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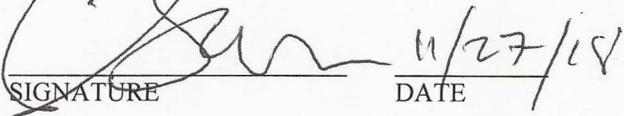
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Risk Factors for Treatment of Gum Disease Among Asian and Hispanic Adult Groups

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ABSTRACT

Risk Factors for Treatment of Gum Disease Among Asian and Hispanic Adult Groups

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The purpose of this study was to assess the association between risk factors for treatment of gum disease of Asian and Hispanic adults in the United States and identify the specific risk factors for treatment of gum disease using Centers for Disease Control and Prevention's National Health and Nutrition Examination Survey (NHANES) data from 2015-2016. Eleven risk factors were selected from the oral health questionnaire section of NHANES 2015-2016. Individuals who stated that they could not afford the cost (OR=1.53) had a higher prevalence of treatment of gum disease. There was no significance between Asians and Hispanic adults and treatment for gum disease ($p=.347$). While self-reported data was a time and cost-effective way to assess the study, it may have contributed to less reporting of gum disease. Though the study was able to identify a significance in a specific risk factor for treatment of gum disease, future studies should utilize clinical examination to confirm gum disease and examine the relationship between treatment for the disease and its specific risk factors.

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INTRODUCTION

Periodontal or gum disease, is a highly prevalent chronic disease that affects approximately 47% of adults in the United States (Eke et al., 2012). It destructs the connective tissue and dental bone support followed by inflammation due to the infection caused by the periodontal bacteria (Bascones-Martinez, 2009). In order to treat the disease, those infected have a scale and root-planing procedure done to remove plaque and tarter deposits on the tooth and root surfaces (The Journal of American Dental Association, 2005). If left untreated, this disease can lead to the compromise of proper function, speech, esthetic, and quality of life in individuals.

The burden of periodontal disease and treatment of care is unequally distributed among those who identify as an ethnic minority when compared to their counterparts. This disparity has been called to attention since the Oral Health Report by the Surgeon General in 2000 (U.S. Department of Health and Human Services, 2000).

The National Health and Nutrition Examination Survey (NHANES) assess the weight periodontal disease has on the United States through annual surveys on selected civilian, noninstitutionalized population aged two months and older to produce national estimates (Ezzati, 1992). Though previous studies addressed the inverse relationship between socioeconomic position (SEP) among ethnic minority groups and periodontal disease, little is known about the specific socioeconomic risk factors that affect these ethnic minority groups and their gum disease treatment, specifically among Asian and Hispanic adults. Thus, it is imperative to understand the risk factors for treatment of gum disease among Asian and Hispanic adult groups.

Literature Review

When compared to their other counterparts, Asian and Hispanic groups experience greater disparities in periodontal disease. According to the Journal of Periodontology, the highest

prevalence of this disease is in ethnic minorities with 50 percent of Non-Hispanic Asians and 63.5 percent of Hispanics being affected by periodontitis, an advanced form of periodontal disease (Eke et al., 2015).

Periodontal disease is associated with the accumulation of bacterial plaque and dental calculus, open proximal tooth contacts, increased loss of attachment, decreased crestal bone support, and increased probing depth (Jernberg, Bakdash, & Keenan, 1983). Common treatment for periodontal disease includes scale and root planing (deep cleaning) to scrape and remove tartar above and below the gum line by a dental professional. However, if left untreated will cause painful chewing, teeth loss and sensitivity, and swollen and receding gums (National Institute of Dental Craniofacial Research, 2012).

The call to attention by the Surgeon General in 2000 led the revolution to understand this oral health burden and disparity gap. Disparities in the major spread and severity of periodontal disease has been noted to be persistent among racial/ ethnic populations since the early 1960s (Kelly & Van Kirk, 1965). However, there continues to be a lack of documentation in disease prevalence among Asian and Hispanics, both with a 43 percent population increase between 2000 and 2010 (Ennis et al., 2011 and Hoeffe et al., 2012).

Many studies report that SEP has a strong influence on the prevalence of periodontal disease (Alpagot et al., 1996). This is supported by the study performed by Weatherspoon et al., which reported that Asian and Hispanic groups had lower socioeconomic status and education but higher periodontal disease with 39.8 percent and 17.4 percent self-reporting the burden of disease (Weatherspoon, 2016). Additionally, the prevalence of periodontitis in adults in the United States using NHANES 1999 to 2004 and 2009 to 2012 data shows the same trend of

increased periodontal disease with increased poverty levels and lower education (Dye et al, 2007 and Eke et al, 2015).

Most studies on periodontal disease use income and education level as a SEP as an indicator as it refers to the socioeconomic status and social class of the individual (Galobardes et al., 2006). Income is measured by yearly earnings at the individual, family or household level and can relate to the ownership of material goods and resources. (Berkman and Kawachi, 2000). Thus, income can influence health since money can obtain access to care, food, shelter, and education. Education reflects the knowledge assets of an individual since the number of educational years accumulated or credentials achieved may have direct effect on an individual's employment status or job position. Consequently, it may lead to health benefits or lack of.

Though the general understanding of sociodemographic on periodontal disease is well-documented few literatures have identified the specific SEP risk factors that influence periodontal disease in racial/ ethnic minorities. Thus, the primary purpose of this study was to assess the association between risk factors for treatment of gum disease among adult Asian and Hispanic groups.

RESEARCH AIMS

The current study aimed to identify the specific risk factors which influence the burden of periodontal disease in adult Asians and Hispanics. Specifically, the objectives are to:

1. Determine the difference in treatment of gum disease among adult Asian and Hispanic groups
2. Determine the extent which risk factors contribute to treatment of gum disease

RESEARCH HYPOTHESIS

The following were specific research hypotheses for this study:

1. Adult Asian group will have a higher prevalence of treatment for gum disease than adult Hispanic group.
2. Risk factors will have a significant effect on treatment for gum disease.

METHODS

DESIGN OF THE INVESTIGATION

National Health and Nutrition Examination Survey (NHANES) is a collection of studies aimed to assess the health and nutritional status of children and adults in the United States through surveys that combine interviews and physical examinations. NHANES is a program part of the National Center for Health Statistics (NCHS), a part of the Centers for Disease Control and Prevention (CDC). This present analysis was based on the cross-sectional study from the 2015-2016 NHANES data for the evaluation of risk factors for treatment of gum disease. From the 15,327 participants and 30 different locations selected in 2015-2016 NHANES data, 9,971 completed their interviews. The participants included both children and adults. Within the race variable (the comparison group), those who were non-Hispanic White, non-Hispanic Black, and other race including multi-racial (n=5700) were excluded. For the purpose of this study, those who were under the age of 18 and over the age of 79 (n=1762) were not analyzed. Once these exclusion criteria were applied, the final sample for this study was 2,509.

Outcome of Interest

Treatment for gum disease was self-reported from participants and were classified as receiving treatment if they provided an affirmative response to the question: Have you ever had treatment for gum disease such as scale and root planing, sometimes called “deep cleaning”? Those who refused to answer, did not know, or had missing information were not analyzed.

Exposure of Interest

The eleven responses to the question, “What were the reasons you could not get the dental care you needed” were the eleven risk factors (exposure of interest) for the purpose of this study. Eleven risk factors were selected from oral health questionnaire section which provided

personal interview questions on oral health topics. The eleven risk factors included the following: could not afford the cost, did not want to spend the money, insurance did not cover recommended procedures, 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 dentists, unable to take time off from work, too busy, I did not think anything serious was wrong/ expected dental problems to go away, other, refused, don't know. Individuals who responded with "refused" or "don't know" were not accounted for.

Race Comparison Group

For the purpose of this study, Asians and Hispanics were used as the comparison group in this analysis. Race was defined in the interview as, "What race do you consider yourself to be?" Those who identified as non-Hispanic White, non-Hispanic Black, and other race including multi-racial were excluded. Participants who identified as Mexican-American and Other Hispanic were collapsed into the category, Hispanic, which allowed for better distribution. Those who identified as Asian was left unaltered.

Sociodemographic Covariates

Sociodemographic information was collected, in the home, by trained interviewers using Computer-Assisted Personal Interview (CAPI) system. Respondents selected the language of interview (English or Spanish) and was provided the option of an interpreter during the interview if needed. The following measures were considered as covariates to reflect previous studies describing indicators for gum disease: age, gender, total number of people in household, annual household income, language, marital status, and education level.

The participants' age ranged from 18 to 79. Those who were 80 years and older were not analyzed due to uneven distribution of data. Age in year at the time of screening interview, was

originally a continuous variable but was stratified into the seven age groups: 18-25, 26-35, 36-45, 46-55, 56-65, 66-75, 76-79. Gender was left unaltered and participants identified as male or female. Total number of people in household was left unaltered and were categorized as: 1, 2, 3, 4, 5, 6, or 7+. Annual household income was calculated by the sum of all reported family/individual income values by NHANES. Participants who identified as having an annual household income of \$0-\$4,999; \$5,000-\$9,999; \$10,000-\$14,999; \$15,000-\$19,999; \$20,000-\$24,999; and Under \$20,000 were collapsed into one category as \$0-24,999. Those who identified as having an annual household income of \$25,000-\$34,999; \$35,000-\$44,999; \$45,000-\$54,999 were collapsed into one category as \$25,000-54,999. Those who identified as having an annual household income of \$55,000-\$64,999; \$65,000-\$74,999; \$100,000 and over; and \$20,000 and over were collapsed into one category as \$55,000 and over. Language variable was left unaltered and was categorized as speaking English or Spanish during time of interview. For marital status variable, those who identified as being married or living with a partner were collapsed into one category as married. Those who identified as being widowed, divorced, or separated were collapsed into one category as no longer married. Those who identified as being never married was left unaltered.

Education level was assessed by the question, "What was the highest grade or level of school you have completed or the highest degree you have received?" According to NHANES data, individuals who were aged 6 to 19 were categorized into education level-children/youth. For education level- children/ youth, those who never attended/ kindergarten only, attended grade levels first through 12th/ no diploma, less than fifth grade and less than ninth grade, high school graduate or GED or equivalent were collapsed into one category as high school. Those who identified as more than high school was categorized as some college. Those who refused, don't

know, or had missing information were not analyzed. Individuals who were aged 20 and older were categorized into education level-adults. For those who were categorized as education level-adults by NHANES and identified as less than ninth grade or ninth through 11th grade (includes 12th grade with no diploma), and high school graduate/ GED or equivalent were collapsed into one category as high school. Those who identified as having some college or AA degree or college graduate or above were collapsed into one category as some college. By collapsing the education levels, this allowed for better distribution.

Statistical analysis

The study utilized secondary data from NHANES 2015- 2016 and used IBM SPSS Statistics Version 24.0 (IBM Inc., Chicago, USA) for all data analyses. Treatment for gum disease was the outcome of interest and the eleven risk factors were the exposure of interest. From the 9,971 individuals who completed their interview from NHANES, 7,462 were excluded from the analysis if they did not identify as Asian or Hispanic and was not between the ages of 18 and 79. This yielded an analytic sample of 2,509.

The following variables were analyzed: age, total number of people in household, annual household income, language, marital status, and education level. The descriptive analyses were performed by means of frequencies, cross tabs, and one-way ANOVA for the comparison groups (Asian and Hispanic). In order to understand the sample characteristic for Asians and Hispanics group, a one-way ANOVA was used for the continuous variable (age) to compare mean and standard deviation. A chi-square crosstab was performed for the categorical variables (age group, total number of people in household, annual household income, language, marital status, and education level). The total sample size, p-value, and percentage were taken to describe the sample characteristics, treatment for gum disease, and risk factors within ethnicity. Additionally,

total sample size, p-value and percentage were taken to describe risk factors within treatment for gum disease using chi-square crosstabs.

A binomial logistic regression was applied in order to determine the model and conduct the analysis for the study. The model used the outcome of interest, treatment for gum disease (dichotomous), as the dependent variable. The first model began with the sociodemographic covariates, excluding education level children/ youth. After the sociodemographic variables were added, three risk factors (insurance did not cover recommended procedure, dental office is not open at a convenient time, could not afford the cost) that had a significant p-value from the previous chi-square were used in the second model.

RESULTS

PRESENTATION OF THE FINDINGS

Participant Demographic

A total of 2,509 individuals who met the criteria of self-identifying as Asian and Hispanic and between the ages of 18 and 79 were analyzed. Of the individuals, 28% of the individuals were from the Asian group and 72% were from the Hispanic group. Total, over 53% of the individuals were female. The average age of the Asian group was 43.1 and 46.2 for the Hispanic group (Table 1). When categorized into the different groups, age significantly differed across the ethnic groups ($p<0.001$). Over 20% of the individuals lived in a total household of two people. Total number of people in a household differed significantly by ethnic group ($p<0.001$). Over 39% of the individuals had an annual household income of \$55,000 and over. Annual household income was statistically different across the ethnic groups ($p<0.001$). Over 66% of the individuals spoke English. Language significantly differed across the ethnic groups. Over 68% of the individuals were married. Marital status was significantly different across the ethnic groups ($p<0.001$). According to the oral health questionnaire section in the NHANES 2015-2016, education level was separated for individuals aged 18 and 19 and those 20 and up. Over 79% of the individuals who were 18 and 19 had a high school education level. Education level for those who were 18 and 19 was not significantly different across the ethnic groups ($p=0.224$). Over 54% of those who were 20 years old and up had a high school education level. Education level for those who were 20 years old and up was significantly different across ethnic groups ($p<0.001$).

Treatment for Gum Disease

Among the 2,509 individuals that were analyzed in the study, over 31% of the total had treatment for gum disease. Among the Asian and Hispanic group, 32.9% and 30.6% had

treatment for gum disease, respectively (Table 2). Treatment was not statistically significant across the ethnic groups ($p=0.347$).

Risk Factors

Based on the chi-square cross tabs three of the risk factors were significantly different among the two ethnic groups (Table 3). The three risk factors included those who stated an affirmative response to: “could not afford the cost” ($p<0.001$), “insurance did not cover recommended procedure” ($p=0.007$), and “dental office is not opened at convenient times” ($p=0.031$). These risk factors were included in the final model for the binomial logistic regression.

When evaluating the eleven risk factors against treatment for gum disease all factors were not statistically significant (Table 4). The following were the eleven risk factors and its significance to treatment for gum disease: could not afford the cost ($p=.169$), did not want to spend the money ($p=.733$), insurance did not cover recommended procedures ($p=.319$), dental office is too far away ($p=.497$), dental office is not open at convenient times ($p=.559$), another dentist recommended not doing it ($p=.502$), afraid or do not like dentists ($p=.937$), unable to take time off from work ($p=.276$), too busy ($p=.712$), did not think anything serious was wrong/expected dental problems to go away ($p=.694$), other reason could not get dental care ($p=.884$).

Binomial Logistic Regression

From the eleven risk factors that were considered from the oral health questionnaire section of the NHANES 2015-2016 data, three of the risk factors (could not afford the cost, insurance did not cover recommended procedure, and dental office is not opened at convenient times) were significant against the race/ethnicity group and were used in the final model (Table 3). The results of the binomial logistic regression demonstrated that treatment of gum disease

had a statistically significant association with those participants who identified as “could not afford the cost [of procedure]” (Table 5). Those who identified as not being able to afford the cost were 1.536 times (95% CI: 1.143-2.063) more likely to have had treatment for gum disease compared to those who did not have treatment for gum disease.

Household income proved to be the greatest source for treatment of gum disease ($p < .001$) (Table 5). Participants who identified with having an annual household income of \$25,000-54,999 were .655 (95% CI: .487,.881) less likely to have had treatment for gum disease compared to those who had an annual household income of \$0-24,999. Additionally, those who had an annual household income of \$55,000 and over were .422 (95% CI: .312,.571) less likely to have had treatment for gum disease compared to individuals with an income of \$0-24,999.

Total number of people in household provided to be the second source for treatment of gum disease. Those who had a total of five people in household were 1.683 (95% CI: 1.008-2.809) more likely to have had treatment of gum disease compared to those who had one person in their household. Additionally, age had a slight significance to treatment of gum disease (95% CI: .980,.998).

Furthermore, the other sociodemographic variables and risk factors that were included in the binomial logistic regression model did not have a significant association to treatment of gum disease (Table 5).

DISCUSSION

The purpose of this study was to understand the risk factors for treatment of gum disease between adult Asian and Hispanic groups and to identify which specific risk factor has the greatest effect on treatment of gum disease. The results indicated that participants who identified as having the following risk factors: could not afford the cost, insurance did not cover recommended procedure, and dental office is not opened at convenient times had the greatest significance between Asian and Hispanic groups and that the risk factor, could not afford the cost had the most significance to treatment of gum disease. Because there were few studies examining Asians and even fewer studies identifying specific risk factors associated with treatment gum disease, it was of interest to determine the difference in treatment of gum disease among adult Asian and Hispanic groups and the extent which risk factors contribute to treatment of gum disease.

Prevalence for treatment of gum disease was similar between adult Asian and Hispanic groups, however Asians still reported to have a slightly higher prevalence for treatment, which reflected past research and the hypothesis for this study (Weatherspoon et al., 2016). Thus, emphasizing the importance of carrying out more research regarding periodontal disease among the Asian population in the United States.

Though the primary purpose of the study was to assess the risk factors influence on the burden of periodontal disease in adult Asians and Hispanics, other variables were analyzed to assess any additional influence on treatment of gum disease. Other variables analyzed were gender, age, total household of people, annual household income, and marital status. Other studies controlled for one or more variable when observing its influence on periodontal disease, however few controlled for them simultaneously. Though it was discovered that the risk factors

were statistically significant in the study, annual household income had a dominant influence on treatment of gum disease (Table 5). Additionally, household size revealed to have statistical significance to treatment of gum disease.

Household income had the greatest influence on treatment of gum disease, specifically for those who identified with having an annual household income of \$25,000 to \$54,999 and \$55,000 and over (Table 5). Past research found that socioeconomic factors has some influence in explaining differences in periodontal disease (Borrell and Crawford, 2012). This remained true in this present study when looking at the SES factor, annual household income, when included in the binomial logistic regression. Evidence showed that those with higher-income had lower odds of having treatment for gum disease, thus may have indicated absence of periodontal disease diagnosis (Borrell et al., 2006). Literature suggests that income can influence health due to what money can buy, such as food, shelter, and access to care, all of which play an important role in oral health if compromised (Lynch and Kaplan, 2000). Additionally, this study revealed that those who indicated that they cannot afford the procedure actually needed to have the treatment done. Thus, may have indicated that part of the reason why participants who had higher household income had a lower prevalence of receiving treatment for gum disease.

The study found that household total of people, specifically having five people, had an influence on treatment of gum disease following household income. Few studies looked at the relationship between total people in house and periodontal disease, however, it could be an indirect influence of income since it was reflected by the size of the household. Additionally, age had a slight significance as seen by documented literature.

While household income and total household size were found to have a statistically significant association with treatment of gum disease, other variables were not significant and

did not follow the trend of documented literature. Contrary to the literature, in this study gender, adult education, and marital status, were not significantly associated with treatment of gum disease, association may have been weakened due to controlling many variables simultaneously (Borrel et al., 2004; Sakki et al., 1998).

Social risk factors had an influence on gum disease, specifically if it involved being able to afford the procedure. Variables household income and total household size were interrelated and had a great influence on treatment of gum disease. Household income and size could foster healthy eating, shelter, and better healthcare access which could prevent gum disease. Being able to identify individuals who were not able to afford treatment as having higher prevalence for treatment of gum disease revealed that it is beneficial to focus on the risk factors that influence gum disease the most in order to assist individuals who are burdened by it and improve overall oral health.

CONCLUSION

Current studies showed that there are many social risk factors that influence periodontal disease, specifically in racial and ethnic minorities. However, few studies have shown the specific risk factors of periodontal disease and upon Asian and Hispanics (Weatherspoon, 2016). It was of interest to identify the specific risk factors which influence gum disease among adult Asians and Hispanics using the NHANES 2015-2016 national data set. During this study, it was also imperative to look at the difference in treatment of gum disease among Asians and Hispanics as well as the extent to which risk factors contribute to treatment of gum disease.

The results demonstrated that there was no significant difference in treatment of gum disease between Asians and Hispanics. Though there was no significant difference in treatment of gum disease between Asians and Hispanics, the Asian group had a slightly greater prevalence of having treatment than the Hispanic, as hypothesized. Individuals who identified as not being able to afford the costs of dental procedures were more likely to have treatment of gum disease, thus have had gum disease. The risk factor, could not afford treatment, was the only risk factor from the eleven that were evaluated which had a significant effect on treatment of gum disease. A major finding in this study found that household income had a major influence on treatment of gum disease which reflect other documented literature (Bornell and Crawford, 2012).

Individuals with lower SES were less likely to practice preventative oral health care, thus would put them at a greater risk for gum disease and ultimately seek treatment which would create greater financial difficulty for them (Bersell, 2017). Though it was difficult to change an individual's social economic status, it is important to understand their specific concerns and obstacles to better assess their oral health needs. By understanding which specific risk factors

had the greatest impact on treatment of gum disease, it would help gain knowledge in improving the public's oral health and overall health.

Strengths, Limitations, and Future Direction

The major strength of this study was in the racial diversity of the participants in this study since very little was known about periodontal disease among Asians and Hispanics in the United States. Additionally, the risk factors available allowed for exploration in the specific factors that affect treatment of periodontal disease on adult Asians and Hispanic. Although only one of the eleven risk factors were statistically significant among the outcome of interest, it still supported literature which stated that SES plays a large role in those who were presented with periodontal disease.

However, there were limitations in this study to note. The use of participants who reported as having had treatment of gum disease was an affirmative indication for them having had the actual disease. This left out the individuals who may have had gum disease but did not receive treatment for it. Additionally, the use of self-report for treatment of gum disease rather than clinical examination may have unaccounted for individuals who actually had treatment but identified as not having it, thus affecting the study outcome.

Despite using a self-reported measure, the findings from this study suggest that both Asians and Hispanics are similarly affected by periodontal disease and that not being able to afford dental procedures have the greatest association to treatment of gum disease, thus having had the disease at some point in their life. With the Asian and Hispanic groups continuing to increase in the United States, it is imperative to understand the risk factors of periodontal disease in these racial/ethnic groups in order to reduce the burden of the disease and improve overall health.

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TABLES**Table 1. Sample Characteristics for Asian Versus Hispanic Adults; National Health and Nutrition Examination Survey, 2015-2016.**

	Total (\bar{x})	SD	Asian (\bar{x})	SD	Hispanic(\bar{x})	SD	
Total Mean Age (yrs)	45.3	16.7	43.1	15.7	46.2	17.1	
	Total(%)	n	Asian(%)	n	Hispanic(%)	n	p-value*
	100.0	2509	28.0	702	72.0	1807	
Age group							p<0.001
18-25	14.4	362	14.8	104	14.3	258	
26-35	19.6	492	22.8	160	18.4	332	
36-45	17.2	431	19.8	139	16.2	292	
46-55	17.4	437	19.9	140	16.4	297	
56-65	16.7	420	11.8	83	18.6	337	
66-75	12.4	311	9.5	67	13.5	244	
76-79	2.2	56	1.3	9	2.6	47	
Gender							p=0.059
Male	46.6	1168	49.6	348	45.4	820	
Female	53.4	1341	50.4	354	54.6	987	
Household Total (# of people)							p<0.001
1	6.7	168	7.4	52	6.4	360	
2	20.4	512	21.7	152	19.9	404	
3	19.7	494	22.6	159	18.5	335	
4	19.9	500	20.7	145	19.6	355	
5	15.2	382	14.2	100	15.6	282	
6	8.8	222	5.3	37	10.2	185	
7+	9.2	231	8.1	57	8.6	174	
Annual Household Income (\$)							p<0.001
0-24,999	29.9	650	16.6	99	35.0	551	
25,000-54,999	30.6	665	22.9	137	33.6	528	
55,000 & over	39.4	856	60.5	362	31.4	494	
Language							p<0.001
English	66.9	1678	99.9	701	54.1	977	
Spanish	33.1	831	0.1	1	45.9	830	
Marital Status							p<0.001
Married	68.4	1623	74.0	493	66.2	1130	
No longer married	16.4	390	7.4	49	20.0	341	
Never Married	15.1	359	18.6	124	13.8	235	

(table continues)

Table 1. (continued)

	Total (\bar{x})	SD	Asian (\bar{x})	SD	Hispanic(\bar{x})	SD	
Total Mean Age (yrs)	45.3	16.7	43.1	15.7	46.2	17.1	
	Total(%)	n	Asian(%)	n	Hispanic(%)	n	p-value*
	100.0	2509	28.0	702	72.0	1807	
Education level- Children/ Youth (Includes 18-19 year olds)							p=0.224
H.S	79.3	107	72.2	26	81.8	81	
Some College	20.7	28	27.8	10	12.6	18	
Education level- Adults (20 year olds and up)							p<0.001
H.S	54.1	1283	30.5	203	63.3	1080	
Some College	45.9	1090	69.5	463	36.7	627	

Table 2. Treatment for Gum Disease for Asian Versus Hispanic Adults, National Health and Nutrition Examination Survey, 2015-2016.

Total	<i>Total(%)</i>	<i>n</i>	<i>Asian(%)</i>	<i>n</i>	<i>Hispanic(%)</i>	<i>n</i>	<i>p-value*</i>
	100.0	1937	27.1	523	72.9	1406	p=0.347
Treatment for Gum Disease							
Yes	31.2	602	32.9	172	30.6	430	

Table 3. Risk Factors for Asian Versus Hispanic Adults; National Health and Nutrition Examination Survey, 2015-2016.

Total	<i>Total(%)</i>	<i>n</i>	<i>Asian(%)</i>	<i>n</i>	<i>Hispanic(%)</i>	<i>n</i>	<i>p-value*</i>
	100.0	2509	28.0	702	72.0	1807	
Could not afford	15.9	400	5.7	40	19.9	360	p<0.001
Did not want to spend money	1.4	36	1.3	9	1.5	27	p=0.688
No Insurance	4.1	104	2.4	17	4.8	87	p=0.007
Office too far away	0.4	10	0.1	1	0.5	9	p=0.204
Inconvenient office time	1.0	2 4	0.3	2	1.2	22	p=0.031
Other dentist did not recommend	0.0	1	0.0	0	0.1	1	p=0.533
Fear of dentist	0.6	15	0.1	1	0.8	14	p=0.065
No time off work	1.3	32	0.7	5	1.5	27	p=0.117
Too busy	1.8	44	1.6	11	1.8	33	p=0.657
Expected problems to go away	1.4	36	0.9	6	1.7	30	p=0.128
Other reason	1.7	43	1.0	7	2.0	36	p=0.085

Table 4. Risk Factors for Treatment of Gum Disease; National Health and Nutrition Examination Survey, 2015-2016.

Total	<i>Total (%)</i>	<i>n</i>	<i>Yes(%)</i>	<i>n</i>	<i>No(%)</i>	<i>n</i>	<i>p-value*</i>
Could not afford	17.1	741	18.3	215	16.6	526	p=.169
Did not want to spend money	1.4	63	1.5	18	1.4	45	p=0.733
No insurance	5.2	228	5.8	68	5.0	160	p=0.319
Office too far away	0.6	24	0.1	5	0.4	19	p=0.497
Inconvenient office time	1.0	42	1.1	13	0.9	29	p=0.559
Other dentist did not recommend	0.2	8	0.3	3	0.2	5	p=0.502
Afraid of dentist	1.4	62	1.5	17	1.4	45	p=0.937
No time off work	1.3	57	1.6	19	1.2	38	p=0.276
Too busy	1.6	68	1.5	17	1.6	51	p=0.712
Expected problems to go away	1.1	49	1.0	12	1.2	37	p=0.694
Other reason	2.2	95	2.1	25	2.2	70	p=0.884

Table 5. Binary Logistic Regression of Treatment for Gum Disease (dichotomous); National Health and Nutrition Examination Survey, 2015-2016.

Treatment for Gum Disease	Model 1		Model 2	
	Odds Ratio	99% Confidence Interval	Odds Ratio	99% Confidence Interval
Ethnicity	1.050	(.820,1.345)	1.011	(.788,1.299)
Gender	1.100	(.889,1.362)	1.122	(.905,1.390)
Adult Education	.953	(.751,1.210)	.947	(.746,1.203)
Age	.989	(.980,.998)	.989	(.980,.998)
Household size (# of people)				
1	Ref	Ref	Ref	Ref
2	1.135	(.830,2.084)	1.283	(.809,2.036)
3	1.608	(.996,2.596)	1.613	(.997,2.069)
4	1.573	(.968,2.555)	1.583	(.973,2.575)
5	1.677	(1.001,2.778)	1.683	(1.008,2.809)
6	1.355	(.772,2.378)	1.376	(.783,2.417)
7+	1.617	(.918, 2.848)	1.644	(.932,2.900)
Household income				
\$0-24,999	Ref	Ref	Ref	Ref
\$25,000-54,999	.675	(.504,.906)	.655	(.487,.881)
\$55,000+	.449	(.334,.603)	.422	(.312,.571)
Marital Status				
Married	Ref	Ref	Ref	Ref
No longer married	1.287	(.934,1.774)	1.300	(.942,1.794)
Never married	1.038	(.684,1.575)	1.023	(.673,1.555)
Risk Factors				
Insurance not covered			.722	(.413,1.261)
Inconvenient office time			.957	(.320,2.864)
Could not afford			1.531	(1.142,2.051)

FIGURES

Figure 1. Participant Flow Chart

