Prevention of Early Childhood Caries via Parent Education

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The Center for Disease Control (CDC) estimates one out of five children will go without dental care each year, and one out of six of these children will experience a toothache. Children who live in poverty have significantly higher rates of dental caries (14%) (3). Research shows that early childhood caries (ECC) is linked to lack of knowledge from parents. Since children
from the age of 1-5 are mainly dependent on the parents to provide adequate oral hygiene care, parents play a key role in the prevention of dental diseases in their children. However, according to the research study “OHEP: An Oral Health Education Program for Mothers of Newborn” the percentage of parents who understand the importance of oral health for their children is very low (5). Despite the efforts of public health departments and the CDC, the ECC rates have not decreased: instead from 1990-2004, the decay rate has increased significantly (8).

Many factors affect parent’s knowledge regarding their child’s oral health including education level, financial, and lack of access to care. Studies show that most mothers who have regular dental visits and have graduated high school or have obtained a higher education have an increased level of awareness in oral health (10). Parents of children with ECC often wait until their child experiences pain before bringing their children to the dentist; often leading to loss of the deciduous teeth (8). Restorative treatment, as opposed to preventative treatment, is more invasive and costly. Painful experiences in a dental office at any age can cause anxiety and a negative association to regularly scheduled appointments. This adverse attitude to professional and home care can perpetuate a progressive and recurring cycle throughout life leading into advanced dental disease. Therefore, in order to help decrease the ECC rate and ensure quality of life for children, it is imperative to increase the knowledge of the parents regarding their children’s oral health through education.

Health professionals can teach expecting and new parents about the importance of oral care and hygiene for infants, taking care of an infant's gums and teeth, feeding their infant healthy foods, and getting a dental checkup by age one.
Early childhood caries (ECC) is a serious public health problem in both developing and industrialized countries (4). ECC begins early in life, progresses rapidly in those who are at high risk, and often goes untreated. Its consequences can affect the immediate and long-term quality of life of the child's family and can have significant social and economic consequences beyond the immediate family as well. ECC can be a particularly virulent form of caries, beginning soon after dental eruption, developing on smooth surfaces, progressing rapidly, and having a lasting detrimental impact on the dentition. Children experiencing caries as infants or toddlers have a much greater probability of subsequent caries in both the primary and permanent dentitions (4). Several studies show that early childhood caries are normally found in children who live in poverty or in poor economic conditions, who belong to ethnic and racial minorities and whose parents have limited education. In these populations, due to the prenatal and perinatal malnutrition or undernourishment, these children have an increased risk for enamel hypoplasia, limited exposure to fluoride and a greater preference for sugary foods (4).

Dental caries is the most common chronic infectious disease of childhood, caused by the interaction of bacteria, mainly Streptococcus mutans, and sugary foods on tooth enamel. Streptococcus mutans can spread from mother to baby during infancy. These bacteria break down sugars for energy, causing an acidic environment in the mouth and result in demineralization of the enamel of the teeth and dental caries.

Vertical transmission, also known as mother-to-child transmission, is the transmission of an infection or other disease from caregiver to child. The major reservoir from which infants acquire Streptococci mutans is their mother who shares utensils with their baby. Prolonged and nocturnal breastfeeding is associated with an increased risk of ECC, especially after the age of 12 months. These conditions coupled by less saliva production at night result in
higher levels of lactose in the resting saliva and dental plaque for longer than would be expected during the day. Thereby, there is shifting balance toward de-mineralization rather than re-mineralization during the night because of the insufficient protection caused by reduced nocturnal salivary flow.

Therefore, much of the professional advice and practical research has focused on modification of the infant diet and feeding habits through education of the parents. Child health professionals, including but not limited to physicians, physician assistants, nurse practitioners, and nurses, can play a significant role in reducing the burden of this disease. While most children do not visit a dentist until the age of 3 years, children have visited a child health professional up to 11 times for well-child visits by this age.

Dietary and biological factors such as frequent consumption of high sugar foods and the presence of bacteria such as Streptococci mutans contribute to ECC development; however ‘cariogenic’ parental practices are less well understood (6). Same study found that parents’ lower self-efficacy, dental knowledge and parenting stress were all associated with increased rates of caries in preschool children (6). They also found that parents attributed problems to external causes rather than accepting responsibility themselves. Since parents are the primary social force influencing child development in the early childhood years, it follows that interventions targeting parental beliefs and practices known to be associated with ECC may be beneficial in the prevention of ECC (6).

Besides behavioral and motivational recommendations, training the mothers and educators in the ‘lift the lip’ method so that they can observe the ECC in early noncavitated stages will be a valuable tool. Mothers’ knowledge and behaviors of oral hygiene are key
components for children’s oral health care (1). A study related to oral health education for mothers of newborns introduced an oral health primary prevention educational program for mothers of healthy full term infants while they were on the postpartum unit with the overall goal of determining the impact of this intervention on the incidence of white spots and dental caries in the infant, toddler, and preschool populations. The results of a pretest questionnaire administered to all mothers who entered this study revealed that mothers of newborns lacked general knowledge about oral health care for their infants and young children, knowledge about vertical transmission of streptococcus mutans from mother to infant through common food sharing practices that lead to dental caries, and knowledge about when to brush the infant’s teeth. Some mothers lacked knowledge about the benefit of fluoride as a primary prevention strategy for tooth decay. This knowledge deficit may be one of the contributing factors to the high prevalence rate of dental caries in children younger than 71 months. Pretest results revealed that some mothers are not aware of the benefits of fluoride for the oral health of their infants. In addition, the results from a study revealed that 9 of the 10 mothers who returned for the 12-month follow-up visits, all of whom had fluoridated water in their homes, used bottled water to make their child’s formula, and thus the infants were not receiving the benefits of fluoridated water (5).

A National Institutes of Dental and Craniofacial Research report showed that overall dental caries in primary teeth of children 2 to 11 declined from the early 1970s until mid 1990s (8). However, same report showed that from 1990-2004, there is a small but significant increase in primary decay and most were found on younger children. 42% of children 2 to 11 had dental caries in their primary teeth. Black and Hispanic children and those living in families with lower incomes have higher decay rate compared to Caucasian children (8). Of these children, 23% had untreated dental caries, especially for children living in poverty. Children in families with
income less than 100% compared to Federal Poverty Level (FPL) had an average number of dfs (decay, filled primary surfaces) of 5.63 out of 6, demonstrating that low income children are twice as likely to experience decay than children of higher income (2.28 out of 6). As a consequence of dental disease 52,000,000 school hours are lost each year (2). A report in 2004 of the American Academy of Pediatric Dentistry stated that children between the ages of 2 and 5 who had not visited a dentist within the past 12 months are more likely to have caries in their primary teeth and estimate 50% of all children have never visited a dentist (7). Children with severe dental caries also may experience pain, speech and communication problems, eating and dietary nutritional deficiencies, disrupted sleep patterns, learning issues, and lower quality of life that extend into adulthood. Treatments for ECC are very costly since the needs treatment are quite invasive and often requires general anesthesia. These procedures can range from $1500 – 2000 per child per year (7).

These statistics demonstrate a need for preventative care for young children since their primary teeth are more prone to dental caries. It also indicates that within lower income groups parents need to be educated on how to improve their children's oral health. Since these young children are absolutely dependence on their parent for their daily oral home care, the parent should be trained on how to keep their child’s teeth and gums healthy and value the important of regular dental visits.

Several national initiative and coordinated efforts aimed at preventing tooth decay in children exist. Some of these initiatives include the Targeted Oral Health Services Systems (TOHSS) Grant Program, Oral Health Disparities Collaborative (OHDC) Pilot, The American Academy of Pediatrics (AAP) Oral Health Initiative, Maternal and Child and Health Bureau/Administration for Children and Families (ACF) Office of head Start Collaborations, The
American Academy of Pediatric Dentistry Head Start Dental Home Project, and the Symposium on Biobehavioral Interventions to Improve Pediatric Health (6).

The Targeted Oral Health Service System provides infrastructure funding for state oral health programs to allow statewide approaches to prevent oral diseases and promote sustainability of oral health programs. Their three main goals are to increase number of dental visits for children at greatest risk for oral disease by age one, improve access to oral health services for children with special health care needs, and ensure restorative treatment of active disease through dental sealants. In the state of California, the system is implemented into early childhood preventive care in community health settings such as Women, Infants, and Children (WIC). At WIC locations, children receive oral health services and parents are educated on how to maintain the oral health of their children. In 2007, the Center for Oral Health developed the Early Entry Into Dental Care Program in Alameda County. Since then, the Alameda program has expanded to two sites and a similar program in northern California in Humboldt County has expanded into three sites.

The Alameda County Office of Dental Health currently collaborates with two WIC centers that served approximately 4,000 women and 13,000 infants and children in 2011. The dental team consists of one RDH and one or two case managers who visit at each of the two WIC centers once per week. Approximately 12-20 participants are seen on those days. Oral health education for WIC participants is done in two stages. The first is through a class taught by a WIC nutrition assistant with the guidance of the RDH during and/or after visual assessments. Classes focus on a PowerPoint presentation two to three times a day in English or Spanish. Participants are also given a variety of materials such as assessments of findings, referral information, oral health pamphlets, toothbrushes, dental floss, toothpaste, and the Dora the Explorer book titled
Show Me Your Smile!: A Visit to the Dentist (7). Approximately 75% of participants receive dental benefits from Medicaid. Uninsured participants are covered by the Alameda County through its sponsored care program. The Early Entry into Dental Health Program sustains funding mainly through large grants and public funding sources. The main objective to sustain long-term funding is to attain a Federally Qualified Health Center (FQHC) status that will allow the billing at a higher rate to cover costs for non-paying participants.

Dental caries is an infectious disease that can be transmitted from mother to infant. Because the disease rate is very high for children of low income families, it is important to increase the awareness of parents regarding the prevention of dental caries. Other factors prevent parents from seeking dental care including education, income, and insurance. For those reasons, this project will focus on reducing the caries rate of children by increasing the awareness of their parents regarding oral health and the importance of dental visits at early an age, including educating parents about the proper hygiene techniques for their children. In order to meet this goal, dental hygiene students will reach out to these low income families via WIC programs by incorporating dental health education into the existing prenatal courses. To test the effectiveness of the program, parents will be given pre-survey to collect the primary data and post-survey to evaluate the effectiveness of the program.
**Description of Program:**

A dental health program conducted at low-income clinics and WIC centers in the south and east side of San Jose, CA. An educational class regarding dental care for their newborn child will coincide with the general parenting classes held at WIC. The dental education will initially be conducted by dental hygiene students. The program "Oral Health Education" will eventually be taught by the instructor of the general parenting class.

**Target Group Description:**

The program will target the parents of newborn children going to the parenting classes at WIC of San Jose, CA. All ethnicities will be targeted, but most parents are expected to be minorities. The main target group will be the mother’s attending, but a secondary objective will be to train the healthcare worker in giving oral health instructions.

**Potential Community Partners:**

Santa Clara County Dental Society, Santa Clara County Health Department, Children's Health Insurance Program in California (State Program), WIC of San Jose

**Goals:**

- Increase knowledge and awareness of young children’s oral health among parents
- Increase number of dental visits by young children

**Objectives:**
- Parents of young children will demonstrate knowledge of plaque biofilm removal and its effects on dental caries formation by passing a written test with a grade of 75% or higher.
- Parents will understand the importance of annual dental visits for their children by answering a question on survey given at the end of class.
- All parents of young children will be able to correctly perform effective wiping techniques on the oral cavity without teeth and brushing technique on primary teeth on the puppet with some assistance at end of class.
- All parents of young children will report visiting a dental professional at child’s annual check-up through a survey given by WIC personnel.

**Type of Program:**

Education intervention - provide oral health education to parents on how to remove plaque biofilm and increase awareness of oral health for their children 0-1 year of age.

**Program Activities:**

The anticipated effects of the program will be to increase the knowledge of parents on how to maintain the oral health of their infant and encourage them to see a dentist by the age of 1. The program activities will be to contact WIC locations within the south bay. An educational class regarding oral health will be incorporated into the already existing general parenting classes held at WIC.

**Lesson Activities:**

1. Initial survey to evaluate current education and attitudes of parents
2. Powerpoint presentation - Explain plaque and its role in the formation of caries and periodontal disease. Give examples of cariogenic foods and its impact on oral health. Emphasize the importance of seeing a DDS by the age of one in order to prevent caries formation and establish a dental home. Emphasis on early childhood caries and causes such as use of bottles and sippy cups during sleep, also the importance of primary teeth for health and permanent dentition.

3. Gum brushing demonstration - Demonstration techniques for oral hygiene care will be introduced with a puppet in front of the class. Techniques include: use of washcloth or gauze to remove plaque from alveolar ridges and oral mucosa, infant toothbrushes, samples of toothpaste safe for infant/toddler. The parents will then demonstrate it back to the dental hygiene instructors for one-on-one feedback. Instructors will be evaluating for thoroughness of plaque biofilm removal from all surfaces of the mouth.

4. Review key points of PowerPoint presentation

5. Post-class survey will be given to evaluate increased knowledge of parents. Parents will be given gum brush, pamphlet containing oral health information, and list of affordable community dental resources within the area.

**Sequence of Events**

1. Contact WIC to establish relationship and raise awareness of staff to help improve dental health of children. Plan and coordinate schedules for oral health education to be incorporated into existing parent education classes.

2. Call dental products companies to gain support and donations for program

3. Visit WIC to conduct classes
4. Analyze initial and post-survey results

5. Evaluate effectiveness and success of program

**Budget:**

Estimated cost of program = $500

1. Gum brushes

2. Copying costs for surveys and handouts

3. Practice models/puppets

**Evaluation:**

- Pre and post survey will be conducted.
- Knowledge based post survey testing the knowledge improvement score of parents and comparing the results with the initial class survey.
- Telephone survey 6 months after class date (children should be age 1 by that date) to check if parents have taken their child to a DDS and established a dental home.

**Survey**

1. **Are baby teeth important to keep clean and maintain?**
   
   a. Very Important
   
   b. Not Important
   
   c. Not sure

2. **What age do you think you should start brushing your child’s gums and teeth?**
a. Less than 6 months

b. When they first have baby teeth

c. When they start growing adult teeth

3. **How often do you brush your child’s teeth and gums?**

   a. Once day

   b. Twice a day

   c. Never

4. **What age do you think you should take your child to the dentist?**

   a. When their first baby tooth shows

   b. When they are 1 year of age

   c. When their baby teeth hurt

   d. When they begin having adult teeth

5. **Have you ever been shown or know how to brush a child’s teeth?**

   a. Yes

   b. No

6. **Do you think treating cavities in baby teeth are important?**

   a. Very important
b. Not important

c. Not sure
References


