Perceptions of Dental Hygienists and Dentists about Preventing Early Childhood Caries: A Qualitative Study

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Abstract

Purpose: The objective of this qualitative pilot study was to gain an in-depth understanding of dental hygienists and dentists perspectives regarding children's oral health and what needs to be done to prevent early childhood caries (ECC), the most frequent chronic disease of childhood.

Methods: A skilled facilitator conducted four focus groups and four phone interviews with 20 dental hygienists and 17 dentists practicing in a variety of locations within the state of Maryland. The interview guide was based on results from previous state-wide surveys of dental hygienists and dentists. Sessions were recorded, transcribed, and reviewed by the PI and facilitator. Qualitative content analysis was used to identify and manually code themes.

Results: Focus groups and interviews provided rich and insightful information for strategies to help solve the ECC problem in Maryland, which supplemented the earlier quantitative mail survey data. Three key themes emerged: challenges to preventing ECC among low-income families; necessary educational methods and practices; and, the need for inter-professional collaboration. Discussions focused on issues related to educating parents with low oral health literacy about how to prevent ECC and the value of including non-dental health care providers, such as pediatricians and school nurses, in the caries prevention process.

Conclusions: Current approaches to educating low-income adults about caries prevention are insufficient to prevent ECC and dental care providers cannot accomplish this goal alone. Ensuring that all dental care providers have a science-based understanding of caries prevention is critical. Integrating science-based oral health preventive care into medical and nursing undergraduate programs could increase providers' knowledge and confidence towards incorporating oral health into patient care plans; improve the oral health literacy of providers and patients; and improve patient oral health outcomes.

This manuscript supports the NDHRA priority area: **Professional development: education** (educational models)

Submitted for publication: 5/10/16: accepted:3/8/17

Introduction

Dental caries is a persistent public health problem, particularly among low-income children in the United States.[1-2] While national data has demonstrated an overall decrease in caries prevalence among children aged 2 to 11 years since the 1970s,[1] more recent data shows a gradual increase in caries among children, aged 2 to 5 years, since the late 1980s.[3] The National Health and Nutrition Examination Survey (NHANES) reveals that non-poor, preschool-aged children overall, experience caries at a lower rate than their lower income counterparts. However, when this population demographic is affected by dental caries, their disease experience is similar to their lower income counterparts,[4] and often goes untreated at the same rate.[5] As of the 1999-2004 NHANES, the rate of untreated decay among children 2 to 5 years of age, was 28%.[3] In contrast to the national data, Vargas found an overall untreated decay prevalence of 52% among children enrolled in Head Start in the state of Maryland.[6]

In general, dental caries is a preventable disease process.[7] However, when preventive regimens are not applied and the disease goes untreated, extensively decayed teeth of very young children are not easily restored in a dental office. Subsequent treatment for these cases often occurs under general anesthesia in a hospital or hospital-like setting. In 2012, Maryland spent $1,396,652 on dental-procedure related general anesthesia for its Medicaid population, with nearly 60% ($830,603) of that on children under 6 years of age – the population most susceptible to caries and least likely to receive preventive dental services.[8-11] The 2014 Annual Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) Participation Report for Medicare and Medicaid in Maryland reflects the lack of preventive dental services

showing that of the 234,981 children 0-5 eligible for services, nearly 62% did not receive any preventive dental services.[11] Despite recommendations by both the American Academy of Pediatrics (AAP) and the American Academy of Pediatric Dentistry (AAPD) that children establish a dental home and receive preventive services by age one, children 0-5 years continue to have low rates of preventive care.[12-14]

Over 70 years of research have demonstrated the use of fluorides is the most effective means for preventing or arresting caries. Translation of these research findings into practice for health care providers in general remains a challenge as evidenced by the ongoing pervasive dental disease, and a lack of knowledge about effective preventive methods among dental and other health providers. Surveys conducted among oral health providers in Maryland reflect this lack of understanding and use.[15-18] Maryland dental hygienists reported not fully understanding the most current recommendations and research about caries etiology and prevention.[15] For example, a majority of dental hygienists knew incipient carious lesions can be remineralized (91.7%) and it is desirable to use professionally applied fluorides for all children in areas without fluoridated water (90.3%). However, less than one third of the respondents knew that removal of plaque is more valuable for maintaining gingival health than for preventing caries(31%) and that dilute, frequently administered fluorides are more effective in caries prevention than more concentrated, less frequently administered fluorides (29.1%).[15] Similarly, Maryland dentists reported only moderate knowledge and use of caries preventive regimens with their patients.[16] The purpose of this current study was to complement data from state surveys conducted in the state of Maryland and gain more in-depth understanding of dentists and dental hygienists perspectives regarding children's oral health and what needs to be done to prevent early childhood caries (ECC).

Methods

This qualitative pilot study used focus groups and one-on-one interviews of practicing dental hygienists and dentists in 2011. Twenty dental hygienists and 17 dentists (11 general, 6 pediatric) participated in the study. A semi structured interview guide (open ended questions) was developed by the Principal Investigator (PI) and the focus group facilitator based on results from previous, Maryland, state-wide surveys of dental hygienists and dentists. Topics included provider's strategies for prevention of dental caries, specifically their thoughts on the use of fluorides, approaches to educating their patients and use of non-dental, care providers in caries prevention. This study was approved by the University of Maryland, College Park, Institutional Review Board.

The focus groups were held at a professional focus group facility centrally located in the state and separate focus groups were held for dental hygienists and dentists. Three dental hygienists from the Eastern Shore were interviewed by phone and one dentist was interviewed in person, so that geographic area of the state was represented in the study. The same skilled facilitator moderated the focus groups and 4 interviews. All participants, those in focus groups and those interviewed by phone or in person, were asked the same questions. Prior to each session participants were screened for inclusion criteria – providers must accept Medicaid patients and be from diverse locations within the state. Consent was obtained prior to each focus group (written) and interview (verbal). The focus groups lasted about 90 minutes; the phone interviews about 60 minutes.

Data analysis consisted of several steps. Following each focus session or interview, the strengths and weaknesses of the encounter were discussed. The focus group and interview recordings were transcribed and reviewed by the facilitator and PI to ensure descriptive validity. To help ensure interpretive validity, about 10 minutes before each session ended the PI supplied the moderator with additional questions or unclear points to be proved before each session ended. 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. A qualitative content analysis was used to manually code the themes. The PI and facilitator discussed agreed on the resultant 3 themes. Further, PI and facilitator concluded the data from the two focus groups and phone interviews for each professional group could be combined.

Results

The study results are presented by the following themes: challenges to preventing ECC, educational methods and practices, the need for inter-professional collaboration.

Theme 1 – Challenges to Preventing ECC

Patient Challenges

Both provider groups independently discussed the many challenges faced by their low-income patients, especially those with low oral health literacy, limited resources, the young age of many parents, lack of transportation and language and cultural barriers. They discussed the difficulty of getting patients to understand the importance of oral health and its relationship to overall health, and making oral health a priority. The majority of discussion focused on the range of oral health topics that parents need to know, but also included what parents do not know or understand well, or do consistently. Dentists cited perceptions among patients that decay, "just runs in families," rather than that bacteria play a role in tooth decay and can be transmitted from caregiver

to child. One dentist noted while heredity may make one more susceptible to oral health problems, "bad teeth don't run in families. What runs in families is not seeing the dentist." Dentists in one group agreed that many parents know very little other than "brush twice a day" only because it is featured in toothpaste advertising. One dentist stated, "parents know that you need antibiotics for tooth infections and Tylenol for oral pain – but they do not know that painful oral infections are avoidable."

Several providers mentioned that many parents did not understand that tooth decay is preventable and that baby teeth should not need to be extracted. One dental hygienist shared her experiences with, "People don't know that cavities are preventable and there's a way not to get them…pregnant mothers… have no idea that you're supposed to brush the baby teeth…it's crazy, but the word's not out." Another dental hygienist added, "Sometimes parents just don't believe that it's [decay] preventable. Some parents want to help and do whatever they can, but sometimes they don't really think that they can help it that their child just gets cavities, 'cause they're prone to getting cavities'…" Another theme identified by a dental hygienist in this discussion was that parents often assume that if they do not see a problem in their child's mouth that there are no problems. There is a lack of understanding of the decay process and the absence of a problem means that the child is fine.

Another misunderstanding mentioned by participants is the recommended age for a child's first visit to a dentist. Many of the participants said parents are not bringing their child in as early as they should and fewer than *20% actually do so.* Some children who actually present to the dental practice by age one, already have ECC while some parents only come to the dentist when they notice a brown spot because they want to know what it is. At the same time, dentists pointed out that the AAPD only recently changed the recommendation for the first dental visit to age one and that this change is not common knowledge even within the dental community. Several of the participants noted that in some Maryland counties, oral exams are required for Head Start or kindergarten admission, so parents mistakenly believe that this is the age that dental visits need to start. One dentist commented that "a lot of people have this misconception that [care should start] at age three, but by age three, children already have a lot of cavities. It's rampant. So, at age one, you establish the things we're talking about. Yes, this child is too young to be brushing their own teeth. You need to brush their teeth." Both dentists and dental hygienists mentioned that parents did not make dental care a priority. One dentist stated that "the problem is getting the parents' mindset changed that this is a priority" while both groups noted that they have had to resort to telling parents that they would contact child protective services if appointments for treatment of advanced decay were missed.

Providers discussed challenges posed by limited resources which make serving healthy foods, supervising consistent brushing and keeping to health care appointments difficult, even when dental problems are apparent. Additional challenges come from increased sugar in food products and marketing messages that promote unhealthy foods even from well-intentioned programs like Women, Infants, and Children Supplemental Nutrition Program (WIC), whose recommendation for juice was meant to discourage soda consumption. Teaching patients how to make good choices was cited as an ongoing issue. Another perspective to the problem came from a dentist who shared, "I agree that the challenge is educating the parents, but I think it's also not just educating them about oral health but about nutrition and the changes in many of the products that are in the market today [including knowing] the amount of sugar that's in one can of soda."

Other barriers mentioned were lack of or minimal dental coverage for adults resulting in inadequate contact with dental hygienists and dentists and messages about the importance of oral health and how best to care for babies' and children's oral health. One dentist explains one aspect of the problem with the following comment: "Many parents in the Medicaid population don't have dental coverage – so that presents a problem in getting them to take care of their [own] teeth. If they don't have health insurance, they will not… take care of their own children's teeth until there is a crisis."

Finally, a major challenge that emerged from the session discussions was the reluctance of parents to be firm with their children about brushing. One dentist told a story about a mother who brought her child in at age three, and the dentist found the child's teeth covered with heavy plaque. The parent blamed the child for brushing poorly and tried to tell the dentist that the child wouldn't "let" her (the mom) brush the child's teeth. A hygienist reported that "the parent is like, 'He won't let me brush his teeth…' and, 'He wants to eat candy all day.' [I ask the parent] 'Well, who buys the candy? ... [and tell them] you have to make him brush at night.'" A dentist noted, "One of the most common things when I go through brushing and nutrition…they'll respond with, 'Well, I tell them to brush all the time… [or] 'I told you not to eat candy'… They often have this disconnect where it's not up to the kids to make the decision themselves."

Provider Challenges

Oral health care providers discussed several challenges related to the use of fluoride to prevent ECC as well as the value of inter-professional collaboration. Perspectives on fluoride and understanding of recommendations for fluoride use varied

among the participants. There was some confusion among several of the dental hygienists and dentists about best practices regarding drinking tap water, risks for fluorosis, and systemic versus topical fluoride. For example, some providers mentioned that systemic use of fluoride has raised concerns over whether there is too much fluoride exposure, but they also emphasized how important it is to ask patients about the source of their water to be able to advise them about fluoride supplements (drops and tablets). One hygienist stated that the dentist she works with no longer prescribes dietary fluoride supplements. Additionally, quite a few of the participants practicing in urban areas had not heard of Nursery® Water, a purified bottled water product, available with and without added fluoride, that is used for mixing infant formula. These practitioners were unaware of any bottled water product with an optimum fluoride level; thus, they were not recommending their use.

Two dentists in the focus groups had concerns about fluoridated water. One dentist reported she just learned from a continuing education course that some well water may have excess fluoride and was not recommending its use, however she also acknowledged that she is far more concerned about cavities than fluorosis. Another dentist stated that they personally do not drink tap water and felt strongly that tap water should not be encouraged as a source of fluoride because they felt that fluoride from toothpaste was sufficient. This dentist shared, "I don't encourage them to drink tap water… if you're using toothpaste, brushing twice a day, and we're using fluoride varnish to clean (sic) your teeth…I think we're actually getting more than enough fluoride to prevent tooth decay…If you use fluoride toothpaste twice a day, you're getting the dosage of fluoride you're supposed to get anyway."

Some of the dentists practicing in urban areas seemed surprised to learn that many parents reported they never drink tap water, regardless of whether one resides in the city or in more rural areas of Maryland. With the exception of two dentists, the majority of dentists in the focus groups were encouraging parents to understand the importance of tap water as a source of fluoride. Dental hygienists and dentists also noted that most parents do not know very much about fluoride, and that some even believed fluoride to be poisonous. One dentist commented, "People look up on the Internet that fluoride is poison. You could kill somebody with fluoride.' What [parents] don't understand is that it's in such a minute amount [in the water], they don't understand the studies and they don't understand what fluoride does."

Theme 2 – Dentists' and Dental Hygienists' Approaches to Patient Education

Dental hygienists and dentists discussed their approaches to educating their patients. They spoke about the importance of using clear or plain language so parents can understand and use the information. They shared examples of techniques used to be respectful while communicating the importance of dental disease. Many participants said that their entire staff (dentists, dental hygienists, dental assistants, interpreters and bilingual staff) is involved in patient education. Although dentists stated that they deliver some patient education, the dental hygienists were more involved, often taking the lead role in all types of settings. One dental hygienist shared a common

Table I. Perceptions Regarding the Role of Pediatricians in Preventing ECC

"I think working along with the pediatrician is very important. Everyone takes their child to see the doctor before they go to the dentist. I think if we can get [pediatricians] and educate them on the importance of what we need in the dental field, then maybe that will help so they will reinforce it." (dental hygienist)
"Pediatricians: [should] refer every patient to a dentist. I have a pediatrician next door to my office and every patient gets referred to a dentist." (dentist)
"A lot of times when pediatricians do the examination, they look at the whole body, look in the mouth, and look right past the lips to the throat. They don't look at the oral cavity. They don't see tooth decay…I think we need to get, in terms of policy, the physician to be more engaged when they're doing an examination… of the oral cavity." (dentist)
"[I wish] pediatricians [would] tell parents to see a dentist by age one; given diet instruction, encourage parents to follow through treatment, and tell them: 'Leaving cavities untreated could be fatal. Caries is a disease.'" (dentist)
"Pediatricians [should stress]: that oral health is just as important as overall health; seeing a dentist as early as the first tooth is important (or even before); nutrition is important—what are they putting in the bottle, feeding, etc.; brushing and routine care; habits—pacifier, thumb-sucking; developing a relationship with local dentists, clinics to educate each other concerning children's health." (dentist)
"If pediatricians could simply stress the importance of their patients seeing their dentist/hygienist regularly (every 6 months). And at every appointment, ask when their last visit to the dentist was. If they constantly inquire about visits to the dentist, parents will realize the importance of going." (dentist)

perspective: "The hygienist sees and has a relationship with the patient that's a little bit closer than the dentist's. Even though the dentist comes in and does the exams, the patient sort of relates to and talks to the hygienist a little more freely than they do to the doctor. When the doctor comes in, usually the [patients] clam up or don't say as much as they say to the dental assistant or to us."

Other educational techniques used were demonstrations to show patients how to brush teeth and using disclosing solution to show children and parents where they missed plaque. For young children, a gigantic model of teeth was used for demonstrating how to brush. One dentist shared that, "one of the things that has worked for my populations is the new popular, disclosing solution." Another dentist followed up that the disclosing solution instructional aid "allows parents to do some of that checking, because the kids will be playing around with it… [The parents can say], 'Your teeth are still purple. Go back in there and brush all the purple off.' That's very effective."

Theme 3 – Need for Inter-professional Collaboration

With regard to inter-professional collaboration, several participants commented about the value of involving pediatricians in ECC prevention. Most participants agreed with a dentist who stated that "the need to have a better collaboration with pediatricians will help build or express the need for dental exams. Better communication skills with the parents so you are not only informative, but encouraging at the same time." Expanded statements on the role of pediatri-cians in preventing ECC are presented in Table I.

Others reported having pediatricians who regularly refer children to their practices. One dentist shared that she and her colleagues go to pediatricians' offices to give lunchtime talks about oral health care, particularly to help the pediatric practices understand the importance of children being seen by a dentist and having a dental home by age one. This is earlier than the commonly-held belief that the recommended age for first dental visits is several years beyond age one. Several participants

Table II.
Suggestions for Inter-professional Collaboration

"Some of the best results we find are when we bring someone else in and collaborate with them. The best example: school nurses…We can go do a fluoride varnish and screening on all these kids…then we're gone. It is the school nurse that has to call every single parent that has an urgent referral and call them again….it's a really good follow-up collaborative effort with a non-dental person…School nurses are my favorite people to get involved with." (dentist)

"I think one of the areas [where] we can have the most effective assistance is in the schools with school nurses, because they have more access to children, in terms of children who experience tooth decay, or experience toothache pain…there are school nurses assigned to almost every school."

"School nurses – they get to see cavities first in low socio-economic patients because a lot of these patients never see a doctor." (dentist)

"When the kids go to school, they have to be immunized. Why can't there be something about them having to have their oral health checked out as well, every six months? Why can't we mandate that they get their teeth checked before they go to school….and on up to sixth grade or high school?" (dental hygienist)

"School nurses…—I mean, they can make or break your program, too. I've worked with the local dentist a little bit, too, and he had a great school nurse who was all into it and really gets it, and those kids are getting in, they're getting their sealants done. If you have a school nurse who's harried and feels like she's so busy or whatever and it's just another thing she has to do, then they're just not into it and they don't really want to schedule it ..." (dental hygienist)

"We used to be part of prenatal classes and grandparent prenatal classes as well. We used to do a lot more public health and then everybody became so clinically oriented in the public health programs and it seems to be coming back around again where there's a lot more outreach and a lot more collaboration with school health and things like that to try and initiate it again." (dental hygienist)

"It would be great in the hospitals… How about someone coming in and teach you how to take care of [the baby's gums]—I mean they teach you how to give your baby a bath… they do all [the] things that are in your new parent packets." (dental hygienist)

"If you go down the list of [foods approved by WIC], there are very few that are going to be non-cariogenic—one of the biggest ones being the juices that they push very, very hard. It's kind of like talking to a stone wall when you try to talk to the people at WIC that some of the problems are actually being caused by what they're allowing the children to have." (dental hygienist)

stated that this misunderstanding was common amongst ***all*** health care providers, including oral health care, with one dentist commenting that it was prevalent to hear age three and one dental hygienist stated that the recommended age for first dental visits is around age two.

Participants were sympathetic to the limitations pediatricians have with "maybe fifteen minutes per patient," and emphasized the importance of health care providers other than pediatricians–family physicians, obstetricians, and school nurses–taking a role in teaching parents about oral health.

Some of the participants called for simply expanding the channels by which information could be distributed to parents, such as through hospitals providing prenatal classes with parents and grandparents or with WIC through nutritional messages. Selected quotes relating to inter-professional efforts are presented in Table II.

Discussion

Results from this qualitative study of dental hygienists and dentists are consistent with our findings from focus groups with Maryland adults. Our previous study found that adults have an insufficient understanding of what causes tooth decay and how to prevent it.[19] Furthermore, these groups did not understand the role of fluorides in preventing tooth decay; were confused about juice and its impact on their child's teeth; and most did not drink tap water or give it to their children; rather, they used bottled water.[19] Similarly, the oral health care providers in the current study emphasized what was not understood or practiced by parents when caring for their child's oral health including adequate oral hygiene, the role of fluorides in preventing ECC, limiting consumption of sweets, and the lack of understanding that decay is preventable. Findings from the current study also reinforced results from state and national surveys indicating that adults have a low level of understanding about how to prevent tooth decay.[20-21]

Concordant with previous studies of Maryland oral health care providers,[15-16] participants in this study generally supported using fluorides. However, not all participants agreed with the fluoridated water recommendation or supporting statements about its effectiveness, even in light of the evidence. Two dentists outright stated they "wouldn't recommend" and "don't encourage" consumption of tap water in optimally fluoridated communities with one stating the fluoride from toothpaste and from the "fluoride varnish [we use] to clean your teeth" is enough, and another citing potability concerns related to the municipal water system's aging infrastructure. This lack of consensus among dentists regarding the safety and efficacy of community water fluoridation serves to confuse the public. The most current AAPD clinical practice guidelines describe fluoridated water as "the most equitable and cost-effective method of delivering fluoride to all members of all communities."[22] The guideline recommendations, however, do not make it clear that the consumption of fluoridated water should be encouraged as the primary source of fluoride for anyone connected to a fluoridated water system and that the protective and restorative effect of fluoride occurs from frequent low-level exposures.

Novel findings from this study are related to dental hygienists' and dentists' perceptions of how to reduce ECC and increase oral health literacy among their patients. Participants emphasized the need for earlier intervention by health care providers outside of dentistry, such as pediatricians and family practice physicians, since these health care providers tend to see families for well-care visits long before those families typically establish a dental home. Frequent encounters with these trusted health care providers provide early health education opportunities that dentists and dental hygienists do not typically have. Furthermore, in many states physicians or their staff can be trained to administer and receive reimbursement for early interventions such as fluoride varnish on deciduous teeth,[23] and can write prescriptions for dietary fluoride supplements for children living in areas not served by fluoridated municipal water systems.

Dental hygienists and dentists also emphasized the importance of using specific communication techniques to help patients understand the health guidance they receive. These techniques include using plain language and simple sentences when talking with patients; the use of models to demonstrate to parents and children how to properly brush teeth; using disclosing solution to show parents and children how well they brushed their teeth; confirmation of the patient's understanding of the communicated information; and, continually reinforcing messages.

One limitation of this study is the number of dental hygienists and dentists who participated in the focus groups or interviews. Due to limited resources, only two focus groups or interviews were conducted with each professional group. Nonetheless, little new information emerged from the respective second sessions. Also, while all participants met the selection criteria, this was essentially a convenience sample. This limitation is mitigated to some extent in that no additional information was gained, which may suggest data saturation. Overall, these results serve as a reminder that both dental and dental hygiene education programs need to ensure that their graduates are well versed in the caries disease process along with prevention strategies and that practitioners must stay informed of current professional guidelines for pediatric oral care. Results from this study, in addition to other study results, will help direct educational interventions for health care providers and low-income adults.

Conclusion

Focus groups and interviews with dental hygienists and dentists provided insightful suggestions for future strategies to help solve the prevailing ECC problem in the state of Maryland. Results from this and previous studies, suggest that traditional approaches to educating at-risk families and caregivers about preventing ECC are insufficient to mitigate the disease burden experienced by this population. It is critical that all oral and health care providers have a science-based understanding of caries prevention. Integrating science-based oral health promotion and disease prevention into medical and nursing education programs could increase providers' knowledge and confidence towards including oral health in patient care plans. If increased numbers of health care providers including obstetricians, pediatricians, family physicians and nurses, provided guidance on how to maintain good oral health and prevent ECC, the prevalence of ECC could decrease, especially among those who are low-income or lack a dental home. Additionally, incorporating communication skills training as a part of professional education, would assist all health care providers in better assessing their patients' levels of understanding of health and disease conditions and the behaviors that promote health. Lastly, equally as important as professional training, is the need for more innovative educational interventions to reach individuals, especially those with low-education, to help them understand their role in preventing ECC.

Acknowledgements

Project funding was provided by DentaQuest Foundation, 465 Medford Street, Boston, MA.

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