

Early Childhood Caries and the Role of the Pediatric Nurse Practitioner

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ABSTRACT

This article addresses issues related to early childhood dental caries (ECC) and the role pediatric nurse practitioners can play in ameliorating symptoms and promoting the oral health of children. ECC is preventable, yet it is one of the most prevalent health conditions children experience in the United States. Before kindergarten, one fourth of US children experience ECC. Factors that contribute to ECC are poor socioeconomic status and lack of parental education, health insurance, and available dentists. PNPs can play a vital role in preventing ECC by incorporating oral health assessment, education, and preventive activities as part of the routine health care surveillance visit.

Keywords: childhood, dental caries, health disparity, pediatric nurse practitioner

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The purpose of this article is to address issues related to early childhood dental caries and the role pediatric nurse practitioners (PNPs) can play in ameliorating symptoms and promoting the oral health of children. Dental caries is the disease process that leads to the breakdown of tooth enamel. The American Dental Association (ADA) defines early childhood caries (ECC) as the presence of 1 or more decayed, missing (due to caries), or filled tooth surfaces in any primary tooth in a preschool-age child between birth and 6 years.¹ ECC is also known as “nursing caries,” “baby bottle tooth decay,” and “bottle caries.”¹

According to Healthy People 2020, which provides national health objectives for the nation, significant strides have been made in the oral health of the nation over the past 50 years. Most of the success is attributed to better prevention and treatment efforts²; yet, despite these gains, more than one fourth of children experience ECC before entering kindergarten, and by age 19, 68% of youth have experienced tooth decay in permanent teeth.³ PNPs can play a vital role in preventing ECC, often during well-child visits where an oral health assessment is performed, thereby identifying risk factors and providing education to prevent ECC

and making appropriate referrals to dentists when appropriate.

BACKGROUND

ECC is one of the most common chronic diseases of childhood.² ECC is associated with poor oral health and has far reaching implications such as oral pain, excessive school absenteeism, poor school performance, failure to thrive, and continued poor oral health as an adult.⁴ Oral health problems are costly. In 2010, an estimated \$108 billion was spent on dental services in the United States,⁴ and today an estimated 18.5 million children go without basic dental care each year because of inadequate access either by provider shortage or lack of insurance coverage.⁵

ETIOLOGY

Dental caries is a disease that is multifactorial; however, a major variable is the presence of oral bacteria, which decreases the pH of the oral flora. This catabolic process is initiated when oral pathogens, specifically *Streptococcus mutans* (SM), are present.¹ SM adheres to tooth enamel, and the acids produced by SM demineralize the tooth surface. Dental plaque aids in the process of bacterial adhesion to the tooth

surface by providing a sticky medium or biofilm for the bacteria. Continual bathing of the tooth surface with foods and liquids high in sugar fuels this process, resulting in high levels of acid production and decreased oral pH levels.⁶ The ingestion of sugary snacks and foods more than 3 times a day in children < 24 months has been shown to increase the presence of SM in the oral cavity.⁷ Vertical transmission of SM from mother to infant and horizontal transmission of SM (ie, transmission between members of a group such as siblings of a similar age or children in a daycare center) from sharing food or utensils are common.¹ Other factors associated with infant colonization are the mother's oral hygiene, high SM level, periodontal disease, high sugary snack frequency, and socioeconomic status.

DENTAL CARIES AND HEALTH DISPARITY

The Surgeon General's report "Oral Health in America" stated that dental caries is the "silent epidemic" among poor and minority groups,² which are disproportionately affected. ECC is preventable, yet millions of children continue to have unmet dental health needs, including access to services and preventive strategies.⁵ Mexican American and black, non-Hispanic children between the ages of 2 and 4 years and 6 and 8 years bear an unfair burden of ECC and associated negative sequelae.⁸ These children are more likely to live in families that are at or below the federal poverty level and have Medicaid insurance.⁹

Difficulty accessing dental care for low-income children is highlighted in a 2008 Government Accountability Office report.¹⁰ The severe shortage of pediatric dentists in the US, especially in designated health profession shortage areas, exacerbates the access problem.¹¹ In fact, the number of dentists in the nation has been on a steady decline, whereas the population has increased. According to the Health Resources and Services Administration, as of December 2012 there were 4,458 dental health profession shortage areas, and in those areas there are 45 million people who need access to preventive and restorative dental services. To rectify this issue, 9,060 dentists will be needed immediately to fill the gap in order to provide a patient to provider ratio of 3,000:1.¹² Cost, lack of health insurance, inability

to obtain appointments, and unwillingness by dental providers to participate in Medicaid and children's health insurance program plans because of poor reimbursement contribute to the paucity of care and the disparity gap.³

The use of service is also shown as a disparity gap. Regular preventive care is necessary for good oral health; however, poor and minority children are less likely to have a dental home or be seen by a dentist for preventive care, including fluoride and sealant application.¹³ Nationwide, approximately 40% of children enrolled in Medicaid received dental service, and of those, only 35% used preventive dental services in 2009.¹⁴

Further evidence of disparities is the lack of fluoridation in public water supplies in many communities. Although fluoridation of community water sources has been attributed to the decreasing prevalence of caries, only 27 states have met the Healthy People 2010 objective of having 75% of public water systems fluoridated.⁴

Several social determinants of oral health have been identified, namely socioeconomic status, race, and education. About two thirds of children and adolescents from low-income families (1-19 years old) have dental caries, and 1 in 4 has untreated caries.¹⁵ According to the National Survey of Children's Health in 2005, Hispanic children were the least likely group to receive preventive dental care. Forty percent of Mexican American children ages 6-8 years have untreated dental decay compared with 25% of non-Hispanic whites.⁴ Low socioeconomic and poor parental knowledge of how diet affects their children's teeth also contribute to this growing problem.⁷

MANAGEMENT OF ORAL HEALTH

The earlier the child receives dental care, the less likely the child will experience permanent dental health problems. The American Academy of Pediatric Dentistry (AAPD) and the ADA recommend that infants have an initial oral evaluation within 6 months of the eruption of the first primary tooth or by 12 months of age.⁷ The AAPD advocates oral health anticipatory guidance at every visit. A study has reported that health care providers' recommendation that children visit the dentist was

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