

Efficacy of Oral Health Promotion in Primary Care Practice during Early Childhood: Creating Positive Changes in Parent's Oral Health Beliefs and Behaviors

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Abstract

Nurse practitioners frequently provide care to children suffering from poor oral health. Creative approaches to impacting dental disease are needed due to the current lack of traditional dental providers. This study investigated the effects of oral health promotion provided by primary care providers on parental oral health beliefs and behaviors. Participants receiving standard oral care during two well child visits and two additional enhanced oral health visits (n=44) were compared to participants receiving standard oral care during two well child visits alone (n=40). Results revealed changes in parent's perception of the importance of oral care for their children's primary teeth compared to general healthcare needs ($p<0.05$), response to brushing their children's teeth ($p<0.0001$), confidence in brushing their teeth ($p<0.05$) and frequency of brushing ($p<0.0001$) in both groups. This small but important study shows that oral health programs in primary care can produce changes that can improve oral health outcomes. Parents and children exposed to oral health programs during their frequent well child care visits in the first years of life may help decrease the rate of early childhood caries and improve their quality of life.

Introduction

The occurrence of caries in the pediatric population is currently at epidemic proportions. It is the most common chronic childhood disease [1,2]. Despite repeated efforts through programs aimed at improving oral health status, epidemiological data indicates a continued increase in the prevalence of pediatric dental disease [3,4]. Due to the magnitude of this disease across the U.S., Healthy People 2020 has identified oral health as one of the priority areas needing to be addressed by state, federal and professional organizations [5].

Early childhood caries (ECC) occurs in all socioeconomic and racial groups; however, children of low socioeconomic status have a higher risk of caries and poor oral health outcomes compared to more affluent populations [6-9]. A major limitation to decreasing ECC includes shortages in pediatric dental services and providers who are both willing and able to provide services to uninsured children, as well as to children with Medicaid insurance [10-14].

Currently there is an interest in demonstrating how dental education and care that has not been easily accessible to many high-risk families can be integrated into primary care practice [15,16]. Few studies are available documenting the usefulness of oral health promotion programs in primary care practices aimed at changing parent's oral health beliefs and behaviors for their children. The study facilitated by a Pediatric Nurse Practitioner (PNP) explored the following hypotheses:

1. Parents of children ages 6 to 15 months who receive standard oral health care during well visits with the addition of enhanced oral health promotion visits will demonstrate a positive change in their oral health beliefs and behaviors.

2. Parents of children ages 6 to 15 months who receive standard oral health care during their well visits alone will demonstrate a positive change in oral health beliefs and behaviors.

3. Parents of children ages 6 to 15 months receiving standard oral health care during their well visits with additional

enhanced oral health promotion visits will have a greater change in their oral health beliefs and behaviors compared to parents of children receiving standard oral health care during their visits alone.

4. Parents of children ages 6 to 15 months who received additional enhanced oral health promotion visits will describe their experience as positive.

Patients and Methods

The current mixed methods study focused on changes in parents' oral health beliefs and behaviors for their children based on their participation in standard oral health care during their children's well child visits with the addition of enhanced oral health promotion visits compared to children that received only standard oral health care during the child's routine well child visits.

Participants for the study consisted of parents of children 6 or 9 months of age at the time of enrollment, who receive primary care services at a private pediatric clinic, enrolled in Medicaid insurance program and English speaking. One hundred patients were enrolled, with 50 parents randomly assigned to either the intervention or control group.

Study approval was obtained by the University's Committee on Human Subject and private clinic prior to subject recruitment. Following consent and enrollment of participants, the initial Early Childhood Oral Health (ECOH) questionnaire was completed followed by the completion of the first well child care visit. Once the visit was complete, the children were scheduled for their next well child care visit (control group) or their enhanced oral care visit (intervention group). The study procedure followed a standardized protocol based on enrollment age and group placement. At the completion of the study the all participants in the intervention group (N=44) received a total of two well child visits with standard oral health care and two enhanced oral health promotion visits, while the control group participants (N=40) received only two well child visits with standard oral health care.

Standard oral health care was the oral health care delivered during each well child visits. Standard oral health included: caries risk assessment, oral health examination, fluoride varnish application, anticipatory guidance, attempt to refer to a dental home and a toothbrush provided to the child. The time allotted for well child visits were approximately 30-minutes, limiting the time spent specifically on the child’s oral health. Enhanced oral health visits were separate 20-minute visits with the primary care provider focusing specifically on the oral health of the child. This visit consisted of an extensive oral health history and caries risk assessment, medical history, and an oral health examination. Detailed child and family oral health education was discussed with a handout focusing on common ECC risk factors. A tooth brush was provided during the child’s first enhanced oral health visits, along with education on how to brush, proper use of fluoride toothpaste and the importance of regular brushing. Additionally, a sippy cup was provided at the second visit to reinforce proper oral health beliefs and behaviors, which included information of foods to avoid for the prevention of caries development. At each visit the family was given dental provider information with an attempt to refer them for future assessment and care.

Measures

Early childhood oral health questionnaire

The ECOH questionnaire was adapted, with permission from the work of Mohebbi et al. [17] and determined to be reliable and valid. The ECOH questionnaire maintained a socio-ecological focus with an emphasis on the complexity of ECC caries. The concept map of early childhood oral health (Figure 1) was used in the study to demonstrate the multiple factors and interactions between the child, family

and community in predicting the future oral health behavior, beliefs of parents, as well as physiologic oral outcomes in the child [18]. The ECOH questionnaire covered pertinent oral health topics on: daytime and nightly feeding habits (N=7); current oral care provided to their child including use of toothbrushes, toothpaste and frequency of use (N=6), parent’s belief in the importance of oral care to their child’s primary teeth and secondary teeth (N=3); parent’s confidence to care for their child’s teeth (N=3), frequency of dental care visits for the child and parent (N=3); and demographic questions related to the age of child and parent, sex of the child and parent, socioeconomic status and current working status of the family (N=14).

The ECOH was completed following recruitment and consent and repeated by participants at the end of the study (i.e., at the 12 month well child care visit, for those children enrolled at the 6 months of age well child care visit or at the 15 month well child care visit for those children enrolled at the 9 month of age well child care visit).

Qualitative experience of parents (Intervention Group)

Following the completion of the final ECOH questionnaire the intervention group responded to a four open-ended questionnaire in writing in an attempt to determine parent’s personal assessment of the oral health knowledge gained during the visits as well as identifying what they identified as most and least helpful by participating in the enhanced oral health promotion visits.

Statistical Analysis

Quantitative data analyses utilized both SPSS®, version 20, and SAS® software programs [19,20]. Bi-variate analysis using descriptive statistics for nominal variables, Fisher’s exact test for count data, as well as the generalized mixed effect model through the PROC GENMOD procedure in SAS® were used for examining the differences between the parent’s oral health beliefs and behaviors before and after their child received two standard oral care visits during their well child care visits and two enhanced oral health promotion visits, the differences between the oral health beliefs and behaviors before and after two standard oral care visits for the control group and the differences between the intervention and control groups.

The fourth study aim was to describe the qualitative experiences of the parents who participated in the enhanced oral health promotion visits. Content analysis was used to explore the subjects’ responses to the four open-ended questions asked before their final well child care visit with standard oral health care was completed.

Results

The overall purpose of this study was to test the impact of oral health promotion visits in a primary care practice on parental beliefs about oral health and parental oral health behaviors for their children 6 to 15 months of age. The demographic characteristics for the intervention group and control group were compared using SPSS® version 20. There were no statistically significant differences found between the intervention group (N=44) and control group (N=40) based on the responses to the ECOH questionnaire from the 84

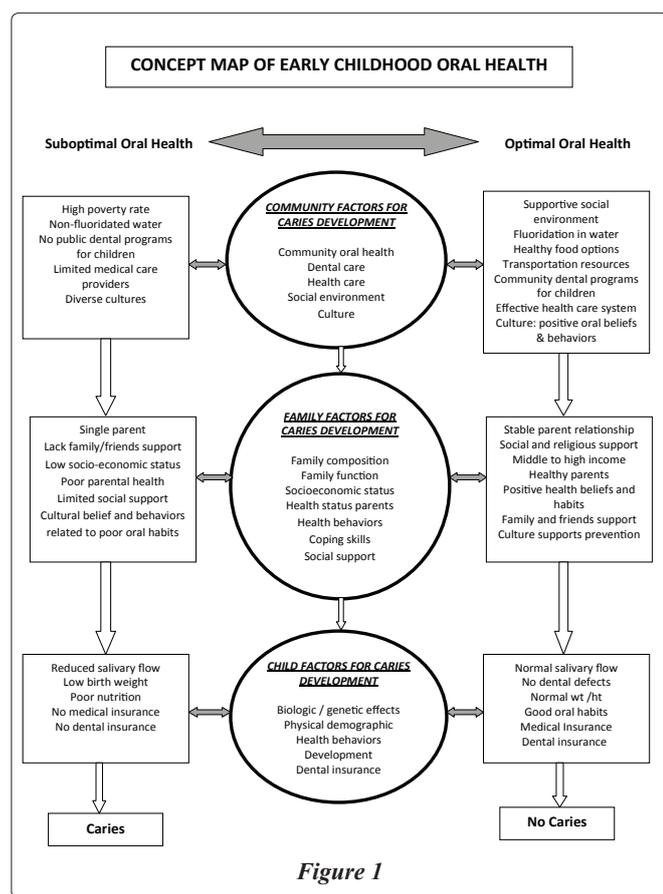


Figure 1

participants that completed the study.

The study results revealed improvements in parents' oral health beliefs and behaviors over the relatively short time frame of approximately 6 to 9 months (*Table 1*). Analysis in both groups indicated significant changes in parents' perception of the importance of oral care for their children's primary teeth compared to general health ($p < 0.05$), responses to whether they were brushing their children's teeth ($p < 0.0001$), confidence in brushing their children's teeth ($p < 0.05$) and frequency of brushing ($p < 0.0001$). While behaviors related to the care of teeth changed, there was no significant change over time in any of the feeding behaviors reported by the parents.

A total of 37 participants in the intervention group chose to complete the open-ended questions that focused on their experiences while participating in the enhanced oral health promotion visits. These responses were analyzed using a content analysis approach. Main categories were identified as valuable information learned about oral health care, oral health skills learned for better oral health for their children and value of oral health incentives for the participants and their children. Specifically, the participants identified important aspects of the intervention including oral health techniques (brushing) they were taught, importance of proper oral health care for their children at an early age and incentives (toothbrushes and cup) they received while participating in the enhanced oral health promotion visits.

The main limitation of the study was its small sample size which can fail to detect clinically significant differences and result in type II errors.

Discussion

Oral health continues to be a major public health issue, particularly for low-income populations. Parental knowledge about proper oral health care and the importance of the child's primary teeth are factors known to improve a child's oral health outcomes. In the current study, the oral health care education provided to the parents was associated with positive changes in their beliefs about their children's oral health care as well as positive changes in parental oral health behaviors in both the control and intervention groups over time.

Dietary practices are known contributors to caries development. In this study, despite education provided to

parents regarding the relationship between eating and drinking and the development of caries, there were limited changes in parents' feeding habits for their children. These results indicate that parents may require additional education about the risks of children's intake of sugary fluids and snacks, as well as being provided with alternative choices for their young children who still require frequent feedings and fluid intake throughout the day based on the child's individual growth and development.

Despite the small sample size, the current study was able to develop meaningful new knowledge about oral health care in a relatively short period of time (17 months). It appears the concept of brushing teeth and the beneficial effects was an easy concept to grasp for parents. Toothbrushes as an incentive may have had a positive effect on parental behavior over time. Importantly, the results indicated that additional oral health visits were not needed to achieve this level of success, with virtually all parents found to be brushing their children's teeth by the ages of 12 or 15 months.

It would be beneficial to replicate this study using a larger sample size in order to confirm the current results. It would also be interesting to re-examine the participants in this study in one to two years to determine: (a) if parental oral beliefs and behaviors have remained constant or changed; (b) to measure whether or not the children in the study are caries free; (c) to determine if the parents are currently seeking professional dental care for their children; and (d) to determine if the children in the original study have assumed responsibility for their oral health as evidenced by reduced sugar intake and regular tooth brushing with fluoridated toothpaste.

The results of this small but important study indicate that pediatric primary care providers that initiate oral health promotion programs, during scheduled well child care visits, can positively impact parents' beliefs about the oral health needs of their children and change behaviors about actively participating in the oral health of their children. Children are often seen 8 to 9 times for well child visits in the first 2 years of life which provides an open opportunity to discuss oral health in a setting that is trusted and known to the family. Based on the results, showing no significant differences between changes in the control and intervention group, there is no justification for families to return for additional enhanced oral health visits which may in fact cost them additional time as well as money.

Due to the undersupply of dental providers, primary care providers should act to implement these programs. The limited time required to perform standard oral health care, the potential economic benefit to the practice, and satisfaction of impacting children's oral health are important reasons to increase the number of programs in the U.S. and internationally.

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Table 1. Changes in Parents Perception of Oral Status and Confidence in Care.

	(I)	(C)
<i>Perception of Oral Status and Care</i>		
Importance of primary care teeth compared to permanent teeth	0.1128	0.9344
Importance of oral care of primary care teeth compared to general health needs	0.0043*	0.0476*
Importance of oral care of permanent teeth compared to general health needs	0.6810	0.1665
<i>Confidence in Oral Care</i>		
I don't know how to brush my child's teeth properly	0.0404*	0.0266*
I don't have time to brush my child's teeth twice a day	0.0655	0.0703
I can't make our child brush their teeth twice a day	0.0512	0.0972

(I): Intervention Group (C): Control Group * $p < 0.05$

participated in the study.

References

1. U.S. Department of Health and Human Services. *Oral Health in America: A Report of the Surgeon General*. 2000.
2. Douglass J, Douglass A, Silk H. A practical guide to infant oral health. *American Family Physician*. 2004; **70**: 2113-2120.
3. Bagramian RA, Garcia-Godoy F, Volpe AR. The global increase in dental caries. A pending public health crisis. *American Journal of Dentistry*. 2009; **22**: 3-8.
4. Krol D. Dental caries, oral health and pediatricians. *Current Problems in Pediatric and Adolescent Health Care*. 2003; **33**: 253-270.
5. U.S. Department of Health and Human Services. Office of Disease Prevention and Health Promotion. *Healthy People 2020*; 2010: Washington, DC, USA.
6. de la Fuente-Hernandez J, Acosta-Gio E. The effects of poverty on access to oral health care. *Journal of American Dental Association*. 2007; **138**: 1443-1445.
7. Locker D. Deprivation and oral health: a review. *Community Dentistry and Oral Epidemiology* 2000; **28**: 161-169.
8. Passel J. Demographic and social trends affecting the health of children in the United States. *Ambulatory Pediatrics*. 2002; **2**: 169-179.
9. Harris R, Nicoll AD, Adair PM, Pine CM. Risk factors for dental caries in young children: A systematic review of the literature. *Community Dental Health*. 2004; **21**: 71-85.
10. Crall J. Access to oral health care: professional and societal considerations. *Journal of Dental Education*. 2006; **20**: 1133-1138.
11. Edelstein BL. Disparities in oral health and access to care: findings of national surveys. *Ambulatory Pediatrics*. 2002; **2**: 141-147.
12. Kenney G, Ko G, Ormond B. Gaps in prevention and treatment: Dental care for low income children. Washington, DC: The Urban Institute, National Survey of American's Families, Series B. No. B1-15.
13. Kenney G, McFeeters J, Yee J. Preventive dental care and unmet dental needs among low-income children. *American Journal of Public Health*. 2005; **95**: 1360-1366.
14. Seale N, Casamassimo P. Access to dental care for children in the United States: A survey of general practitioners. *Journal of American Dental Association*. 2003; **138**: 1630-1640.
15. American Academy of Pediatrics Policy Statement. Oral health risk assessment timing and establishment of the dental home. *Pediatrics* 2003; **111**: 1113-1116
16. Stewart R, Hale K. The paradigm shift in the etiology, prevention and management of dental caries: Its effect on the practice of clinical dentistry. *Journal of California Dental Association*. 2003; **31**: 1-8.
17. Mohebbi SZ, Virtanen JI, Vahid-Golpayegani M, Vehkalahti MM. A cluster randomized trial of effectiveness of educational intervention in primary health care on early childhood caries. *Caries Research*. 2009; **43**:110-118.
18. Mattheus DJ. Vulnerability related to oral health in early childhood: A concept analysis. *Journal of Advanced Nursing*. 2010; **66**: 2116–2125.
19. Statistical Software: SAS 9.3. 2011. Cary, NC: SAS Institute Inc.
20. IBM Corp. 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.