

Management of caries in the child three years of age and younger: a survey of post-doctoral pediatric dentistry program directors

N. Sue Seale, DDS, MSD Alice Kendrick, PhD

Dr. Seale is regents professor and chairman, Department of Pediatric Dentistry, Baylor College of Dentistry, Texas A&M University System Health Science Center, Dallas, Tex; Dr. Kendrick is professor, Division of Advertising, Southern Methodist University, Dallas, Tex.

Correspond with Dr. Seale at sseale@rambcd.edu

Abstract

Purpose: The purpose of this study was to report the results of a survey of pediatric dentistry post-doctoral program directors regarding education of post-doctoral students about management of caries in children 3 years-of-age or younger.

Methods: Fifty-two pediatric dentistry advanced education program directors were sent questionnaires inquiring about payer sources in their programs, distribution of caries in children 3 years of age or younger within the payer sources, the methods they teach and use to treat the caries, and the effectiveness of treatment and outcome data about the success of their treatment.

Results: Twenty-nine programs responded (56%). On average, two-thirds (66%) of the patients in post-doctoral pediatric dentistry programs are Medicaid patients. Program directors are fairly uniform in how they define methods of caries management, and they rate definitive therapy as the most effective method to manage all types of caries. Literature/textbooks were most frequently cited as the major source of scientific evidence to support treatment decisions. Fewer than 20% of program directors have outcome data on the effectiveness of their methods of treatment.

Conclusions: Medicaid is the major payer source for patients in post-doctoral programs and definitive therapy is considered by program directors to be the most effective approach to managing caries in this patient population. Program directors rely on the literature and textbooks and few have outcome data. (*Pediatr Dent 24:33-37, 2002*)

KEYWORDS: EARLY CHILDHOOD CARIES, POST-DOCTORAL TEACHING

Received April 19, 2001 Revision Accepted December 11, 2001

There is increasing emphasis in the health care industry for providers to have outcome data to support treatment decisions. In keeping with this emphasis, the 1997 AAPD presidential theme was "No Decisions without Data." The Scientific Affairs Committee of the AAPD conducted a survey in the winter of 1997 to collect information from private practicing pediatric dentists and pediatric dentistry post-doctoral programs concerning management of caries in children 3 years of age or younger and their outcome data to support their treatment. Preliminary results were presented at the 1997 and 1998 Annual Session Contemporary Issues Workshop and the 1998 Academicians Workshop. The data from the practitioner's survey were published in 2001.¹

When the data from the graduate program directors' survey were analyzed and compared with the analyses of the

data from the practitioner's survey, there were surprising differences between the two groups. These differences present some very interesting issues concerning the patient populations which advanced education programs treat and which form the basis of the educational experiences of the individuals who will join the practicing community as the next generation of pediatric dentists. They also raise potentially challenging questions about how these differences may affect the readiness of newly graduated pediatric dentists to join busy practitioners as their associates.

Therefore, the purpose of this study was to report the results of the survey of post-doctoral program directors about payer sources in their programs, distribution of caries in children 3 years of age or younger within the payer sources, the methods they teach and use to treat these caries, and the effectiveness of treatment and outcome data about the success of their treatment.

Methods

The program directors of all 52 post-doctoral programs in pediatric dentistry in the U.S. and Canada were sent a three page questionnaire in January of 1997 regarding education of post-doctoral students about caries management in children 3 years-of-age or younger. A postcard follow-up was sent in February. Program directors were asked to describe how their faculty taught methods of managing caries in the young child and the incidence of caries in children ≤ 3 years-of-age treated in their programs, how the caries was distributed among payer sources and the overall distribution of payer sources in the program clinics.

The survey listed the following methods of caries management in the young child: preventive maintenance; risk assessment; definitive therapy; glass ionomer; and clean out and leave. The respondents were asked to identify (from a list of descriptors following each method) those which best describe their definition and use of the method in the child ≤ 3 years-of-age in their programs. A list of these descriptors is provided in the publication reporting the data from the practitioner's survey.¹ The next series of questions asked the program director how each of the methods was used in his/her program to treat different degrees of severity of caries including: enamel caries; enamel and dentinal caries; pulpal involvement and abscesses; or simultaneously demonstrating all three of the previous types.

They were then asked to define effectiveness of treatment based on recall evaluations, to rate on a Likert scale the effectiveness of the previously described techniques in managing the degrees of caries, and to describe any outcome data they had about how well the methods worked in their programs. A final series of questions inquired about program directors' greatest challenges in managing caries in the child ≤ 3 years-of-age and asked them to describe the resources upon which they based their decisions to teach any or all of the treatment techniques previously identified.

Results

Twenty-nine responses were received for a response rate of 56%. Program types included 11 hospital-based, 6 dental school-based and 12 combined. One-third of the programs offered a formal course in management of caries in the child ≤ 3 years of age.

Payer sources

Responses about overall distribution of payer sources in the post-doctoral programs for the young child indicate that, on average, two-thirds (66%) of patients in post-doctoral programs are Medicaid patients, while only 12% have insurance and fewer than 20% are self-pay.

Methods and definitions of caries management

The frequency of use of methods of caries management is summarized in Table 1 and reveals that the most frequently used were definitive therapy (100%), preventive maintenance (97%) and risk assessment (86%). The most

commonly used technique within definitive therapy was general anesthesia in hospital (used by 100% of programs), followed by conscious sedation, papoose board and restoring teeth aggressively with SSC/pulp (each used by between 86 and 97%).

For preventive maintenance, all programs use knee-to-knee exam, and in-office topical fluoride gel or foam and in-office brushing were used by approximately 80% of respondents. With risk assessment, 90% of respondents reported to investigate diet history and family caries history. For glass ionomer, 90% clean out caries with a bur and use local anesthesia for this procedure.

Three-fourths use resin/glass ionomer combinations and two-thirds prescribe topical fluoride by the caretaker. One-half etch before placing the glass ionomer and use plain glass ionomer. Less than half the programs use clean out and leave, and, for those who do, 80% prescribe topical fluoride by the caretaker and clean out caries with a bur. Two-thirds of the time they perform this procedure without anesthesia.

Use of methods to treat different levels of caries

Table 2 indicates an association between severity of caries and how treatment methods are used. For caries of enamel, fewer than half would treat definitively, but for caries involving dentin, 97% would provide definitive treatment. All program directors teach definitive treatment for pulpally involved teeth and for patients demonstrating all three degrees of caries simultaneously. Preventive maintenance is the treatment of choice by 97% of program directors for caries of enamel, but is recommended less often as caries becomes more severe, with slightly more than half (55%) recommending it for caries involving dentin and 45% for pulpal involvement. More than 75% will recommend it for all degrees of caries simultaneously.

Table 1. Frequency of Program Directors Use of Treatment Methods*

Definitive therapy	100%
Preventive maintenance	97%
Risk assessment	86%
Glass ionomer	76%
Clean out and leave	48%

*Respondents could choose more than one method

Table 2. Percentage of Program Directors Who Teach Treatment Methods for Different Degrees of Caries

	Enamel only	Enamel and dentin	Pulpal involvement	All three caries patterns simultaneously
Definitive therapy	48%	97%	100%	100%
Preventive maintenance	97%	55%	45%	79%
Risk assessment	66%	62%	45%	64%
Glass ionomer	48%	48%	4%	43%
Clean out and leave	10%	10%	0%	14%

Table 3. Criteria for Effectiveness of Treatment*

Caries free at recall	52%
No pain/asymptomatic	41%
Restorations intact at recall	31%
Restore form, function	31%
Stop progress of carious lesion	28%
Improved OHI/dietary changes	21%
Compliant parents/changed behavior	14%

Table 5. Evidence to Support Methods Taught*

	Preventive maintenance n=20	Risk assessment n=15	Clean out & leave n=9	Glass ionomer n=13	Definitive therapy n=17
Number of mentions*					
Literature/textbooks	9	10	5	12	15
AAPD guidelines	4	0	0	0	2
No evidence/science	5	4	4	2	2
Personal experience	1	1	1	2	5
Ped dent authority	4	5	2	2	1
National conference	3	1	0	2	1
Other	1	1	0	1	0

*Respondents could choose more than one response

Table 4. Effectiveness of Caries Management Techniques for Different Degrees of Carious Involvement

	Enamel only	Enamel and dentin	Pulpal involvement	All three caries patterns simultaneously
Definitive therapy	4.53	4.53	4.58	4.55
Preventive maintenance	3.09	2.47	2.29	2.88
Risk assessment	2.76	2.61	2.79	2.57
Glass ionomer	3.92	3.79	1.80	3.10
Clean out and leave	2.33	2.43	2.67	2.00

Values shown are mean scores for items scored from 1 to 5 with 1=not effective and 5=very effective

Risk assessment is recommended by two-thirds for caries of enamel, dentin and all three types simultaneously, and by 45% for teeth with pulpal involvement. Glass ionomer is favored by slightly less than half (48%) of program directors for caries of both enamel and dentin and rarely for pulpally involved teeth. Clean out and leave is the least popular method of treatment, favored by only 10% for caries of enamel and dentin. None recommend it for pulpally involved teeth and only 14% for teeth demonstrating all three levels of severity of caries.

Criteria for effectiveness of treatment

An open-ended question asked program directors to list the criteria they use for determining effectiveness of treatment or to define effectiveness at recall (see Table 3). The most frequently listed criteria were "Caries free at recall," identified by more than half the respondents, and "no pain/asymptomatic," listed by slightly more than 40%. Roughly 30% identified "having restorations intact," "restore form and function" and "stop progress of carious lesion" as effectiveness criteria.

Effectiveness of caries management techniques

Responses to a request to rate the effectiveness of the treatment techniques previously discussed for different degrees of severity of caries are summarized in Table 4. Program directors gave the highest and almost uniform effectiveness scores to definitive therapy for management of all types of caries. Preventive maintenance and glass ionomer received decreasing effectiveness ratings as caries became more severe. Program directors were slightly less positive about the effectiveness of risk assessment for all degrees of severity of caries.

Evidence to support methods taught

Responses to the request of program directors for a listing of references, conferences, individuals, or other sources from which they drew scientific support for the decisions to use different treatment techniques are summarized in Table 5. The most often cited resource was literature/textbooks, especially in the case of definitive therapy and glass ionomer. Pediatric dentistry authorities, personal experience, national conferences and AAPD guidelines were also mentioned.

Outcome data

When asked if they had outcome data on how well the methods of treatment worked in their programs, 86% said they had none. Those who responded positively cited quality assurance records, subjective treatment plans, operating room and sedation charts, tracking of patients treated in the operating room for new caries and case reports and photographs as outcome data.

Biggest challenge in managing caries

Program directors identified parental compliance (48%) and managing the child's behavior (41%) most frequently as the biggest challenges in dealing with caries in the child ≤3 years of age. These findings are summarized in Table 6.

Discussion

As was previously mentioned in the introduction, at the same time the program directors were sent the survey presented in this manuscript, a similar survey was also sent to a randomly selected sample of AAPD members in practice. Some of the most meaningful information associated with the responses of the program directors can be found by comparing their responses with those of the practitioners, which was reported by Seale and Kendrick.¹ Patients treated in the academic medical centers, which often provide the clinical component of teaching programs, may differ dramatically from populations commonly seen in private practice.¹

The first big difference was the distribution of payer sources for the patients in the two groups. Medicaid was the most frequent (66%) payer source in the post-doctoral programs while insurance and self-pay were more frequent (72%) payer sources in private practice.¹ Additionally, nearly one-half of the private practice respondents had no Medicaid patients. Evidence in the literature supports that these two patient populations have different risk factors and disease levels, both of which affect the management of caries in the very young child.^{2,3,4}

Additional differences may be found in the responses of program directors about treatment technique definitions, uses, and effectiveness when compared with those same responses from private practitioners. The frequency of use of the five techniques for treating caries was similar for both groups, but the way they defined these techniques was different and may be related to differences in patient populations between the two groups. Responses from those in private practice appear to define techniques emphasizing home care and prevention such as risk assessment, and conservative treatments for caries such as disking.

The fact that program directors chose descriptors to define definitive therapy involving the behavior management techniques of papoose board/restraint, conscious sedation, and general anesthesia in the hospital more frequently than did practitioners may indicate that program directors see a younger population of patients with more caries and/or more difficult behavior management problems.

Responses about effectiveness of the different techniques for treatment of varying degrees of severity of caries indicate that practitioners are much more positive about the effectiveness of two of the caries management techniques. Practitioners gave preventive maintenance effectiveness ratings of: 3.8, 3.1 and 3.2, respectively, for caries of enamel, dentin and all three types simultaneously compared with ratings of 3.1, 2.5 and 2.9 for the same degrees of severity of caries.¹ Practitioners rated risk assessment as: 3.5, 3.2 and 3.2, respectively, for caries of enamel, dentin and all three types simultaneously while program directors rate the same degrees of caries as 2.8, 2.6 and 2.6.¹ Perhaps the graduate programs are not treating patient populations for whom preventive programs and conservative treatment approaches are believed to be appropriate or effective. When the effectiveness ratings were compared with the payer sources for

the private practitioners, preventive maintenance and risk assessment were given lower effectiveness ratings by those with higher percentages of Medicaid patients.¹ Private practitioners with a higher percentage of Medicaid patients appear to rate effectiveness of caries management techniques similarly to program directors.

Additionally, Seale and Kendrick reported that analysis of payer sources with questions concerning treatment decisions for private practitioners revealed a significant relationship between the percentage of Medicaid and the importance of different factors in the treatment decision-making process.¹ The higher the Medicaid percentage in the practice, the more positive the respondents were about the importance of post-doctoral program teaching in helping them make the decisions concerning caries management. Intuitively, this association makes sense, because these practitioners are treating patients similar to those they treated in their post-doctoral programs.

Differences in responses about criteria used to determine effectiveness of treatment may again indicate different patient populations with different levels of disease. The criteria of no pain/asymptomatic (41%) was identified as an indicator of success much more frequently by the program directors than by practitioners (25%).¹

These differences in responses indicating different patient populations in teaching programs pose several interesting issues to ponder. Are post-doctoral students being educated in settings with patient populations that are different from those they will treat when they leave their programs and enter private practice? Do program directors have control in their programs of the patient populations or other experiences, or are they responding to institutional requirements to treat certain populations and/or generate income? Programs may be producing a practitioner whose treatment philosophy is more aggressive than is appropriate for some of the patient populations he/she will eventually treat.

Care should be taken to ensure that training programs provide a sufficient variety of children so that post-doctoral students have developed the skills necessary to treat the needs of all types of children. Ideally, the need to prepare a well-rounded pediatric dentist should be balanced with the programs' needs to provide care for underserved populations and to maintain financial viability.

Finally, because post-doctoral programs are the source of research assessing the effectiveness of different treatment approaches, efforts should be made to include the full range of the population in research studies so that data are available to guide clinical decisions for a wide range of children.

Table 6. Biggest Challenge in Managing Caries*

Parental compliance	48%
Managing child's behavior	41%
Parent's dental knowledge	10%
Financial issues	10%
Insurance/GA	7%
Other	10%

*Respondents could choose more than one response

Research results based on treatment outcomes in graduate programs may require careful reporting with proper qualifications to avoid misapplication to inappropriate patient populations. The ability to generalize research performed in the post-doctoral programs may not be as broad as previously thought.

Additional questions are raised by these data which deserve further consideration. How did techniques of caries management come to be defined? How does one decide which ones to use on which patients? If the decision is based on the needs of the children making up the patient populations, how are decisions modified to accommodate different patient populations demonstrating different needs? How do differences in patient populations affect the ability to determine effectiveness of the treatment techniques?

One must ask whether program directors are preparing post-doctoral students to see all types of patients and provide all types of care. Different patient populations may require different communication skills, may expect different restorative options and may demonstrate different levels of compliance. Treatment options requiring a great deal of patient/parent compliance may not be taught in programs where the predominant patient pool does not demonstrate these skills.

Conclusions

1. On average, two-thirds of the patients in post-doctoral pediatric dentistry programs are Medicaid patients.
2. Program directors are fairly uniform in how they define methods of caries management.
3. Program directors uniformly rate definitive therapy as the most effective method to manage all types of caries.
4. Program directors cite literature/textbooks as the major source of scientific evidence to support their treatment decisions.
5. Fewer than 20% of program directors have outcome data on the effectiveness of the methods of treatment that they use.

References

1. Seale NS, Kendrick AG. A survey of pediatric dentists' management of dental caries in children three years of age or younger. *Pediatr Dent* 23:211-216, 2001.
2. Vargas CM, Crall JJ, Schneider DA. Sociodemographic distribution of pediatric dental caries: NHANES III, 1988-1994. *JADA* 129:1229-1238, 1998.
3. Reisine ST, Psoter W. Socioeconomic status and selected behavioral determinant as risk factors for dental caries. *J Dent Edu* 65:1009-1016, 2001.
4. Tinanoff N, Douglass J. Clinical decision-making for caries management in primary teeth. *J Dent Edu* 65:1133-1142, 2001.

AN INVITATION TO PARTICIPATE

Academy members have asked how they can become involved with *Pediatric Dentistry*. The most obvious way is to prepare and submit a manuscript to be considered for publication. However, there is also a great need for dedicated individuals to volunteer the hours needed to review manuscripts. If you are interested, please contact Editor-in-Chief Milton Houpt by e-mail (houpt@umdnj.edu) indicating your particular interest and/or area of expertise. There is no financial remuneration for these activities, but great personal satisfaction comes from contributing to the production of our highly respected journal.