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Christina Studts, PhD, Committee Chair

Dr. William Pfeifle, Director of Graduate Studies

Factors influencing differential oral health care use between Hispanics and non-Hispanic Whites in the U.S

A paper submitted in partial fulfillment of the requirements for the degree of
Master of Public Health in the University of Kentucky College of Public Health

By
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April 23rd 2014

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Oral health is often considered merely the absence of disease. However, oral health involves much more. Good oral health facilitates very basic functions like eating and speaking; a healthy smile is also associated with good self-esteem and productivity.¹ Most oral health diseases are largely preventable. Despite this, a large portion of the population in the United States still suffer from untreated dental decay.² Poor oral health has a direct effect on systemic health, quality of nutrition, digestion, phonetics, self-image and self-esteem.⁵ Whether considered individually or combined, each of these factors has a direct impact on the quality of life of children and adults.

According to the Centers for Disease Control and Prevention (CDC), oral health in the United States has shown substantial improvements in the last two decades. However, racial and ethnic minorities have larger unmet oral health needs when compared to the general population.³ According to the CDC, Hispanic and African American populations are the most disproportionately affected groups. Between 1999 and 2004, 22.8% of non-Hispanic White adults between 35 and 44 years old had untreated dental decay, compared to 40.2% of Mexican Americans.³

Although Hispanic adults have nearly twice as much untreated dental decay as compared to White non-Hispanic adults,³ existing research has failed to determine the main factors explaining this disparity. According to Stewart *et al.* and Perez *et al.*, acculturation plays a role in accessing dental care.^{7,8} In contrast, Jaramillo *et al.* found that acculturation assessed by language spoken was not associated with past dental visits.⁹ Other proposed explanatory factors include lack of dental insurance, poverty, and level of education.⁷ Furthermore, Cortes *et al.* detailed several specific barriers that Hispanics have to overcome in accessing oral health care, such as work schedule conflicts

and dependence on public transportation.¹⁰ Finally, according to Allukian, Hispanics may have difficulty accessing dental services because of the lack of culturally competent providers⁴

To find appropriate solutions for current oral health disparities, it is necessary to develop a clear understanding of the issue. Factors underlying the difference in tooth decay incidence between Hispanic and non-Hispanic Whites must be identified, particularly because the importance of oral health goes beyond the mouth; it has a direct impact on systemic health as well as overall functioning. Increasing the proportion of Hispanics who access preventive dental care is critical. Prevention plays a crucial role in the remediation of oral health problems by decreasing health care costs and reducing potential complications later on.⁶

This study will compare factors affecting accessibility, affordability and availability of dental services between Hispanics and non-Hispanic Whites in the U.S. It will also assess differences between these groups in factors influencing the incidence of oral health problems. The primary hypothesis is that Hispanics will be more likely to report needing care but not being able to get it, compared to non-Hispanic Whites. In addition, the secondary hypothesis is that among all of the respondents who did not get care when they needed it, the respondent-identified factors reducing the availability, accessibility, and affordability of oral health care will differ between Hispanics and non-Hispanic Whites. The final hypothesis is that, among Hispanic respondents only, acculturation will play a direct role in whether participants needed but did not receive dental care. Given that current research on this topic is somehow contradictory, the results of this paper will help inform future solutions such as special interventions for

minority groups, which may include community outreach programs, changes in current policies, and reduction of identified barriers, among others.

Methods:

The Institutional Review Board at the University of Kentucky waived review of this study because of the use of publically available, de-identified secondary data.

Study design and sampling

This study investigated the reasons behind the high incidence of oral health problems in 1327 Hispanic adults who participated in the 2003-2004 National Health and Nutrition Examination Survey (NHANES) by comparing their responses regarding affordability, accessibility and availability of dental services to those of the 2865 non-Hispanic Whites who also participated in the survey. Participants were selected using complex, multistage, probability sample design consisting of four stages. First, primary sampling units were selected from all U.S counties; selection was based on strata defined by geography and proportions of minority populations. These are mostly single counties, or in a few cases, groups of contiguous counties selected with probability proportional to size (PPS). Then, within each primary sampling unit, segments were selected containing a cluster of households using PPS. The next step consisted of listing all the households of each segment and randomly drawing a sample from each. Lastly, selection of individuals took place. All eligible members within a household were listed, and a subsample of individuals was randomly selected based on sex, age, race, income and Hispanic origin, assessed by combining participant responses on race and origin. The study sample does not include people in supervised care or custody in institutional settings, active military, and any other U.S citizen residing outside of the U.S territory.

Data collection procedures

A cross sectional study design was used. NHANES is a nationally representative survey of the U.S population. It consists of questionnaires administered at the home of participants and a physical examination, including an oral health exam, conducted in mobile examination centers. The oral health questionnaire was administered before the oral examination, in the home of participants, using the Computer-Assisted Personal Interviewing (CAPI) system. Interviewers were frequently accompanied by field supervisors on interviews and observed to verify that the protocol was followed. Participants received cash remuneration for their participation as well as reimbursement for transportation, baby/elder care and a complete report of the findings of the examinations.

Measures

This study investigated factors affecting accessibility, availability and affordability of dental health services among Hispanics and compared them to those reported by non-Hispanic Whites, using data from the 2003-2004 National Health and Nutrition Examination Survey. Predictor variables of interest were being Hispanic and acculturation. These were measured as follows:

Demographics. Race and ethnicity were assessed by self-reported responses in the initial questionnaire. Participants were asked the dichotomous “yes” or “no” question, “Do you consider yourself to be Hispanic or Latino?” The respondents who answered yes were then asked: “Where do your ancestors come from?” Response options were Puerto Rican, Cuban/Cuban American, Dominican (Republic), Mexican/Mexican American, Central/South American, other Latin American, Other Hispanic or Latino. For the current

study, only participants who were subsequently categorized in NHANES as Hispanic or non-Hispanic White were included in the sample.

Acculturation. For the current study, language read and spoken at home was used as a proxy for acculturation. In the NHANES interview, participants responded to a Likert-type item describing the proportion of English versus Spanish that they spoke at home. Responses were coded 1 = only Spanish, 2 = Spanish more than English, 3 = both equally, 4 = English more than Spanish, and 5 = only English. Higher values on this variable indicated higher levels of acculturation.

Oral Health. The primary outcome variable was not receiving needed dental services during the past year. This dichotomous variable was measured by participant responses to the question, “During the past 12 months was there a time when you needed dental care but could not get it at that time?” If participants answered yes, they were considered as not receiving dental services in the past year.

Finally, an oral problems index score was created by summing responses to six Likert-type scale items, which measured the impact of oral health problems. The first question in this category was, “How often during the last year have you had painful aching anywhere in your mouth?” The next question was, “How often during the last year have you had difficulty doing your usual job or attending school because of problems with your teeth, mouth or dentures?” The third question was, “How often during the last year have you been self conscious or embarrassed because of your teeth, mouth or dentures?” The fourth question was, “How often during the last year has your taste been affected by problems with your teeth, mouth or dentures?” The following question asked, “How often during the last year have you avoided particular foods because of problems

with your teeth, mouth or dentures?” The last question was, “How often during the last year you found it uncomfortable to eat foods because of problems with your teeth or dentures?” For each of these questions, the response options were coded from 1 to 5 and included: never, hardly ever, occasionally, fairly often, and very often. The responses to these six items were added together to create an index, on which the minimum possible score was a 6 and the maximum a 30. Higher scores on the oral problems index indicated worse oral health.

Affordability, Accessibility and Availability. For participants who reported not receiving needed dental services in the previous 12 months, these secondary outcome variables were measured using responses to the item, “What were the reasons that you could not get the dental care you needed?” Participants could select more than one response option from the following: could not afford the cost, did not want to spend the money, the insurance did not cover the treatment, dental office is too far away, dental office is not open at convenient times, another dentist recommended not doing it, afraid or do not like dentist, unable to take time off from work, too busy, I did not think anything serious was wrong and expected dental problems to go away, or other. Each of these reasons was coded 0 if not selected and 1 if selected. For this study, six of the possible reasons were selected a priori to represent affordability factors (did not want to pay, could not afford the cost, insurance did not cover), accessibility factors (dental office is too far), and availability factors (office is not open late, unable to take time off from work). Each was used as a dichotomous outcome variable in separate analyses.

Statistical analyses

This study used descriptive statistics for demographic variables such as age, sex, health insurance status, and annual household income. Frequencies and percentages were used to represent categorical variables, while means and standard deviations were used for continuous variables.

The first objective was to examine if Hispanics were more likely than non-Hispanic Whites to report needing oral health care but not getting it during the past 12 months. Simple logistic regression was used to obtain the crude odds of not getting oral health care for Hispanics versus non-Hispanic whites. Multiple logistic regression was used to compute adjusted odds ratios controlling for age, sex, annual household income, health insurance status, and oral problems index score.

The second objective was to assess the reasons why respondents were not able to get dental services when needed, comparing the answers of Hispanics to non-Hispanic Whites, controlling for possible confounding effects of important variables (i.e., age, sex, annual household income, health insurance status, and oral problems index score). For these analyses, annual household income included comparisons of the lowest (i.e., less than \$20,000) and middle (i.e., \$20,000 to less than \$55,000) income categories to the reference group of the higher combined categories (i.e., \$55,000 to \$74,999 and \$75,000 and higher). Separate multiple logistic regression analyses were conducted for each possible reason that dental services were not received to obtain the adjusted odds of selecting that reason for Hispanics versus non-Hispanic Whites.

The last objective was to determine if acculturation played a role in impeding Hispanics from receiving dental care. Using only the Hispanic subsample, multiple

logistic regression tested the effect of acculturation on needing but not receiving dental services in the past 12 months, controlling for age, sex, annual household income, health insurance status, and oral problems index score.

Results

Demographic characteristics and oral health access:

Table 1 provides the specific characteristics of the sample. Most of the participants in the study were non-Hispanic Whites. The most common age group among the Hispanic participants ranged from 18 to 40 years old. Among non-Hispanic Whites, most respondents were in the 61 and older age group, closely followed by the 18 to 40 age group. There were no significant differences in the proportion of males and females between the Hispanic and non-Hispanic White groups. Regarding household income, most of the participants fell in the \$20,000 to \$54,999 range. Concerning health insurance, 62% of Hispanic participants had coverage, compared to 88% of non-Hispanic Whites. Oral problems index scores were similar between Hispanics ($M = 8.21$, $SD = 3.60$) and non-Hispanic Whites ($M = 8.44$, $SD = 3.79$). Finally, 29% of Hispanics and 15% of non-Hispanic Whites reported having needed dental care in the past 12 months but not being able to get it.

Needing but not receiving dental care:

The effect of being Hispanic versus non-Hispanic White on not being able to get dental care when needed was tested using logistic regression (table 2). Results show that the odds of not being able to find dental care are significantly higher ($OR=1.91$; 95% CI: 1.64-2.23) for Hispanics compared to non-Hispanic Whites. This was still the case after adjusting for important demographic variables such as gender, age, annual household

income, health insurance and the oral problems index score (adjOR=1.42; 95% CI: 1.18-1.71).

Table 3 reports the effects of being Hispanic versus non-Hispanic White on the reported reasons for not being able to get needed dental care. To facilitate interpretation, the reasons are grouped within categories of affordability, accessibility and availability. Statistically significant results were found only within the affordability category. After controlling for important demographic variables, results show that Hispanics have less than half the odds of reporting not being able to get care because participants “did not want to pay,” compared to non-Hispanic Whites (adjOR=0.46; 95% CI: 0.28-0.77). No statistically significant differences in selecting other reasons for not receiving dental care were detected between Hispanics and non-Hispanic Whites.

Finally, table 4 reflects the effect of acculturation on Hispanic participants not being able to get needed dental care in the past year. Significant results were obtained in unadjusted (OR=0.89; 95% CI: 0.82-0.98) and adjusted (adjOR=0.88; 95% CI: 0.79-0.98) analyses. Controlling for age, gender, annual household income, health insurance, and dental problems index score, for each one point increase in acculturation, the odds of Hispanic participants not being able to get needed dental care in the past 12 months significantly decrease.

Discussion

This study found that compared to non-Hispanic whites, Hispanics have 50% higher odds of reporting not being able to get needed dental care in the past year, controlling for age, gender, annual household income, health insurance, and an oral

problems index score. These findings are consistent with previous reports of Hispanics being disproportionately affected by oral health problems, including higher rates of untreated tooth decay and periodontal disease.¹¹ At the same time, they suggest potential targets of interventions aimed at increasing access to services for this particular group.

The fact that Hispanics and non-Hispanic Whites scored similarly on the oral problems index even when 25% more non Hispanic Whites reported health insurance coverage indicates that factors influencing access to dental care go beyond insurance coverage.

Regarding the specific reasons impeding participants from getting the care they needed, most affordability, accessibility and availability problems did not differentiate Hispanics from non-Hispanic Whites. In general, for affordability and accessibility factors, annual household income and health insurance status had significant independent effects on participants' selecting particular reasons for not accessing care. No significant predictors were found for accessibility factors. Interestingly, however, Hispanics had less than half the odds of reporting not wanting to pay as a reason for not accessing dental health services, compared to non-Hispanic Whites.

Finally, this study found that acculturation plays a significant effect on whether Hispanics are able to get dental care when needed. The less acculturated Hispanics are, the lower their odds of accessing needed dental services. Most of the limited literature available on the role that acculturation plays in getting care is consistent with this finding; however, some contradicting data exist, like the findings reported by Jaramillo *et al.* who found that acculturation assessed by language spoken was not associated with dental

visits.⁹

An important aspect of this study is that significant findings were consistent after controlling for important demographic factors such as age, sex, annual household income, health insurance, and the dental problems index score, which emphasizes the validity of the results. Another strength of this study was its use of data from NHANES, which is one of the largest surveys conducted in the U.S and is representative of its population.

These data allowed for direct comparison between Hispanics and non-Hispanic Whites. Nonetheless, due to the retrospective cross-sectional nature of the study, some recall bias could have occurred when respondents were asked about access to dental care during the past year and the reasoning behind it, which could result in inaccuracies. An additional limitation of the study was reliance on a single-item proxy for acculturation. Given the significant finding regarding acculturation as measured by this single item, future studies should examine the effects of acculturation on Hispanics' access to dental services using more extensive measures of acculturation with established reliability and validity. Finally, low cell counts and poor model fit limit the interpretability of the results comparing reasons for not accessing dental health services between Hispanics and non-Hispanic Whites.

Policy makers can use this study as guidance on how to address the oral health disparities that Hispanics face in the U.S. These results show that even when Hispanics and non-Hispanic Whites report similar levels of oral health problems, Hispanics have higher odds of not receiving needed care, but lower odds of reporting unwillingness to pay as a factor precluding them from receiving dental services. Acculturation is an

additional important factor in Hispanics' access to dental health services. When all of these factors are considered together, they constitute significant barriers for this population, impeding them from getting the care they deserve. Inclusive policies that specifically address the need for more bilingual and especially bicultural oral health providers, who are sensitive and understand these patients' needs in health departments and community clinics, are imperative. Considering that Hispanics are the fastest growing minority group in the U.S, this problem will not disappear in the near future, but may in fact become more apparent and more costly. Additional studies aimed at exploring the same variables of this study and the results of the oral examination outcomes in NHANES could offer important information on the direct relationship between lack of access and its consequences on oral health status. In addition, assessing the effect that being Hispanic has on accessing preventive dental care would be another beneficial route to explore. Finally, a study designed specifically to measure acculturation and oral health may be beneficial in trying to find the causes of oral health disparities in Hispanics, as well as short and long-term solutions.

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Table 1. Demographic characteristics and oral health access of Hispanics and non-Hispanic White participants in NHANES 2003-2004

	Hispanics N (%)	Non-Hispanic Whites N (%)
Demographics		
Total Participants	1327 (31.7)	2865 (68.3)
Age (in years)		
18 - 40	650 (49)	1032 (36)
41 – 60	292 (22)	723 (25.2)
61 & older	385 (29)	1110 (38.7)
Sex		
Male	639 (48.2)	1369 (47.8)
Female	688 (51.8)	1496 (52.2)
Covered by health insurance		
Yes	825 (62.2)	2515 (87.8)
No	490 (36.9)	323 (11.3)
Household income		
Under \$20,000	396 (29.8)	621 (21.7)
\$20,000 to \$54,999	612 (46.1)	1087 (37.9)
\$55,000 to \$74,999	87 (6.6)	334 (11.7)
\$75,000 and up	132 (9.9)	618 (21.6)
Oral Problems		
During the past 12 months, was there a time when you could not get dental care?		
Yes	385 (29)	569 (14.7)
No	939 (70.8)	3297 (85.2)
Oral problems Index Score (possible range: 6 to 30)	Mean 8.21 SD 3.60	Mean 8.44 SD 3.79

Note: percentages for each variable may not sum to 100% due to missing data.

Table 2. Effect of being Hispanic versus non-Hispanic White on not being able to get dental care when needed

	Unadjusted OR (CI) N = 4185	Adjusted OR (CI) N= 4126	Adjusted Model Fit Statistics
Needed but did not get dental care in the past 12 months	1.91 [†] (1.64, 2.23)	1.42 [†] (1.18, 1.71)	x^2 (df=6) = 652.79, $p < .001$ Nagelkerke $R^2 = 25\%$

Adjusted odds ratios (OR) were obtained from multiple logistic regression controlling for: age, gender, annual household income, health insurance and oral problems index score.

[†] $p \leq 0.001$

Table 3. Effect of being Hispanic versus non-Hispanic White on reasons for not being able to get needed dental care

	Unadjusted OR (CI) N = 889	Adjusted OR (CI) N= 832	Adjusted Model Fit Statistics
Affordability			
Did not want to pay	0.46** (0.29, 0.74)	0.46** (0.28, 0.77)	x^2 (df=6) = 23.51, $p < .01$ Nagelkerke $R^2 = 6\%$
Could not afford the cost	1.33 (0.98, 1.80)	1.09 (0.78, 1.54)	x^2 (df=6) = 92.91, $p < .001$ Nagelkerke $R^2 = 16\%$
Insurance did not cover	0.64* (0.45, 0.92)	0.69 (0.47, 1.01)	x^2 (df=6) = 17.84, $p < .01$ Nagelkerke $R^2 = 4\%$
Accessibility			
Dental office is too far	1.64 (0.93, 2.89)	1.65 (0.91, 2.98)	x^2 (df=6) = 24.25, $p < .001$ Nagelkerke $R^2 = 8\%$
Availability			
Office not open late	0.77 (0.38, 1.54)	0.84 (0.41, 1.74)	x^2 (df=6) = 2.66, $p = .85$ Nagelkerke $R^2 = 5\%$
Unable to take time off from work	1.39 (0.79, 2.44)	1.66 (0.92, 3.02)	x^2 (df=6) = 6.01, $p = .42$ Nagelkerke $R^2 = 3\%$

Adjusted OR were obtained from multiple logistic regression controlling for: age, gender, annual household income, health insurance and oral problems index score. Sample size for multiple logistic regression was reduced by 57 participants via listwise deletion.

* $p \leq 0.05$ ** $p \leq 0.01$

Table 4. Effect that acculturation has on not being able to get dental care when needed among Hispanics

	Unadjusted OR (CI) N = 1307	Adjusted OR (CI) N= 1208	Adjusted Model Fit Statistics
Acculturation	0.89* (0.82, 0.98)	0.88* (0.79, 0.98)	χ^2 (df=6) = 156.66, $p < .001$ Nagelkerke $R^2 = 17\%$

Note. Higher scores indicate higher levels of acculturation.

Adjusted OR were obtained from multiple logistic regression controlling for: age, gender, annual household income, health insurance and oral problems index score. Sample size for multiple logistic regression was reduced by 99 participants via listwise deletion.

* $p \leq 0.05$

BIOGRAPHICAL SKETCH

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TITLE	INSTITUTION	DATE
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Chiclets and nicotine candies used to fight off cigarette addiction. Presented at the Venezuelan Society of Oral Surgery.	Presented at the Venezuelan Society of Oral Surgery. Caracas, Venezuela.	May, 2004

Membership in professional societies:

National Medical Hispanic Association

