we handed each participant a copy of the consent form, read it aloud, explained the procedures, and asked if they had any questions. Participants signed the form and received a copy of it (Figure 1).

All participants (N = 117) completed the survey. Eighty-four completed a one-on-one interview and those at the baby showers (N = 33) provided feedback in one of 5 focus groups. Participants received $25 cash, a health passport book, educational pamphlets, and a toothbrush and toothpaste. Only first names were used throughout the sessions. The study took place between July 2016 and April 2018. The WIC clinic visits were conducted between July and October 2016 and the baby showers were held in April 2017 and 2018.

Measures

Surveys. The 56-item survey included 18 questions related to dental caries prevention from the National Health Interview Survey.[35,36] We included 7 questions from the Consumer Assessment of Healthcare Providers and Systems[37] to assess communication practices of their dental provider because provider communication practices can impact patient understanding of health conditions, preventive measures and treatment options.[38] We assessed health literacy with Chew et al's[39] brief

health literacy screener questions because these items have been shown to be appropriate for low-income patient populations while minimizing the burden on study participants. We included 6 items about social supports during pregnancy by Webster et al,[40] because social support can facilitate positive health behaviors.[41] The remaining 22 questions addressed medical and dental appointments and demographic characteristics.

Interviews/focus groups. The study team developed a structured interview guide. The topics included: primary reason for having or not having a dental appointment; any current dental problems, beliefs regarding dental visits during pregnancy, which, if any, of her prenatal providers had discussed oral health and what was said, awareness of Maryland's prenatal dental insurance program, personal barriers to prenatal dental care, and suggestions for increasing prenatal dental care for low-income pregnant women. The principal investigator and focus group facilitator developed a focus group guide based on the interview guide.

Data Analysis

Surveys. Completed surveys were coded by one team member and verified by a second team member. Survey data were entered into an Excel spreadsheet, verified by a second person, and imported into SPSS version 24.[42] We generated descriptive statistics and the chi-square test of independence.[43] All statistical tests used an alpha level of .05.

Interviews. The interviews were recorded and transcribed. A second team member verified all transcriptions. Transcribed interviews were entered into Atlas.ti version 7.5 qualitative content analysis software,[44] coded, and analyzed to extract major themes and quotes. The principal investigator and a team member discussed and agreed on the codes and themes.

Focus groups. The focus group data were analyzed as follows: (1) recordings were transcribed and reviewed by the facilitator and principal investigator; (2) the facilitator combined additional notes taken by a study team member during the sessions to prepare a summary used to identify themes and quotes relevant to the study objectives; (3) a qualitative content analysis was used to code the themes manually; and (4) the principal investigator and facilitator discussed and agreed on the resultant 3 themes.

RESULTS

Sample Demographics

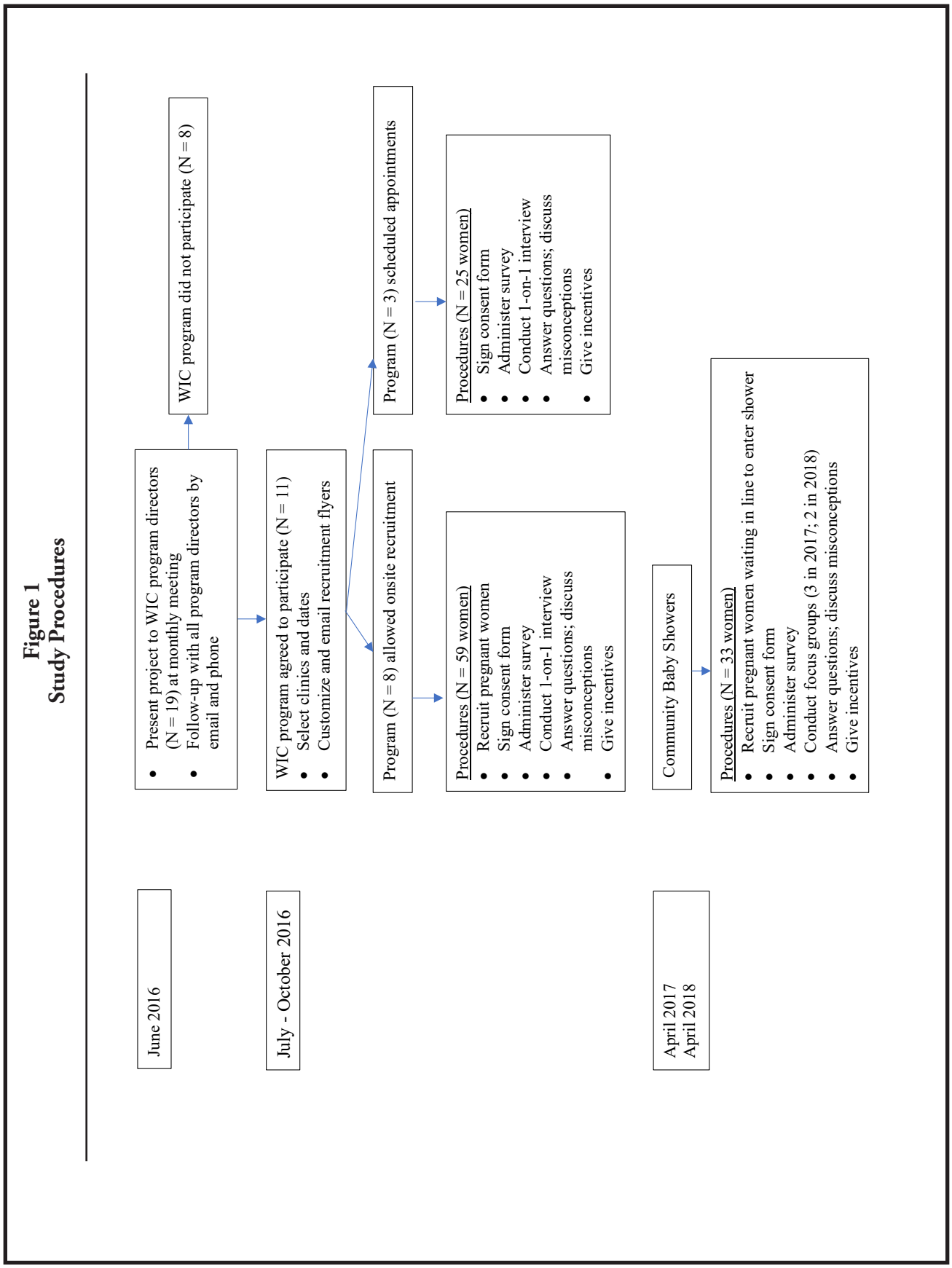
A little over half (53.3%) of participants were 18-28 years of age. Over two-thirds (69.2%) were Medicaid recipients. Whereas Maryland Medicaid covers dental care for low-income pregnant women, only 53% of study participants reportedly had seen a dentist during their pregnancy (Table 1).

Oral Health Literacy

We consider OHL to include knowledge, understanding, and practices related to dental caries prevention. Respondents had a low level of knowledge and understanding of how to prevent dental caries and most did not engage in behaviors that prevent this disease. When asked what the single best way to prevent tooth decay is, no respondents answered the question correctly (using fluoridated water). Only 6.8% were able to correctly identify an early sign of tooth decay (white spots on a child's front teeth). When asked how sure they were that they could prevent dental caries in their child, only 36.8% said they were 'very sure.' Those with a high school education or less were less likely to respond 'very sure' compared with those with higher levels of education, $\chi^2(2, N = 112) = 6.01$, $p = .05$. Whereas almost all respondents had heard of fluoride (93.2%), only half (49.6%) knew its purpose (prevents tooth decay). Drinking fluoridated water is the best way to prevent tooth decay but only 38.5% of women reported drinking tap water. The primary reasons given for not drinking tap water included the water tastes terrible (18.8%), it is unsafe (15.4%), and they drink bottled water (14.5%). Women born outside of the United States were less likely to drink tap water than native-born women, but the association was not statistically significant $\chi^2(1, N = 117) = 3.37$, $p = .07$ (Table 2).

With regard to the 3 health literacy screening questions, 83.8% were confident they could follow the written instructions on a bottle of Tylenol. Approximately 60% were 'extremely sure' they could correctly complete medical forms by themselves and 'never' have someone help them read printed materials from their medical provider. We also examined the associations among the 3 health literacy screener questions by Chew et al[39] and demographic, knowledge, opinion, and practices variables. The incorrect belief that all children develop tooth

Figure 1
Study Procedures



decay was significantly associated with all 3 questions. Also, participants who responded, 'not at all sure/a little sure/ somewhat sure/quite sure' were more likely to believe they will lose all or most of their teeth when they grow older compared with women who responded, 'extremely sure', but it was not statistically significant (Table 3).

Dental Provider Communications

We asked women who had a dental appointment during this pregnancy (N = 55) 7 questions about how well their dental provider communicates with them at their appointments. Less than half of women (41.6%) reported their dental provider 'always' explained things in a way that was easy to understand. About half (49.5%) said their dental provider 'always' listened carefully to them. Forty-eight percent reported their provider 'always' knew important information about their medical/dental history, and 50.5% said their provider 'always' spent enough time with them. About equal numbers said their provider 'always' showed respect for what they had to say (54.5%) and, they 'always' felt comfortable asking their provider questions about their teeth and gums (55.4%).

Themes from Interviews and Focus Groups

Three themes emerged from the interviews and focus groups: (1) reasons for having a prenatal dental appointment; (2) issues with the Medicaid dental benefit; and (3) suggestions on how to increase prenatal care. The data from the interviews and focus groups were combined to report results.

Theme 1 – Reasons for having prenatal dental care. Of the 84 women interviewed, 35 reported having a dental appointment during their current pregnancy. Most women who sought dental care said they did so to prevent dental problems. They believed professional care is important to the mother's oral and general health and/or they believed the mother's oral health could affect her baby's health. A few women went to the dentist on a routine basis whether they were pregnant or not. Others sought care because a healthcare or social service provider recommended they see a dentist during their pregnancy; a few wanted to take advantage of the MHSDP benefit for pregnant women.

The majority of women (N = 49) reported they

Table 1
Demographic Characteristics of Pregnant Women

Characteristic	Number (Percentage)[a]
Age	
18-28 years of age	59 (53.2%)
29-40 years of age	52 (46.8%)
Marital Status	
Married/Partnered	67 (57.3%)
Single/Divorced/Separated	39 (33.3%)
Level of Education	
≤ High School Degree	49 (41.9%)
Some College/Technical School	41 (35.0%)
Graduated College/Graduate School	23 (19.7%)
Employment Status	
Unemployed	58 (49.6%)
Employed	56 (47.9%)
Race/Ethnicity	
African American/Black	54 (46.2%)
White	38 (32.5%)
Hispanic, Latina or Spanish Origin	12 (12.0%)
Multi-racial	7 (6.0%)
Asian/Pacific Islander	2 (1.7%)
Country of Birth	
Born in the US	85 (72.6%)
Not born in the US	32 (27.4%)
Had a Dental Visit During This Pregnancy	
Yes	62 (53.0%)
No	51 (43.6%)
Type of Health Insurance	
Medicaid	81 (69.2%)
Private Insurance	24 (20.5%)
Uninsured	2 (1.6%)
Taking Prenatal Classes	
No	81 (69.2%)
Yes	30 (25.6%)
WIC Participant	
Yes	104 (88.9%)
No	9 (7.7%)

Note.
a: May not total to 100% due to missing data.

Table 2
Pregnant Women's Knowledge, Opinions, and Practices Related to Preventing Dental Caries

Selected Responses to Questions about Preventing Tooth Decay	Number (Percentage)[a]
What is the single best way to prevent tooth decay?	
Brushing teeth/brushing teeth with fluoride toothpaste	71 (60.6%)
All other responses	33 (28.3%)
Going to a dentist	13 (11.1%)
Using fluoridated water[b]	0 (0.0%)
What is an early sign of tooth decay?	
Black/brown spots on child's front or back teeth	30 (25.6%)
Plaque buildup	26 (22.2%)
Pain in mouth	17 (14.5%)
Cavity/hole in back teeth	17 (14.5%)
White spots on child's front teeth[b]	8 (6.8%)
All other responses	19 (16.4%)
Do all children develop tooth decay?	
No[b]	54 (46.2%)
Probably no	21 (17.9%)
Probably yes	17 (14.5%)
Yes	11 (9.4%)
Don't know	14 (12.0%)
How sure are you that you can prevent tooth decay in your child?	
Very Sure	43 (36.8%)
Somewhat sure	59 (50.4%)
Somewhat unsure	5 (4.3%)
Very unsure	3 (2.6%)
Don't know	7 (6.0%)
Have you heard of fluoride?	
Yes	109 (93.2%)
No/Don't Know	8 (6.9%)
What is fluoride used for?	
Used to prevent tooth decay[b]	58 (49.6%)
Used to prevent plaque	22 (18.8%)
Used to clean teeth	21 (17.9%)
All other responses	16 (13.7%)
What is your most important source of oral health information?	
Dentist	93 (79.5%)
Internet	8 (6.8%)
Doctor	7 (6.0%)
All other responses	9 (7.7%)

Note.
a: May not total to 100% due to missing data.
b: Correct answer

Table 3
Statistically Significant Associations between Health Literacy Screener Questions and Demographics, Knowledge, and Opinions Variables

Characteristic	Health Literacy Screener Questions		Chi-square tests of independence
	Confidence you can complete medical forms correctly by yourself		
	Extremely sure	**All other responses[a]**	
Born in US	54 (65.9%)	28 (34.1%)	$\chi^2(1, N = 109) = 3.99\ p = .05$
Not born in US	12 (44.4%)	15 (55.6%)	
Do not believe all children develop tooth decay	38 (73.1%)	14 (26.9%)	$\chi^2(1, N = 109) = 6.53\ p = .01$
Believe all children develop tooth decay	28 (49.1%)	29 (50.9%)	
Do not believe I will lose all or most of my teeth when I get older	27 (73.0%)	10 (27.0%)	$\chi^2(1, N = 109) = 3.62\ p = .06$
Believe I will lose all or most of my teeth when I get older	39 (54.2%)	33 (45.8%)	
	Confidence you can follow the instructions on a bottle of Tylenol		
	Extremely sure	**All other responses[a]**	
Age 18-28	54 (94.7%)	3 (5.3%)	$\chi^2(1, N = 108) = 4.18\ p = .04$
Age 29-40	42 (82.4%)	9 (17.6%)	
Do not believe all children develop tooth decay	50 (94.3%)	3 (5.7%)	$\chi^2(1, N = 112) = 4.30\ p = .04$
Believe all children develop tooth decay	48 (81.4%)	11 (18.6%)	
	Need help reading materials from your healthcare provider		
	Never	**All other responses[b]**	
Age 18-28	32 (54.2%)	27 (45.8%)	$\chi^2(1, N = 110) = 7.08\ p = .01$
Age 29-40	40 (78.4%)	11 (21.6%)	
Do not believe all children develop tooth decay	40 (75.5%)	13 (24.5%)	$\chi^2(1, N = 115) = 5.30\ p = .02$
Believe all children develop tooth decay	34 (54.8%)	28 (45.2%)	

Note.
a: not at all sure/a little sure/somewhat sure/quite sure
b: always/often/sometimes/occasionally

had not seen a dental provider during their current pregnancy. The most frequently cited reason was that they could not afford dental care because they did not have money for co-payments or care if it was not completely covered by insurance. Other key reasons for not having a dental appointment included having pregnancy-related symptoms, competing priorities such as work, family obligations, and other medical appointments, prioritizing medical appointments over dental appointments because they thought medical appointments were more important, being unaware of the need to see

Table 4
Quotes from One-on-One Interviews and Focus Groups Regarding Reasons for Having or Not Having a Prenatal Dental Appointment – the Maryland Healthy Smiles Dental Program and Facilitators to Prenatal Dental Care

Reasons for Having a Prenatal Dental Appointment
Because my insurance doesn't cover it after I am [no longer] pregnant.
When I first came in for WIC she told me to make sure that I followed up with my dentist and my primary care and my OB/GYN.
The more you read the more you surprise yourself how important it [dental care] is, for you and the baby.
I've never had issue with cavities until I got pregnant the first time. So I just know that the whole calcium when you're pregnant it sucks it from your body so that issue since then, just cavities.
My root canal cracked … they didn't want it to give me an infection and cause harm to the baby so they wanted me to go ahead and get it taken out.
Reasons for NOT Having a Prenatal Dental Appointment
No one has ever really told me why it was very important. If we don't know why, then that can be put at the bottom of the list.
If you're not [already] going to the dentist, how would you get that information? My OB didn't say anything…in either one of my pregnancies, they never asked. So, I feel like if they had said something and made it sound more important I might have probably paid more attention to it.
It really comes down to money and that's really hard to come by now. Dentists are really expensive even though I have a good medical insurance you still have to pay a lot out of pocket
I don't know if it is safe.
I didn't know until just now [here today] that they cover everything while you're pregnant.
Maryland Healthy Smiles Dental Program (Medicaid)
I just found out recently that my insurance covers more when you are pregnant.
Because I not sure where to go. I have a card, but when I call the number, they never answer.
It's hard to get a dentist appointment a majority of the time with Medicaid. I don't know if it's because it's a few dentists in the area that accept Medicaid and they're always booked.
It's just like nobody wants to take the insurance.
I just feel like the state insurance is just hard to find the right appointment. Sometimes they give you numbers of providers that don't accept you. It took me a while to find this place to get my prenatal appointment. It was just hard.
Facilitators to Prenatal Dental Care
I think a lot of people aren't aware that it's important.
…when you go in your OB's office, they have all these posters everywhere about your pregnancy and things like that. So, if they put a board up about like how your insurance covers it and the things you should be doing while you're pregnant.
Less wait time. They overbook. I've been to a lot of different dentists and its' all super crowded. Less wait so I don't have to take off that much from work.
Childcare because most people might not have a way to put their kids, like, you see everyone coming in here most especially just for the cleaning, they have to come with their kids, most have 3, and you know, paying for the babysitter, it's another cost, so you have to come with the kids to the dental care.

a dental provider while pregnant, having a fear of needles, drills or pain, and holding the belief that dental care is unsafe during pregnancy (Table 4).

Theme 2: Issues with Medicaid dental benefits. Study participants reported multiple issues related to Medicaid dental benefits. Overall, women found it hard to navigate the system. They reported not knowing how to find a dental provider, encountering non-working numbers for dental providers, making phone calls to insurance call centers that left them confused about how to use the insurance and what it covered, and enduring long wait times for their application to be approved. Whereas most women were insured by Medicaid, less than one-fifth reported receiving communications from MHSDP about dental benefits. In fact,

many women were unaware of MHSDP. Women who were aware of MHSDP frequently mentioned issues in accessing care. Many women said it was hard to find a dental provider who accepted their insurance and/or pregnant patients. They reported calling dental offices and being told the provider did not take their insurance or they did not see pregnant women even though the provider was listed in the insurance materials. In more rural counties, women reported they had to drive long distances to find a dentist who accepted their insurance, which was more difficult if she did not have transportation. Some women reported that prior to becoming pregnant, they had health insurance plans that provided some dental benefits, but the company later dropped dental coverage leaving them without dental insurance. Women also reported difficulty scheduling appointments, citing long wait times to be seen or inconvenient office hours. Although many women reported issues with MHSDP, a few reported receiving phone calls telling them about the dental benefit and encouraging them to see a dentist during their pregnancy (Table 4).

Theme 3 – Suggestions on how to increase prenatal dental care. Participants identified several factors that could help more pregnant women receive prenatal dental care. With regard to MHSDP, participants recommended a more user-friendly interface to MHSDP to address navigation issues and health plan materials that were easier to understand. Many women emphasized the need for more dental providers who accept Medicaid insurance especially in rural counties, and the need for assistance with finding a dentist. Furthermore, some suggested reducing the time period before Medicaid benefits take effect and a longer coverage period to allow them to use the dental benefit.

The most frequent suggestion was the need for better transportation options to help women get to appointments without having to spend a lot of money and time. Transportation was an issue for women throughout the state. Child-friendly clinics were mentioned almost as frequently as transportation. The women said they do not always have child care and some dental providers will not see them if they bring their children to their appointment. A few women suggested that dental clinics have activities for children and/or supervision while the woman is being treated. Other suggestions included shorter wait times to get an initial appointment or to reschedule an appointment, expanded office hours, and elimination of co-payments or fees. Many women said they would go to the dentist more frequently if they could afford it and if there were dental providers who accepted Medicaid insurance closer to where they lived.

Women overwhelmingly recommended that dental providers use social media to increase awareness of the importance of prenatal dental care, advertise on social media, especially if they accept pregnant patients, and join online communities such as Facebook groups to disseminate information about the importance of oral health during pregnancy. They noted that social media increased their awareness of health topics, especially when individuals in their network posted links to information or 'like' providers (Table 4).

DISCUSSION

A 2018 systematic review of determinants of prenatal dental care by Rocha et al[7] found little published literature on factors associated with the utilization of dental services by pregnant women. These authors identified misconceptions about the safety of prenatal dental care and not understanding the importance of oral health to overall health as important behavioral factors that prevent pregnant women from seeking dental care. Our findings are similar in that most women lacked knowledge and understanding about the importance of dental care while pregnant and how pregnancy can affect their oral health. Some held beliefs that dental care was unsafe during pregnancy and most prioritized dental care lower than medical care. Relatively few women knew how to prevent dental caries in themselves or their children and a majority did not engage in caries prevention behaviors, such as drinking fluoridated tap water.

The health literacy screening questions indicated that most study participants had adequate health literacy. However, their caries prevention knowledge, understanding and practices indicated a low level of OHL, which is a barrier to preventing dental caries in themselves and their children. If parents do not understand how to prevent this disease they cannot take steps to do so. In addition, 40% of participants reported they have someone help them

read printed materials from their health provider. Understanding written instructions for follow-up care or self-care are vital to optimal health.[45]

Another aspect of health literacy is the ability to navigate the healthcare system and understand health insurance benefits. Most women were unaware of MHSDP benefits for pregnant women and most reported they were unaware of their dental benefits. In some cases, women had selected a Medicaid health insurance plan with limited dental benefits before they were pregnant and did not know they were eligible for more comprehensive dental benefits through MHSDP once they became pregnant. Some women were first made aware of MHSDP during our interviews. Many women expressed a desire to take advantage of MHSDP but cited pregnancy-related health issues such as not feeling well or being too exhausted to go to the dentist. A few women said they had a high-risk pregnancy that required many medical appointments and they did not feel they had the time or energy for dental appointments. Many women also mentioned other medical appointments or competing work and family priorities as reasons for not seeking dental care.

Only 26.1% of Maryland women receiving Medicaid benefits reported having at least one dental visit during pregnancy.[26] To increase the number of women who receive dental care while pregnant, Medicaid, MHSDP and the Maryland Department of Health Office of Oral Health must increase their outreach efforts to make more women aware of MHSDP so pregnant women can receive care in the short period of time they are eligible. One possible approach to increasing awareness of MHSDP is to enlist the support of medical and social service providers as women see these providers more frequently than dental providers during pregnancy The Office of Oral Health could contact the professional organizations for obstetricians, physician assistants and nurse midwives and provide information about the safety of prenatal dental care, availability of the Medicaid dental benefit for pregnant women, sources for educational materials, and lists of dental providers who serve low-income women.

The women also saw social services providers such as WIC and local health department staff during their pregnancy. A few women reported WIC personnel discussed dental health with them, but the discussions varied widely by WIC program. Whereas WIC programs discuss oral health with pregnant women, participation in WIC has decreased in each of the past 6 years (2010-2016) resulting in fewer opportunities to reach low-income women about this important health topic.[46] Nonetheless, WIC personnel are important allies in raising awareness about the importance of oral health. Additionally, more healthcare and social service providers such as home visitors and community health workers should routinely discuss oral health with their low-income pregnant patients to raise awareness of the importance and safety of oral healthcare during pregnancy, raise awareness of MHSDP benefits, and increase the OHL of pregnant women. To increase access to prenatal dental care further, especially in designated dental health professional shortage areas, the Office of Oral Health could provide funding for dental hygienists to practice in community clinics without direct supervision of a dentist as allowed by the 2003 Maryland law.[47] More than half of states, including Oregon and Colorado, have such laws that support increased access to care.[48] Allowing mid-level providers, also known as dental therapists, would further increase access to dental care.[49] Finally, Maryland could extend the MHSDP eligibility period for 6 months after delivery so women could receive the care and education necessary to understand how to care for their oral health and that of their child.

Women in this study frequently cited lack of transportation to get to medical and dental appointments. Thus, efforts to gain grants through the Maryland Department of Transportation to facilitate transportation is one avenue to pursue. Furthermore, most women need child care which suggests strongly that health facilities such as federally qualified health centers and local health department clinics should consider obtaining grants to provide child care while women receive health services. Finally, regarding their dental provider's communication skills, most women reported there was room for improvement. These results suggest that dental providers might benefit from courses in effective communication skills.

Strengths and Limitations

The use of mixed methods allowed us to gather detailed information about the women's OHL,

prenatal dental care and understanding of how to prevent dental caries. By recruiting through WIC locations throughout Maryland, we collected information from a diverse group of participants. They represented urban and rural areas, a wide range of ages (18 to 40), and their experience with motherhood ranged from women pregnant with their first child to women pregnant with their sixth child. This diversity provided many different perspectives. A limitation of the study is the data were self-reported. Thus, social desirability may have caused participants to answer questions in a way that would be viewed favorably by the interviewer. Finally, the study used a convenience sample of women who volunteered to participate in the study.

Conclusions and Implications

When low-income women have access to dental care while pregnant and visit a dental provider, they are more likely to receive information about practices to promote oral health in themselves and their children, which can increase their OHL. To decrease rates of ECC, policies and programs must be implemented to increase the OHL of low-income pregnant women because the OHL of caregivers is associated with their children's oral health status.[6,7]

Human Subjects Statement

This study was approved by the University of Maryland College Park and the Maryland Department of Health Institutional Review Boards.

Conflict of Interest Statement

The authors declare that they have no conflict of interest.

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