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Outcomes of a Quality Improvement Project Examining Early Childhood Caries and Improving Identification of At Risk Patients in a Pediatric Medical Home Setting[1,2]

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Early childhood caries (ECC) is a widespread childhood disease that disproportionately affects children with disabilities, those in lower-income households and minority children. The American Academy of Pediatrics (AAP) recommends that all children be screened for ECC and referred to a dentist by the age of one. This quality improvement project took place at a hospital-affiliated pediatric clinic. A caries risk screening tool was implemented at 9-, 12-, and 18-month well child check-ups for 3 months. A retrospective chart review was performed for comparison purposes. The quality improvement project indicated improvement in identification of children at high-risk for ECC.

Background Knowledge

EARLY CHILDHOOD CARIES (ECC) remains the number one chronic disease affecting young children in the United States (Dye et al., 2007). ECC is defined as the presence of one or more decayed, missing, or filled tooth surfaces in any primary tooth in a child between birth and 3 years of age (Viswananathan, 2010). Children belonging to racial and ethnic minorities are more likely to have dental decay than white children, and typically their decay is more severe (Dye et al., 2007). Children most at risk for developing ECC are those insured by Medicaid, have mothers with dental decay, are premature, or have other special health care needs (Pediatrics, A. A., 2012). Despite ECC being largely preventable, it continues to be five times more common than asthma and seven times more common than hay fever in the pediatric population in the United States. Not only is it the most common pediatric disease, it can lead to physical and psychological disabilities as well as considerable morbidity in adulthood (Szilagyi, 2009).

Thus, there is a need for collaboration among primary care providers and dentists to effectively address the health needs of children most at risk for caries, in particular, those ages birth to 3 years. Pediatric primary care providers are the frontline providers of healthcare for infants and toddlers and see children at high risk for ECC on a regular basis, whereas a dentist may not see children until age 5 (Berg & Stapleton, 2012). Currently, the American Academy of Pediatrics (AAP) recommends all children have their first dental visit by age one (Pediatrics, A. A., 2012). Educating pediatric primary care providers to perform a rapid oral health risk assessment at specific well-child checkups, coupled with anticipatory guidance, fluoride varnish, and referral of high-risk patients to pediatric dentists, are economically viable options for pediatric office visits (Berg & Stapleton, 2012).

Significance to Healthcare

In 2003, the U.S. Department of Health and Human Services (US DHHS) issued a national call to action to

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promote oral health. A key aspect of this call to action focused on the oral health of the pediatric population, recommending the replication of effective programs and demonstrated efforts that have improved oral health (U.S. Department of Health and Human Services (USDHHS), 2003). Despite this call to action, early childhood caries remain a significant issue in South Carolina and throughout the United States. According to the South Carolina Department of Health and Environmental Control (SC DHEC), 52% of children under the age of eight in South Carolina have experienced tooth decay (2007). Children from economically disadvantaged households are significantly more likely to experience early tooth decay (Dye et al., 2007). Approximately 430,000 children or 42% of those under age of 18 in South Carolina live below 200% of the federal poverty level, thus increasing their risk for early childhood caries [South Carolina Department of Health and Environmental Control (SCDHEC), 2007]. In response to the US DHHS call to action, South Carolina undertook several strategies to address the oral health needs of its population. Two of these initiatives were the establishment of a Children's Oral Health Coalition and the use of Bright Futures in Practice: Oral Health. Bright Futures has been instrumental in South Carolina's efforts to improve children's oral health. (Zimmerman, 2006)

Evidence Review

Despite awareness of an increase in ECC incidence and of effective prevention strategies, proper infant oral healthcare and the establishment of a dental home by age one have not become standards of clinical practice (Ramos-Gomez, Crystal, Man Wai, Crall, & Featherstone, 2010). The American Dental Association, the American Academy of Pediatric Dentistry, and the American Association of Public Health Dentistry first endorsed caries risk assessment, but its practice by non-dental professionals has become more widespread (AAP, 2012). The AAP now recommends the use of a risk assessment tool during well child visits to all pediatric providers, and many community-based organizations use the tool as an essential portion of their comprehensive infant oral care programs (Ramos & Man-Wai, 2011). A risk-based disease management approach to address ECC has been successfully implemented in hospital-based dental practices and has demonstrated better clinical outcomes than traditional approaches to caries management. At one site, the disease management group experienced a 62% lower risk of new caries (Ng et al., 2012). Interviewers also found parents receptive to use of a disease management protocol and appreciative of explanations why their children may have developed ECC (Ng et al., 2012).

Several current oral health models rely upon collaborative efforts between medical and dental associates to effectively address the pediatric oral healthcare needs. One example is North Carolina's Mouth of Babes Program, which was designed on the concept that the pediatrician's office is an excellent opportunity to initiate oral health interventions. Medicaid reimburses the medical providers for three healthcare visits, prior to 3 and one-half years of age, that specifically focus on risk assessment, anticipatory oral health guidance, and fluoride varnish application. The program has reported an increase in access to preventive services and improved treatment outcomes, with a 49% reduction of ECC before children reach 8 months of age. Medical providers were able to identify oral disease with 88% accuracy, and referral effectiveness increased from 12 to 33% (Berg & Stapleton, 2012).

In a cross-sectional survey examining primary care clinicians in pediatric practices and referral rates based on dental screenings at the clinic, De la Cruz, Rosier, and Slade (2004) found 78% of the providers were likely to refer a child who was at high-risk for future dental disease. However, investigators also found 96% merely gave the primary caregiver the name of a local dentist without additional information. De la Cruz et al. (2004) concluded that, with effective training, pediatric primary health care providers could provide oral health promotion and disease prevention tools to help reduce dental disease in the pediatric population.

Evidence reviewed here suggests that consistent implementation of a risk-screening tool can effectively increase identification and timely treatment of ECC.

Intended Improvement

The objectives of this project were to (a) increase the identification of primary care pediatric patients at high-risk for development of early childhood dental caries and (b) effectively refer those patients to a dental provider. This process improvement project involved implementation of a risk assessment tool at the 9-, 12-, and 18-month well child visit. Children identified as high-risk after screening with the risk assessment tool were then referred to a local pediatric dentist.

Clinical Question

In the pediatric primary care setting, how does the implementation of a risk-screening tool affect the identification and referral of children at high-risk for dental caries?

Methods

Ethical Issues

The purpose of this quality improvement project was to improve the identification and management of pediatric patients at high-risk for dental caries seen during well child visits. All data were de-identified and used solely for quality improvement purposes. Based on 45CFR46.101(b)2 and 46.102(f) and 45CFR164.514(a)-(c) of the Health Insurance Portability and Accountability Act, the project was exempt from institutional review board review. All employees working on the project are bound by HIPAA regulations to retain privacy of the patients involved.

Setting/Sample

The project was implemented in a hospital affiliated pediatric clinic that provides care based on the medical home