Oral health status of New Hampshire Head Start children, 2007-2008

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Abstract

Objectives: We report on the baseline prevalence and severity of dental caries of children enrolled in the New Hampshire Head Start program during the 2007-2008 school year.
Methods: We selected a random cluster sample of 607 children aged 3-5 years attending 27 Head Start centers across the state. Four volunteer dentists provided oral examinations and determined the presence of untreated dental caries, caries experience, and treatment urgency.
Results: Overall, 40 percent of the participating children had experienced dental caries, and 31 percent had at least one untreated decayed tooth. Approximately 22 percent of the children had evidence of maxillary anterior caries, 23 percent were in need of dental care, and <1 percent needed urgent care.
Conclusions: The prevalence of dental caries is comparable with that reported by Head Start programs elsewhere. The prevalence of caries affecting maxillary anterior teeth is higher. Further studies should examine state-specific barriers to dental care among this population.

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Introduction

Dental caries are the most common chronic childhood disease and are preventable through a combination of community, professional, and individual strategies. Enough is known about caries and their prevention that any child can grow into adulthood without substantial dental disease (1). Recent studies indicate that children from low-income families are more likely to be affected by caries than their more affluent peers (2-4). Meanwhile, children living in poverty

have the highest rates of dental insurance coverage, primarily through Medicaid and the State Child Health Insurance Program. Despite higher levels of dental insurance coverage, children from lower-income families are less likely to receive dental care than children from families with higher income. This disparity might result from a lack of pediatric dentists and dentists who provide services to the Medicaid-eligible population. Personal knowledge and attitudes regarding oral health contribute to this imbalance (2,3).

Head Start is a national program that provides comprehensive child development services primarily to children and families at or below the Federal Poverty Level. According to program performance standards (5), Head Start agencies must determine whether each child has an ongoing source of continuous accessible health care within 90 calendar days from the child's entry into the program, including dental care. If a child does not have a source of ongoing care, agencies must assist parents or guardians in accessing a source of care. The New Hampshire Department of Health and Human Services collaborated with the New Hampshire Head Start program to conduct a survey during the 2007-2008 school year with the goal of obtaining uniform baseline oral health-related data, while providing dental examinations, which helped to fulfill the Head Start federal mandate related to dental care.

Methods

We conducted the survey at 27 of the 45 New Hampshire Head Start sites during October 2007-February 2008. We used a simple random one-stage cluster sample design, in which all children at each selected site would be surveyed. Optimal sample size of 625 completed examinations was calculated on the basis of expected prevalence of a caries experience (6), preferred 95 percent confidence intervals (CIs), size of the reference population, anticipated response rate, and cluster design. Twenty-five Head Start sites, with 817 eligible children, were selected for the sample initially. Because of inclement weather during the survey period, which influenced the participation rate, three additional sites with 101 eligible children were included toward the end of the survey. The replacement sites were randomly selected with the original sample at the inception of the project. Despite repeated attempts, one site with 10 eligible children was not visited and was excluded.

All children aged 3-5 years at the time of enrollment were eligible for participation. Written informed consent was sought from the parents or guardians of all eligible children. This survey underwent human subjects review at the Centers for Disease Control and Prevention and was determined to be a public health surveillance, not a research.

Four dentists (three pediatric and one general) provided oral examinations by using disposable explorers and mirrors. The standards of the examinations were determined by the participating dentists at the first screening site when five children were examined by all of the examiners. In order to sustain uniformity, all dentists adhered to the written examination criteria for the remainder of the survey. According to the criteria, each tooth was classified as sound, decayed, filled, or missing. Untreated caries was defined as the presence of one or more noncavitated or cavitated lesions in any primary tooth. Caries experience was defined as the presence of one or more decayed (noncavitated or cavitated lesions), missing (caused by decay), or filled primary teeth. Maxillary anterior caries was defined as the presence of one or more decayed (noncavitated and cavitated lesions), filled, or missing (caused by decay) maxillary primary incisors and maxillary primary canines. Noncavited lesions were included in the caries definition as their presence indicates the beginning of the disease process. Treatment urgency was classified as dental treatment needed (cavitated lesions requiring dental care); urgent dental treatment needed (care needed because of pain or swelling); or no obvious problems. Noncavitated lesions were not included in classification for treatment urgency. Due to a limited number of providers available for follow-up treatment, treatment priority was given to participants with cavitated lesions and complications. Formal interexaminer reliability assessment was not conducted; nonetheless, we analyzed data from each of the examiners to determine outliers. For the purpose of our analyses, we classified the Head Start sites as urban or rural by using the Rural Urban Commuting Area codes for each zip code (7).

Data were analyzed by using SAS® software (version 9.1, SAS Institute, Inc., Cary, NC, USA), and the PROC SURVEYFREQ procedure. Study population average estimates and secondary subgroup analyses were performed by age, sex, and urban/rural status. Appropriate 95 percent CIs were calculated for each measure to assess statistical significance. Only children aged 3-5 years at the time of the examination were included in the analysis. Four volunteer dentists provided dental examinations. The Northeast Delta Dental Foundation funded the purchase of equipment and supplies.

Results

Of the 908 eligible children, 758 (83 percent) presented a signed informed consent form allowing them to participate. Of those who consented, 607 (80 percent) underwent oral examination and were included in the analysis (Figure 1). The median participation rate per site was 71 percent, with the site-specific rates ranging from 42 percent to 83 percent. No difference was noted by urban/rural location. Thirty-one percent of the children had at least one untreated decayed tooth, and 40 percent of the children had experienced dental caries. Approximately 22 percent of the children had evidence of maxillary anterior caries; 23 percent were in need of dental treatment (76 percent of those with untreated caries); and <1 percent needed urgent dental care. Subgroup analyses indi-

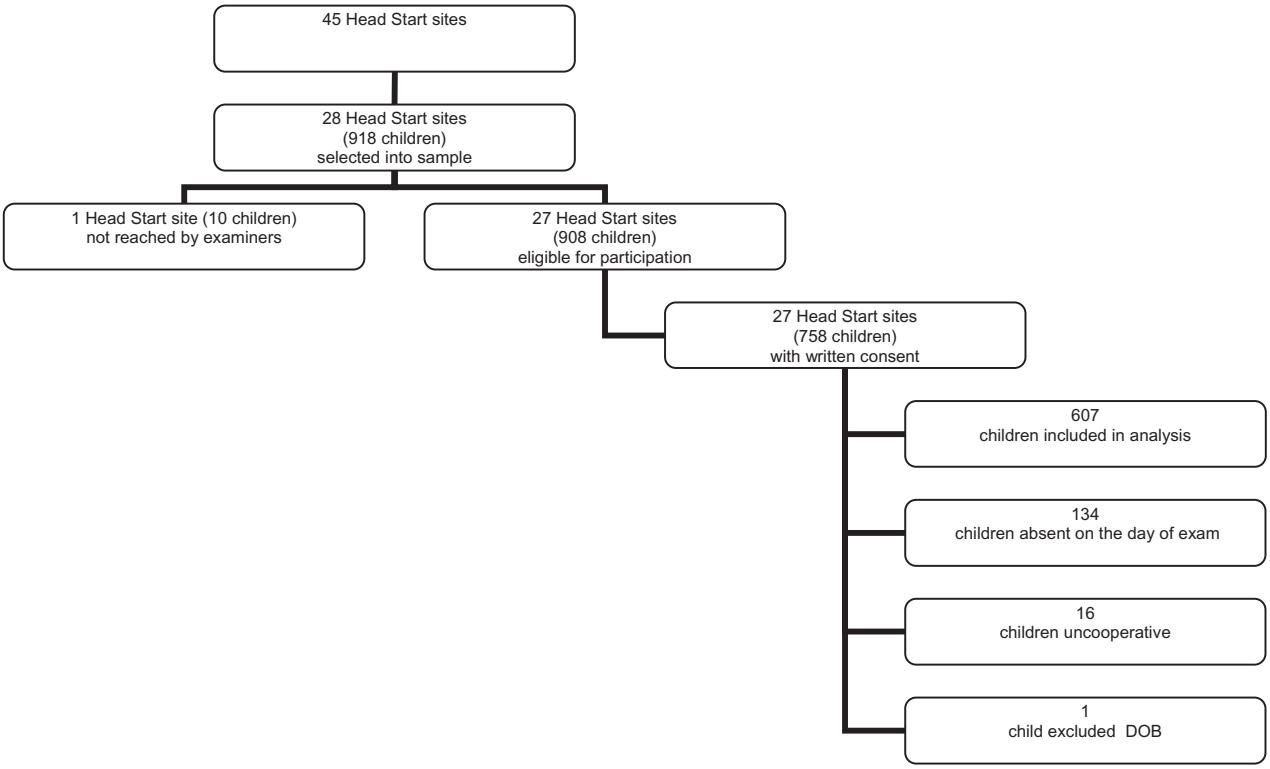

Figure 1 Sample distribution regarding participation and analysis. Uncooperative children, children unwilling to undergo oral examination; DOB, date of birth.

cated no statistical differences in caries prevalence between males and females or between those attending sites classified as urban or rural. As expected, the prevalence of caries experience increased with age (Table 1). Information on race/ethnicity was not collected. The prevalence of racial/ethnic minorities among the New Hampshire Head Start enrollees is approximately 15 percent (written communication, Office of Head Start, Program Information Report, 2006-2007), and any meaningful analyses within racial/ethnic subgroups is not possible with our sample size.

Discussion

This survey was conducted to obtain baseline data related to oral health among New Hampshire Head Start children and utilize the findings in the needs assessment and program planning. To put our data into perspective, we have chosen two recently published studies for comparison (6,8). Our results demonstrate that 31 percent of New Hampshire Head Start children had untreated caries, which is similar to a prevalence of 28 percent reported among Ohio Head Start children (8) and lower than the 52 percent prevalence of untreated decayed teeth among preschool children aged 3-4 years attending Head Start in Maryland (6). Caries experience was noted among 40 percent of the children, which is comparable with 38 percent among Ohio Head Start enrollees and lower than the prevalence detected in Maryland at 55 percent. Dental treatment was needed by 23 percent of surveyed New Hampshire children overall or 76 percent of those with untreated caries. The difference between those with untreated caries and those in need of restorative dental care can be attributed mainly to the presence of arrested decay or non-cavitated lesions not requiring dental care as determined by the examining dentists. A favorable finding is that only 0.8 percent of the surveyed children needed urgent dental care because of pain and swelling. The Ohio and Maryland Head Start studies reported that approximately 9 percent and 10 percent of children, respectively, had complained or cried because of a toothache. The detected prevalence of maxillary anterior caries is higher than the prevalence of 12 percent reported among Ohio's enrollees aged 3 years. This might be explained by the age differences of assessed children, and differences in applied definitions, because New Hampshire included noncavited as well as cavitated lesions.

Certain limitations of our survey should be considered. We did not collect any information related to the frequency of dental visits, insurance status, or personal habits. Knowing whether those who declined participation did so as a result of substantial disease or if they had had a recent dental visit is impossible. Our elected caries definition included cavitated

Table 1 Oral Health Indicators among New Hampshire Head Start Children

	Participants (no.)	Untreated caries (no.) % (95% CI)	Caries experience (no.) % (95% CI)	Maxillary anterior caries (no.) % (95% CI)	Dental treatment needed (no.) % (95% CI)
Overall	607	186 30.6 (27.3-34.0)	244 40.2 (37.0-43.4)	136 22.4 (19.4-25.4)	142 23.4 (20.2-26.6)
Sex					
Male	303	86 28.4 (24.8-32.0)	115 38.0 (34.1-41.8)	68 22.4 (18.3-26.6)	64 21.1 (17.3-24.9)
Female	304	100 32.9 (27.6-38.2)	129 42.4 (37.4-47.4)	68 22.4 (18.1-26.6)	78 25.7 (20.6-30.7)
Age (years)					
3	197	51 25.9 (22.2-29.6)	62 31.5 (27.3-35.7)	35 17.8 (13.4-22.2)	38 19.3 (16.2-22.4)
4	342	114 33.3 (29.4-37.3)	150 43.9 (40.3-47.5)	81 23.7 (20.0-27.3)	92 26.9 (22.9-30.9)
5	68	21 30.9 (24.2-37.5)	32 47.1 (40.2-53.9)	20 29.4 (22.3-36.5)	12 17.6 (11.5-23.8)
Location					
Rural	105	33 31.4 (25.8-37.1)	46 43.8 (37.7-49.9)	20 23.1 (19.6-26.7)	23 21.9 (16.2-27.6)
Urban	502	153 30.5 (26.6-34.3)	198 39.4 (35.9-42.9)	116 19.0 (14.4-23.7)	119 23.7 (20.0-27.4)

CI, confidence interval.

as well as noncavitated lesions. In comparison, the Ohio and Maryland studies reported on the prevalence of teeth with cavitated lesions only. Similarly, our definition of maxillary anterior caries pertains to each tooth, not to each tooth surface. Lastly, the fluoridation status of each child was unknown, and reliable analyses related to fluoride exposure could not be performed. We determined that 23 percent of the children were in need of dental treatment. Future studies should examine specific barriers preventing receipt of dental care among this population and explore the constraints of efficient dental care delivery.

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References

1. US Department of Health and Human Services. *Oral health in America: a report of the Surgeon General*. Rockville (MD): US Department of Health and Human Services, National Institute of Craniofacial Research, National Institutes of Health; 2000.
2. Edelstein B. Disparities in oral health and access to care: findings of national surveys. *Ambul Pediatr*. 2002;**2**(Suppl 2): 141-7.
3. Mouradian W, Wehr E, Crall J. Disparities in children's oral health and access to dental care. *JAMA*. 2000;**284**:2625-31.
4. Psoter WJ, Pendrys DG, Morse DE, Zhang H, Mayne ST. Associations of ethnicity/race and socioeconomic status with early childhood caries patterns. *J Public Health Dent*. 2006;**66**: 23-9.
5. US Department of Health and Human Services. Administration for Children and Families [Head Start Program Performance Standards and Other Regulations, 45 CFR 1304.20, page on the Internet]. Washington, DC; 2008 [cited 2009 Mar 10]. Available from: http://eclkc.ohs.acf.hhs.gov/hslc/Program%20Design%20and%20Management/Head%20Start%20Requirements/Head%20Start%20Requirements/1304/1304.20%20Child%20health%20and%20developmental%20services..htm.
6. Vargas C, Monajemy M, Khurana P, Tinaoff N. Oral health status of preschool children attending Head Start in Maryland, 2000. *Pediatric Dent*. 2002;**24**:257-63.
7. Hart LG, Larson EH, Lishner DM. Rural definitions for health policy and research. *Am J Public Health*. 2005;**95**:1149-55.
8. Siegal M, Yeager M, Davis A. Oral health status and access to dental care for Ohio Head Start children. *Pediatr Dent*. 2004;**26**: 519-25.