Prevalence of Dental Caries and Periodontal Disease in Mexican American Children Aged 5 to 17 Years: Results from Southwestern HHANES, 1982–83

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Abstract: This paper describes the estimated prevalence of dental caries and periodontal disease in 2,550 children, 5 through 17 years of age, who resided in five southwestern states of the United States and were examined in the Hispanic Health and Nutrition Examination Survey (HHANES) of 1982–84 of the National Center for Health Statistics.

Dental caries in the Mexican American children was predominantly a disease of occlusal surfaces of molars; few smooth surfaces of posterior and anterior teeth were affected by caries. This intra-oral distribution of dental caries strongly supports the use of fissure sealants as a preventive procedure. Filled tooth surfaces contributed about 66 per cent of the total DMFS (decayed, missing, filled surfaces) scores. The analysis also shows that about 50 per cent of the 17 year old Mexican Americans had five or more filled or decayed teeth. Mild gingivitis was prevalent (76.9 per cent) in the Mexican American children. (*Am J Public Health* 1987; 77:967–970.)

Introduction

The Hispanic population may be the largest minority group in the United States by the end of the 20th century. The 1980 census estimated that there were 14.6 million Hispanics* in the USA,[1] an increase of about 5.6 million (62 per cent) since 1970, although even this figure may be an underestimate. Despite the increasing number of Hispanic Americans, little information is available about their health status.[2,3]

Previous surveys conducted by the National Center for Health Statistics (NCHS) and the National Institute for Dental Research (NIDR) have included few Americans of Hispanic descent.[5–7] In the first National Health and Nutrition Examination Survey (NHANES I), for example, only about 700 individuals reported that they were of Mexican ancestry.

The only large-scale survey that included a large sample of Hispanics was the Ten State Nutrition Survey of 1968–70.[8] In that survey, it was found that Hispanic children (ages 6 to 17 years) in Texas had more missing teeth and higher DMFT (decayed, missing, and filled teeth) scores than both non-Hispanic White and Black children. By contrast, Hispanic children in the nine other states had lower mean DMFT than either non-Hispanic White or Blacks residing in these states.

In the 1978–81 National Preventive Dentistry Demonstration Program (NPDDP),[9,10] Hispanic children ages 6, 8, 10, and 12 years from the fluoridated cities of New York City, El Paso, Texas, and Hayward, California participated in the study. Mean DMFS (decayed, missing, filled surfaces) scores of El Paso Hispanic children were less than half of those found in Hispanic children from the two other cities, although they were similar to those of El Paso's non-Hispanic children.

Health attitudes and behaviors of Hispanic Americans have been reported to differ from those of non-Hispanic Americans.[11,12] Use of dental services was reportedly infrequent by Hispanics, and many considered use of these services only when continual pain was experienced.[11] Differences were also found between Hispanics and non-Hispanics in the reasons for and frequency of dental visits and in the demand for cosmetic, orthodontic, surgical, and prosthetic services. These differences remained even after accounting for income and education.

The scarcity of data on Hispanic children makes it difficult to reach firm conclusions on the caries prevalence of Hispanics. There are even fewer data on periodontal disease in Hispanic children. The purpose of this study is to describe the estimated prevalence of dental caries and periodontal disease of Mexican American children, ages 5 through 17 years, living in five southwestern states (California, Texas, New Mexico, Colorado, Arizona). The prevalence is based on dental examination data from 2,550 children. This number included 22 children who resided in the selected households but who were not Mexican Americans.

Methods

Survey Design

The Hispanic Health and Nutrition Examination Survey (HHANES) sample design is a four-stage cluster sample selected with probablities proportional to size. The four stages were: 1) primary sampling units (PSUs), made up of counties or small group of contiguous counties; 2) segments (clusters of households); 3) households; and 4) eligible persons. A detailed description of the complex sample design is presented elsewhere.[4] Only a brief summary description is presented here.

By design, HHANES is not a representative national survey of all Hispanics residing in the United States, but rather is representative of Hispanics living in the areas sampled. These areas include approximately 76 per cent of all Hispanics residing in the United States.[4] The Southwestern portion of HHANES covered about 97 per cent of all Mexican Americans within its sampling frame (the five selected states).

After being informed of their inclusion in the survey, some persons could not or would not participate in the interviews. Some of those interviewed could not or would not participate in examinations in the Mobile Examination Center. The number of individuals who received dental examination was 7,240 out of 7,462 who were medically examined.

In the analyses presented in this paper, sampling weights as well as correction for the clustering effect introduced by

*In HHANES, persons were considered eligible to participate in the survey based upon self-reported ethnicity or "national origin."[4]

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TABLE 1—Per Cent Distribution of Mexican American Children 5 to 17 Years of Age in Southwestern HHANES, 1982–83, by Age and Number of Decayed, Missing, and Filled Teeth (DMFT)

Age	N	Number of Decayed, Missing and Filled Teeth			
		0	1–4	5–8	9–28
5	222	97.2	2.5	—	—
6	221	92.2	7.8	—	—
7	203	71.9	28.1	—	—
8	210	64.0	35.7	0.3	—
9	226	56.7	42.4	0.9	—
10	181	47.8	48.4	2.7	1.0
11	230	40.0	51.7	7.5	0.7
12	217	29.7	54.6	14.5	1.3
13	190	22.3	47.1	23.9	6.7
14	170	25.7	48.9	21.7	3.7
15	160	20.2	37.0	34.5	8.3
16	174	18.3	38.7	26.7	16.3
17	146	14.6	35.1	30.9	19.4
All	2,550	46.2	36.8	12.6	4.4

the survey design were accounted for when means and standard errors were computed. Programs of the Organized Sets of Integrated Routines in Statistics (OSIRIS)[13] supported by the Institute of Survey Research, University of Michigan, were used to compute weighted means and percentages.

Oral Conditions Measured

Each participant received a medical and dental examination, and a 24-hour dietary-recall interview, conducted by a trained dietary interviewer. Other demographic and health-related behaviors were also recorded. Questions of relevance to dentistry included reasons for and frequency of dental visits, preventive health behaviors, coverage by dental insurance, and an evaluation of perceived oral health. Not all of these data are included in this report.

The dental examiners measured prevalence of dental caries using National Institute of Dental Research (NIDR) criteria,[7] periodontal disease using the Periodontal Index (PI),[14] oral hygiene status using Debris (DI) and Calculus (CI) Indexes,[15] malocclusion status and history of orthodontic treatments as defined by NIDR.[16] The examiners also evaluated the denture status of partially and completely edentulous examinees, and estimated the need for restorative care using the NIDR Dental Restorative Treatment Need Index.[16] Three dental examiners participated in the survey; they were trained and recalibrated by a senior epidemiologist.

Results

Of all the Mexican American children between the ages of 5 and 17 years residing in the southwest, 46 per cent were free from caries (Table 1). Overall, 4.4 per cent had DMFT scores higher than nine. The percentage of children with DMFT scores higher than or equal to nine ranged between 1.0 in those aged 10 years and 19.4 per cent in the 17 year-olds.

Table 2 shows that Mexican American females had significantly higher mean number of filled occlusal surfaces than males; but no significant difference was detected between males and females in decayed and missing occlusal and other tooth surfaces. Data presented in Table 2 also show that occlusal tooth surfaces were the most susceptible to decay, and that anterior tooth surfaces were the least decayed.

Although there was no linear association between mean DMFS scores and income, children from low-income families had a substantially higher percentage of tooth surfaces that were decayed and a lower percentage of teeth that were filled than children from the high-income families (Table 3).

TABLE 2—Mean Number of Decayed, Missing, and Filled Surfaces by Type of Tooth Surface in Southwestern Mexican American Children, 5 through 17 Years of Age, and By Sex, Southwestern HHANES 1982–83

Tooth Surface	Male		Female	
	Mean	SEM*	Mean	SEM*
Posterior Teeth				
Occlusal surfaces				
Decayed	0.51	0.04	0.56	0.04
Filled	1.10	0.07	1.53	0.09
Missing	0.04	0.01	0.04	0.01
BL surfaces†				
Decayed	0.31	0.03	0.26	0.02
Filled	0.74	0.04	0.87	0.05
Missing	0.08	0.00	0.08	0.01
MD surfaces‡				
Decayed	0.07	0.01	0.08	0.01
Filled	0.20	0.03	0.27	0.03
Missing	0.08	0.01	0.08	0.01
Anterior Teeth				
BL surfaces†				
Decayed	0.05	0.02	0.03	0.01
Filled	0.05	0.01	0.06	0.01
Missing	0.00	0.00	0.00	0.00
MD surfaces‡				
Decayed	0.06	0.02	0.05	0.01
Filled	0.03	0.00	0.05	0.01
Missing	0.00	0.00	0.00	0.00

*SEM = Standard Error of the Mean.
†BL = Buccal and lingual surfaces.
‡MD = Mesial and distal surfaces.

The prevalence of periodontal disease in Mexican American children, 5 through 17 years of age, is presented in Table 4. An unusually high proportion of Mexican American children suffer from gingivitis (76.9 per cent).

The mean number of teeth with mild gingivitis (defined as a score of 1 in the PI[14]) was 6.14 while the mean number of teeth with more severe form of gingivitis (code 2 in the PI) was 1.01. Only four children between the ages of 5–17 had periodontal pockets.

Discussion

The dental caries distribution of Mexican Americans residing in the Southwest is similar to that of other groups in the region examined by the National Institute of Dental Research (NIDR) in 1979–80, i.e., an overall low level of

TABLE 3—Mean DMFS Scores and Per Cent Decayed, Filled and Missing Tooth Surfaces out of Total DMFS in Mexican Americans 5 to 17 years of age, Southwestern HHANES, 1982–83

Family Income in US Dollars	n*	Mean DMFS	Per Cent of Total DMFS		
			Decayed**	Filled**	Missing
<6,000	292	4.4	33.4	63.5	3.1
6,000–9,999	409	3.4	29.5	62.8	7.7
10,000–14,999	440	3.2	30.7	63.8	5.5
15,000–24,999	665	3.7	26.4	67.5	6.1
25,000–39,999	403	3.8	21.6	71.3	7.1
40,000+	113	4.2	15.9	79.1	5.0

*n = number of individuals. The total number of children who were dentally examined and had income information was 2,322.
**$p < .05$

TABLE 4—Periodontal Disease Status of Hispanic Participants between 5 and 17 Years of Age in Southwestern HHANES, 1982–83

	Per Cent of Individuals	
	HHANES (1982–83)	
Age (years)	Normal	Gingivitis only
5	60.4	39.6
6	38.0	61.4
7	24.4	75.6
8	16.7	83.3
9	16.9	83.1
10	16.1	83.9
11	17.1	82.9
12	19.2	80.8
13	20.4	79.1
14	17.1	82.9
15	14.4	85.6
16	20.8	78.6
17	18.7	80.6
Total	22.9	76.9

disease and clustering in occlusal surfaces of molars. The surface-specific distribution of dental caries in Mexican American children also mirrors that of children who participated in the National Preventive Dentistry Demonstration Project,[9,10] and children in the NIDR survey.[17]

HHANES found the occlusal surfaces of molars as the tooth surfaces most susceptible to decay, supporting the observation of Graves and Stamm[18] that dental caries is now a disease predominantly of occlusal surfaces of molars. Few of the anterior teeth of Mexican Americans were affected by caries, and few teeth in children were extracted because of caries, findings similar to those from the NPDDP.[10]

Because of differing patterns in the use of dental services and the lower reported frequency of dental visits by Mexican Americans compared with other groups,[11,12] it was expected that Mexican American children in the southwest would have more decayed teeth than children residing in the same region. But the data from HHANES show that, in Mexican American children, filled teeth were the major contributor to the total DMF scores. The ratio of filled surfaces to the total DMFS scores was about 66 per cent. In the NIDR survey, this ratio for Region V (Arizona, Colorado, New Mexico, and Texas) children was about 74 per cent, while for Region VII (Washington, Oregon, and California) the ratio was over 90 per cent. These differences may be associated with the lower average income of Mexican Americans when compared to regional averages.

Children of all races from southwestern states have long enjoyed a lower prevalence of dental caries than 17 children from other parts of the country,[6,7,9,10] and comparison of southwestern portion of HHANES and the recent statewide survey in South Carolina, also conducted during 1982–83, shows that these differences still remain.[19] Although a number of explanations have been advanced for the low prevalence of dental caries in certain geographic regions,[20,21] none has been scientifically tested within the context of the multifactorial etiology of caries. One likely explanation for the lower prevalence of dental caries in the southwest is the wide availability of naturally fluoridated water supplies.[22] Since no residence history was collected in HHANES, further exploration of the effect of exposure to fluoridated water is not possible. In HHANES, an assessment of the reported dietary and nutritional intake of Mexican Americans was carried out; however, comparative analysis of these data has not yet begun.

Despite the overall low level of dental disease in Mexican American children, only 14.6 per cent of the 17 year olds were caries free, and over 50 per cent of those children had five or more decayed or filled teeth. Also, of the estimated 5.6 million DMF teeth in Mexican American children, about 3.3 million (58.9 per cent) were contributed by about 26 per cent of the children. This finding concurs with the results of the NPDDP study:[10] a relatively small percentage of the children are highly susceptible to dental caries, while the majority are less so.

The distribution of dental caries in southwestern Mexican Americans raises a number of issues on the effectiveness and economics of different preventive programs. Because of the concentration of dental decay on occlusal fissures in Mexican Americans, use of fissure sealants as a preventive procedure seems most appropriate. Based on HHANES data, about 77 per cent of the decayed or filled occlusal surfaces in 17 year olds had sound proximal surfaces and, therefore, could theoretically have been saved from fissure caries with use of fissure sealants. These findings support strongly the recent recommendations of the Council of Dental Research of the American Dental Association concerning sealants.[23]

Mexican-American children from families with low annual income had about two times more decayed teeth than children from high-income families. This high level of unmet dental need in children from low-income families was also observed in the NPDDP project.[24] HHANES data also show a high percentage of Mexican American children have mild gingivitis. A need for dental public health programs of service and education for these children is strongly supported by the HHANES data.

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NIH Consensus Development Conference: Geriatric Assessment Methods

The National Institute on Aging and the NIH Office of Medical Applications of Research, in collaboration with others, will sponsor a Consensus Development Conference on Geriatric Assessment Methods for Clinical Decision-making. The conference will be held October 19–21, 1987 at Masur Auditorium, Clinical Center, National Institutes of Health, Bethesda, Maryland.

The care of older persons is becoming an ever-increasing responsibility for all but a few physicians and other health care providers. Before practitioners can make reasonable judgments about the best care strategies for each older individual, it is clear that appropriate patient data must be collected. The type of data and the methods for its collection can affect the outcome of geriatric care, improve the quality of life, and reduce overall health care costs.

A body of knowledge is being amassed about the instruments and methodologies of geriatric assessment. It is important that health professionals know which techniques are especially useful in one or another situation.

This conference will bring together biomedical and behavioral scientists, clinicians, other health professionals with an interest in geriatric medicine and health services research, and representatives of the public to address several key questions:

- What are the goals, structure, processes, and elements of assessment for clinical decision-making?
- What are the comparative merits of different methods in carrying out a geriatric assessment?
- What is the evidence that a geriatric assessment is effective? If so, in what settings, for whom, and for which outcomes?
- Insofar as a geriatric assessment is effective, what linkages to clinical management systems are required?
- What are the priorities for future research in geriatric assessment?

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