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Oral Health Activities of Early Head Start Teachers Directed toward Children and Parents

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Abstract

Objectives—This cross-sectional study examined Early Head Start (EHS) teachers' oral health program activities and their association with teacher and program characteristics.

Methods—Self-complete questionnaires were distributed to staff in all EHS programs in North Carolina. Variables for dental health activities for parents (4 items) and children (4 items) were constructed as the sum of responses to a 0-4 Likert-type scale (never to very frequently). Ordinary least squares regression models examined the association between teachers' oral health program activities and modifiable teacher (oral health knowledge, values, self-efficacy, dental health training, perceived barriers to dental activities) and program (director and health coordinator knowledge and perceived barriers to dental activities) characteristics.

Results—Teachers in the parent (n=260) and child (n=231) analyses were a subset of the 485 staff respondents (98% response rate). Teachers engaged in child oral health activities (range=0-16; mean=9.0) more frequently than parent activities (range=0-16; mean=6.9). Teachers' oral health values, perceived oral health self-efficacy, dental training, and director and health coordinator knowledge were positively associated with oral health activities ($P<0.05$). Perceived barriers were negatively associated with child activities ($P<0.05$).

Conclusion—The level of oral health activity in EHS programs is less than optimal. Several characteristics of EHS staff were identified that can be targeted with education interventions. Evidence for effectiveness of EHS interventions needs to be strengthened, but results of this survey provide encouraging findings about the potential effects of teacher training on their oral health practices.

Keywords

Early Head Start; early intervention; child; oral health; dental caries; prevention

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Introduction

A number of initiatives have targeted oral health problems among children participating in early education and child care programs (1-4). These initiatives are viewed as important because of the large and increasing amount of dental disease observed in young children in the United States. The prevalence of dental caries in the primary dentition of two- to four-year-old children increased from 18.5% in 1988-1994 to 23.7% in 1999-2004 (5). Large disparities also exist in the prevalence of dental disease and access to dental care according to race, ethnicity, socioeconomic status and other child and family characteristics (6, 7). Among poor and near-poor children two to five years of age, 54% have untreated dental caries compared to 6% of high-income children (6).

Early Head Start (EHS) is a federally funded program designed to address the social, educational and health needs of pregnant women and children younger than three years of age. Families with household incomes at or below 135% of the Federal Poverty Level are targeted (8). EHS is an attractive setting in which to implement preventive dentistry programs because they enroll high-risk children at an age before most of them will have experienced any dental disease. Nationwide, EHS programs serve approximately 66,000 children, but this number will increase by an estimated 54,000 pregnant women and children because of funding from the American Recovery and Reinvestment Act of 2009 (8, 9).

EHS programs must adhere to federal performance standards that outline activities to promote the healthy development of children and families (10), but limited evidence exists regarding the frequency and types of oral health activities conducted in EHS programs (11, 12). Studies of oral health in EHS have reported the prevalence of caries in inner-city EHS children (13) and examined staff opinions about medical professionals providing dental care (13, 14). In a qualitative study, Mofidi et al. found that EHS parents and staff are generally knowledgeable about oral health, but struggled to communicate effectively with each other about this topic (15).

To better understand oral health activities within EHS programs and differences across programs, we undertook a survey of staff in North Carolina (NC), a state facing problems with dental disease and access to care similar to those observed nationally. In some NC counties, nearly 60% of children begin school having experienced dental caries (16). Access to care also is difficult because of workforce shortages. In 2005, the state had only 4.1 dentists per 10,000 people, the 47th lowest dentist to population ratio in the U.S. (17).

The survey collected information about oral health activities of teachers in EHS programs using a framework for expected activities (14). It was conducted to provide information about the involvement of EHS programs in oral health promotion for use in a planned statewide educational intervention. The information collected provides insights into EHS staff's oral health knowledge, values placed on oral health, perceived self-efficacy in providing oral health activities, and other characteristics that might affect implementation of oral health activities. The purpose of this paper is to report on the oral health activities of teachers in EHS programs in NC, describe variation among programs, and identify teacher- and program-level factors associated with these activities that could potentially be modified through training programs or other interventions.

Methods

A cross-sectional survey of staff in home-based and center-based NC EHS programs was conducted in June 2005. The 18 EHS programs in NC were identified with assistance from the state's Head Start collaborator and confirmed by published lists and communication with the federal regional oversight office. Questionnaires were delivered in person to each of the

EHS programs by research staff. A designated EHS staff member collected and returned all questionnaires. The questionnaire itself included six domains (knowledge, value placed on oral health, confidence in performing dental activities, expected outcomes, current practices, and barriers encountered), all of which contained items related to classroom activities, interactions with families, dental screening, referral, and follow-up of children. Questionnaires with the same domains but slightly different questions were distributed to program directors, health coordinators and other EHS staff.

Further details about the sample selection, questionnaire development and data collection are described in a paper by Mathu-Muju et al. (14). The study was approved by the Institutional Review Board at the University of North Carolina at Chapel Hill and the NC Head Start State Collaboration Office.

Variable selection and construction

Outcome, predictor, and control variables were constructed to measure teachers' oral health program activities and their individual and program characteristics. Characteristics of EHS teachers and programs that could potentially be affected by interventions seeking to increase teacher participation in oral health activities were defined as predictor variables.

Outcome variables—Two continuous outcome variables were constructed from survey questions inquiring about the frequency with which teachers perform oral health activities. The variable for child activities was derived from four questions that asked teachers how often they: (1) have children brush their own teeth; (2) brush children's teeth for them; (3) use toothpaste to brush; and (4) provide classroom education to children about dental health. The outcome variable for parent-directed activities was constructed using teachers' responses to four questions about how often they talked to parents about: (1) cleaning their child's teeth; (2) whether all the child's dental needs had been met; (3) food choices to promote good dental health; and (4) the parents' own dental health. Outcome variables were constructed as the sum of responses to a 0-4 Likert type scale (never to very frequently) for the four items in each outcome variable (range=0-16).

Predictor variables—The explanatory models for oral health activities included 14 variables that describe modifiable factors related to oral health. Eight variables described characteristics of teachers in five domains (oral health knowledge, values, self-efficacy, barriers to activities, and dental training) and six variables described characteristics of each program's director and health coordinator in two domains (oral health knowledge and barriers to activities).

Three binary variables measuring teachers' oral health knowledge were constructed using questions asking if toothpaste should cover all the bristles of a child's toothbrush (*disagree*), whether low-income children were less likely to develop caries (*disagree*), and the recommended timing of a child's first dental visit (*age one).* Variables measuring directors and health coordinators knowledge about the timing of a child's first dental visit were included in the analysis.

Fifteen survey questions assessed the value teachers placed on oral health by asking about the importance of primary teeth, dental visits, and EHS oral health activities. Most questions used 0-4 Likert-type response scales, which were recoded to binary items (agree vs. disagree) due to the highly skewed distribution of responses. A multi-item scale was constructed by summing the total number of "agree" responses (range=0-15; mean=11.45; Cronbach's alpha=0.82).

Perceived oral health self-efficacy was measured using 12 questions, of which 9 asked about teachers' confidence in their ability to perform certain oral health activities and 3 focused on the expected outcomes of those activities. Questions used 0-4 Likert-type scale responses, which were summed to create a multi-item construct with higher values indicating greater perceived oral health self-efficacy (range=0-48; mean=29.85; Cronbach's alpha=0.84). Scales measuring value placed on oral health and self-efficacy were recoded as ordinal variables (low, medium, high) based on the distributions.

Using a list of potential barriers and a 0-4 Likert-type scale, staff were asked to indicate how much each one was an obstacle to providing dental activities for children and parents. Responses of "very much an obstacle" and "somewhat an obstacle" were recoded to indicate a barrier to dental activities, and then summed to create a count of the total barriers. For teachers, we summed six items describing barriers to child activities (range=0-6) and eight items describing barriers to parent activities (range=0-8). For directors and health coordinators, we summed seven items describing barriers to child activities (range=0-7) and 12 items describing barriers to parent activities (range=0-12).

A binary variable was constructed to indicate whether a teacher received training on how to include dental health in their EHS activities (reference group: teachers who did not receive or did not recall receiving training).

Control variables—We used teacher characteristics (age, race/ethnicity, educational attainment level, time since last dental visit, the number of years employed by EHS) and the total number of children in each program as control variables. These variables are unlikely to be targeted with educational interventions, and thus were held constant in the analysis to determine the independent effect of each of the predictor variables.

Data analysis

Descriptive statistics were calculated to examine child and parent activities and variation in predictor and control variables among programs. Additionally, we report the percent frequency distribution of the responses to the individual activities that compose the multi-item teacher activity outcome variables and perceived barriers variables because of their importance in understanding teacher activities and barriers to change. We also describe findings related to who brushes children's teeth and whether toothpaste is used to better understand teacher brushing practices. If an individual had a missing response for only one question that comprised a multi-item construct, the response for that question was imputed as the average score across non-missing questions from that construct, rounded to the nearest whole number. Otherwise, the variable was set to missing. Following construction of variables, we checked for multicollinearity by analyzing pairwise correlations and Variance Inflation Factors.

Ordinary least squares regression was used to examine the independent associations between predictor variables and child and parent oral health activities while accounting for the control variables. We adjusted for variation among programs by using Huber-White cluster standard errors, defining programs as our clustering unit (18, 19). All tests were conducted with a significance level of 0.05 using Stata 10 (StataCorp, College Station, TX).

Results

The response rate was 100% for program directors (n=18) and health coordinators (n=20) and 98% for staff (n=485). Our analysis was restricted to staff who self-identified as teachers (n=309) because they regularly interact with children and families. After imputation of certain missing items for approximately 2% of staff, we omitted 49 teachers from the

analysis. No statistically significant differences were observed for child and parent oral health activity scores between teachers with missing and non-missing variables. For programs with more than one health coordinator, we included only the health coordinator who had worked at EHS the longest. The analytical sample for parent oral health activities included 260 teachers. Analysis of child oral health activities excluded teachers who work only with infants because recommendations for cleaning the mouths of infants differ from recommendations for older children (20), leaving a sample size of 231 teachers.

Descriptive Results

As displayed in Table 1, most teachers were knowledgeable about the amount of toothpaste to use when brushing children's teeth (74%), but less than half of teachers (48%) knew that an age one dental visit is recommended. The majority of teachers (61%) placed a high value on oral health, but perceived themselves as having a moderate level of self-efficacy in oral health activities (57%). Most teachers (61%) had not received or did not remember receiving any dental health training from EHS. In general, directors and health coordinators demonstrated a higher level of knowledge than teachers about the timing of a first dental visit.

EHS programs exhibited substantial variation in a number of variables. Program size ranged from 32 to 150 children. Additionally, we observed variation among EHS programs for teachers' reported levels of perceived oral health self-efficacy, knowledge about the timing of a child's first dental visit, years worked at EHS, and level of education.

Oral health activity sum scores ranged from 0-16 (never to very frequently), with teachers having mean scores of 6.87 for parent activities and 9.03 for child activities. The distributions of Likert-scale responses to each of the individual items used to construct the outcome variables are displayed in Table 2. Teachers reported engaging in oral health activities with children more frequently than with parents, but the percentage reporting routinely (i.e., frequently or very frequently) providing these services still was below 50% for all activities except for having children brush on their own.

The majority of teachers had children brush their own teeth, and a small percentage of teachers reported brushing children's teeth for them (Table 3). Toothpaste use varied according to who brushed children's teeth. Although the majority of teachers had children brush their own teeth, less than half (46%) reported using toothpaste with this practice. Among the 25.5% of teachers who indicated that both the child and teacher routinely brushed the child's teeth, 52.2% reported using toothpaste.

Factors Associated with Parent Activities

Results of the regression analyses of the associations between predictor variables and oral health activities are presented in Table 4. For teachers, placing a high value on oral health or having high perceived oral health self-efficacy was positively associated with parent activities ($P=0.017$ and $P<0.001$, respectively). Teachers who received dental health training from EHS had parent activity scores 1.6 points higher than teachers who did not receive or did not recall receiving dental health training ($P=0.004$). Teachers in programs with directors knowledgeable about the recommended age one dental visit had parent activity scores 1.5 points higher ($P=0.024$) than teachers who worked in programs with directors without this knowledge.

Factors Associated with Child Activities

Teachers with high perceived oral health self-efficacy engaged in child activities more often than teachers with low self-efficacy ($P=0.013$), having scores 1.9 points higher. Dental

training from EHS increased teachers' child activity scores by 1.2 points (P=0.044). For teachers, one additional reported barrier to child dental health activities was associated with a 0.32 decrease in child activity score (P=0.013). Additionally, teachers in programs with health coordinators knowledgeable about the recommended age one dental visit had parent activity scores 1.6 points higher than teachers who had health coordinators lacking this knowledge (P=0.042).

Barriers to Dental Health Activities

Because barriers to dental health activities were found to be negatively associated with participation in child activities and an understanding of individual barriers is important for designing interventions, we display in Table 5 the percent of teachers, directors and health coordinators who perceive each item in the barriers construct to be a barrier to oral health activities. The majority of teachers indicated lack of dental health education materials and limited knowledge about fluoride use as barriers to oral health activities. Most directors and health coordinators reported finding a dentist who sees young children or accepts Medicaid as barriers.

Discussion

Several conclusions can be drawn from the findings of this study that have implications for activities of teachers in EHS programs and consequently the oral health of enrolled children. First, nearly three-quarters of teachers reported that they never, rarely or only occasionally brush children's teeth and less than half of them never or rarely use toothpaste, practices that are now required by the Office of Head Start (10). Teachers are much more likely to let children brush their own teeth routinely (60.2%) than to brush their teeth for them (3.5%) or combine self-brushing with follow-up brushing (25.5%), and less than half let children use toothpaste when they brush their own teeth. Thus most children were not being exposed routinely to fluoridated toothpaste at the time of this survey. Further studies should monitor the effect of the new Head Start performance guidelines on both who is brushing children's teeth and if fluoridated toothpaste is being used.

Interaction between teachers and parents about oral health appears to be limited, results that are consistent with a qualitative study conducted with EHS staff in NC (15). Only 15% to 35% of teachers reported routinely engaging in any of the listed parent activities. More than 44% of teachers indicated that they never asked parents about their oral health. These activities might be underestimated in our survey because we did not inquire about EHS staff other than teachers who might engage in these activities. Many programs devote at least one parent meeting every year to the topic of dental health. Regardless of how information is shared, teachers report barriers to parent communication. Most directors reported that parents are not interested in dental health activities provided by EHS and do not want to be told how to take care of their children's teeth. Teacher-parent interactions about oral health can encounter competing interests, including distractions from young children, busy parental schedules, and the need to address other critical issues.

We examined modifiable characteristics of EHS teachers and programs as the primary variables of interest in our analytical models because of their potential to be affected by interventions (21). We found a significant relationship between teachers' oral health practices and their expressed oral health values, self-efficacy, dental training, barriers to child oral health activities and directors' and health coordinators' knowledge about the timing of a child's first dental visit. These findings provide support for the second conclusion of this study—that teachers' parent- and child-directed oral health practices are associated with characteristics that can be targeted with educational interventions and potentially changed so that oral health is improved. Early education and child care programs

have positive effects on a number of social outcomes for children and families (22-25). Less evidence is available for health outcomes in general (26, 27) and dental health interventions in particular. Although evidence of effectiveness of EHS oral health interventions directed toward teachers and other staff is generally lacking, diet and oral hygiene behaviors that include fluoride exposures are important determinants of dental caries, which can be influenced by effective interventions in the classroom (28-30). Based on the results of this study, successful implementation of oral health programs in EHS will require staff educational interventions that include not only knowledge development, but also skill building in order to improve self-efficacy and expected outcomes.

A third conclusion from this study is that variation exists in practices and in teacher- and program-level determinants, both between and within EHS programs. Variation between programs was observed for teachers' level of self-efficacy in oral health practices and knowledge about timing of the child's first dental visit. Within programs, differences were observed between teachers and program level staff. Teachers were generally knowledgeable about brushing practices, but less knowledgeable than program directors and health coordinators about the recommended age one dental visit. Teachers and directors also perceived different barriers to oral health activities, with a higher proportion of teachers indicating that oral health activities provided in the classroom will not prevent cavities. Thus, intervention strategies may need to vary by program and staff type to be most effective in increasing teacher oral health activities.

Finally, this study provides encouraging and useful findings about teachers' exposure to dental health training and its potential effects on behaviors. Approximately 39% of teachers had received training on how to incorporate oral health into EHS activities. Despite this low proportion, all but one program had at least one teacher who had received dental training. Teachers who received this training reported participating in both child and parent oral health activities more frequently than those who had not. In response to another survey question, 74% of teachers indicated that they felt they needed dental health training to help with their responsibilities. These findings suggest that a large percentage of teachers need training and that they are receptive to this training. Studies will need to determine the potential for interventions to improve oral health activities within EHS programs.

Limitations

Findings must be interpreted cautiously to avoid inferring causality from associations observed in this study because of its cross-sectional design. Although EHS programs follow federal standards, our results may not be generalizable beyond NC because variation in adherence likely exists among states and programs. Finally, because our findings are based on self-completed questionnaires the results might be biased if teachers mis-stated their level of participation in oral health promotion activities or incorrectly recalled their activities.

Conclusion

Few studies have examined teachers' oral health activities in EHS programs. This study documents the frequency of these activities in all EHS programs in NC and how they vary according to teacher and program characteristics. The level of oral health activity in EHS programs is less than optimal and below currently recommended practice guidelines, but we identified several characteristics of staff that can be targeted with education interventions because they are not fixed determinants of behaviors. The evidence base for interventions needs to be strengthened because it does not provide clear guidance about how to change these factors among EHS staff. Nevertheless, results of the study itself provide encouraging findings about the potential effects of teacher training on their oral health behaviors in the

classroom and with parents because of the association between reported training and activities, and the desire among staff to be trained in oral health.

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References

1. Head Start dental home initiative: Program updates [Internet]. American Academy of Pediatric Dentistry; Chicago (IL): [updated 2010; cited 2010 March 28]. Available from:http://www.aapd.org/headstart/
2. Hopewell, A.; Health Systems Research, Inc.. Steffensen, J.; Department of Community Dentistry, University of Texas Health Science Center at San Antonio. American Dental Education Association and Head Start: Envisioning future collaborations to improve oral health. Administration for Children and Families, Health Resources and Services Administration, U.S. Department of Health and Human Services; Washington (DC): Jun. 2006
3. Del Grosso, P.; Brown, A.; Silva, S.; Henderson, J.; Tein, N.; Paulsell, D. Strategies for promoting prevention and improving oral health care delivery in head start: Findings from the oral health initiative evaluation. Volume I: Final Technical Report. Administration for Children and Families, Office of Planning, Research, and Evaluation, U.S. Department of Health and Human Services; Washington (DC): Oct. 2008 Mathematica Policy Research, Inc., Princeton, NJContract No.: 233-02-0086
4. Parent's checklist for good dental health practices in child care [Interent]. National Resource Center for Health and Safety in Child Care and Early Education; Aurora (CO): [updated 2008; cited 2010 April]; Available from: http://nrc.uchsc.edu/dentalchecklist.pdf
5. Dye, BA.; Tan, S.; Smith, V.; Lewis, BG.; Barker, LK.; Thornton-Evans, G., et al. Trends in oral health status: United States, 1988-1994 and 1999-2004. National Center for Health Statistics, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services; Hyattsville (MD): Apr. 2007 Vital and Health Statistics 11(248). Report No.: (PHS) 2007-1698
6. 2007 National Healthcare Quality Report. U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality; Rockville (MD): Feb. 2008 AHRQ Pub. No. 08-0040
7. Edelstein BL, Chinn CH. Update on disparities in oral health and access to dental care for America's children. Acad Pediatr. 2009; 9:415–9. [PubMed: 19945076]
8. The Early Head Start national resource center. What is Early Head Start [Internet]. Office of Head Start, Administration for Children and Families; U. S. Department of Health and Human Services; Washington (DC): [cited 2010 January]; Available from:http://www.ehsnrc.org/AboutUs/ehs.htm
9. Early Head Start: American Recovery and Reinvestment Act Implementation Plan [Internet]. Department of Health and Human Services; Washington (DC): [updated 2010 June; cited 2010 Oct]; Available from: http://www.hhs.gov/recovery/reports/plans/pdf20100610/ACF%20Early%20Head%20Start%20June%202010.pdf
10. Oral health revision [Internet]. Office of Head Start, Administration for Children and Families, U.S. Department of Health & Human Services; Washington (DC): [updated 2006 December; cited 2010 April]; Available from:http://eclkc.ohs.acf.hhs.gov.libproxy.lib.unc.edu/hslc/Program%20Design%20and%20Managem ent/Head%20Start%20Requirements/PIs/2006/resour_pri_00109_122006.html; 1186076918723
11. Edelstein B. Access to dental care for Head Start enrollees. J Public Health Dent. 2000; 60(3):221–9. [PubMed: 11109221]

12. Kranz AM, Rozier RG. Oral health content of early education and child care regulations and standards. J Public Health Dent. 2010 Forthcoming.
13. Kopycka-Kedzierawski DT, Bell CH, Billings RJ. Prevalence of dental caries in Early Head Start children as diagnosed using teledentistry. Pediatr Dent. 2008; 30(4):329–33. [PubMed: 18767513]
14. Mathu-Muju KR, Lee JY, Zeldin LP, Rozier RG. Opinions of Early Head Start staff about the provision of preventive dental services by primary medical care providers. J Public Health Dent. 2008; 68(3):154–62. [PubMed: 18843804]
15. Mofidi M, Zeldin L, Rozier R. Oral health of Early Head Start children: A qualitative study of staff, parents, and pregnant women. Am J Public Health. 2009; 99(2):245. [PubMed: 19059853]
16. Rozier R, King R. Defining the need for dental care in North Carolina: contributions of public health surveillance of dental diseases and conditions. NC Med J. 2005; 66(6):438–44.
17. Stamm JW. The dentist workforce in North Carolina 2005: a commentary. NC Med J. 2005; 66(6)
18. Rogers WH. Regression standard errors in clustered samples. Stata Technical Bulletin. 1993; 13:9–13.
19. Wooldridge, JM. Econometric analysis of cross section and panel data. MIT Press; Cambridge (MA): 2002.
20. Guideline on infant oral health care [Internet]. Infant Oral Health, Clinical Affairs Committee, American Academy of Pediatric Dentistry; Chicago (IL): [updated 2009; cited 2010 March]; Available from: http://www.aapd.org/media/Policies_Guidelines/P_OralHealthCareProg.pdf
21. Champion, VL.; Skinner, CS. The health belief model. In: Glanz, K.; Rimer, BK.; Viswanath, K., editors. Health behavior and health education: theory, research, and practice. 4th ed. Jossey-Bass; San Francisco: 2008. p. 45
22. Burchinal M, Roberts J, Nabors L, Bryant D. Quality of center child care and infant cognitive and language development. Child Dev. 1996; 67(2):606–20. [PubMed: 8625731]
23. Mashburn A, Pianta R, Hamre B, Downer J, Barbarin O, Bryant D, et al. Measures of classroom quality in prekindergarten and children's development of academic, language, and social skills. Child Dev. 2008; 79(3):732–49. [PubMed: 18489424]
24. Barnett W. Long-term effects of early childhood programs on cognitive and school outcomes. Future Child. 1995; 5(3):25–50.
25. Anderson LM, Shinn C, Fullilove MT, et al. The effectiveness of early childhood development programs: a systematic review. Am J Prev Med. 2003; 24(3S):32–46. [PubMed: 12668197]
26. Head Start impact study: First year findings [Internet]. Head Start Bureau, Administration on Children, Youth and Families, U.S. Department of Health and Human Services; Washington (DC): [cited 2010 September]; Available from:http://ncchildcare.dhhs.state.nc.us/general/mb_headstart.asp
27. Zoritch B, Roberts I, Oakley A. Day care for pre-school children. Cochrane Database Syst Rev. 2000; (3)
28. Holtta P, Alaluusua S. Effect of supervised use of a fluoride toothpaste on caries incidence in pre-school children. Int J Paediatr Dent. 2009; 2(3):145–9. [PubMed: 1304804]
29. Schwarz E, Lo EC, Wong MC. Prevention of early childhood caries--results of a fluoride toothpaste demonstration trial on Chinese preschool children after three years. J Public Health Dent. 1998 Winter;58(1):12–8. [PubMed: 9608441]
30. Bluford DAA, Sherry B, Scanlon KS. Interventions to prevent or treat obesity in preschool children: A review of evaluated programs. Obes Res. 2007; 15(6):1356–1372.

Table 1

Characteristics of Early Head Start (EHS) Teachers and Programs in the Analytical Sample

	Parent activities (n=260)		Child activities (n=231)	
Variable	**N**	**%**	**N**	**%**
Outcome variables				
Parent oral health activities (mean, SD)	(6.87)	(4.03)		
Child oral health activities (mean, SD)			(9.03)	(3.48)
Predictor variables				
Teacher characteristics				
Knowledge about…				
Recommended age 1 dental visit	124	47.69	104	45.02
Amount of toothpaste to use	193	74.23	170	73.59
Low-income children's increased risk of tooth decay	214	82.31	189	81.82
Value placed on oral health				
Low (≤7)	32	12.31	29	12.55
Moderate (8-11)	69	26.54	62	26.84
High (≥12)	159	61.15	140	60.61
Perceived oral health self-efficacy				
Low (≤24)	60	23.08	53	22.94
Moderate (25-35)	148	56.92	132	57.14
High (≥36)	52	20.00	46	19.91
Received dental health training from EHS	101	38.85	93	40.26
Barriers to parent oral health activities (mean, SD)	(2.70)	(2.11)		
Barriers to child oral health activities (mean, SD)			(1.94)	(1.54)
Director characteristics (n=18)				
Knowledge of recommended age 1 dental visit	11	61.11	11	61.11
Barriers to parent oral health activities (mean, SD)	(7.00)	(2.14)		
Barriers to child dental health activities (mean, SD)			(2.44)	(1.46)
Health coordinator characteristics (n=18)				
Knowledge of recommended age 1 dental visit	10	55.56	10	55.56
Barriers to parent oral health activities (mean, SD)	(4.89)	(2.76)		
Barriers to child oral health activities (mean, SD)			(1.44)	(1.62)
Control variables				
Program size, # of children (mean, SD)	(97.66)	(37.06)	(97.66)	(37.06)
Teacher characteristics				
Dental visit within last year	146	56.15	126	54.55
Years employed by EHS				
<1 year	56	21.54	50	21.65
1-2 years	89	34.23	76	32.90
3 or more years	115	44.23	105	45.46
Education level				

	Parent activities (n=260)		Child activities (n=231)	
Variable	**N**	**%**	**N**	**%**
High school graduate or less	38	14.62	32	13.85
Some college	160	61.54	143	61.90
College degree or higher	62	23.85	56	24.24
Race/Ethnicity				
White	137	52.69	124	53.68
Black	90	34.62	79	34.20
Hispanic/Native/Other	33	12.69	28	12.12
Age (mean, SD)	(36.44)	(11.64)	(36.26)	(11.4)

SD, standard deviation

Table 2

Percent Frequency Distribution of Teachers' Oral Health Activities in Early Head Start Programs

	Never	Rarely	Occasionally	Frequently	Very Frequently
Parent activities (n=260)	%	%	%	%	%
Advise parents on cleaning their child's teeth	13.8	17.6	33.0	24.6	10.7
Inform parents on food choices to promote good dental health	10.7	18.0	34.6	26.9	9.6
Inquire about the dental health of parents	44.6	21.1	18.4	11.1	4.6
Find out from parents if all the child's dental needs have been met	21.9	21.1	30.3	18.8	7.6
Child activities (n=231)					
Have children brush their own teeth	6.9	2.1	5.1	45.4	40.2
Brush children's teeth yourself	20.3	13.8	36.8	17.3	11.6
Use toothpaste to brush children's teeth	44.5	5.1	8.2	14.7	27.2
Provide classroom education about dental health for children	12.1	6.4	35.9	27.7	17.7

Table 3

Routine Classroom Brushing Practices (1st table entry) and Use of Toothpaste (second table entry) in Early Head Start Programs

		Child Brushes	
		No	**Yes**
Staff Brushes	**No**	25 (10.8%)	139 (60.2%)
With toothpaste		*NA*	*64 (46%)*
	Yes	8 (3.5%)	59 (25.5%)
		1 (12.5%)	*31 (52.2%)*

NA=Not applicable. Routine brushing and toothpaste use is defined as responses of “very-frequently” or “frequently” to questions about the frequency of these activities.

Table 4
Predictors of Teachers' Oral Health Activities in Early Head Start (EHS) Programs

	Parent Activities (n=260)		Child Activities (n=231)	
Variable	**Coefficient**	**Standard Error**	**Coefficient**	**Standard Error**
Predictor variables				
Teacher characteristics				
Knowledge about…				
Recommended age 1 dental visit	−0.40	0.49	−0.44	0.52
Amount of toothpaste to use	−0.80	0.47	−0.25	0.56
Low-income children's increased risk of tooth decay	−0.50	0.52	0.16	0.64
Oral health values				
Moderate (8-11)	1.24	0.69	1.11	0.65
High (≥12)	1.99*	0.76	0.37	0.67
Perceived oral health self-efficacy				
Moderate (25-35)	0.47	0.67	0.57	0.39
High (≥36)	3.51**	0.71	1.86**	0.54
Received dental health training from EHS	1.59**	0.47	1.20*	0.55
Barriers to parent dental health activities	−0.07	0.10		
Barriers to child dental health activities			−0.32*	0.11
Director characteristics				
Knowledge of recommended age 1 dental visit	1.52*	0.61	−0.33	0.83
Barriers to parent dental health activities	−0.05	0.11		
Barriers to child dental health activities			−0.17	0.14
Health coordinator characteristics				
Knowledge of recommended age 1 dental visit	0.93	0.45	1.61*	0.73
Barriers to parent dental health activities	0.007	0.102		
Barriers to child dental health activities			−0.002	0.133
Significant control variables				
Years employed by EHS (vs. ≥3 years)				
<1 year	−1.53*	0.69	−0.62	0.77
1-2 years	−0.91	0.67	−0.67	0.87
Race/Ethnicity (vs. White)				
Black	0.62	0.54	0.91	0.54
Hispanic/Native/Other	2.20**	0.66	−0.40	0.70
Constant	3.26	1.86	6.76**	1.90
R^2	0.31			0.26

For ordinal variables, low is reference category; For categorical variables, modal is reference category; Both models use cluster standard errors; Models also control for having a dental visit in last year, education level, age, and program size.

*Statistically significant at the 5% level;

** Statistically significant at the 1% level

Table 5

Percent Frequency Distribution of Teachers' Perceived Barriers to Oral Health Activities in Early Head Start Programs

	Teachers (n=260)	Directors (n=18)	Health coordinators (n=18)
Barriers to parent activities	%	%	%
Finding a dentist in my community who will see a child younger than 3 years of age is difficult	38.5	94.4	77.8
Finding a dental professional who will do dental screenings for infants and toddlers		88.9	83.3
Finding a dentist in my community who will accept Medicaid and Health Choice		88.9	72.2
Finding a dentist in my community who will see pregnant women		50.0	38.9
Parents are not interested in dental health activities provided by the EHS center	27.3	55.6	33.3
Parents do not want to be told how to take care of their children's teeth	37.3	61.1	22.2
Most parents do not understand why infants and toddlers need dental screenings		66.7	55.6
I worry that I might give parents bad advice about some aspect of dental health	35.0	33.3	11.1
I don't have enough knowledge to advise parents on fluoride use	59.2		
I don't have enough knowledge to advise parents on cleaning their children's teeth	31.5		
Barriers to child activities			
Activities we can provide in the classroom will not prevent cavities	16.0	5.6	11.1
Teaching children younger than 3 years of age about dental health is too difficult	26.4	38.9	16.7
I don't have enough knowledge about dental health to plan dental health activities for our program		38.9	22.2
I don't have enough educational materials to adequately teach children about dental health	53.3		
I don't have educational materials in languages other than English	57.6		
Barriers to parent and child activities			
Children younger than 3 don't have enough dental problems to worry about	25.4	22.2	11.1
My center has too many other activities to devote time to dental health	15.4	22.2	22.2
Establishing partnerships in the community to address dental health issues		61.1	33.3
Finding dental expertise for our health advisory committee		55.6	27.8

Early Head Start (EHS) staff were asked to indicate to what extent they consider each of the following to be an obstacle to providing dental health activities in the program or to establishing an effective EHS health program. Barriers to child activities for teachers based on sample size of 231.