

# Effectiveness of a Basic Training Presentation on Infant Oral Health Care for Pediatric Medicine Residents

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**Objective:** We hypothesize that viewing educational presentation with video will provide pediatric medicine residents with instructive information on infant oral health. Therefore, the aim of this study was to evaluate an infant oral health education program targeting University of Nebraska Medical Center (UNMC) pediatric medicine residents.

**Methods:** Assessment of 32 pediatric medicine residents in the form of a questionnaire was completed immediately before and after a 60 minute educational intervention. The intervention was in the form of a PowerPoint presentation and video of infant oral health for health care providers. The 16-questions (True/false/don't know or multiple choice) questionnaire was based on the information presented in the lecture and video. **Results:** There was a significant difference between the pre-test and post-test scores ( $p$ -value  $<0.001$ ). The mean score on the pre-test was 10.09 out of 16 (63%) and the mean score on the post-test was 13.3 out of 16 (83%). There was no significant correlation between age, gender, or year of residency training with pre or post-test scores. Twenty-five (78.1%) reported themselves "very likely" to use the information. **Conclusions:** A one hour Power Point and video educational intervention was effective in teaching pediatric medicine residents basic information on infant oral health.

**Keywords:** infant oral health, early childhood caries, dental education, preventive dentistry  
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## INTRODUCTION

Studies from the Centers for Disease Control and Prevention (CDC) and the National Institutes of Health (NIH) have shown the prevalence, seriousness and societal cost of early childhood caries (ECC) has increased, despite declining caries in school age children.<sup>1</sup> Although

early childhood caries is preventable, more than 50% of children have caries by the time they reach kindergarten.<sup>2</sup> This disease affects the general population but is 32 times more likely to occur in infants who are of low socioeconomic status, whose mothers have a low education level, and who consume sugary foods.<sup>3</sup> The American Academy of Pediatric Dentistry (AAPD) recognizes that infant oral health is the foundation upon which preventive education and dental care must be built to enhance the opportunity for a lifetime free from preventable oral disease.<sup>4</sup> The AAPD encourages parents and other care providers to help every child establish a dental home by 12 months of age.<sup>5</sup> The American Academy of Pediatrics (AAP) recognizes that early childhood dental caries emerges within all cultural and economic pediatric populations; however, it approaches epidemic proportions in populations with low socioeconomic status.<sup>6</sup> The AAP supports that pediatricians and pediatric health care professionals should develop the knowledge base to perform oral health risk assessments on all patients beginning at 6 months of age.<sup>6</sup> Patients who have been determined to be at risk of development of dental caries or who fall into recognized risk groups should be directed to establish a dental home 6 months after the first tooth erupts or by one year of age (whichever comes first).<sup>5</sup> The AAPD encourages both dental and non-dental health care providers to use the Caries-Risk Assessment Tool (CAT) in the care of infants, children and adolescents and to provide basic preventative counseling; and recommends that non-dental health care providers refer

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all children, especially those at moderate or high risk, to a dentist for oral health care.<sup>7</sup>

Since physicians, nurses and other health care professionals are far more likely to see new mothers and infants than are dentists, it is essential that they be aware of the infectious patho-physiology and associated risk factors of ECC and make appropriate decisions regarding timely and effective intervention.<sup>8-10</sup> Therefore, all primary health care professionals who serve mothers and infants could provide parent/caregiver education on the etiology and prevention of ECC. By training primary health care professionals such as pediatricians on basic information regarding recognition of, prevention of and referral for ECC their ability to diagnose and refer patients to an appropriate dental home would be greatly enhanced. Also, they will be able to better provide guidance and prevention information to their patient's parents. Education provided during residency training, before practice patterns have become rigidly established, has been successful.<sup>11,12</sup> One study concluded that after two hours of training in infant oral health, the pediatric primary care providers were unable to identify caries at the tooth level, but were adequately successful at the patient level, and competent in the need for referral.<sup>2</sup> Investigators concluded that an infant oral health education program can improve physicians' oral health knowledge and behaviors, particularly regarding promoting the age one dental visit.<sup>13</sup> One potential barrier reported was developing the curriculum.<sup>14,15</sup> We hypothesize that viewing a concise, educational presentation with video will provide pediatric residents with instructive information and a targeted approach to infant oral health care and anticipatory guidance. Therefore, the aim of this study was to evaluate an infant oral health education program targeting UNMC pediatric medicine residents.

### METHODS

This research project has been approved by the IRB and all pediatric medicine residents who participate were given the "Rights of Research Patients" information and completed the appropriate IRB consent forms. The study involved training UNMC Pediatric medicine residents about infant oral health care and assessing their knowledge before and after the training in a nonequivalent control group design. Participants were given an assessment in the form of a questionnaire, which they completed immediately before and after the introduction of an educational intervention. The educational presentation took approximately 45 minutes, followed by a 15 minute question and answer session. For participating in the study, pediatric medicine residents received a folder containing information on infant oral health and a 10 dollar gift card.

The authors used AAPD guidelines to develop and produce an educational intervention using PowerPoint and instructional video. The presentation provides an informative and concise representation of infant oral health for health care professionals designed to instruct pediatric medicine residents in how to perform an infant oral screening, how to identify infants at increased risk for oral health prob-

lems, how and when to obtain appropriate referrals to oral health professionals, and how to provide parents with appropriate anticipatory guidance. The topics covered include: how to perform an infant oral health exam, what to look for in an infant oral health exam, how to recognize incipient and gross carious lesions, when to obtain referrals for oral health, timing of the first dental visit, periodicity of dental screenings, appropriate use of fluoride supplementation and emergency care for infant oral trauma. In addition, the presentation reviewed anticipatory guidance on appropriate feeding and proper oral hygiene for infants.

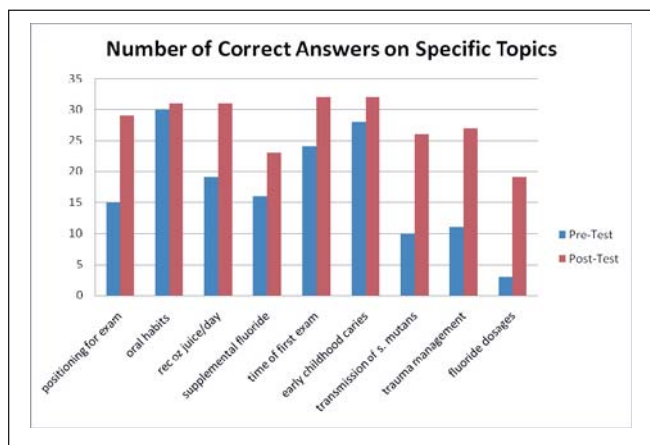
A 16-item (True/False/Don't Know and multiple choice) questionnaire based on information presented in the lecture and video was designed to assess residents' knowledge of these important aspects of infant oral health. The questionnaire was given immediately before and after the educational intervention. The pretest questionnaire included the following demographic information to describe the residents participating in the study: respondents' sex, residency year, and if they have had any formal or informal training in infant oral exam prior to the presentation. The post test included three questions to evaluate residents' opinion of the importance and the usefulness of the presentation in expanding their knowledge of infant oral health.

Statistical differences between individual scores and total scores on the knowledge-based questionnaire were evaluated by comparing correct answers of post-pre test score difference using a paired t-test. "Don't know" or blank responses were scored as incorrect. An analysis of covariance was completed to examine differences in knowledge and potentially confounding factors including age, sex, residency year and extent of previous training.

### RESULTS

Of the 49 UNMC pediatric residents, 32 were able to participate in the study. Residents unable to participate were on rotation or doing externships outside of Omaha. There were 21 (65.6%) females and 11 (34.4%) males in the study. Eight (25%) were in their first year of residency, 13 (40.6%) in their second year, 9 (28.1%) in their third and 2 (6.2%) were in their fourth year of residency training. The average age was 30.2 (SD 3.26) years (range 26-41 years). Only 5 (15.6%) reported any training in infant oral health, formal or informal, 27 (84.4%) had no training. The average score on the pre-test was 10.09 out of 16 (SD 1.65), which increased to 13.31 out of 16 (SD 1.84) on the post test. This difference was significant ( $p$ -value  $<0.001$ ). Study participants scored very well on questions regarding causes of caries and possible complications and outcomes of caries. They scored poorly, however, on questions about when children need fluoride supplements and correct dosages for fluoride supplements (Figure 1).

Correlation statistics were run to determine if there were any significant correlations between age, year in residency, gender and previous training in infant oral health to scores on pre and post tests. None of these showed significant correlations. Thirty two (100%) of study participants found the



**Figure 1.** The number of correct answers on specific topics

information useful, and 29 (90.6%) were very satisfied with the presentation. Twenty five (78.1%) reported they were very likely to incorporate this information into their daily practice and 7 (21.9%) said they would be somewhat likely to use the information given; no participants said this would not affect the way they practice. Of the 3 (9.4%) participants who said they would like to make any changes, 2 said they wish the presentation had been longer and provided more information, and 1 said they would have preferred hands on training.

## DISCUSSION

The Surgeon General's report on oral health called for improved education about oral health, a renewed understanding of relationships between oral health and overall health, and an interdisciplinary approach to oral health involving primary care providers.<sup>1</sup> Infant oral health promotion in physicians' offices can improve children's dental health by reducing the risk of development and progression of caries and ensuring that dental treatment is initiated before the disease becomes extensive. Educating the physician, however, is a necessary pre-requisite. The lack of oral health education in medical school and residency curricula has been well documented.<sup>8,16-18</sup> Furthermore, delivering effective education after completion of residency training is challenging, as evidence suggests that traditional didactic continuing medical education does not improve physician performance.<sup>19</sup> Two important areas where primary health care providers can contribute to improving oral health in children are by encouraging parents to find a dental home (and make appropriate referral to one if necessary) and by giving parents appropriate anticipatory guidance. This study aimed to evaluate an infant oral health education program targeting University of Nebraska Medical Center (UNMC) pediatric medicine residents. This study demonstrated that more training for medical professionals needs to be done for infant oral health. Twenty-nine (90.6%) reported they were "very satisfied" with the presentation, demonstrating that basic, vital information about infant oral health can be presented effectively in under an hour of training. Only 15.6%

of study participants reported any training, formal or informal in infant oral health. However, all study participants reported the information useful and the vast majority said it would make a major impact in their daily practice activities.

The dental home is the ongoing relationship between the dentist and the patient, inclusive of all aspects of oral health care delivered in a comprehensive, continuously accessible, coordinated and family-centered way.<sup>4</sup> Establishment of a dental home begins no later than 12 months of age and includes referral to dental specialists when appropriate.<sup>5</sup> Anticipatory guidance is the process of providing practical, developmentally-appropriate information about children's health to prepare parents for the significant physical, emotional and psychological milestones. This includes appropriate discussion and counseling at each dental visit for topics such as oral hygiene, dietary habits, injury prevention, non-nutritive habits, substance abuse, and speech and language assessment.<sup>7</sup> Anticipatory guidance is tailored for each child and parents' specific needs and risk factors. It is typically provided as one-on-one counseling which can be very persuasive in helping parents to change inappropriate habits. This study educated pediatric medicine residents in infant oral health, establishment of dental home and anticipatory guidance. As expected, scores on the post-test increased 32% over baseline. However, further studies are needed to determine if this knowledge is retained long-term. On both the pre-test and post-test, subjects scored best on questions about the causes of caries, bottle use and possible complications caused by caries. This is possibly because this is the information they are confronted with in their daily clinical care. Subjects scored less well on questions about care for infant oral trauma and prescribing fluoride supplements. Family Medicine residency program directors reported lack of knowledge of preventive dental procedures and oral health care recommendations.<sup>14</sup> Preventive dental procedures is also important information for pediatric residents because pediatricians prescribing vitamin supplements may be over or under prescribing fluoride supplements if they do not know the dosage guidelines. Children without dental homes are likely to go to their pediatrician for any oral trauma and knowledge for proper management or referral is also important. Furthermore, parents are likely to ask about these topics at health care maintenance appointments. Surprisingly, there was no significant correlation between past training in infant oral health and scores on the pre or post tests. This could be because of the small number who reported training and the inability to specify the type of training.

Many pediatricians seem to sense the importance of oral health, and although they may lack significant knowledge, 74% expressed a willingness to begin fluoride varnish applications in their practices.<sup>8</sup> Even though physicians believe they should provide dental screening for children, the majority do not screen for early tooth decay, an important indicator of future caries risk.<sup>17</sup> This study showed that instruction in infant oral health was effective in improving pediatric residents' knowledge. A similar study evaluated the effectiveness of an oral health educational program that included

didactic sessions, hands-on instruction by pediatric dentists and residents and preventive dentistry prompts to increase proficiency of pediatric residents in oral health concluded that instruction in oral health was effective in improving pediatric residents' knowledge about oral health, their confidence in providing oral health services, and the delivery of these services in their ambulatory care practices.<sup>20</sup> However, opinions regarding the importance of oral health in their daily clinical care improved only slightly.<sup>20</sup> Our research produced similar results, but residents' reported an increased recognition of the importance of infant oral health in their clinical practice. There is great need for increased collaboration between medical and dental professionals to help train pediatric health care professionals about infant oral health. There are several limitations for this study which merit further research. Only a small group of residents in one program participated in this study; it remains to be seen if the results can be generalized to a larger group. Also, this study was completed in one sitting and a long term follow-up must be completed to determine permanent changes in practice habits. Ideally this change would be tracked through training and after. Finally, all data collected in this study was by self-reporting. Residents may or may not have answered questions about practice habits and oral health values honestly. Follow-up studies should also determine if this is the best delivery method for the information and possible delivery method dependent differences in information retention and practice changes.

### CONCLUSIONS

This study demonstrated the effectiveness of a PowerPoint and video presentation to train pediatric medicine residents in basic information on infant oral health. Study participants reported great interest, a gain in knowledge and that this information will change their daily practice activities in infant oral health. More research should be done on how to best deliver information on infant oral health to pediatric residents and long term retention of the information.

### ACKNOWLEDGEMENT

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