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Parent-Reported Distress in Children Under 3-years Old During Preventive Medical and Dental Care

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Abstract

Purpose—This study examined factors related to young children’s distress during preventive oral health visits. Additionally, associations between parent-reported child behavior during the dental visit and during prior medical visits were tested.

Methods—One hundred twenty two children under 3 years of age enrolled in a government insurance program for low-income children were seen for examination, prophylaxis, and fluoride application at a university-based dental clinic. Child distress was rated by parents on a numerical rating scale.

Results—The average age of children enrolled was 23.5 ± 7.3 months. The majority (55.7%) were judged to have little or no distress pre-examination. Mild or no distress during the examination was reported for 42.6% of the children and severe distress was reported for 39.4%. Intensity of distress during the examination was not associated with the child’s age, gender, dental health, or prior experience with dental care. Distress was also unrelated to the caregiver’s

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Conflict of Interest:

The authors declare that they have no conflict of interest.

education level or own dental health. Intensity of distress was associated with the child's pre-dental examination distress and distress during prior medical examinations and injections.

Conclusions—Dental professionals can better anticipate child distress by assessing children before examination and inquiring about previous medical experiences. Strategies to prepare parents and alleviate distress may help children cope with the preventive dental visit.

Keywords

stress; coping; infant; preventive dentistry

Introduction

Early preventive dental visits (PDV) are fundamental to the promotion of oral health in young children. Recognizing this, the American Academy of Pediatric Dentistry, the American Dental Association, the Canadian Dental Association, the European Academy of Pediatric Dentistry, and the American Academy of Pediatrics recommend that children have an oral health assessment by the first birthday. (AAPD 2012; CDA 2005; EAPD 2008; Hale 2003) As a result, more young children are now receiving dental care than in the past. (Garg *et al.* 2013) Early initiation of care provides an opportunity to perform risk assessment, screen for untreated dental disease, provide oral health counseling, and deliver preventive care such as fluoride varnish treatments.

Early preventive dental visits by young children enrolled in government insurance programs for low-income children are associated with greater use of preventive services in the future and with lower dental-related costs. (Savage *et al.* 2004; Sen *et al.* 2013) These findings extend over the life course, reducing overall disease experience into adulthood. (Bhaskar *et al.* 2014) However, receipt of recommended preventive visits is still generally low for US children, and not all children attend PDV at equal rates. (Landers *et al.* 2013; Yu *et al.* 2002) Disparities in dental visit attendance have been associated with large family size, young parent age, low educational levels, low income, difficulty finding a provider who accepts government insurance, transportation challenges, high parent dental anxiety, and poor perceived child oral health. (Alio and Salihu 2005; Committee on Oral Health Access to Services 2011; Goettems *et al.* 2012; Kataoka-Yahiro and Munet-Vilaro 2002; Kelly *et al.* 2005; Mofidi *et al.* 2002; Phillips *et al.* 2000; Piovesan *et al.* 2011; Smith and Lewis 2005; Watson *et al.* 2001)

Developing a habit of preventive care from a young age is particularly important for low-income children who are more likely to develop tooth decay and have, on average, more than twice the number of decayed teeth as do non-poor children. (Dye *et al.* 2007; Kaste *et al.* 1999; US DHHS 2000; Vargas *et al.* 1998) Children of lower socioeconomic groups are considered to be at higher risk for disease; therefore they should be given priority for preventive dental care before age 3. (Beil *et al.* 2013) Despite these recommendations, in the years 2005 – 2008, the proportion of all U.S. children reported to receive any preventive oral health care in the prior 12 months was only 21% and did not vary appreciably by family income. (Huebner *et al.* 2013) A recent cross sectional study indicated that children in a

Canadian sample from low-income families were least likely to have visited the dentist by age one and most likely to have cavities.(Darmawikarta *et al.* 2014)

Unlike dental care for adults, care for young children necessitates a triadic relationship among the patient, parent, and clinician. Emotional aspects of the dental experience, for the child and the parent, influence a parent's decision to return for subsequent dental visits. For example, parents of preschool-age children in need of restorative treatment describe their child's crying and upsetting behaviors during prior dental visits as a primary reason they avoided seeking recommended care.(Bitar King *et al.* 2011; Song and Pickrell 2010) Conversely, a positive experience can influence the family to return for additional preventive treatments, increase confidence in oral health home care maintenance, and promote positive outcomes at return visits.(Zhou *et al.* 2013) Concerns about children's behavior affect dentists too, and some may be reluctant to see very young children to avoid disruption of the office environment due to crying.(Garg *et al.* 2013)

From an adult's perspective a routine dental or medical examination includes procedures that may be uncomfortable but do not elicit a high level of stress. However, child distress during medical and dental procedures is common and likely due to the child's natural wariness of unfamiliar situations and people, immature communication skills, and developing emotional stability.(Cunha *et al.* 2009) Medical procedures perceived to be necessary yet painful and distressing to young children, including immunizations, venipuncture, and cancer treatments, have been the subject of extensive investigation.(Blount *et al.* 1991; Blount *et al.* 2008b; Chambers *et al.* 2009; Frank *et al.* 1995; Mahoney *et al.* 2010; McMurtry *et al.* 2007; McMurtry *et al.* 2010; Zhou *et al.* 2013) The shared goal of these studies was to identify ways to reduce distress and disruptive behavior of paediatric patients. Recommendations derived from this literature suggest that medical providers' use of distraction, nonprocedural talk, breathing exercises, specific directions to the child, and physical contact such as bouncing, patting, and rocking may improve a child's reaction to care. While a considerable body of literature has evaluated pain behavior during routine and specialty medical care, few studies have examined young children's distress during routine dental care.

Though routine visits rarely include procedures as invasive or painful as an injection, it is widely accepted that young children cry during dental examinations. In fact, parents are sometimes informed that this eventuality is an advantage, allowing for good visualization of the child's mouth. To date, there have been few studies of the frequency or intensity of distress experienced during dental examination and preventive visits. Interventions to improve the experiences of the parent and child have not been widely considered because we currently have a limited ability to identify children prone to extreme distress during dental examinations. In this study, we sought to quantify the prevalence and intensity of young children's distress during routine dental examinations and determine if information routinely collected at the time of the appointment could predict the behavior of individual children.

Materials and Methods

Participants

The study was carried out based upon the ethical principles of the Declaration of Helsinki. All procedures were approved by an ethics committee, the University of Washington's Institutional Review Board (FWA00006878), and each subject's parent underwent the informed consent process prior to entry into the study. A convenience sample of 122 children presenting to the University of Washington Center for Pediatric Dentistry (CPD) from April 2012 to March 2014 was chosen. Parents of children aged 6 to 36 months who presented for preventive dental examinations were eligible to participate in the study. Subjects were selected from the patient pool of 21 faculty, resident, and student dentist participants. Inclusion criteria were parents fluent in English and physically healthy children under 36 months of age enrolled in the federal government insurance program for low-income children.

Procedures

The data used in this study were collected as part of a larger study of young children's behavior during dental exams that included video recording of the examination and two questionnaires completed by the parents. For the present study we drew our data from the parent questionnaires only. After check-in with the clinic reception desk, caregivers were approached by a member of the research team and invited to participate in the study. Consenting parents then completed an initial questionnaire. The questionnaires asked for adult and child socio-demographic information; parents' rating of their child's health (poor to excellent); parents' rating of their own dental health (poor to excellent); the age at which the child first had a dental appointment; and the child's reaction to the last dental examination (easy to difficult). This questionnaire also asked questions pertaining to the child's reaction to *physical exam* and *shots* administered during previous preventive medical visits. Parents rated the intensity of their child's distress during medical examination on a numerical rating scale, which was later summarized as *easy*, *mid-range*, or *difficult*.

Standard of care preventive dental visit procedures, including an oral examination, prophylaxis, and fluoride varnish treatment were then performed. The majority of children were examined in the knee-to-knee position. During the appointment, parents rated their child's distress at the following time points: when the dentist entered the room; when the dentist was looking in the child's mouth, cleaning, or putting fluoride on the teeth; and when the dentist was finished looking in the child's mouth. The dentist performing the procedures was blinded to the responses of the initial questionnaire and the parent distress ratings. For analysis this was summarized as *before*, *during*, and *after* dental examination, respectively.

In the second questionnaire, procedures were rated by parents on a 10-point numerical rating scale with anchors of "no distress" (0) and "distress as bad as it could be" (10). This measure was informed by clinical studies of pain responses to medical procedures, in which the terms "pain" and behavioral "distress" are used interchangeably. (Cohen 2002; Williamson and Hoggart 2005) Consistent with the literature on pain intensity, the numeric ratings of child distress during the dental appointment were grouped to form a four-level

metric: no distress (0), mild distress (1–3), moderate distress (4–6), and severe distress (7+). (Jones *et al.* 2005)

Statistical Analysis

Descriptive statistics (means, standard deviations, counts, and percentages) were calculated for all variables. Associations among child's distress during the three parts of the dental appointment (*before, during, and after* dental examination) were calculated using a Chi-square Test or a Fisher's Exact Test. Similarly, we tested associations between parent-report of distress during the dental examination and several covariates of interest (child's age, child's gender, child and caregiver dental health, caregiver education, and child's prior experience with preventive dental care) using a Chi-square Test or a Fisher's Exact Test. The significance level was pre-set to 0.05.

Results

Table 1 presents descriptive information for the 122 parent child dyads that participated in the study. The sample was largely comprised of non-Hispanic white or Asian female caregivers, the majority of whom had attended at least some college. Racial and ethnic characteristics of child participants generally matched that of their adult caregivers. The average age of children enrolled was 23.5 ± 7.3 months, with children between 25–36 months of age representing the largest age group. The majority of parents (80.3%) reported their child's dental health as good to excellent, while their own dental health was reported as good (45.9%) or worse (24.6%). Nearly all parents (96.7%) reported that their child had a place for medical care, and 56.6% of the children had experienced dental examination previously.

While about 80% of parents reported their child as having either mild or no distress before the dental examination, almost 55% were reported as displaying moderate or severe distress during the examination procedures. (Figure 1a) Child distress during the examination was statistically associated with distress prior to the dental examination ($p < .0001$). While a portion of children (28.2%) who displayed no distress pre-examination exhibited severe distress during the examination, most children rated as showing no distress pre-examination were rated as showing no distress, or mild distress, during the examination (56.3%). In contrast, children who exhibited moderate or severe distress pre-examination were highly likely to exhibit severe distress during examination (83.3% and 66.7% respectively). After examination, most children recovered to pre-examination distress levels. Intensity of distress was not associated with age, gender, child or caregiver dental health, caregiver education, or prior experience with preventive dental care. (Table 2)

While a relatively small number of children were reported to have difficulty with past medical examinations, nearly 1/3 reported difficulty with immunizations. (Figure 1b) Intensity of distress during the dental examination was statistically associated with a history of distress during medical examinations and immunizations ($p < .0001$). Children reported to have great difficulty with immunizations or with medical examinations were overwhelmingly likely to exhibit severe distress during dental examination (80.6% and 93.3% respectively). (Table 2)

Discussion

In this study, we sought to identify factors related to young children's distress during preventive oral health visits. Our finding that intensity of distress was not associated with age is surprising, as younger children have previously been reported to demonstrate higher levels of behavioral distress. (Dahlquist *et al.* 1995) It may be that because all children in our sample were under the age of 36 months, there was insufficient variation to detect an age-based difference. Though approximately half of the children had a history of prior dental visits, this did not appear to positively or negatively affect reported distress.

We found it of interest that only 12% of parents rated their child's previous medical examinations as difficult and yet more than 3 times that number were rated as displaying severe distress during the dental examination and fluoride application. Because examination and preventive procedures are non-painful, dental providers may presume the infant dental visit to be a relatively benign experience. However, we found that early dental examinations are perceived by parents and very young children to be relatively invasive and sufficiently stressful that stress reduction techniques are indicated.

The medical literature provides insight into practitioner and parent behaviors that may help decrease child stress and facilitate coping. One study that evaluated the influence of adults' behaviors on infant distress following injections found support for the stress reduction strategies of: distraction, non-procedural talk, and seating the child in contact with the parent. There is also support for parents' patting the child to promote child coping. (Blount *et al.* 2008a; Mahoney *et al.* 2010) Distraction may include use of video, music, or stories during any phase of the visit. Age-appropriate toys such as rattles and dolls can also be useful. (Chambers *et al.* 2009) These toys can become the focal point of a child-centered approach to dental behavior management. (Weinstein 2008)

While, future research is needed to evaluate the full potential that these techniques have to alleviate stress during the dental examination, practitioners can employ some of these strategies to improve the patient experience. One suggestion is for dental providers to engage in parent coaching: training parents in positioning, body language, distraction techniques, and positive vocal tone. (Chambers *et al.* 2009) Because parent anxiety is positively associated with negative behavior in children undergoing dental treatment, it may also be wise to inform parents of this and work to reduce their anxiety. Alternately the dentist may suggest that a non-anxious family member bring the child to the appointment. (Frank *et al.* 1995)

Routine dental care has not traditionally been sought from an early age; however the high rates of decay experienced by young children indicate a need for emphasis in prevention from the time of eruption of the first tooth. While most children see a primary medical care provider approximately 10 times for preventive visits and immunizations before the age of three, few see a dentist in the first years of life. (Douglass *et al.* 2004) Unfortunately, rates of first dental visits and return visits have been low historically, and remain low. Though additional research is needed to understand low rates of return for ongoing preventive dental care, one possible explanation is related to parents' satisfaction with the dental experience.

(Grembowski and Milgrom 2000) How parents perceive health and illness, preferences for healthcare approaches, and style of communication are also important parental motivators. (Kataoka-Yahiro and Munet-Vilaro 2002; Miller *et al.* 2010; Vann *et al.* 2013) In order to foster a habit of routine care it is critical that parents develop positive associations with dentistry and perceive the experience as valuable to their child's health. By preparing parents for what to expect in a dental examination, clinicians may contribute to a positive association with the visit.

In this study, distress was associated with difficulty during prior medical examinations and immunizations. We found this to be the case for approximately 1/3 of all child participants. These results indicate that children who react most strongly to medical examinations and immunizations are at highest risk for severe distress during dental examination. By inquiring about a child's reaction to medical procedures the clinician may gain insight into the potential reaction to dental care. This information may then be used to relay accurate messages, set parent expectations, and preempt parent dissatisfaction. Simply asking a question like "how did s/he do for their medical examination?" may go a long way toward predicting the child's reaction to dental examination. Based upon the large number of children who seem to have a difficult time coping with early preventive dental care, it may also be helpful to explain to parents that dental examination and fluoride treatment is commonly perceived to be relatively invasive. Parents may appreciate knowing that while the majority of children display moderate to severe distress for preventive dental treatment almost all children quickly recover after the examination.

This study was subject to several limitations. Examination procedures were performed at a university-based dental clinic, with twenty-one separate dental providers participating in the project. The treating dentists were comprised of faculty, residents, and students. It is likely that practitioner experience and style may have affected the children's response to care and parents' impression of distress experienced by each child. While variation in provider ability is a weakness of the study, it does not significantly detract from the primary outcome of interest: the parent's subjective assessment of child distress in the context of all medical care. The study provided evidence that many parents perceive early dental visits to be relatively stressful experiences for young children, but child distress was not measured objectively by an independent observer. The study sample was also limited to children from low income families. This group was selected because this population experiences greater difficulty attending preventive dental care and experiences poorer oral health. Although consistent with the intent of the study, this may limit the generalizability of the findings. Parent report was also subject to recall bias, as rating of the child's distress during medical visit was for past experiences, while the dental examination rating occurred in real time.

Conclusion

This study showed that the majority of parents report that young children experience moderate to severe distress during preventive dental treatment. Pre-examination distress and difficulty with prior medical examinations and immunizations are significantly associated with distress during exam. Parent satisfaction and willingness to bring their child for routine preventive care are impacted by their experience. Dental providers can help parents of

young children develop a habit of routine paediatric preventive care by anticipating child behaviors, informing parents about possible child reactions, providing parent coaching, and altering their own style to facilitate a positive experience.

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Figure 1a

Figure 1b

Figure 1.

Figure 1a: Child Distress at the Dental Visit

*Graphic created with MS Word

Figure 1b: Child's Experience at a Medical Visit

*Graphic created with MS Word

Table 1

Demographic Characteristics of Adults and the Accompanying Child Participants

	N = 122
<i>Caregiver Characteristics</i>	
	Mean (SD)
Age of Caregiver	31.2 (6.4)
	N (%)
Relationship to child	
Mother	93 (76.2%)
Father	22 (18.0%)
Other	4 (3.3%)
Missing	3 (2.5%)
Education	
High School or Less	24 (19.7%)
Some College	43 (35.2%)
4 year College or More	51 (41.8%)
Missing	4 (3.3%)
Hispanic Ethnicity	
Yes	17 (13.9%)
No	104 (85.3%)
Missing	1 (0.8%)
Race	
White	75 (61.5%)
Black	5 (4.1%)
Asian	19 (15.6%)
Other/Multiple	12 (9.8%)
Missing	11 (9.0%)
Overall Dental Health	
Poor/Fair	30 (24.6%)
Good	56 (45.9%)
Very Good/Excellent	36 (29.5%)
Amount of Dental Work	
None	24 (19.7%)
Some	72 (59.0%)
A lot	25 (20.5%)
Missing	1 (0.8%)
<i>Child Characteristics</i>	
Child Age	
Less than 12 months	7 (5.7%)
12 – 18 months	23 (18.9%)

	N = 122
19 – 24 months	31 (25.4%)
25 months or more	59 (48.4%)
Missing	2 (1.6%)
Child Gender	
Male	61 (50.0%)
Female	61 (50.0%)
Child Hispanic Ethnicity	
Yes	24 (19.7%)
No	96 (78.7%)
Missing	2 (1.6%)
Child Race	
White	62 (50.8%)
Black	6 (4.9%)
Asian	17 (13.9%)
Other/Multiple	25 (20.5%)
Missing	12 (9.9%)
Child Has a Place for Medical Care	
Yes	118 (96.7%)
No	4 (3.3%)
Child Overall Health	
Poor/Fair	3 (2.5%)
Good	16 (13.1%)
Very Good/Excellent	102 (83.6%)
Missing	1 (0.8%)
Child had a Previous Dental Visit	
Yes	69 (56.6%)
No	51 (41.8%)
Missing	2 (1.6%)
Child Has a Dental Home	
Yes	103 (84.4%)
No	19 (15.6%)
Child Overall Dental Health	
Poor/Fair	13 (10.7%)
Good	41 (33.6%)
Very Good/Excellent	57 (46.7%)
Missing	11 (9.0%)

Table 2
Associations Between Caregiver and Child Characteristics and Child Distress During Dental Examination Procedures

	Child Distress during Dental Examination				p-value
	None	Mild	Moderate	Severe	
Caregiver Education					0.629*
High School or less	7 (29.2%)	3 (12.5%)	4 (16.7%)	10 (41.7%)	
Some College	9 (21.4%)	10 (23.8%)	5 (11.9%)	18 (42.9%)	
4 year College or more	8 (16.0%)	13 (26.0%)	11 (22.0%)	18 (36.0%)	
Caregiver Overall Dental Health					0.953**
Poor/Fair	4 (13.3%)	7 (23.3%)	5 (16.7%)	14 (46.7%)	
Good	13 (24.1%)	12 (22.2%)	9 (16.7%)	20 (37.0%)	
Very Good/Excellent	8 (22.2%)	8 (22.2%)	6 (16.7%)	14 (38.9%)	
Child Overall Dental Health					0.902*
Poor/Fair	3 (25.0%)	2 (16.7%)	1 (8.3%)	6 (50.0%)	
Good	9 (22.0%)	6 (14.6%)	9 (22.0%)	17 (41.5%)	
Very Good/Excellent	11 (19.6%)	13 (23.2%)	9 (16.1%)	23 (41.1%)	
Child Age					0.620*
Less than 12 months	2 (33.3%)	1 (16.7%)	1 (16.7%)	2 (33.3%)	
12 – 18 months	3 (13.0%)	8 (34.8%)	4 (17.4%)	8 (34.8%)	
19 – 24 months	5 (16.1%)	5 (16.1%)	4 (12.9%)	17 (54.8%)	
25 months or more	15 (25.9%)	12 (20.7%)	11 (19.0%)	20 (34.5%)	
Child Gender					0.504**
Male	16 (26.2%)	12 (19.7%)	10 (16.4%)	23 (37.7%)	
Female	9 (15.3%)	15 (25.4%)	10 (16.9%)	25 (42.4%)	
Child Has Seen a Dentist Previously					0.547**
Yes	17 (24.6%)	14 (20.3%)	10 (14.5%)	28 (40.6%)	
No	8 (16.3%)	13 (26.5%)	10 (20.4%)	18 (36.7%)	
Child Distress Pre Dental Examination					<0.001*

	Child Distress during Dental Examination				p-value
	None	Mild	Moderate	Severe	
None	24 (33.8%)	16 (22.5%)	11 (15.5%)	20 (28.2%)	
Mild	0 (0%)	9 (36.0%)	7 (28.0%)	9 (36.0%)	
Moderate	1 (5.6%)	1 (5.6%)	1 (5.6%)	16 (83.3%)	
Severe	0 (0%)	1 (16.7%)	1 (16.7%)	4 (66.7%)	
Child Difficulty during Medical Examination					<0.001*
Easy	13 (28.9%)	14 (31.1%)	8 (17.8%)	10 (22.2%)	
Mid-Range	10 (18.2%)	12 (21.8%)	11 (20.0%)	22 (40.0%)	
Difficult	0 (0%)	0 (0%)	1 (6.7%)	14 (93.3%)	
Child Difficulty during Immunization at Medical Visit					<0.001*
Easy	12 (46.2%)	7 (26.9%)	3 (11.5%)	4 (15.4%)	
Mid-Range	8 (15.4%)	17 (32.7%)	14 (26.9%)	13 (25.0%)	
Difficult	2 (5.6%)	2 (5.6%)	3 (8.3%)	29 (80.6%)	

* P-value calculated using a Fisher's Exact Test

** P-value calculated using a Chi-square Test