Assessment of an Infant Oral Health Education Program on Resident Physician Knowledge

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ABSTRACT

Purpose: The purpose of this study was to implement and evaluate the effect of an early childhood oral health education program given to physician residents at Columbia University Medical Center, New York City. It was hypothesized that a short training program in infant oral health would improve the oral health knowledge base of these future physicians and promote the age 1 dental visit.

Methods: A sample size of 92 physician residents participated in this study. A 1-hour seminar describing common dental findings, including poor oral hygiene and early childhood caries (ECC), was presented, and an identical 14 question pre- and post-test were completed. The pre- and post-tests were administered to all participants, and statistical differences between pre- and post-tests were calculated using a paired \( t \) test \( (P<.05) \) and SAS 9.1 statistical software.

Results: There was an average of 77% correct responses on the pre-test and 90% correct responses following instruction \( (n=92, P<.001) \), with a mean improvement in the scores of 2 questions on the post-test. There was a significant improvement in the knowledge base of residents on topics related to ECC and its prevention and fluorides.

Conclusion: A 1-hour seminar resulted in significantly improved post-test scores for physician residents about infant oral health. \( \text{(J Dent Child 2012;79(2):49-52)} \)

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Oral health is an integral component of the overall general health of children.\(^1\) The increased accessibility of successful preventive measures, such as fluorides, has led many to believe that children no longer suffer from oral health problems.\(^2\) Unfortunately, dental caries remains the most common chronic disease of childhood and can have detrimental effects on growth and development when the disease is severe.\(^3\) Between 1999 and 2002, 41% of 2- to 11-year-olds had dental caries in their primary teeth\(^4\) and as many as 2.5 million 2- to 5-year-olds had untreated tooth decay.\(^5\) As dental disease continues to be a serious problem, low-income and minority children suffer disproportionately from dental caries and have additional barriers, such as limited access to dental services.\(^6\)

To promote early detection of dental caries and the establishment of a dental home, both the American Academy of Pediatrics (AAP) and American Academy of Pediatric Dentistry recommend the first dental visit by 1 year old.\(^5,6\) National data suggest, however, that few children have received this suggested preventive care. Only 26% of 3- to 4-year-olds received recommended dental visits, while 80% received recommended medical well child visits.\(^7,8\) Further, approximately 90% of poor children have a regular source of medical care, while only 22% of children younger than 6 years old receive dental treatment.\(^9\) Because most children have early exposure to medical but not dental services, primary care physicians have a unique opportunity to be instrumental in helping at-risk children gain necessary access to dental treatment.\(^7\)

Unlike dentists, primary care physicians see a large percentage of children during their infant and toddler years and can play an important role in the prevention and control of early childhood caries (ECC) because...
of their access to this population. Despite 90% of physicians in a national survey reporting that dental counseling and examinations should be part of the well child visit, 50% reported having no previous dental health education in medical school or residency, and only 9% correctly answered questions on infant oral health. Additionally, most physicians in one study did not screen for ECC, an important precursor to future disease.

While enhancing involvement of primary care medical providers is essential to increasing access to dental care for all children and improving their oral and overall health, physician education is required. Studies report that providing education after the completion of a residency is challenging, while education provided during residency training, before practice patterns are established, is successful. Dental education during medical training programs is limited and deserves more attention than it currently receives.

The purpose of this study was to evaluate the knowledge of Columbia University Medical Center (CUMC) physician residents before and after an infant oral health seminar. It was hypothesized that even a short training program in infant oral health would improve the oral health knowledge base of these future physicians and promote the age 1 dental visit.

**METHODS**

This research was reviewed and approved by the Columbia University Institutional Review Board (IRB-AAAD8253). The aim was to include all pediatric and family medicine residents regardless of program year at CUMC in the study. The participation in the study was voluntary, and no compensation was provided to the participants. The study included all pediatric and family medicine residents who presented for their block rotations at the pediatric medicine clinic. A 1-hour power point presentation on infant oral health was presented to these residents. A 14-question pre-test was administered prior to the presentation and an identical post-test was administered after the presentation.

The presentation focused on the role of the physician in the early detection of caries; consequences of ECC; signs of ECC focusing on white spot lesions and when to refer; benefits and sources of fluoride; fluorosis; use of fluoride varnish; screening methods, including knee-to-knee examination; anticipatory guidance; oral hygiene and feeding practices; maternal screening; and establishment of a dental home by 1 year old.

The questionnaire consisted of 14 multiple choice questions and tested: areas of ECC and its sequelae; etiology; high-risk groups; the rationale why physicians should perform oral health risk assessments; methods and components of oral health risk assessment; sources of fluoride; fluorosis and its risk factors; feeding and oral hygiene methods; and components of anticipatory guidance. The statistical difference between pre-test and post-test was calculated using a paired t test and SAS 9.1 statistical software (SAS Institute Inc, Cary, NC), with P<.05 considered statistically significant.

**RESULTS**

A total of ninety-two residents completed both the pre- and post-test and were included in the study. Of the 92 study participants, 80 were pediatric residents and 12 were family medicine residents. Data collection was anonymous, and no record of name, sex, or age of the participant was made during the study. Correct responses averaged 77% for the pre-test and 90% for the post-test. The average score on the pre-test was 10.7±1.6 and 12.6±1.1 on the post-test with a mean improvement in score of two questions in the post-test (P<.001).

Table 1 presents each topic area and relevant questions and shows the percentage of residents who were able to correctly answer the questions before and after the seminar. Eighty-four percent of the resident cohort was scored correct with regards to the consequences of untreated dental disease. Further, a large percentage of residents were scored correct with regards to *Streptococcus mutans* (88%) and frequency of sugar consumption (85%) on the pre-test. Ninety-nine percent of residents were able to identify high-risk groups for caries appropriately and were able to provide the rationale of oral health risk assessment for pediatricians in their pre-test, while, 71% of the resident cohort correctly answered the

<table>
<thead>
<tr>
<th>Table 1. Individual Questions Within Each Topic Area and the Improvement from Pre-test to Post-test (% of Residents)</th>
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<tbody>
<tr>
<td>Early childhood caries</td>
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<tr>
<td>Sequelae of untreated dental disease</td>
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<tr>
<td>Etiology</td>
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<td><em>Streptococcus mutans</em> is the most common infecting agent and can be vertically transmitted</td>
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<td>Frequency of sugar consumption increases risk</td>
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<td>High-risk groups</td>
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<td>Screening</td>
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<td>Rationale for physicians incorporating oral health risk assessment into practice</td>
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<td>Method for performing oral health risk assessment</td>
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<td>Components of American Academy of Pediatrics oral health risk assessment</td>
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<td>Fluoride</td>
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<td>Sources of fluoride</td>
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<td>Fluorosis causes and risk factors</td>
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<td>Prevention</td>
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<td>Importance of oral hygiene following night feedings</td>
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<td>Optimal oral hygiene methods</td>
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<td>Anticipatory guidance</td>
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<td>Components of anticipatory guidance</td>
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<td>Education of parent to reduce risk of infection</td>
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question regarding the etiology of the dental caries process.

A large majority of the participants demonstrated via correct answers preliminary knowledge in the rationale for physicians incorporating oral health risk assessment into practice (99%), methods for performing an oral health risk assessment (92%), and the components of oral health risk assessment (83%), as the average for the questions concerning these topics only changed from 91% in the pre-test to 93% in the post-test (Figure 1).

Initially, 57% of study participants correctly identified sources of fluoride and 18% accurately responded to questions relating to fluorosis, and fluorosis’ risk factors. The percentage of accurate responses relating to fluorosis increased significantly to 54% on the post-test. Overall, 38% of residents were able to answer questions related to fluorides correctly on the pre-test, which improved to an average of 77% correct answers in the post-test.

Sixty percent of the residents were able to answer correctly on the pre-test about topics related to prevention, such as the importance of night feedings (86%) and optimal oral hygiene methods (35%). Answers regarding optimal oral hygiene methods improved to 72% and a mean improvement of 79% after the seminar. There was a significant difference noted in the topics related to ECC, fluoride, and prevention. Although a few topics, like anticipatory guidance and screening, did not show a statistically significant difference.

**DISCUSSION**

Current oral health education for physicians is limited.
There were some limitations to this study. First, physician residents may have been in different stages of their specialty training. There were a total of 80 pediatric residents and 12 family medicine residents. Some participants may have been exposed to this information in the past, which may add some bias. It is also maybe interesting to explore further instruction, testing, and follow-up testing based on program year.

Second, although immediate improvements were demonstrated following the presentation, this study was unable to determine if knowledge was retained. The purpose of this study was not to determine if an hour of training in early childhood oral health was sufficient, but whether physicians could benefit from oral health education in their residency programs. Participants performed well with the limited education they received, and it can be speculated that further improvements could be gained if supplementary instruction was provided. It can also be theorized that physicians who are educated on oral health and dental disease would be more likely to promote the age 1 dental visit and be more comfortable in providing anticipatory guidance.

Establishing collaborative relationships between primary care physicians and dentists is crucial to increasing access to dental care for children and improving their dental and general health. Some barriers, however, may prevent primary care practitioner involvement in oral health. Many physicians are unaware of the importance of oral health to overall health, and because physicians have a demanding schedule, oral health may not be a high priority, even in well-child care. An oral health screening may be viewed as just another element to accomplish in an already long list of to-dos. To overcome obstacles in the medical-dental partnership, it should be emphasized that oral health information can be integrated into areas that primary care physicians already focus on, including nutritional/feeding practices, fluoride needs, and anticipatory guidance. Dental caries is a consequential disease that affects the pediatric population with such frequency that it is essential for physicians to incorporate oral health into their daily practice, despite any barriers that may exist.

CONCLUSIONS

Based on this study’s results, the following conclusions can be made:

1. There was improvement in the physician residents’ knowledge immediately following the presentation.
2. There were significant improvements in post-test scores in the areas of fluorides, ECC and prevention.

ACKNOWLEDGMENT

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REFERENCES