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General Dentists' Role in providing care to very young children:Pediatric Dentists' Perspective

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General Dentists' Role in Providing Care to Very Young Children: Pediatric Dentists' Perspective

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Dentistry at Virginia Commonwealth University.

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Abstract

GENERAL DENTIST'S ROLE IN TREATING CHILDREN 0-3 YEARS OLD: PEDIATRIC DENTISTS' PERSPECTIVE

By Shinjni Razdan, DDS

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Dentistry at Virginia Commonwealth University.

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To examine the pediatric dentists' perspective on level of care to children 0-3 years old by general dentists, an electronic survey was sent out to 5185 AAPD members and 769 responded (response rate: 14.8%). Forty-six percent agreed with a general dentist providing a dental home to children 0-3 years old. Only 24% agreed that general dentists could perform complex restorative and behavior management procedures for 0-3 years old. Younger respondents, pediatric dentists who practice in rural areas or teaching pediatric dentistry, and those who perceived adequate exposure during dental school were more likely to agree on general dentists proving a dental home (p values ranged from <0.0001 to 0.022). This study finding can help guide what level of care general dentists may provide and when a referral to a pediatric dentist is recommended and the appropriate competency level of entry-level general dentists to care for 0-3 years old.

Introduction

Early Childhood Caries

As per the American Academy Of Pediatric Dentistry, caries is a biofilm (plaque) induced acid demineralization of enamel or dentin, mediated by saliva. Early Childhood caries (ECC) has been reported by the Centers for Disease Control and Prevention to be the most prevalent infectious disease among US children.[1] The disease of Early Childhood Caries (ECC) is the presence of 1 or more decayed (non cavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child 71 months of age or younger. In children younger than 3 years of age, any sign of smooth surface caries is indicative of severe early childhood caries (S-ECC). From age 3 through 5, 1 or more cavitated, missing (due to caries), or filled smooth surfaces in primary maxillary anterior teeth or a decayed, missing, or filled score of >4 (age 3), >5 (age 4), or >6 (age 5) surfaces constitutes S-ECC.[1] Dental caries is 5 times more common than asthma and 7 times more common than hay fever in children.[1]

There is strong evidence that children who experience ECC are much more likely to develop further dental problems as they get older. In addition, poor dental health affects the growth and cognitive development by interfering with nutrition, concentration and school participation.[2] Decay of the primary teeth can: (1) affect children's physical development, (2) lead to malocclusion and (3) result in significant pain and potentially life threatening facial swellings.[1]

Availability of dental care providers is a key problem for children from low–income families. As noted earlier, general dentists are often unwilling or unable to see young children because of the unique needs they represent; therefore, the care of preschool children is

essentially under the purview of pediatric dentists. There is a documented shortage of pediatric dentists nationwide; the care of children under 5 years of age in this country is in the hands of approximately 3,500 pediatric dentists or roughly one pediatric dentist to 5,648 children (US Census Bureau). Such a shortage creates high demand; there is little economic motivation for dentists to accept Medicaid patients or patients who are considered difficult to treat.[3]

Almost 3 times as many children lack dental insurance as lack medical insurance. Children from poor families who qualify for Medicaid are entitled to comprehensive oral health coverage through the program's Early Periodic Screening, Diagnostic, and Treatment benefit, yet are less likely to receive dental care than children from middle and upper income families, many of whom lack dental coverage.[12]

Factors contributing to inadequate dental access include geographic mal-distribution of clinicians; inadequate members of dentists treating Medicaid eligible children (only 10% of dentists participate nationwide); relatively few pediatric dentists (only 3500), who may be more likely to treat Medicaid children; individuals' knowledge and attitudes concerning oral health; and other difficulties reaching culturally diverse populations and problems intrinsic to Medicaid.[13]

Infant Oral Health And Dental Home

The persistent problem of ECC has spurred the dental profession to adopt the concept of the dental home. This concept was originally developed by the American Academy of Pediatrics (AAP), with the idea that medical care of infants, children, and adolescents ideally should be accessible, continuous, comprehensive, family centered, coordinated, compassionate and culturally effective.[1]

According to the American Academy of Pediatric Dentistry (AAPD), "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, continually accessible, coordinated, and family centered way. Establishment of a dental home begins no later than 12 months of age and includes referral to dental specialist when appropriate.[1] The goals of the early visit are to:

a) Establish a dental home for the infant
b) Prevent early Childhood caries (ECC)
c) Introduce healthy habits to build upon

This visit should include

a) An oral exam
b) Risk assessment
c) Anticipatory guidance

The dental home embraces the importance of early intervention with optimal preventive strategies chosen based on the risk of the patient and would encourage the first dental visit by approximately 1 year of age. Parents may welcome professional support and anticipatory guidance to ensure that their children have healthy mouths at this age. An important feature of a dental home is to provide anticipatory guidance to the parents so that they are aware of their children's growth and development, as well as possible risk factors that occur as children age. Anticipatory guidance provides a framework for practitioners and their staff members to periodically engage parents in conversations about the anticipated needs of the children. Another advantage of the dental home is that preventive intervention can be personalized to the needs of the child.[4]

It has been reported that earlier initial dental visits result in less decay and therefore decreased expenditures. A few studies have revealed the attitudes and practices of pediatric and general dentists regarding the age 1 dental visit. Erickson and Thomas (1997) reported that 73% of AAPD members agreed with the year 1 guideline, but only 47% put it in practice. Studies found that younger practitioners were more likely to agree with the guideline.

General Dentist Providing Dental Home To 0-3 Years Old

However, general dentists don't seem to be up to date on providing age 1 dental visit and dental home to very young children in terms of their knowledge, attitude, and practice. General dentists surveyed were less likely to recommend the year 1 dental visit. It has been noted that dental care is the highest unmet health need of American children.[5] Studies show that 2% of general dentists reported no children less than 3 years of age received treatment in their practice. A national study on general dentists found that only 15% feel that 12 months is an appropriate age for first dental visit. Nearly 70% did not treat children 6 to 18 months old while 28% did not treat children 19 months to 3 years. In Iowa, the percentage of dentists who felt that age 1 was an appropriate age for treatment was slightly higher at 26%, yet only 11% of Iowa children in a longitudinal study had received a dental exam by age 2.[6] McKnight–Hanes reported that 22% of general dentists reported no children less than 3 years of age-received treatment in their practice.[7]

General Dentists' Referral Of Children 0-3 Years Old To Pediatric Dentists

Parents choose pediatric or general dentists to provide dental care for their children. Differences in the dental care recommended for children by general and pediatric dentists have been reported

in areas such as radiographic recommendations, restorative treatment and behavior management techniques.[7]

While dentists with higher percentages of children in their practices were less likely to refer the children to a pediatric dentist, dentists with more children receiving public assistance were more likely to refer children.[8] Literature is contradictory regarding whether advanced training beyond dental school influences the likelihood of referring patients. Atchison and colleagues reported that referrals differed by procedure.[9] In contrast Seale and Casamassimo found that the percentage of children in practices did not differ among dentists who had received additional training compared with those who had not.[10]

Nearly 90% of general dentists who often or always refer children younger than age 3 and 67% of general dentists who never or sometimes refer children younger than age 3 often or always referred uncooperative children.[6]

General Dentists' And Children 0-3 Years Old: The Role Of Dental Education

Current Status of Dental Education to Pediatric Dentistry

Dental education plays a major role in shaping a general dentists' perspective in treating young children. General dentists who perceived that they had not received adequate exposure to children younger than age 3 while in dental school were 82% more likely to often or always refer, compared to general dentists who perceived that they had received adequate exposure.[6]

Access to dental care and oral health disparities have been linked to low socioeconomic status and cultural and ethnic barriers. In addition to these, some within the practicing

community suggest that lack of adequate preparation in dental school may be additional issue related to access to care.

Anecdotal information suggested that many factors might have influenced pediatric dentistry educational programs over the past twenty years. These factors include:

- A declining workforce of dental educators, resulting in difficulty filling faculty positions and impacting faculty-student ratios for clinical programs
- The collapse of departments of pediatric dentistry into larger divisions headed by individuals other than pediatric dentists.
- A change in epidemiology of dental caries in US children
- A decrease in severe caries in the patient populations seeking care in predoctoral pediatric dentistry dental school clinics and a resultant decrease in complexity of clinical procedures being performed by dental students during their training.
- Funding shortages in dental school
- The introduction of new, less specific and less prescriptive accreditation standards for dental education programs

Data suggests that departments are understaffed, and perhaps as a result, faculty other than pediatric dentists provide significant pediatric dentistry supervision to predoctoral dental students. This type of faculty supervision may also result in less complicated patient care, involving only basic behavior management techniques. There are fewer opportunities for dental students to practice treatment with very young child and to perform infant oral exams. As a result, the new general dentist is not adequately trained to feel comfortable and competent to treat the very young child.

On average, predoctoral pediatric dentistry programs teach students to treat children four years of age or older, who are generally well behaved and have low levels of caries. One out of four programs reported hands on educational experience with treatment of the very young, infant oral examinations and Atraumatic restorative treatment. Only 14% indicated all students received actual patient experiences with these procedures.[11]

Commission of dental accreditation

Dental school accreditation standards are very vague regarding pediatric dentistry education for the pre-doctoral program. **CODA** (commission of dental accreditation) does not have any definite guideline for pediatric dentistry for predoctoral education. It states "The system of patient care in which individual students or providers, examine and evaluate patients; develop and prescribe a treatment plan; perform the majority of care required, including care in several disciplines of dentistry; refer patients to recognized dental specialists as appropriate; and assume responsibility for ensuring through appropriate controls and monitoring that the patient has received total oral care." "Graduates must be competent in providing oral health care within the scope of general dentistry to patients in **all stages of life"**

Several studies found that dentists' willingness to treat children and special populations depends on the intensity of their educational experience.[12] During recent years, there have been increasing numbers of low-income preschool – aged children unable to obtain dental services. Experiences with preschool-aged children during dental school training may be one factor associated with general dentists' apparent reluctance to provide services to this age group. Circumstances are further complicated by the perception of general dentists that preschool aged children are a challenge due to behavior management problems and treatment needs differing

from an older population of children. Lack of experience with young children may be further complicated in schools with pediatric residencies, where the more difficult to manage children are referred to the residents.[13]

Cotton, et.al, found that general dentists with hands–on training in infant oral health were comfortable managing the behavior of young children and even enjoyed treating them.[14] Seale and Casamassimo found that dentists who had received hands-on training coupled with lectures during dental school were more likely to treat children 1 to 3 years old.[12]

Program directors have traditionally believed a frightened young child with extensive caries was not a good match for a frightened, inexperienced dental student. It is clear that the amount and quality of educational experience in dental school with children is only one issue affecting whether general dentists treat children in their practice. Issues such as personal preferences for areas of dentistry that do not primarily involve the treatment of children, and the fact that some people simply don't like to work with children, no matter how many experiences are provided, greatly influence the amount and type of care a general practitioner provides to children in their practice. It is clear that children under age 3 are less likely to find a dentist willing to provide treatment than are older children.[15]

Service Learning and Pediatric Dentistry

Service learning has been suggested to supplement predoctoral pediatric dentistry education and has the potential to alleviate some of these issues. A pilot study performed in the UK to determine the effect of a community dental service outreach teaching program on undergraduates' confidence to undertake a range of pediatric dental procedures found that students were more confident following their placement than previously.[16] A study by Seale,

et.al, also determined that the educational system has a shortage of faculty trained in the care of children and increasingly relies on general dentists to teach pediatric dentistry. The result is that dental students only receive experience with manageable children who have a low level of complexity.[11]

Similarly, a study of dental students at The Ohio State University College of Dentistry found that community-based dental clinical education provided students with a statistically significant increase in the number of procedures completed on the pediatric population, as well as an increase in the percentage of minority children treated. Researchers concluded that community-based dental clinical education enhanced pediatric predoctoral student clinical experience in both quantity and diversity.[17] Thus, the incorporation of service learning into dental school curriculum has the potential to not only positively affect dental students' perspectives on community engagement, but also increase their willingness to treat the pediatric population, for which there is an epidemic need. A community–based experience in pediatric dentistry, has the potential to supplement dental students' education experience.[12]

Purpose

The purpose of this study was to determine pediatric dentists' view of general dentists providing an age one dental visit and a dental home to 0-3 years old. This study also gauges the level of competency of entry-level general dentist to provide care to 0-3 years old.

Concept model

The concept model is a diagrammatic description of this research project. (Figure 1) shows a relationship between the general dentist and the pediatric dentist in providing dental home and

age 1 dental visit to 0-3 years old. This in turn will help in treating early childhood caries. The pediatric dentist can guide the general dentist in taking care of 0-3 years old and general dentists' in turn will know when to refer patients to pediatric dentists. Factors such pediatric dentists' age, gender, teaching experience, practice location and description, teaching experience, dental school education, percentage of patients referred and age group of patients referred helped in obtaining an opinion as to what pediatric dentists feel about a general dentist and entry level general dentist providing age 1 dental visit and dental home to 0-3 years old.

Methods

Research Question

1. Do you agree with a general dentist providing age 1 dental visit to 0-3 years old?
2. Do you agree with a general dentist providing dental home for 0-3 years old?

Hypothesis

The hypothesis of this study is a general dentist can provide anticipatory guidance to children 0-3 years and should refer for extensive dental treatment and that Dental school does not prepare an entry-level dentist to treat children 0-3 years.

Study Design

This study was a survey of members of American Academy Of Pediatric Dentistry. The VCU Office of Research approved this study in May 2014. AAPD roster was obtained. The survey was pre-tested for its validity and sent to residents and faculty of Pediatric Dentistry department at VCU. The survey was then sent out in June 2014- August 2014 to 5185 active members of AAPD. A couple reminder emails were sent to non-responders. 769 (15%) responses were received. This research was supported by Alexander fellowship grant.

The questionnaire was designed using Redcap software hosted at VCU. Recap (Research Data Capture) is a secure, web-based application designed to support data capture for research studies.[18]

Survey Instrument

The survey obtained information regarding the demographics (age and gender) of the respondents. Also whether the respondents taught pediatric dental residents and dental students at some point and whether that affected their attitude towards the general dentist providing age 1 dental visit and dental home. Practice location and description of practice, solo pediatric dentist versus group practice with other specialists was also determined. Respondents were asked about the inflow of patients from general dentists (% of referral and age group referred).

Importantly respondents were asked if dental school prepared them well enough to treat 0-3 years old. The questions further asked the respondents how strongly they agreed/disagreed with general dentist providing age 1 visit and also dental home to 0-3 years old. Survey asked questions about specific procedures (anticipatory guidance/sealants/atraumatic restorations/ simple restorations/complex restorations and behavior management ranging from nitrous oxide to general anesthesia that a general dentist and an entry-level dentist can perform according to the respondents.

The survey presented four case scenarios, which can be read in detail in the appendices. The purpose of these cases was to determine the comfort level of the respondents in a general dentist treating these cases and the best treatment option in that situation.

Variables

- Outcome variables
    1. How strongly do you agree/disagree with a general dentist providing age 1 dental visit (strongly agree = 1, agree = 2, disagree = 3, or strongly disagree = 4)

2. How strongly do you agree/disagree with a general dentist proving a dental home for a child 0-3 years old (strongly agree, agree, disagree, or strongly disagree).

- Predictable Variables
  1. Demographics
     - Gender (male or female)
     - Age (<25, >65 in years)
  2. Location and description of dental office
     - Location (urban, middle-small urban, suburban and rural)
     - Description (limited to pediatric dentistry, partner with general dentist or other specialty, combination of the above two, do not practice pediatric dentistry
  3. Taught dental students/ pediatric residents
     - Teaching dental students (yes or no)
     - Teaching pediatric dental residents (yes or no)
  4. Opinion of dental school preparation
     - Yes prepared well to care for children 0-3 years old.
     - No (Did not prepare well to care for children 0-3 years old.)

Statistical Analysis

Descriptive statistics and hypothesis tests were done using JMP software (SAS Institute Inc., Cary NC). Statistical testing using chi-square tests and ANOVA was performed. If significant, Tukey's multiple comparison procedure was done to identify group differences. A significance level of 0.05 was used.

Results

The results of the study will be shown in two sections, a description of the survey questions and the analyses comparing the independent variables and outcome variables.

Description of Respondents

There were 769 pediatric dentists who responded to the survey, out of 5185 who received the survey (response rate: 14.8%) The demographic characteristics of the respondents are summarized in Table 1. Out of 769 respondents 356 (47%) were female and 398 (53%) were male. The average age of the respondents was 45 years and the age ranged from 25 to 65. The five age groups have different agreement.

There were questions regarding the respondents experience in teaching Pediatric dentistry to Pediatric dental residents and dental students and their responses are summarized in Table 2. 55% never taught residents and 45% never taught dental students. 21% taught residents in the past but not currently and 35% taught dental students in the past but not currently. 16% were teaching resident's part time and 9% were teaching full time. 15% were teaching student's part time and 5% were teaching full time.

Table 3 shows an overview of respondent's practice location and description. 22% of respondents had practice in urban location, 23% in middle-small urban, 46% in suburban and 10% in rural location. 66% stated that all practitioners in their office were pediatric dentists, 27% had a mix of pediatric dentist, general dentist and other specialties.

Table 4 shows the patient referral from general dentists. 58% received 10% patient flow from general dentists, 27% received 30% patients, 10% received 50% patients, 3% received 70% and 2% received 90% patients. 95% received referral for children 0-3 years old. 98% received

for4-6 years old, 84% received 7-10 years old, 55% received 11-13 years old and 33% received 14 years old and above.

Respondents were asked their perception whether dental school prepared them to take care of 0-3 years old. 14% stated they felt prepared to treat 0-3 years old and 86% did not. This can be seen in Table 5. 86% who did not think that dental school prepared them to take care of 0-3 years old also disagreed that General dentist should provide an age 1 dental visit, p-value <0.0001 and that a general dentist cannot provide a dental home for the same age group, p-value <0.0001.

Table 6 shows the attitude of pediatric dentists towards general dentists providing care for a one year old and towards a general dentist providing a dental home. 58% respondents agreed that general dentists could provide an age 1 dental visit, 42% disagreed 56% agreed that the general dentist should provide a dental home for child 0-3 years and 44% disagreed.

Respondents were asked about the procedures that in their opinion a general dentist could perform on 0-3 years old. They were asked about procedures like exam, anticipatory guidance, prophylaxis, treatment plan, sealants, atraumatic restorative treatment, simple restorative with local anesthesia, complex restorative (SSC, pulpotomy) and behavior management (nitrous, oral sedation, general anesthesia) as long as they follow the AAPD guidelines. 83% stated that they could provide only do examinations, provide anticipatory guidance, prophylaxis and treatment plan. Seen in Table 7.

Respondents were asked about the procedures an entry-level general dentist can perform competently on 0-3 years old. 77% stated that they can provide only anticipatory guidance prophylaxis and treatment plan. See Table 8.

Respondents were asked about their opinion on general dentist's role in care for 0-3 year's old children. People had varied views but majority of the respondents believed that general dentists should provide anticipatory guidance and refer the patients to pediatric dentists. Many also believed that general dentist could treat children as long as they follow the AAPD guidelines. Respondents also believed that general dentists could help out in rural areas and places where there is a shortage of pediatric dentists.

Tables 9-12 are case scenarios, which are specific to patients and their condition. These cases reflect different treatment options like anticipatory guidance/sealants/simple restorative/complex restorative/behavior management.

Case 1 discusses a 3 years old healthy patient in a rural dental clinic with decalcifications on anterior teeth, which are not cavitated and not in pain. Patient has good oral hygiene and is high caries risk. Majority of respondents feel that general dentist can provide anticipatory guidance, fluoride and either observe those teeth (43%) or refer to pediatric dentist (43%).

Case 2 discusses similar patient who is anxious and would require behavior management. Majority of respondents (77%) feel that general dentist can provide anticipatory guidance and refer the patient to a pediatric dentist.

Case 3 discusses a 3 years old healthy patient with frank decay on #D,E,F,G and severe pain and abscess. Patient has poor oral hygiene and is seeing a dentist for the first time. Majority of the respondents (78%) feel that patient should be provided pain medication and antibiotics and referred to a pediatric dentist.

Case 4 discusses a one and half year old with Baume type 1 spacing. Patient goes to bed with a bottle of milk and parents don't use fluoride toothpaste. Majority of the

respondents (72%) feel that general dentist can provide anticipatory guidance and fluoride and see patient in 3-6 months for a risk-based recall.

In subsequent sections, we analyze the relationships between the demographic characteristics, teaching experience, practice set up, and dental school experience and these two attitudes.

Bivariate Analysis

Table 13 and Figure 2 shows the relationship between age and an age 1 dental visit and a dental home. There was no relationship between age and the attitude towards an age 1 dental visit ($P > 0.1$) but there was a relationship between age and dental home ($P = 0.0220$) Figure 3. Younger practitioners appear to have a lower mean where average score is "agree" than those in the other age ranges. However, the Tukey HSD multiple comparison procedure could not confirm which age groups were different from which other age groups.

Table 14 and Figure 4 shows the relationship between teaching experience and the level of agreement with general practitioners providing an age 1 dental visit and a dental home. There was a relationship between teaching pediatric residents and age 1 dental visit ($P< 0.0001$). Those currently teaching pediatric residents full time had a lower mean (higher agreement) than those teaching part time or not at all. That is, respondents who are currently teaching pediatric residents had a lower mean of 1.652 and seem to agree more than those who teach part time, mean score being 2.186, and also from those who do not teach at all. Those teaching part time agreed more than those who used to teach dental residents in the past. There was also a relationship between teaching dental students and age 1 dental visit ($P< 0.0001$). Practitioners who taught dental students appear to have a lower mean (1.500) compared to those who teach

part time or have never taught dental students, average score is "agree". The Tukey HSD confirms this group from being different than the others.

In this case, those who taught dental students full time agreed more than those who taught part time or never taught.

Figure 5 indicates there is also a relationship between teaching pediatric dental residents and dental home ($P<0.0001$). Respondents who teach full time had a lower mean (1.727) than the other three groups. Those that taught part time had a mean of 2.3 and were more likely to agree than those who used to teach. There was also a relationship between teaching dental students and dental home ($P < 0.0001$). Again, those currently teaching more agreed that general dentists could provide a dental home than the other three groups.

Table 15 and Figure 6 show the relationship between practice setup and age 1 dental visit. There was a significant relationship between practice location and age 1 dental visit ($P=0.0154$). Tukey's HSD procedure showed no significant difference between suburban and rural location with age one visit. Suburban and rural locations were also not different from any of the urban locations. Large urban location expressed more agreement than did middle-small urban and agreed more with age 1 dental visit. There is no statistically significant relationship between practice description and age 1 dental visit ($P >0.1$). There was statistically significant relationship between practice setup and dental home (Figure 7, $P=0.0035$). Tukey test showed that respondents in the rural practice location "agreed" more with dental home[18] compared to other locations. There is not statistical significance between practice description and age 1 dental visit ($P<0.1$).

There is statistical significance between those who felt their dental school training prepared them well to provide care to 0-3 years old and age 1 dental visit and dental home

(P<0.0001, Table 16, Figure 8, and Figure 9). The respondents that felt that dental school prepared them to treat 0-3 years old more strongly agreed that general dentist could provide age 1 dental visit and establish a dental home.

Discussion

Main Findings

Our study shows that younger respondents and recent graduates agreed more that a general dentist can provide age 1 dental visit and a dental home to 0-3 years old. This could be an indication that dental schools are now giving more exposure to dental students in treating younger children. Respondents who are teaching dental students and pediatric dental residents agreed more that a general dentist can provide age 1 dental visit and dental home to 0-3 years old, this could again be an indication of changing trends in teaching pediatric dentistry to dental students. Our study found out that majority of the respondents agreed that a general dentist could provide anticipatory guidance, sealants, ATR and simple restorative procedures as long as they follow the AAPD guidelines.

Our study also indicated that respondents in the rural practice location "agreed" more with age 1 dental visit compared to other locations, which could mean that there is a deficiency and a greater need of pediatric dentists in the area. Respondents who thought that dental school prepared them well, agreed more that a general dentist can provide age 1 dental visit and dental home to 0-3 years old. Pediatric dentists teaching pediatric dental residents and dental students agreed more that a general dentist could provide age 1 dental visit and dental home.

Comparison To Previous Research

Some of our study findings are consistent with studies done by McQuistan and Seale.Among general dentists who saw children younger than 2 years, the proportion who provided services beyond general examinations or preventive care decreased with complexity of treatment, which

was consistent with findings from other studies. Dental care providers who saw the youngest children (0-2 years) typically offered basic diagnostic services, including examinations, treatment planning and patient and parent education. However, pediatric dentists were significantly more likely than general dentists to offer preventive therapy and simple restorative treatment. They also were four times as likely to provide complex restorative treatment.[20]

Seal and Casamassimo have proposed that the disproportionate lack of dental education regarding specific demographic populations such as infants and patients with special needs is a factor in the decreased care of young children by general dentists.[17] Studies done in New York show that fewer than one half (47%) of general dentists saw patients aged 0-2 years, 45% restricted their practice to patients 3 years and older. 90% of general dentists did not see children younger than 6 years.

Studies have shown that nearly 50% of general dentists often or always referred children younger than age 3 to pediatric dentists. If health care professionals are going to recommend that caregivers take children to dentists by 12 months, there needs to be a substantial increase in the number of general dentists who are willing to accept young children into their practice.[6]

General dentists with hands-on training in infant oral health were more comfortable managing behavior of and enjoyed treating young children. Dentists who enjoy treating children are more likely to have properly equipped offices to treat them.[6]

Dentists who feel adequately trained in treating children during dental school are more likely to care for children in their practices. Nonetheless, dentists may currently be reluctant to care for children in private practice if they did not feel prepared to care for this group at graduation. Dental educators should consider the association between perceived exposure to very young children and the likelihood to refer when evaluation curricula. Additionally predoctoral

and continuing education initiatives should be developed to address dentists' reluctance to care for young children.

Additional training and access to consulting pediatric dentists were identified as potential facilitators to seeing additional young children. General dentists who saw patients 0-5 years were more likely to cite additional training as a facilitator than were general dentists who did not see the youngest children.[20]

Since general dentists constitute approximately 80% of the dentist workforce, they should be utilized to the maximum extent possible to provide dental care especially since there is a shortage of Pediatric dentists.[6] If general dentists provided screenings, anticipatory guidance for healthy children, and even while referring children with more extensive needs to pediatric dentists, then perhaps more caregivers would access care for young children at an early age.

Limitations and Suggestions for Further Study

This study had a low response rate. This study is from a pediatric dentists' perspective and does not get an opinion about how a general dentist feels about treating children 0-3 years old. Sending a survey to general dentists' and pediatric dentists will help get a direct comparison of treatment they can render. Further studies are needed to understand why younger pediatric dentists were more likely to agree that a general dentist can provide age 1 dental visit and dental home to 0-3 years old.

Conclusion

Majority of the pediatric dentists' agree that a general dentist can provide care for children 0-3 years old as long as they follow the AAPD guidelines and should refer for complex restorative and extensive behavior management to a pediatric dentist. Younger respondents and those who felt that dental school prepared them well agreed more that an entry level general dentist can provide care for children 0-3 years old.

The information in this research will help guide the level of care a general dentist can provide to 0-3 years old and when to refer the patient to a pediatric dentist but is not intended to replace AAPD guidelines regarding care for young children. It can help facilitate a better relationship between general dentists and pediatric dentists for providing better and quality care to their patients.

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Tables

Table 1. Demographic Characteristics Of The Participants (n = 754)

Characteristic	n	%
Gender		
Female	356	47%
Male	398	53%
Average Age Group		
Younger than 30	16	2%
30-39	251	33%
40-49	195	26%
50-59	181	24%
60 or older	111	15%

Table 2. Currently Teaching Pediatric Dentistry

Characteristic	n	%
To Pediatrics Dentists		
No, I never taught pediatric dentistry residents.	408	55%
No, but I used to teach pediatric dentistry residents.	153	21%
Yes, I am teaching pediatric dentistry resident's part time.	118	16%
Yes, I am teaching pediatric dentistry resident's full time.	66	9%
To Dental Students		
No, I never taught pediatric dentistry to dental students.	340	45%
No, but I used to teach pediatric dentistry to dental students.	260	35%
Yes, I am teaching pediatric dentistry to dental student's part time.	113	15%
Yes, I am teaching pediatric dentistry to dental student's full time.	36	5%

Table 3. Practice Location And Description

Characteristic	n	%
Practice Location		
Large Urban	162	22%
Middle-Small Urban	171	23%
Suburban	344	46%
Rural	74	10%
Practice Description		
All practitioners in my office are pediatric dentists	496	66%
The practitioners in my office are a mix of pediatric dentists and general practitioners or other specialists	202	27%
Other (please describe below)	56	8%

Table 4. Dental School Preparation

Characteristic	n	%
To Take Care of 0-3 years old?		
No	646	86%
Yes	108	14%

Table 5. Patient Inflow From A General Dentist

Characteristic	n	%
Average Patient flow for last year (2013)		
10%	429	58%
30%	203	27%
50%	73	10%
70%	22	3%
90%	15	2%
Age Group referred in the last 5 years		
0-3 years	705	95%
4-6 years	733	98%
7-10 years	628	84%
11-13 years	410	55%
14 yrs. And above	246	33%

Table 6. Role Of General Dentist

Characteristic	n	%
Providing an age 1 dental visit		
Strongly Agree	193	26%
Agree	244	32%
Disagree	189	25%
Strongly Disagree	126	17%
Providing dental home for child 0-3 years		
Strongly agree	164	22%
Agree	255	34%
Disagree	206	27%
Strongly Disagree	128	17%

Table 7. Procedure General Dentist Can Perform On 0-3 Years Old

Characteristic	n	%
Yes, as long as the general dentist follows the AAPD clinical guidelines		
Examination, anticipatory guidance, prophylaxis, and treatment plan	625	83%
Sealants	554	75%
Atraumatic restorative treatment	499	67%
Simple restorative with local anesthesia	514	69%
Complex restorative (i.e. SSC, pulpotomy)	332	44%
Behavior management (i.e. nitrous oxide, oral sedation, general anesthesia)	177	24%

Table 8. Procedure Entry Level Dentist Can Perform On 0-3 Years Old

Characteristic	n	%
Yes, I believe that competency to provide these procedures to 0-3 years old children should be part of the dental school graduation requirement.		
Examination, anticipatory guidance, prophylaxis, and treatment plan	578	77%
Sealants	540	73%
Atraumatic restorative treatment	468	63%
Simple restorative with local anesthesia	478	64%
Complex restorative (i.e. SSC, pulpotomy)	282	38%
Behavior management (i.e. nitrous oxide, oral sedation, general anesthesia)	127	17%

Table 9. Clinical Case 1

Case 1 discusses the treatment a general dentist can provide to a 3-year-old healthy cooperative patient with good oral hygiene with decalcifications on anterior teeth.

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Characteristic	n	%
Responses		
Provide anticipatory guidance /preventive treatment such as fluoride varnish and observe the teeth	320	43%
Provide anticipatory guidance/ preventive treatment such as fluoride varnish and refer to a pediatric dentist	319	43%
Atraumatic restorative treatment	108	14%

Table 10. Clinical Case 2

Case 2 discusses an anxious patient with the same clinical situation as case 1

Characteristic	n	%
Responses		
Provide anticipatory guidance /preventive treatment such as fluoride varnish and observe the teeth	154	21%
Provide anticipatory guidance/ preventive treatment such as fluoride varnish and refer to a pediatric dentist	571	77%
Atraumatic restorative treatment	21	3%

Table 11. Clinical Case 3

Case 3 discusses caries in a 3 year old with severe pain and soft tissue abscess seeing a dentist for the first time.

Characteristic	n	%
Responses		
Provide anticipatory guidance/preventive treatment such as fluoride varnish and refer to a pediatric dentist.	96	13%
Provide pain medication /antibiotics and then refer to a pediatric dentist	583	78%
Provide comprehensive care such as pulpotomy, stainless steel crowns, and extractions.	68	9%

Table 12. Clinical Case 4

Case 4 discusses treatment options for a one and half year old who has Baume type I spacing. Her parents brush her teeth without fluoride toothpaste and she sometimes goes to bed with a bottle of milk.

Characteristic	n	%
Responses		
Provide anticipatory guidance/preventive treatment such as fluoride varnish and see the patient in 3-6 months for a risk-based recall.	542	72%
Provide anticipatory guidance/ preventive treatment such as fluoride and refer to pediatric dentist.	169	23%
Provide no guidance and refer to pediatric dentist.	37	5%

Table 13. Age Of Practitioner vs. Age 1 Dental Visit And Dental Home

Age Group	Mean*		Std. Dev.	p-value
How strongly do you agree/disagree with a general dentist providing an age 1 dental visit?				
Younger than 30	1.875	A	1.088	0.1367
30-39	2.277	A	1.020	
40-49	2.323	A	1.066	
50-59	2.350	A	1.038	
60 or older	2.505	A	0.990	
How strongly do you agree/disagree with a general dentist providing a dental home for a child 0-3 yrs. of age?				
Younger than 30	1.938	A	1.124	0.0220
30-39	2.344	A	0.974	
40-49	2.335	A	1.001	
50-59	2.431	A	1.045	
60 or older	2.640	A	0.980	

* Scored as: 1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree.

Table 14. Teaching Experience vs. Age 1 Dental Visit And Dental Home

Teaching experience	Mean*		Std. Dev.	p-value
How strongly do you agree/disagree with a general dentist providing an age 1 dental visit?				
To Pediatrics Dentists				
No, I never taught pediatric dentistry residents	2.401	AB	1.030	<0.0001
No, but I used to teach pediatric dentistry residents.	2.523	A	1.001	
Yes, I am teaching pediatric dentistry residents part time.	2.186	B	0.995	
Yes, I am teaching pediatric dentistry residents full time.	1.652	C	0.903	
To Dental Students				
No, I never taught pediatric dentistry to dental students.	2.378	A	1.020	<0.0001
No, but I used to teach pediatric dentistry to dental students.	2.405	A	1.039	
Yes, I am teaching pediatric dentistry to dental students part time.	2.259	A	1.029	
Yes, I am teaching pediatric dentistry to dental students full time.	1.500	B	0.811	
How strongly do you agree/disagree with a general dentist providing a dental home for a child 0-3 yrs. of age?				
To Pediatrics Dentists				
No, I never taught pediatric dentistry residents.	2.440	AB	0.993	<0.0001
No, but I used to teach pediatric dentistry residents.	2.618	A	0.969	
Yes, I am teaching pediatric dentistry residents part time.	2.288	B	0.979	
Yes, I am teaching pediatric dentistry residents full time.	1.727	C	0.953	
To Dental Students				
No, I never taught pediatric dentistry to dental students.	2.431	A	1.010	<0.0001
No, but I used to teach pediatric dentistry to dental students.	2.471	A	0.993	
Yes, I am teaching pediatric dentistry to dental students part time.	2.372	A	0.993	
Yes, I am teaching pediatric dentistry to dental students full time.	1.583	B	0.841	

*Scored as: 1=strongly agree, 2=agree, 3=disagree, 4=strongly disagree.
*Means not connected by the same letter are significantly different.

Table 15. Practice Setup vs. Age 1 Dental Visit And Dental Home

Practice Setup	Mean*		Std. Dev.	p-value
How strongly do you agree/disagree with a general dentist providing an age 1 dental visit?				
Practice Location				
Large Urban	2.149	B	1.050	0.0154
Middle-Small Urban	2.447	A	1.032	
Suburban	2.394	AB	1.006	
Rural	2.162	AB	1.073	
Practice Description				
All practitioners in my office are pediatric dentists	2.383	A	1.031	0.1007
The practitioners in my office are a mix of pediatric dentists and general practitioners or other specialists.	2.243	A	1.020	
Other (please describe below)	2.143	A	1.086	
How strongly do you agree/disagree with a general dentist providing a dental home for a child 0-3 yrs. of age?				
Practice Location				
Large Urban	2.228	B	1.053	0.0035
Middle-Small Urban	2.476	AB	0.998	
Suburban	2.490	A	0.970	
Rural	2.135	B	1.025	
Practice Description				
All practitioners in my office are pediatric dentists	2.448	A	1.000	0.1100
The practitioners in my office are a mix of pediatric dentists and general practitioners or other specialists.	2.305	A	1.013	
Other (please describe below)	2.232	A	1.027	

*Scored as: 1=strongly agree, 2=agree, 3=disagree, 4=strongly disagree.
*Means not connected by the same letter are significantly different.

Table 16. Dental School vs. Age 1 Dental Visit And Dental Home

Dental School	Mean*		Std. Dev.	p-value
How strongly do you agree/disagree with a general dentist providing an age 1 dental visit?				
To Take Care of 0-3 years old?				
No	2.403	A	1.042	<0.0001
Yes	1.889	B	0.879	
How strongly do you agree/disagree with a general dentist providing a dental home for a child 0-3 yrs. of age?				
To Take Care of 0-3 years old?				
No	2.466	A	1.012	<0.0001
Yes	1.972	B	0.880	

*Scored as: 1=strongly agree, 2=agree, 3=disagree, 4=strongly disagree.
*Means not connected by the same letter are significantly different.

Figures

Figure 1. Concept Model

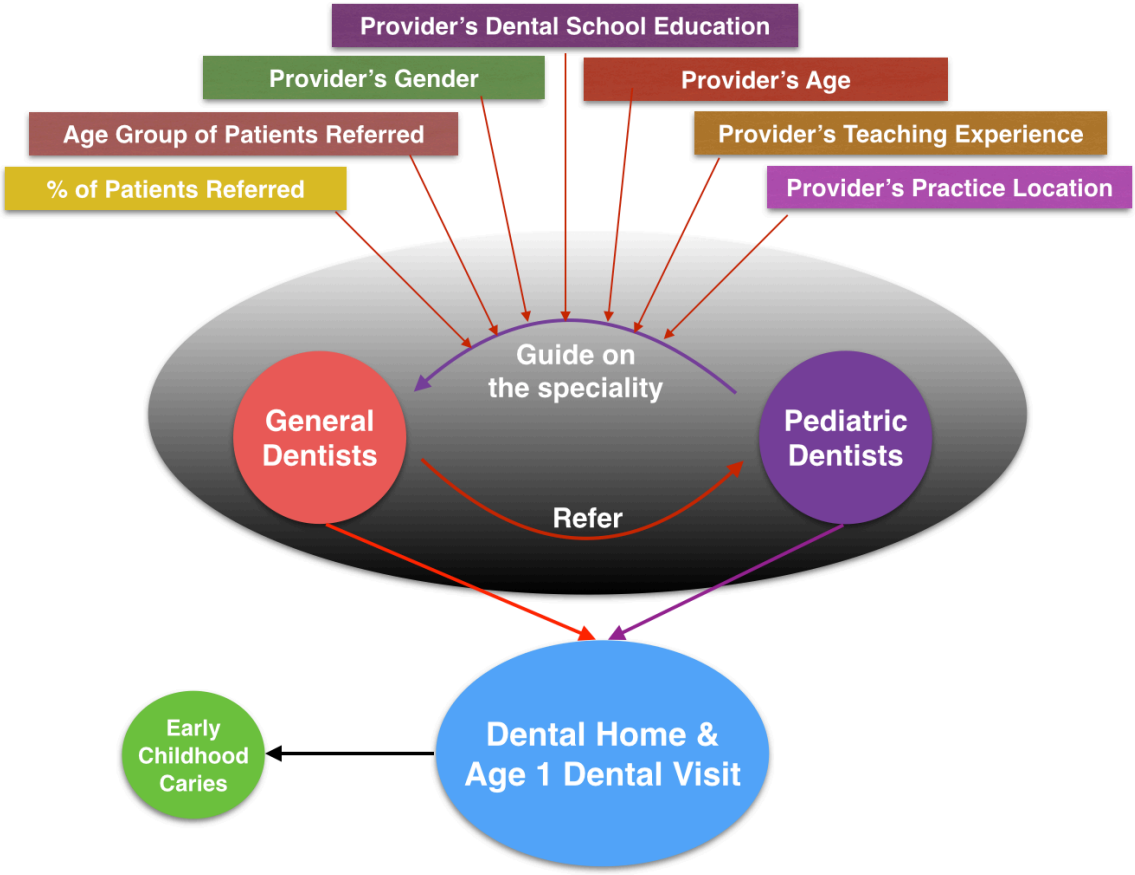
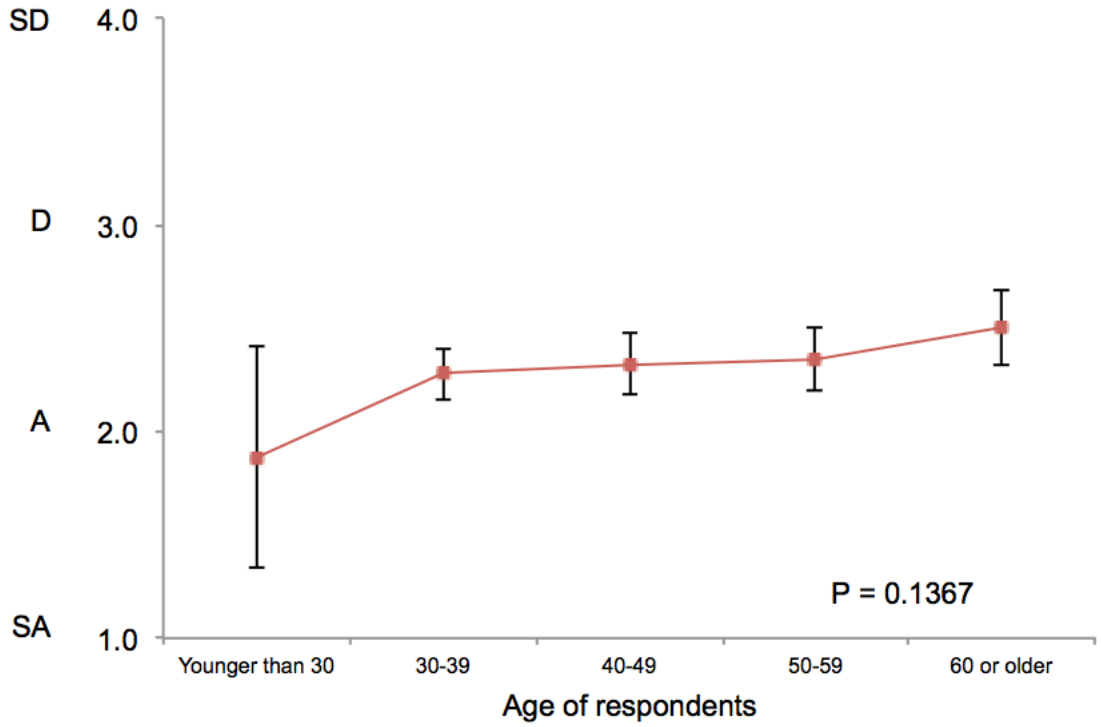
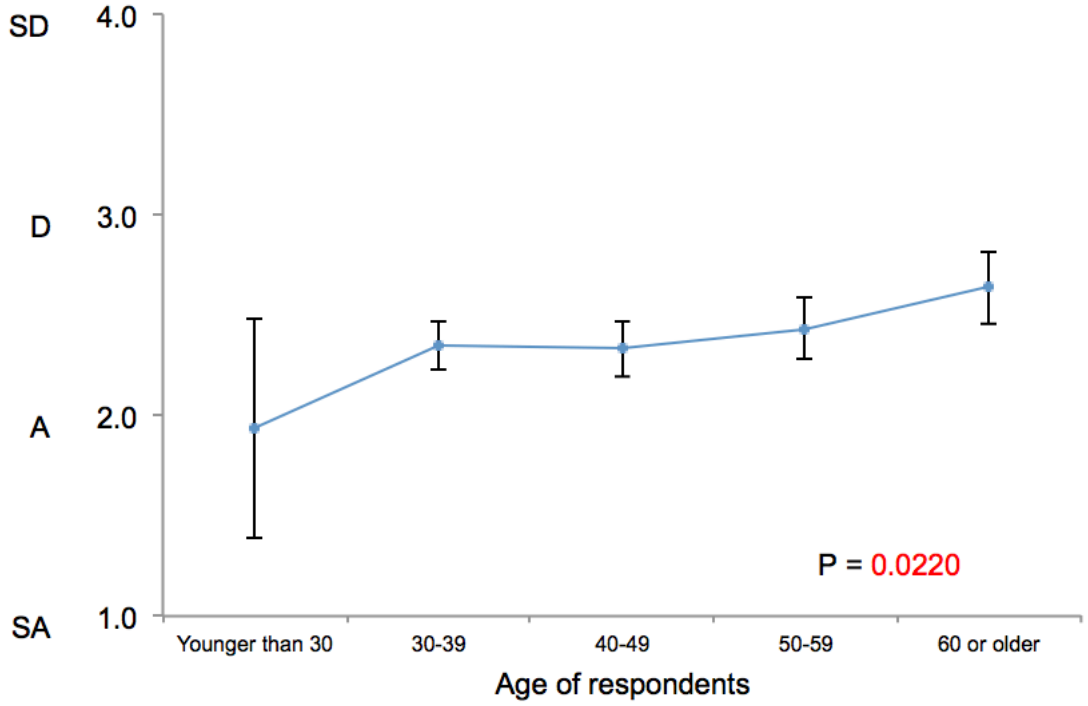


Figure 2. Age vs. Age One Dental Visit



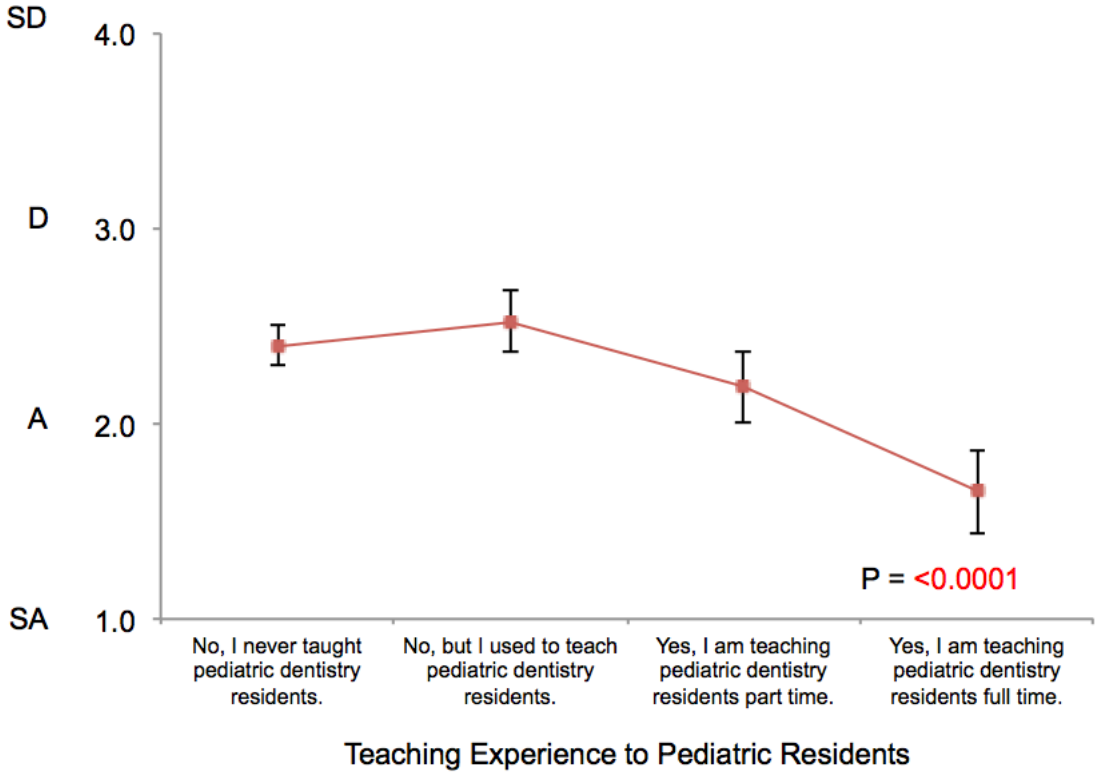
How strongly do you agree/disagree with a general dentist providing an age 1 dental visit?

Figure 3. Age vs. Dental Home



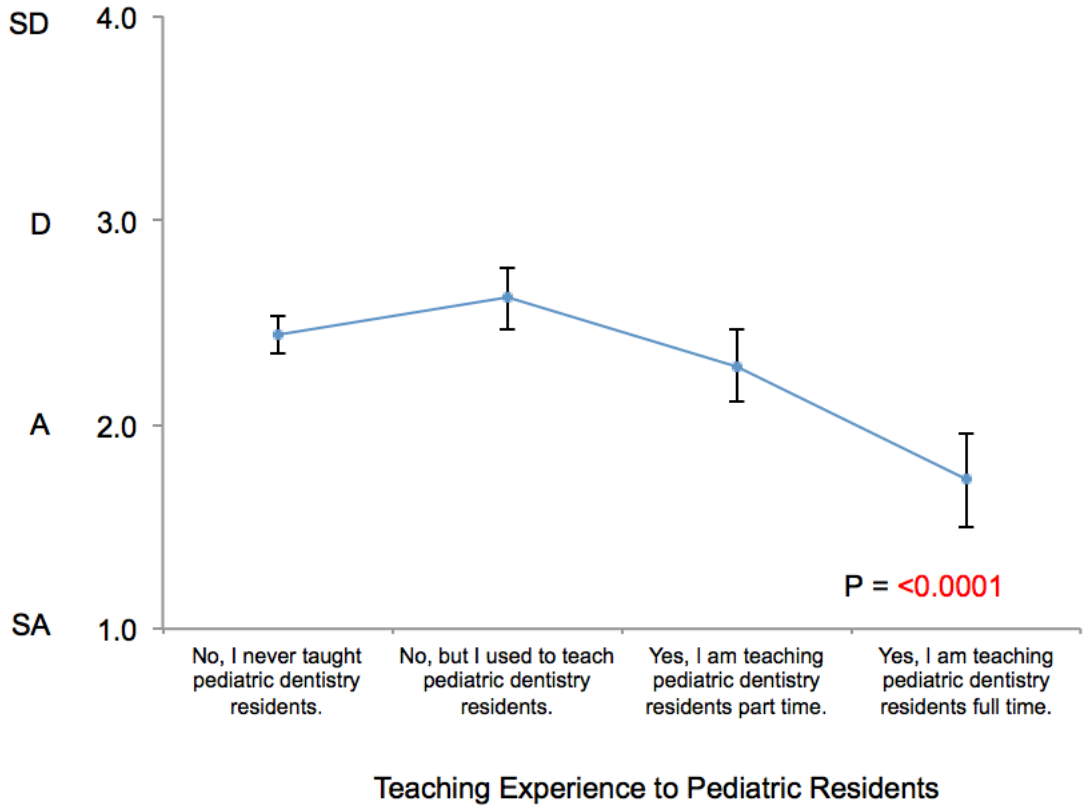
How strongly do you agree/disagree with a general dentist providing a dental home for a child 0-3 yrs. of age?

Figure 4. Teaching Experience vs. Age One Dental Visit



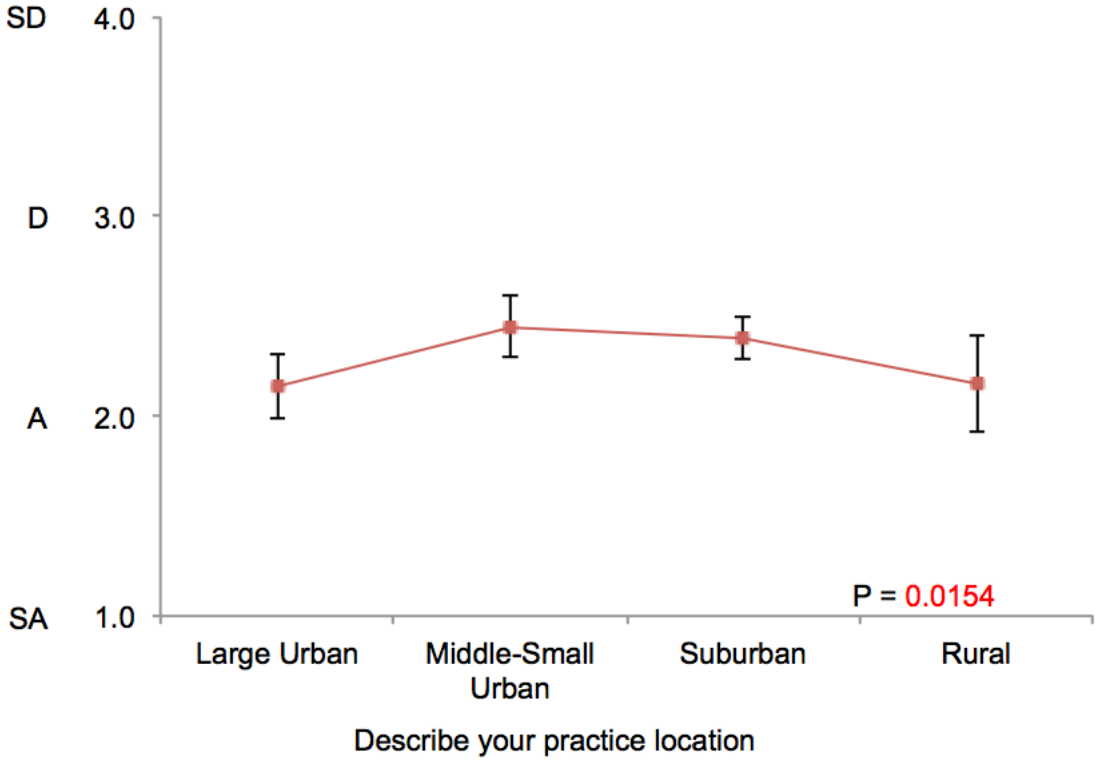
How strongly do you agree/disagree with a general dentist providing an age 1 dental visit?

Figure 5. Teaching Experience vs. Dental Home



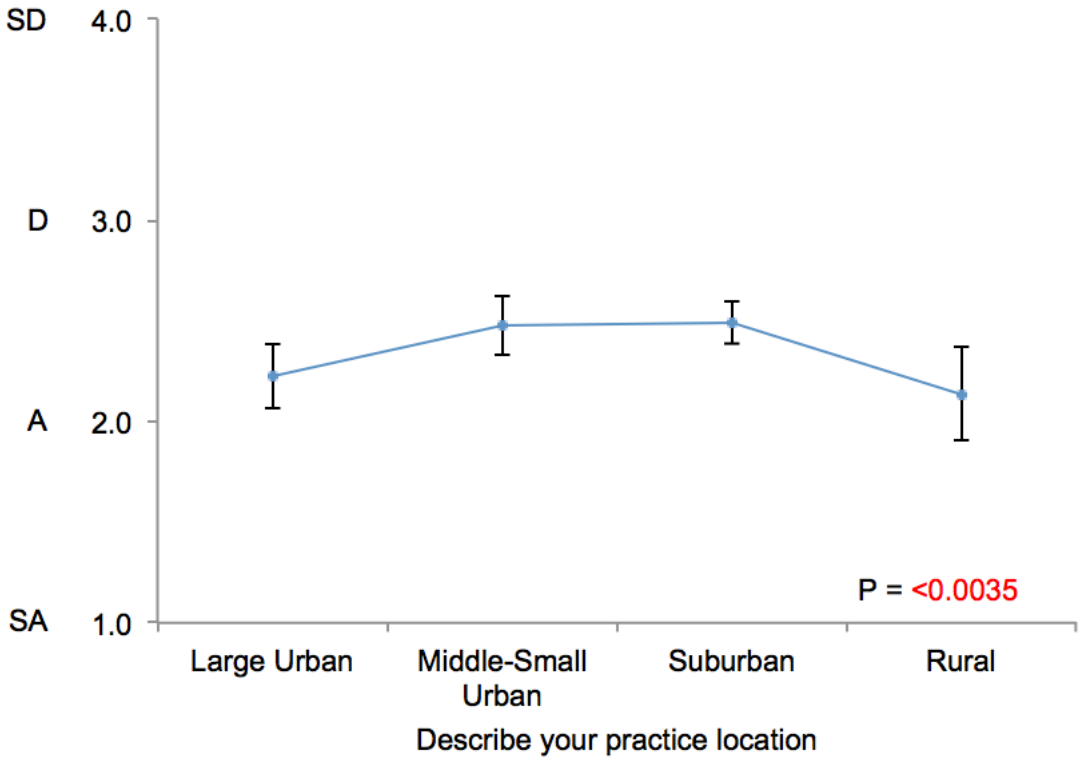
How strongly do you agree/disagree with a general dentist providing a dental home for a child 0-3 yrs. of age?

Figure 6. Practice Setup vs. Age One Dental Visit



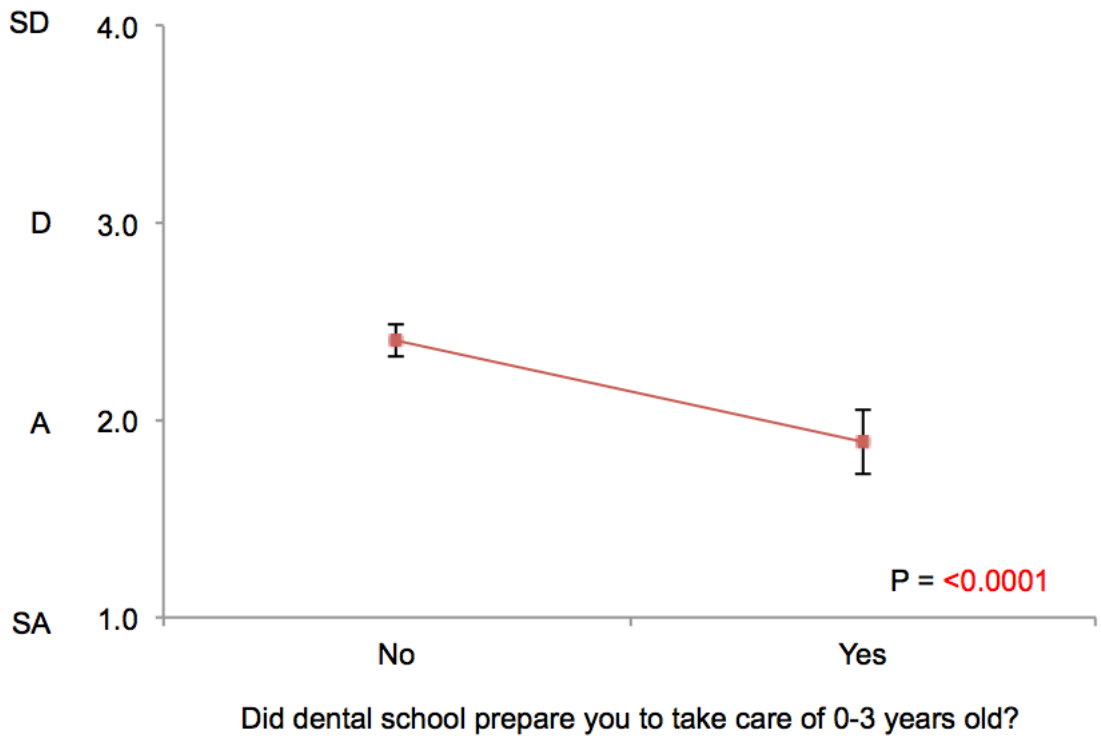
How strongly do you agree/disagree with a general dentist providing an age 1 dental visit?

Figure 7. Practice Setup vs. Dental Home



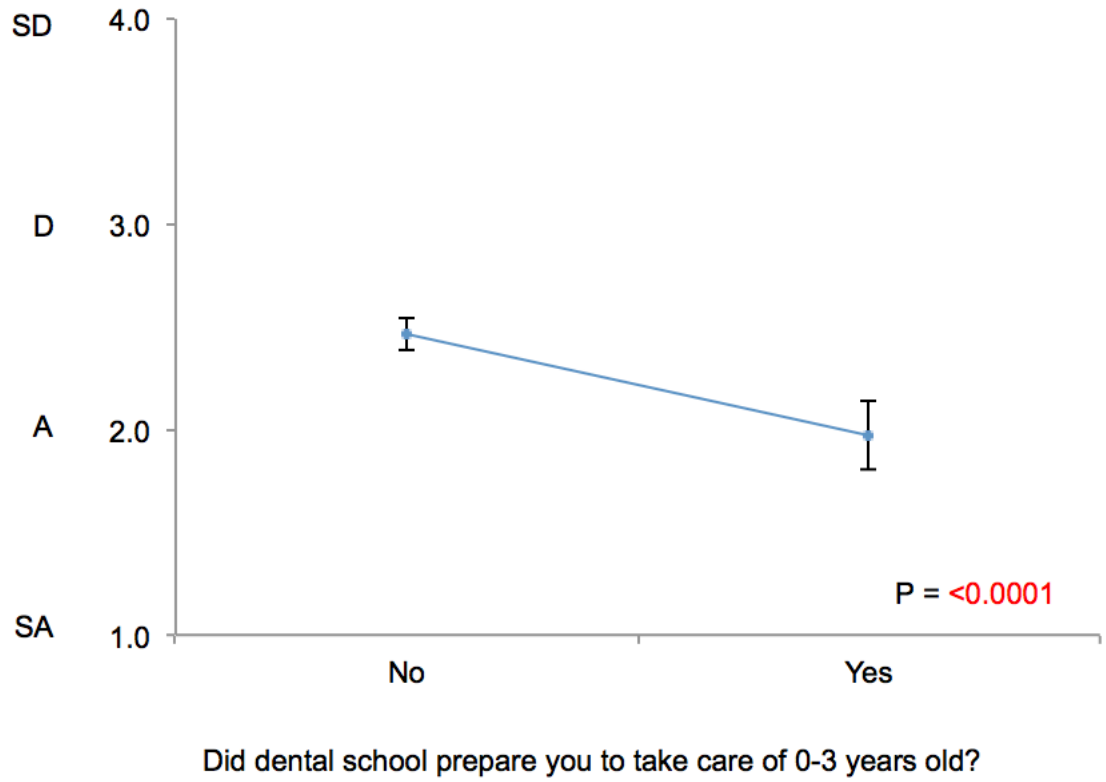
How strongly do you agree/disagree with a general dentist providing a dental home for a child 0-3 yrs. of age?

Figure 8. Dental School vs. Age One Dental Visit



How strongly do you agree/disagree with a general dentist providing an age 1 dental visit

Figure 9. Dental School vs. Dental Home



How strongly do you agree/disagree with a general dentist providing a dental home for a child 0-3 yrs. of age?

Appendix

General Dentist's Role in Providing Care to Very Young Children: Pediatric Dentist's Perspective

The purpose of this study is to obtain pediatric dentists' view of the level of care a general dentist can provide to children aged 0-3 years. The questionnaire consists of demographics, your general opinions, and case scenarios. Here, "general dentist" means a dentist who does not have pediatric dentistry training and practices within the scope of general dentistry. Anticipatory Guidance is "the process of providing practical, developmentally- appropriate information about children's health to prepare parents for significant physical, emotional and psychological milestones". Atraumatic Restorative Treatment is defined as " a dental caries treatment procedure involving the removal of soft, demineralized tooth tissue using hand instruments only followed by restoration of the tooth with an adhesive restorative material, routinely glass ionomer".
It is estimated that it takes less than 5 minutes to complete.

Thank you for your participation.

<Demographics and Practice Information>

1. Please indicate your age in years.
   ☐ Younger than 30 ☐ 30-39 ☐ 40-49 ☐ 50-59 ☐ 60 or older

2. Please indicate your gender.
   ☐ Male ☐ Female

3. Are you currently teaching pediatric dentistry to pediatric residents?
   - ☐ Yes, I am teaching pediatric dentistry resident's full time.
   - ☐ Yes, I am teaching pediatric dentistry resident's part time.
   - ☐ No, but I used to teach pediatric dentistry residents.
   - ☐ No, I never taught pediatric dentistry residents.

4. Are you currently teaching pediatric dentistry to dental students?
   - ☐ Yes, I am teaching pediatric dentistry to dental student's full time.
   - ☐ Yes, I am teaching pediatric dentistry to dental student's part time.
   - ☐ No, but I used to teach pediatric dentistry to dental students.
   - ☐ No, I never taught pediatric dentistry to dental students.

5. In what year did you graduate from your dental school?

6. Do you think your dental school prepared students well to provide care to 0-3 year's old children?
   ☐ Yes ☐ No

7. In what year did you graduate from your pediatric dentistry program?

8. What best describes your type of practice?
   - ☐ a. Practice limited to pediatric dentistry
   - ☐ b. Partnership/associate with general practitioner and/or other specialists
   - ☐ c. some combination of a and b
   - ☐ d. I currently do not practice pediatric dentistry.
   - ☐ e. Other (please comment below)

9. What best describes your primary practice located? If you practice in multiple locations, primary location is where you spent most time.

☐ Large Urban ☐ Middle-Small Urban ☐ Suburban ☐ Rural

10. Approximately what percentages of new patients did general dentists refer last year (2013)?

☐ 0- 20% ☐ 21%-40% ☐ 41%-60% ☐ 61%- 80% ☐ 81%-100%

11. Check all age groups of referrals sent to you by general dentists?

☐ 0-3 yrs. ☐ 4-6 yrs. ☐ 7-10 yrs. ☐ 11-13 yrs. ☐ Above 14 yrs.

<General Dentist's Role in Providing Care to 0-3 years old Children: your perspective in general>

12. How strongly do you agree/disagree with a general dentist providing an age 1 dental visit?

☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree

13. How strongly do you agree/disagree with a general dentist providing a dental home for a child 0-3 yrs. of age?

☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree

14. Do you agree with a general dentist to see 0-3 year's old children for the following procedures?

	Yes, as long as the general dentist follows the AAPD clinical guidelines.	No, only pediatric dentist with proper training would be competent to provide such a procedure.
• Examination, anticipatory guidance, prophylaxis, and treatment plan • Sealants • Atraumatic restorative treatment • Simple restorative with local anesthesia		

• Complex restorative (i.e. SSC, pulpotomy) • Behavior management (i.e. nitrous oxide, oral sedation, general anesthesia)		

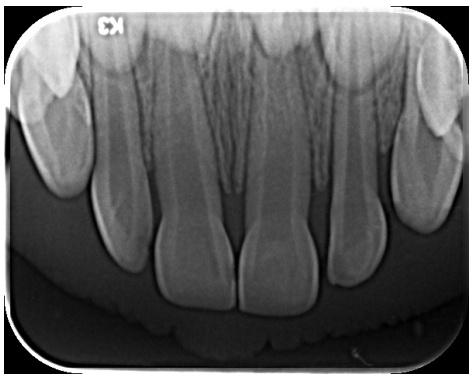
15. Do you think entry-level general dentists (recent graduates of dental school) should be competent to provide the following procedures for 0-3 years old children? (here, "competent" means that the dentist is able to provide the care *independently*. ADA Accreditation Standards stated "Graduates *must* be competent in providing oral health care within the scope of general dentistry to patients in *all stages of life.")*

	Yes, I believe that competency to provide these procedures to 0-3 years old children should be part of the dental school graduation requirement.	No, only pediatric dentist with proper training would be competent to provide such a procedure.
• Examination, anticipatory guidance, prophylaxis, treatment plan • Sealants • Atraumatic restorative treatment • Simple restorative with local anesthesia • Complex restorative (i.e. SSC, pulpotomy) • Behavior management (i.e.nitrous oxide, oral sedation, general anesthesia)		

16. Open ended question: Please share your opinion general dentist's role in care for 0-3 year's old children.

<General Dentist's Role in Providing Care to 0-3 year old Children: Case Scenarios>

17. CASE 1: A 3 year old healthy female patient presents to a rural dental clinic with decalcification on #D, E, F, G. Teeth are not cavitated and patient is not in pain. Patient has good oral hygiene and is high caries risk. Your dental school colleague (general dentist) sees this patient and calls you to get your advice. Patient is very friendly and cooperative. What kind of treatment would you suggest that this dentist could render.

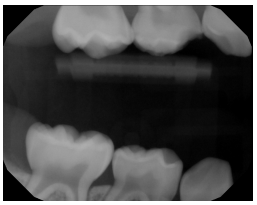
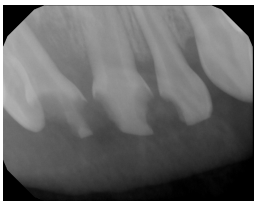
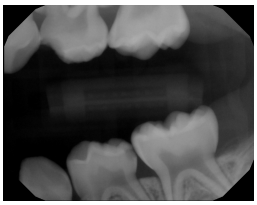


a) Provide anticipatory guidance /preventive treatment such as fluoride varnish and observe the teeth
b) Provide anticipatory guidance/ preventive treatment such as fluoride varnish and refer to a pediatric dentist
c) Atraumatic restorative Treatment

18. CASE 2: In the above question, suppose that the patient was very anxious and started crying as she entered the office. What kind of treatment would you suggest that this dentist can render?

a) Provide anticipatory guidance/preventive treatment such as fluoride varnish and observe the teeth
b) Provide anticipatory guidance /preventive treatment such as fluoride varnish and refer to a pediatric dentist
c) Atraumatic restorative Treatment

19. CASE 3: A 3-year-old healthy male patient presents with CC of "Holes in upper front teeth" to this general dentist's office. Patient is in severe pain and has a soft tissue abscess on #D,E,F,G. Patient has poor oral hygiene and is seeing a dentist for the first time. What kind of treatment would you suggest that this dentist could render?

a) Provide anticipatory guidance/preventive treatment such as fluoride varnish and refer to a pediatric dentist.
b) Provide pain medication /antibiotics and then refer to a pediatric dentist
c) Provide comprehensive care such as pulpotomy, stainless steel crowns, and extractions.

20. CASE 4 :A one and half year old healthy female patient presents to this general dentist's office for her first dental visit. She has Baume type 1 spacing. Her parents help her brush her teeth but don't use fluoride toothpaste. She sometimes goes to bed with a bottle of milk. What kind of treatment would you suggest that this general dentist could render?

a) Provide anticipatory guidance/preventive treatment such as fluoride varnish and see the patient in 3-6 months

b) Provide anticipatory guidance/ preventive treatment such as fluoride and refer to pediatric dentist
c) Provide no guidance and refer to pediatric dentist.

VITA

Shinjni Razdan was born on May 9th 1979 in Chandigarh, India. She attended M. R. Ambedkar Dental College and Hospital with distinction. She was accepted in the International Dental Program at VCU School of Dentistry and graduated with a Doctor of Dental Surgery in May 2013. Shinjni was then accepted to a two year Pediatric Dental Residency at VCU School of Dentistry, from which she is expected to graduate in June 2015.