

Child behavior in a private pediatric dental practice associated with types of visits, age and socio-economic factors

Warren A. Brill*

The purpose of this study was to describe child patient behavior patterns seen in a private pediatric dental practice. Patient behavior for every individual visit was recorded over a span of 3 consecutive months using the Sarnat Behavior Scale as the descriptive measurement device. Behavior during 5 categories of procedures was recorded: new patient examination / introduction to the office, periodic re-care, restorative dentistry, orthodontic adjustment and quick check observation. Socio-demographic variables such as age, sex, method of payment as an indicator of socio-economic status, prior dental experience and referral source were also recorded. The results of this study showed: 1. the younger the child and the more threatening the procedure, the more often negative behavior was noted, 2. patients whose dental treatment was paid for by Medicaid and who are likely to be in a lower socio-economic strata, often exhibited more negative behavior than the fee-for service counterparts, 3. in general, there was no difference in the behavior between males and females, although males age 8 to 12 had a higher incidence of negative behavior than females when undergoing restorative dental procedures. There are trends between age, type of procedure, source of patient referral, method of payment and familiarity with the office, that may be able to used as behavioral predictors in a private pediatric dental office.

J Clin Pediatr Dent 25(1): 1-7, 2000

INTRODUCTION

The management of the difficult pediatric dental patient has long been the purview of the pediatric dentist. What constitutes a behavior problem in the dental setting, how often this occurs, physiological and psychological responses to the stress of dental manipulations and markers for the prediction of untoward dental patient behavior have been addressed in several studies.¹⁻¹²

A 1990 survey of randomly selected Diplomates of the American Academy of Pediatric Dentistry conducted by Allen, *et al.* found an average of 15% of patients considered to have moderate management problems and 7% to have serious management problems.⁶ Some respondents in this survey reported as many as 70% of the patients presenting with management problems.

In Sweden, a 1994 survey of 4,505 children aged 4 to 11 found 10.5% with behavior management problems,

which were more common in the younger children, among children, who missed appointments and children who were treated without local anesthetics.⁴ In another report with the same sample of patients, it was also found that dental fear and behavior management problems decreased with age and that age, general emotional status and maternal dental anxiety were concomitant factors in the development of dental fear.² This same author, in another publication, concluded that children expressing shyness and/or tendencies of negative emotionality should be considered patients at risk for developing dental fear problems.⁵

Another study of Swedish children reported both dental and non-dental markers that were predictive of behavior management problems.⁷ Among the non-dental markers, problems visiting a physician, dental fear in either of the parents and anxiety meeting new people were identified.

Four dental markers were identified: prior problems during a dental visit, dislike of the dentist, not enough time to adjust to the dental situation and fear of injection. None of the dental markers were predictive of behavior for patients aged 3 to 6 and none of them increased the predictive power of the non-dental variables.⁷

Sequential dental visits have been shown to have varying effects on physiological and psychological responses that ranged from improvement, to no change, to increases in negativity, with no consistent

* Warren A. Brill, D.M.D., M.S.(HYG), F.A.A.P.D., Private Practice, Baltimore, Maryland and Assistant Clinical Professor of Pediatric Dentistry, School of Dentistry, University of Maryland, Baltimore, Maryland, 1001 North Point Boulevard, Baltimore, MD 21224.

Phone: 410-282-8900
Fax: 410-284-5781
wbrill@erols.com

marker that can be used by the clinician for behavior management predictions.⁸⁻¹²

In all of these studies, behavior manifestations of the children during dental treatments were not quantified using rating scales such as, the scales suggested by Frankl, *et al.* or Sarnat, *et al.*^{13,14} Wright, *et al.* believe that a shortcoming of the commonly used Frankl scale is, that it does not give enough description as to the specific type of negative behavior, whereas, the Sarnat scale gives a more nuanced description of child behavior encountered in the dental setting.¹⁵

The pediatric dental literature is bereft of a description of the range of child patient behavior encountered in the private office setting for the various types of services that may be received, e.g., clinical evaluation/preventive dentistry, restorative dentistry and orthodontic treatments. Additionally, there are no reports in the literature that differentiate between the specific types of dental visits, prior dental experience by the child or the relationship of socio-economic factors to behavior. There are also no published reports about the predictability of behavior of those patients referred by generalists to pediatric dentists for specialty care.

The purpose of this study was to record the patterns of pediatric dental patient behavior using a behavior rating scale that quantifies the range of patient of patient behaviors seen in a private pediatric dental practice. In addition, it was of interest to determine if relationships existed between socio-economic status, age, sex, source of referral and prior dental experience with patient behavior.

MATERIALS AND METHODS

All patients presenting for treatment at the private pediatric dental practice of the author located in Baltimore County, Maryland during a period of three consecutive months (n = 976 patient visits made by 539 patients) were included in the study. Patients age new born to 60 months were assigned to age group 0-5; 61 to 96 months age group 5-8; 97 to 144 months age group 8-12, and those age 145 months and greater to age group >12. Parents and/or legal guardians gave informed consent for all dental treatment and for any behavior modification methods used during the course of therapy.

Behavior was scored using the scale described by Sarnat *et al.*¹³ Behavior patterns quantified by the Sarnat scale are:

1. Active cooperation

Smiles, offers information, initiates light conversation, gives positive responses.

2. Passive cooperation

Indifferent, but obedient, follows instructions, quiet.

3. Neutral, indifferent

Needs convincing, mild crying, follows instructions under pressure.

4. Opposed, disturbs work

Seizes hands of the dentist, not relaxed, sits and stands alternatively.

5. Completely uncooperative, strongly opposed

Cries, refuses to sit or to enter office.

Behavior during 5 types of visits was evaluated, i.e., new patient examination/ introduction to the office, periodic re-care, restorative dentistry, orthodontic adjustment and quick check observation.

New patients were children making their first visit to the office, but not necessarily the first visit to any dental practice. These patients underwent clinical and radiographic examinations, as tolerated, and were given oral hygiene instructions, dietary counseling, a prophylaxis and topical fluoride treatment, if not done by a referring dentist. Patients referred by general dentists, who elected not to treat them or patients who had previous dental experiences in other settings were classified as new patients for the purpose of this study.

Periodic re-care patients were patients of record returning for periodic follow-up of the oral health status, reinforcement of home oral health maintenance and preventive dental procedures, such as prophylaxis and application of topical fluoride, often referred to as a recall visit. A restorative visit included any invasive procedure such restorative dentistry, extractions, sealants and emergency procedures to relieve pain or treat acute infections. Orthodontic adjustments included: the placement of fixed and removable appliances, as well as modifying them as part of the treatment regimen. Quick check observations were for any non-invasive procedure, not including orthodontics, e.g., checking the integrity of a space maintainer.

Some patients were seen more than once and for more than one type of procedure, e.g., a patient may have come in as a new patient and then returned three times for rehabilitative therapy. Each visit was treated as a unique session.

For each patient visit, the age, sex, method of payment, the Sarnat score, referral source and if it were the first visit to the office was noted.

The primary overseer of treatment scored patient behavior, e.g., the preventive therapy assistant for new patient examination/introduction to the office and periodic re-care/oral health evaluation visits and the pediatric dentist for restorative, orthodontic and quick check observation visits. Both observers were trained in the method and independently scored a trial set of 25 patients in order to standardize their inter-examiner ratings with each other.

Behavior observation data was recorded manually on prepared data recording sheets separate from the patient charts, and transcribed to a computer data base program for storage, tabulation and analysis. Descriptive statistics were computed using patient visits as a unit of interest.

RESULTS

There were 976 patient visits made by 539 individual patients during the 3 months observation period. Table 1 presents a socio-demographic description of the patient population. Of the 976 patient visits, 625 (64%) were made by fee-for-service/insurance patients (IC) and 351 (36%) by patients who were enrolled in Medicaid dental programs (MA). There were 141 (14%) new patient visits, 256 (26 %) re-care visits, 307 (31%) restorative visits, 191 (20%) visits for orthodontics and 81 (8%) visits for quick check observations.

Figure 1 shows the distribution of all new patient visits, both, self/patient referred, and dentist referred, with Sarnat scores of 3, 4 or 5 (S345). Overall, 51 out of 141, or 36% had S345 scores. The percentage of S345 behavior decreased from 50% for those ages 0 to 5 to zero for those above age 12. There were no fee-for-service patients ages 5 and above that exhibited this behavior, while 23% (5/22) of Medicaid patients ages 5 to 8 ($z=3.05, p>99.7\%$) and 17% ages 8-12 (1/6) were scored as S345 ($z=1.56, p>75\%$).

New patients ages 0 to 5 who were referred by general dentists had patterns of behavior that were the same as new patients in general, i.e., 45% (20/44) S345 behavior vs. 50% (45/90) for all new patients ($X^2=.50, p=52.1\%$). There were no dentist referred fee-for-service new patients above the age of 5 with S345 scores, whereas, 33% of Medicaid patients ages 5 to 8 ($z=2.68, p>99.2\%$) and 8-12 (5/15) received Sarnat scores of S345 ($z=1.14, p>74.7\%$), as shown in Figure 2.

The percentage of all restorative patients with S345 behavior decreased from 75% (30/40) ages 0 to 5 to 4% (1/24) for those above age 12, with an overall incidence of 49% (151/307). Both Medicaid and fee-for-service patients up to the age of 12 had similar behavior patterns within the specific age groups. Above age 12 there were zero out of 21 fee-for-service patients scoring S345, while of the 3 Medicaid patients, one scored S345 ($z=2.80, p>99.4\%$), as shown in Figure 3.

There was a group of 85 patients whose first experience in the office was for restorative dentistry, as their initial examination, prophylaxis and topical fluoride were administered elsewhere prior to presentation. The patterns of behavior are shown in Figure 4 where it can be seen that incidence of S345 behavior for all patients decreased from 73% (32/44) for ages 0 to 5 to 22% (2/9) ages 8 to 12. There were no statistically significant differences within each specific group.

There was a subset of restorative dentistry patients, who were referred by general dentists but did not have any procedures performed by the referring dentist, i.e., they were immediately referred and had a new patient examination as the first procedure before undergoing restorative dental treatments. Of these 130 children, 82, or 63% had S345 scores, compared to 49% (151/307) for all restorative patients regardless of source of referral ($x^2=8.63, p>99.6\%$). Figure 5 shows that for

Table 1 Population Demographics (n=976 Patient Visits)

	n	%
Gender		
Male	496	51
Female	480	49
Age Range (Years)		
0-5	248	25
5-8	237	24
8-12	242	25
>12	249	26
Payment Type		
Fee for Service	625	64
Insurance Medicaid	351	36
Visit/Procedure		
New Patient	141	14
Periodic Re-care	256	26
Restorative	307	31
Orthodontics	191	20
Observation	81	8
1st Visit as:		
New Patient	141	14
Restorative Patient	151	16
Dentist Referred as:		
New Patient	70	7
Restorative Patient	130	13

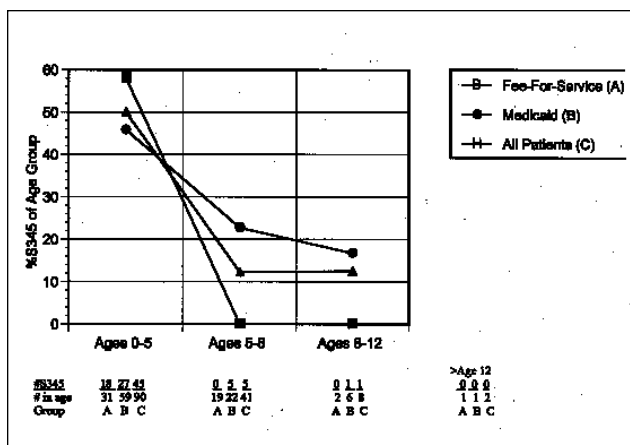


Figure 1. New Patients Visits with Sarnat Score 3, 4, or 5 (S345).

patients age 0 to 5 and 5 to 8, the incidence of S345 is essentially the same between fee-for-service and Medicaid patients, 80% vs. 77% (16/20 vs. 24/31) and 62% vs. 59% (16/26 vs. 16/27). In the age group 8 to 12, 50% (7/14) of the Medicaid enrolled children exhibited S345 behavior vs. 22% (2/9) of those in the fee-for-service category ($z=1.58, p>88.6\%$).

The only difference in S345 behavior between males and females was observed during restorative dental procedures for patients referred by general dentists. Figure 6 shows that males ages 0 to 5 and 5 to 8 more

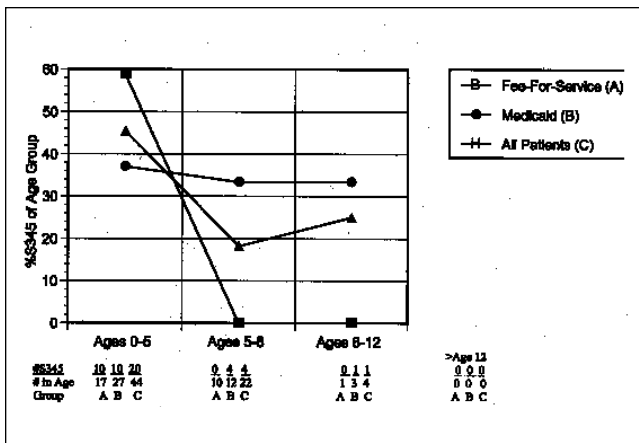


Figure 2. Dentist Referred New Patients with Sarnat Scores of 3, 4, or 5 (S345).

often had S345 scores, while females had a higher incidence of these scores at ages 8-12, although only the latter was significant ($z=2.10, p>96.4\%$).

Figure 7 presents the behavior patterns for re-care patients. These are individuals who had a prior experience in the office. There was an overall incidence of 11% (28/256) of these patients exhibiting S345 behavior. Both fee-for-service and Medicaid patients showed a decrease in frequency of S345 with age, the scores being very similar, decreasing from about 30% to 1% through the age groups. Ages 5 to 8, 23% of Medicaid patients had S345 scores vs. 9% of fee-for-service patients ($z=1.98, p>95.2\%$).

DISCUSSION

One purpose of this study was to describe the type and occurrence of child patient behavior patterns that are observed in a private pediatric dental practice, in addition to identifying predictors of behavior in various clinical situations. In private practice, as in academic and governmental clinical service delivery sites, patients often come in more than once and for more than one type of service. The experience they have at the first visit for any of type of service might be expected impact on behavior at future sessions. Recording behavior for all patient visits, in contrast to just using one visit per child represents what a clinician would actually encounter each time a patient was seen. While there may be questions as to the negative effect of prior visits on the reaction by the child, studies cited below imply that this may not necessarily be the case.

Venahm and Quatrocelli found that dental experience resulted in desensitization to nonstressful procedures and the opposite for stressful procedures, e.g., the response to cavity preparation did not change over 4 visits.⁸ In another study by Venham, *et al.*, negative response decreased by the fourth visit.⁹ Howitt and

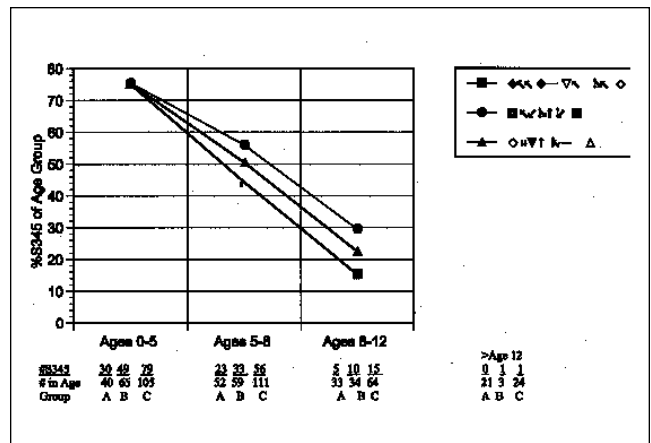


Figure 3. Restorative Dentistry Patient Visits with Sarnat Scores of 3, 4, or 5 (S345).

Stricker found child patient arousal decreased with visits,¹⁰ whereas Koenigsberg and Johnson in two separate studies found either no relationship between anxiety and sequential visits or unchanged responses.^{11,12}

There are several behavior rating scales available to describe dental patient behavior.¹⁶ The Sarnat scale was chosen because of the applicable description of the range of behavior seen in a dental office. The frequently cited behavior rating scale referred to as the Frankl Behavior Rating Scale, describes behavior patterns using 4, rather than 5 levels.¹⁴ Wright *et al.* have pointed out that a shortcoming of this method is that it does not communicate sufficient clinical information for uncooperative children.¹⁵

For the present study it was felt the 5 leveled Sarnat Scale described behaviors that are more meaningful to pediatric dentists. As one purpose of this study was to give pediatric dentists an estimate as to how patients of different ages would behave in a given situation, Sarnat scores were compared within each age group for a specific procedure, and when significant, to the total population as a whole.

While the behavior patterns of the patients in this study cannot be considered indicative of what all pediatric dentists might observe, they are instructive as to what clinicians might expect in similar situations. The practice of the author is located in a low to middle level socio-economic area of suburban Baltimore that borders on Baltimore City, with a large proportion of the population on Medicaid. The specific demographics of all the general dentists practicing in the area is not known, judging from personal acquaintance with many, those who referred patients ran the spectrum of age, gender, training, mix of patient payment modes and experience. Most practiced in solo offices, but there were some who were part of group practices either privately situated or associated with quasipublic and charitable institutions.

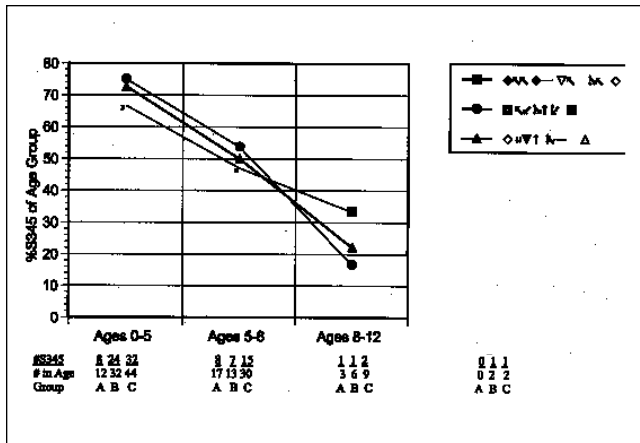


Figure 4. Patients Undergoing Restorative Dentistry at Their First Visit with Sarnat Scores of 3,4, or 5 (S345).

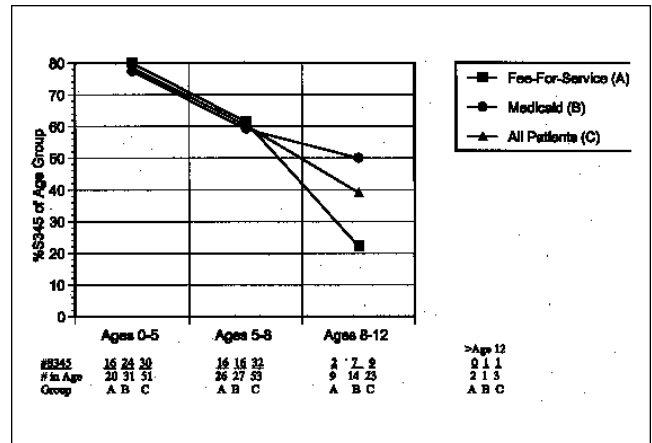


Figure 5. Dentist Referred Restorative Patient Visits with Sarnat Scores of 3, 4, or 5 (S345).

Conversations with several referring general dentists as to what they considered to be a management problem best handled by a pediatric dentist elicited that Samat scores of 3,4 and 5 (S345) were representative of behavior patterns the general dentists chose most often not to deal with, i.e., a chief reason for referral.

No specific information as to parental education, employment or family income was noted on the data recording sheets. However, as an indication of socioeconomic status, the reactions of children enrolled in Medicaid dental programs versus those covered by commercial insurance plans or personally by a responsible adult, were recorded.

The data presented in Figures 1 to 7 represents the percentage of S345 behavior in the total population, not a representative sample, therefore sampling error statistics do not apply for these graphs. Differences in response of population sub-sets were analyzed using paired comparison tests in order to determine if the behavior of children in these various sub-sets was statistically significant.

There were several instances where significant differences ($p > 95\%$) occurred between and amongst the various groups of children and the types of procedures they underwent. These will be elaborated upon below.

Not all published studies reporting behavioral reactions of children to dental procedures specified the type of appointment, although it can be assumed that the patients were undergoing restorative dentistry.¹⁻⁷ The overall S345 score recorded for 49% of all restorative patients in the present study, decreasing from 75% for the youngest age group to 4% for those over the age of 12, is consistent with Allen and the Scandinavian studies, which reported that 10.5% of children ages 4 to 11 had behavior problems.^{6,4} The results of this study, in terms of percentage of children who would be considered management problems, are consistent with the findings of Allen, *et al.* who noted behavior problems

occurring in as many as 70% patients, with an average of 22%.⁶ While many clinicians believe that patient behavior is affected by prior experience and multiple visits, considering the results of the studies cited above,⁸⁻¹² it was assumed that multiple visits were not a factor in the responses of the patient in the present study.

For all new patient visits, half of the patients had S345 behavior patterns, decreasing with increasing age. Only in the 5 to 8 age group was there a difference between payment types, with more Medicaid patients showing negative behavior than fee-for-service children. Dentist referred new patients had the same overall behavior as new patients in general, but Medicaid patients age 5 to 8 again exhibited more management challenges. From the results of this study one could expect half of all new patients, from all sources, to have S345 behavior patterns.

When children underwent restorative dental procedures, the negative behavior decreased with age and was not significantly different between Medicaid and fee-for-service within a given age group up to the age of 12. For children over age 12, those covered by Medicaid had a higher incidence of S345 scores.

This was the same pattern for patients undergoing restorative dentistry at the first session in the office. Also, those children referred by general dentists were more likely to have negative behavior patterns compared to all restorative patients

For restorative patients, the difference in behavior between the age groups was significant, e.g., comparing age group 0 to 5 to 5 to 8, in the former, 75% of the children were S345 compared to 50% of the latter ($z=3.9$, $p > 99.9\%$), while age group 8 to 12 had 4% of the children as S345 ($z=10.9$, $p > 99.9\%$), but within an age group there were no differences (Figure 3).

Restorative patients, age 0 to 5 had no differences in behavior in terms of payment method, referral source

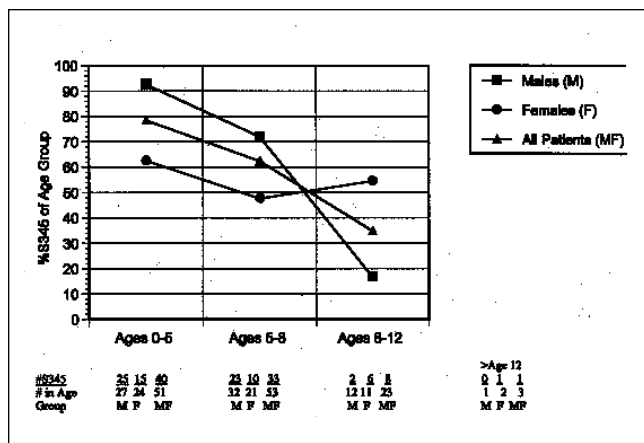


Figure 6. Restorative Patients Referred by General Dentist with Sarnat Scores of 3, 4, or 5 (S345) — Distributed by Age and Sex.

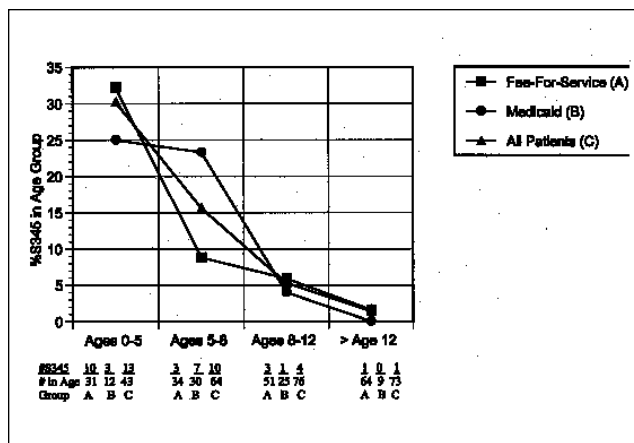


Figure 7. Periodic Recare Patient Visits with Sarnat Score of 3, 4, or 5 (S345).

or whether or not the first dental office visit was for restorative dental procedures within the group ($z=0$, $p=0$), and same was true for the 5 to 8 age group. For the 8 to 12 year age group, socio-economic strata is an indicator of the propensity for negative behavior, as 29% of the Medicaid children were S345 vs. 15% of the fee-for-service children ($z=3.69$, $p>99.9\%$). The fact that some patients did not have a noninvasive introductory visit to the practice also was not significant, however, if the child was referred by a general dentist, there was a higher likelihood of S345 behavior than for patients coming to the office via referral from other than dental sources.

The only difference in response to restorative treatment according to sex was for the 8 to 12 year olds, where males had a higher incidence of S345 behavior than females ($z=2.10$, $p>96.4\%$).

The results for periodic re-care visits are interesting in that even patients who had prior dental experience and were familiar with dentistry and the dental environment exhibited S345 behavior, although the incidence decreased from 30% to 1% as age increased. Method of payment did not appear to be a factor except for children age 5 to 8, who were covered by Medicaid. These children had significantly more negative behavior than fee-for-service counterparts ($z=1.98$, $p>98.2\%$).

As previously cited, there are several reports on the physiological and psychological responses to sequential visits, and responses during solitary visits (8-12). The results of those studies are inconsistent, with reports of no change, as well as positive and negative changes. It would therefore be of interest in a future study to prospectively record the Samat scores of re-care patients and of patients undergoing restorative procedures at sequential visits.

When patients are referred for any medical/dental procedures in Maryland, by statute they must present a standardized referral form with reason(s) for referral.

While it may be true that some general dentists refer Medicaid patients because of financial considerations, this was never noted on any referral form. Stated reasons for referral were the young age of the patient, behavioral problems, extent of decay or request for a specific therapy, such as a pulpotomy or extraction and space maintainer.

Clinicians have long held the anecdotal opinion that the type of visit would affect the behavior of the child. As was cited earlier, children have varying degrees of response to both evaluative and therapeutic dental procedures.¹⁻¹² This study made observations of all patients in all situations encountered in an ongoing private pediatric dental practice. The results of the cited studies and the present study essentially agree that reaction to stress by children is not entirely predictable or rational and that the pediatric dentist should not approach a child with preconceived notions of response.

A limitation of this study is the small number of patient visits in several age groups, thus the behavior of patients over age 12 was not be evaluated on a statistical basis. None the less, when a pediatric dentist sees a patient from lower socio-economic strata, it can reasonably be anticipated that they will not to behave as well as their more fortunate counterparts.

CONCLUSIONS

This study found that there are relationships between age, type of procedure, source of patient referral, method of payment and familiarity with the office on patient behavior in a pediatric dental office.

1. The younger the child and the more threatening the procedure, the more prevalent negative behavior was noted.
2. Patients whose dental treatment was paid for by Medicaid and who are likely to be in a lower socio-economic strata, often exhibited more negative behavior than their fee-for-service counterparts.

3. In general, there was no difference in the behavior between males and females, although males age 8 to 12 had a higher incidence of negative behavior than females when undergoing restorative dental procedures.

REFERENCES

1. Holst A, Hallonsten AL, Schroder U, Ek L, Edlund K. Prediction of behavior-management problems in 3-Year old children. *Scan J Dent Res* 101: 110-14, 1993.
2. Klingberg G. Dental fear and behavior management problems in children. A study of measurement, prevalence, concomitant factors, and clinical effects. *Swed Dent J Suppl* 103: 1-78, 1995.
3. Klingberg G, Berggren U, Carlsson SG, Noren JG. Child dental fear: Cause-related factors and clinical effects. *Eur J Oral Sci* 103: 405-12, 1995.
4. Klingberg G, Annas Lofqvist L, Bjarnason S, Noren JG. Dental behavior management problems in Swedish children. *Community Dent Oral Epidemiol* 22: 201-5, 1994.
5. Klingberg G, Broberg AG. Temperament and child dental fear. *Pediat Dent* 20: 237-43, 1998.
6. Allen KD, Stanley RT, McPherson K. Evaluation of behavior management technology dissemination in pediatric dentistry. *Pediat Dent* 12: 79-82, 1990.
7. Holst A, Schroder U, Hallonsten AL, Crossner CG. Prediction of behavior management problems in children. *Scan J Dent Res* 5: 457-65, 1988.
8. Venham L., Quatrocelli S. The young child's response to repeated dental procedures. *J Dent Res* 56: 734-8, 1977.
9. Venham L, Bengston D, Cipes M. Children's response to sequential dental visits. *J Dent Res* 56: 454-9, 1977.
10. Howitt JW, Stricker G. Sequential changes in response to dental procedures. *J Dent Res*. 49: 1074-7, 1970.
11. Koenigsberg SR, Johnson R. Child behavior during three dental visits. *J Dent Child* 42: 197-200, 1975.
12. Koenigsberg SR, Johnson R. Child behavior during sequential dental visits. *J Am Dent Assoc*. 85: 128-32, 1972.
13. Sarnat H, Peri JN, Nitzan E, Perlberg A. Factors which influence cooperation between dentist and child. *J Dent Educ* 36: 9-15, 1972.
14. Frankl SN, Shiere FR, Fogels HR. Should the parent remain with the child in the dental operator? *J Dent Child* 29: 150-163, 1972.
15. Wright GZ, Starkey PE, Gardner DE. Managing children's behavior in the dental office. pp. 8 1-84. CV Mosby Company, 1983.
16. Horsey MT, Blinkhorn AS. An evaluation of four methods of assessing the behaviour of anxious child dental patients. *Int J Paediatr Dent* 5: 87-95, 1995.

