

DEMOGRAPHIC AND SOCIOECONOMIC PREDICTORS OF DENTAL CARE UTILIZATION

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ABSTRACT

The authors analyzed a comprehensive, nationally representative data set from the 1989 National Health Interview Survey to determine what factors are related to dental care utilization. The authors estimated the percentage of low-income and minority adults who reported visiting a dentist in the past year by race, income, employment status, dental insurance coverage status, sex, health status, education, marital status, age and major activity. Data analyses focused on 49,687 18- to 64-year-old dentate respondents, who were black, Hispanic or white. The authors found large differences in dental care utilization between blacks, Hispanics and whites, when controlling for education, income, age and other variables.

Although dental decay has been significantly reduced over the past 30 years, dental disease continues to be a substantial health problem for many low-income and minority Americans. Low-income and minority Americans experience greater levels of oral disease and are less able to obtain dental care, less likely to be covered by dental insurance and less likely to seek care than higher-income and nonminority Americans.^{1,2}

In 1989, 57 percent of the U.S. population reported having visited a dentist within the past year. However, dental care utilization is considerably lower for black, Hispanic and low-income populations than it is for nonminority and high-income populations.² For instance, only 45 percent of blacks and 46 percent of Hispanics reported visiting a dentist during the past year as compared with 59 percent of whites.²

For the Americans with the lowest incomes, the utilization rate is substantially worse. Only 41 percent of people with a family income of less than \$10,000 a year reported visiting a dentist during the past year as compared with 73 percent of people with a family income of more than \$35,000 a year.²

Several studies examining dental care utilization have been conducted.³⁻¹³ Most of these studies focused on children and older people. For instance, Gift and Newman¹³ analyzed the 1989 National Health Interview Survey, or NHIS, and reported on the use of dental services for U.S. children. They reported that 57 percent of black children visited the dentist during the past year as compared with 72 percent of white children, and 57 percent of Hispanic children visited the dentist during the past year as compared with 71 percent of non-Hispanic children. Gift and Newman reported that these differences persisted even when controlling for income, the education level of the responsible adult and insurance.

Other studies have focused on older adults. For instance, Gift and Newman¹⁴ reported that 43 percent of adults 65 years of age and older reported having visited a dentist within the past year and that older black adults were less likely to visit a dentist than were older white adults. Gift and Newman also noted a dramatic difference in the pattern of dental visits by dentate people vs. edentulous

people, noting that 60 percent of edentulous people reported that they had not been to a dental office in the past five years. In addition, Jones and colleagues¹⁵ reported that “dental care use among minority elders has not increased parallel with elders of all races and national origins.”

Each of these studies provides important and useful information. However, several of these analyses have been limited in their focus, design and modeling of utilization. For example, sufficient attention has not been paid to covariates and the complex sampling methods of some of these studies, and few studies have adequately analyzed utilization data for low-income and minority adults.

Our study examines the relationship between dental care utilization and several socioeconomic variables—such as employment status, dental insurance status, sex, health status, education, marital status, age and race—for adult respondents. This study augments other dental care utilization studies by analyzing a comprehensive, nationally representative data set; using and constructing a unique set of explanatory variables; controlling for, or holding constant, covariates; and focusing on low-income and minority adults.

METHODS

The NHIS is the principal source of information on the health of the civilian, noninstitutionalized population of the United States.¹⁶ The objective of the NHIS is to address major current health issues through the collection and analysis of national data on the incidence and prevalence of illness and utilization of health care ser-

TABLE 1

ESTIMATE OF U.S. CIVILIAN, NONINSTITUTIONALIZED POPULATION WHO VISITED A DENTIST IN THE PAST YEAR (N = 49,687), PART I.*				
VARIABLE	OVERALL % (SE)†	WHITES % (SE)	BLACKS % (SE)	HISPANICS % (SE)
Overall	64 (0.39)	67 (0.42)	49 (0.89)	50 (1.54)
Sex				
Male	60 (0.44)	64 (0.47)	44 (1.23)	44 (1.60)
Female	68 (0.43)	71 (0.46)	53 (0.96)	55 (1.87)
Age (Years)				
18-24	58 (0.83)	62 (0.96)	45 (1.81)	46 (2.09)
25-54	65 (0.40)	68 (0.42)	51 (0.98)	51 (1.68)
55-64	67 (0.79)	70 (0.88)	44 (2.31)	53 (3.60)
Marital Status				
Single	60 (0.60)	66 (0.73)	45 (1.13)	49 (1.87)
Married	66 (0.44)	68 (0.46)	52 (1.38)	51 (2.19)
Widowed/divorced/separated	59 (0.77)	64 (0.85)	49 (1.73)	47 (2.22)
Employment Status				
No	59 (0.65)	64 (0.68)	42 (1.39)	44 (2.78)
Yes	65 (0.39)	68 (0.41)	52 (1.07)	53 (1.32)

* In each row, the overall difference between the percentage of whites, blacks or Hispanics who visited a dentist in the past year was significant at $P \leq .001$ (based on a χ^2 test, accounting for the complex sampling design).
 † SE: Standard error.

vices. The 1989 NHIS, a cross-sectional household survey conducted by the National Center for Health Statistics, included questions on the dental health care of the U.S. civilian, noninstitutionalized population who were more than two years of age. The NHIS also included questions regarding the interval since the last dental visit, the number of dental visits, edentulousness and private dental insurance.

The NHIS data are obtained from household members through personal interviews conducted by permanent staff members of the U.S. Bureau of the Census. Between 65 and 70 percent of the adults 17 years of age and older were self-respondents. Family members responded for the remaining 30 to 35 percent of the respondents who were not present when the interviews were conducted.

In general, people excluded from the NHIS include patients in long-term care facilities, people on active duty with the U.S. armed forces and U.S. nationals living in foreign countries. Data are collected from approximately 49,000 households including 132,000 people in a calendar year. Participation is voluntary and confidentiality is guaranteed. The annual response rate is more than 95 percent.¹⁶

We focused our analysis on determining what factors were related to the respondents' reports in the 1989 NHIS of having been to the dentist in the past year. We confined our data analyses to dentate respondents between the ages of 18 and 64 years who were either black, Hispanic or white and for whom we had complete data. We estimated the percentage of respondents who reported visiting the dentist in the past year by race,

TABLE 2

ESTIMATE OF U.S. CIVILIAN, NONINSTITUTIONALIZED POPULATION WHO VISITED A DENTIST IN THE PAST YEAR (N = 49,687), PART II.*				
VARIABLE	OVERALL % (SE†)	WHITES % (SE)	BLACKS % (SE)	HISPANICS % (SE)
Income Per Family Member				
Less than \$5,000	43 (1.36)	51 (1.65)	36 (1.55)	30 (2.36)
\$5,000-\$10,000	47 (0.74)	48 (0.98)	38 (1.54)	47 (1.85)
\$10,000-\$15,000	59 (0.74)	61 (0.84)	51 (1.76)	54 (2.05)
\$15,000-\$25,000	72 (0.47)	73 (0.46)	63 (1.61)	62 (2.30)
\$25,000-\$50,000	81 (0.54)	81 (0.56)	73 (2.51)	73 (2.82)
More than \$50,000	82 (1.78)	83 (1.84)	71 (13.92)	69 (11.64)
Education				
Some high school	44 (0.81)	48 (0.88)	37 (1.45)	38 (2.17)
High school graduate	61 (0.50)	63 (0.56)	48 (1.09)	54 (1.81)
Some college	70 (0.54)	72 (0.55)	57 (1.76)	62 (1.92)
College graduate	79 (0.57)	80 (0.53)	66 (2.52)	72 (2.49)
Dental Insurance Status				
No	54 (0.52)	59 (0.57)	39 (1.01)	41 (1.67)
Yes	74 (0.43)	75 (0.48)	63 (1.46)	66 (1.54)
Health Status				
Excellent or very good	67 (0.43)	70 (0.46)	52 (1.19)	52 (1.56)
Good	59 (0.59)	63 (0.67)	46 (1.46)	47 (2.84)
Fair or poor	52 (0.87)	56 (1.09)	44 (1.97)	44 (2.51)
Major Activity				
Working	65 (0.40)	68 (0.43)	52 (1.05)	52 (1.49)
Keeping house	62 (0.66)	67 (0.73)	41 (2.16)	49 (2.74)
Student	70 (0.98)	74 (0.97)	53 (2.52)	54 (4.09)
Other	51 (1.29)	57 (1.53)	35 (2.36)	34 (3.52)

* In each row, the overall difference between the percentage of whites, blacks or Hispanics who visited a dentist in the past year was significant at $P \leq .001$ (based on a χ^2 test, accounting for the complex sampling design).
† SE: Standard error.

income, employment status, dental insurance status, sex, health status, education, marital status, age and major activity.

To estimate the degree to which demographic and socioeconomic variables predicted a dental visit in the past year, while controlling for the effect of other predictors, we used logistic regression. Logistic regression is an analytical method commonly used in health services research and is appropriate for use when the outcome, or dependent variable, is dichotomous, or a yes/no variable.¹⁷ Specifically, logistic regression results in an estimate

of an odds ratio, or OR, which is the ratio of the odds of the outcome in one group to the odds of the outcome in another group, while controlling for other variables in the model.

In our analysis, the dependent variable was whether a respondent reported having visited a dentist in the past year. Thus, for one example, our logistic regression model resulted in an estimate of the odds of women having seen a dentist in the past year divided by the odds of men having seen a dentist in the past year, when controlling all other variables in the model.

All estimates, statistical tests and confidence intervals were computed with the use of a software package (SUDAAN Release 6.4, 1996, Research Triangle Institute), while taking into account the complex sampling design of the NHIS.

We operationalized the dependent variable—dental care utilization—by determining if a respondent reported a dental visit at least once during the previous year. The explanatory variables we examined included race, income, employment status, dental insurance status, sex, health status, education, marital status and age. We measured dental insurance status, employment status and sex as binary variables.

We categorized race as black, Hispanic or white. (Respondents were classified as Hispanic if they reported having a Hispanic origin, irrespective of whether they classified themselves as white, black or some other race.) Health status was a self-reported categorical variable and was classified as excellent or very good, good, or fair or poor. Education was categorized as some high school, high school graduate, some college or college graduate. Marital status was classified as single, widowed/divorced/separated or married. We categorized major activity as working, keeping house, student or other.

We derived income per family member from variables for family income, size and age using an equivalence scale suggested by the National Research Council's Panel on Poverty and Family Assistance.¹⁸ According to the panel, the scale recognizes the differences between children and adults and adjusts, in a

consistent manner, for economies of scale as family size increases.

RESULTS

A total of 116,929 people responded to the 1989 NHIS. Of these respondents, 64,279 were between the ages of 18 and 64 years, reported having teeth and were black, white, or Hispanic. Those respondents without complete information were excluded, resulting in a working sample of 49,687 respondents.

From the data, we found that 30 percent (15,038) of the sample respondents reported they were in less than excellent or very good health. Twenty-four percent (11,737) reported that they were not employed. Approximately half were women (53 percent, or 26,181) or had dental insurance coverage (50 percent, or 24,664). Seventy-two percent (35,660) were between the ages of 25 and 54 years. Approximately 13 percent (6,422) were black, and 22 percent (10,694) were college graduates.

Tables 1 and 2 show the estimated percentage of the U.S. civilian, noninstitutionalized population who visited a dentist within the past year, by race and other demographic and socioeconomic variables. Data indicate that more than one-half of the 18- to 64-year-olds had visited a dentist during the previous year. Overall, a lower proportion ($P < .001$) of blacks and Hispanics reported having visited a dentist during the previous year than did whites. We also found that respondents with lower incomes were less likely ($P < .001$) to report a dental visit in the past year than were respondents with higher incomes.

TABLE 3

ESTIMATED EFFECT OF DEMOGRAPHIC AND SOCIOECONOMIC PREDICTORS ON THE ODDS OF VISITING A DENTIST IN THE PAST YEAR (N = 49,687), PART I.*			
PREDICTOR	OR†	(95 PERCENT CI‡)	P-VALUE
Age (Years)			
18-24	1.00	(Reference group)	
25-34	0.99	(0.90-1.07)	< .0001
35-44	1.18	(1.08-1.32)	< .0001
45-54	1.19	(1.08-1.32)	< .0001
55-64	1.43	(1.20-1.49)	< .0001
Sex			
Female	1.00	(Reference group)	
Male	0.64	(0.62-0.67)	< .0001
Race			
White	1.00	(Reference group)	
Black	0.66	(0.61-0.73)	< .0001
Hispanic	0.80	(0.73-0.88)	< .0001
Marital Status			
Single	1.00	(Reference group)	
Married	1.07	(1.00-1.15)	< .0029
Widowed/divorced/separated	0.94	(0.86-1.03)	< .0029
Employment Status			
Employment	1.00	(Reference group)	
Not employed	1.01	(0.94-1.09)	No significance

* Odds estimates are based on a logistic regression model.
 † OR: Odds ratio.
 ‡ CI: Confidence interval.

As we expected, respondents without dental insurance or with lower levels of education were less likely ($P < .001$) to report a visit than were respondents with dental insurance or higher levels of education. The majority of respondents reported that they were in excellent or very good health, and we found that women or employed respondents were more likely ($P < .001$) to report a visit than were men or unemployed respondents. For each demographic or socioeconomic subgroup in Tables 1 and 2, blacks and Hispanics were less likely ($P < .001$) to report a dental visit than were whites.

On the basis of a logistic regression model, we estimated the effect of various demographic and socioeconomic predictors on the odds of reporting a den-

tal visit in the past year (Tables 3 and 4). The predictors we included in the model were age, income, education, sex, race, marital status, dental insurance status, employment status, health status and major activity. We found that all predictors, except for employment status, were significantly associated with respondents reporting a dental visit in the past year. We estimated that the odds of blacks having visited a dentist in the past year were 0.66 ($P < .0001$) times that of whites, controlling for all other predictors in the model. We also estimated that Hispanics were less likely to report a dental visit than were whites (OR = 0.80, $P < .0001$). Respondents with higher levels of family income were more likely to have visited

TABLE 4

ESTIMATED EFFECT OF DEMOGRAPHIC AND SOCIOECONOMIC PREDICTORS ON THE ODDS OF VISITING A DENTIST IN THE PAST YEAR (N = 49,687), PART II.*			
PREDICTOR	OR†	(95 PERCENT CI‡)	P-VALUE
Income Per Family Member			
Less than \$5,000	1.00	(Reference group)	
\$5,000-\$10,000	1.02	(0.92-1.12)	< .0001
\$10,000-\$15,000	1.40	(1.26-1.55)	< .0001
\$15,000-\$25,000	2.01	(1.82-2.24)	< .0001
\$25,000-\$50,000	2.82	(2.50-3.17)	< .0001
More than \$50,000	3.27	(2.50-4.27)	< .0001
Education			
Some high school	1.00	(Reference group)	
High school graduate	1.43	(1.34-1.52)	< .0001
Some college	1.82	(1.70-1.96)	< .0001
College graduate	2.41	(2.18-2.65)	< .0001
Dental Insurance Status			
Some	1.00	(Reference group)	
None	0.61	(0.57-0.65)	< .0001
Health Status			
Fair or poor	1.00	(Reference group)	
Good	1.01	(0.93-1.10)	< .0017
Excellent or very good	1.10	(1.01-1.20)	< .0017
Major Activity			
Working	1.00	(Reference group)	
Keeping house	1.04	(0.91-1.15)	< .0001
Student	1.80	(1.61-2.01)	< .0001
Other	1.02	(0.91-1.15)	< .0001

* Odds estimates are based on a logistic regression model.
† OR: Odds ratio.
‡ CI: Confidence interval.

a dentist at least once in the past year than were respondents with lower levels of family income.

The data in Tables 3 and 4 also indicate that respondents without dental insurance coverage were less likely (OR = 0.61, $P < .0001$) to seek dental care than were respondents with dental insurance coverage. Respondents with lower levels of education were less likely (OR = 1.43, $P < .0001$) to seek dental services than were respondents with higher levels of education, controlling for all other predictors in the model. Men were less likely (OR = 0.64, $P < .0001$) to visit a dentist than were women.

We found that, while married respondents were somewhat more likely to visit a dentist (OR = 1.07, $P < .0029$) than were single respondents, widowed/divorced/separated respondents were the least likely overall (OR = 0.94, $P < .0029$) to visit a dentist. We found that employment was not significantly ($P > .05$) predictive of dental care utilization, controlling for all other predictors.

DISCUSSION

While our data analyses have provided some important information, they have limitations. For example, some utilization determinants—such as dental insurance coverage and dental vis-

its—are limited in breadth and detail. We were unable to use the NHIS data to determine if a visit had been made for preventive services or to address acute dental problems. Therefore, a report of a visit to the dentist in the past year could mean that the respondent had either good preventive practices or an acute problem. A report of not having visited the dentist in the past year could mean that the respondent had poor preventive practices, no acute problem or limited access to dental care. The differences between the demographic and socioeconomic subgroups in the percentage of respondents who visited a dentist could have resulted from a combination of these explanations.

We also found that survey limitations existed. The NHIS data were retrospective and did not provide information directly about the respondents' intent to consume dental care services or purchase dental care. Also, the fact that the respondents self-reported the data, which is less accurate than data collected by observation, further limited the results of this study.

On the other hand, the analyses we conducted expanded on previous work and advanced dental care utilization knowledge. For instance, we found that dental care utilization is strongly related to sex, income, education and dental insurance coverage, even while controlling for covariates. And although employment was predictive when we performed bivariate analyses, it was not a significant predictor when we performed multivariate analyses. Perhaps, once we control for dental insurance status, income and education variables, we will find that



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employment is no longer predictive.

Most importantly, data analyses show that there are large differences in dental care utilization between blacks, Hispanics and whites. In particular, we found that Hispanics and blacks are less likely to visit a dentist than are whites, even after controlling for education, income, age and other variables. Therefore, there must be other systematic differences between blacks, Hispanics and whites that were not measured in this study. For instance, differences in attitudes toward dental care, differences in dental health status, presence of barriers to care, language or cultural barriers, or discrimination could each help explain our results.

Additional study is needed to specifically characterize these additional factors and determine their relative importance. Although traditional utilization determinants—such as income, education and insurance—are clearly related to dental care utilization, it is apparent that they do not completely explain uti-

lization patterns for all people.

The results of this study have important implications for providers, patients and oral health policy planners. For instance, because Hispanics and blacks have lower dental care utilization rates than do whites, even after controlling for income and dental insurance coverage, government-financed programs for underserved populations that are designed to simply pay for dental care may be ineffective. Instead, to facilitate dental care access for people who face cultural and language barriers, new approaches may be required when designing programs. An integral component of many of these programs should be to reinforce the need for and importance of good oral health.

In addition, as our study shows that blacks and Hispanics with dental insurance coverage and high incomes also have low utilization rates, providers can help facilitate access to dental care by expanding outreach programs and multilingual support. ■

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