Reviewing Inequalities in Access to Oral Health Care and its Effect on Dental Hygiene in Hispanics in the United States

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Abstract

Oral health has a significant effect on a person's quality of life. Poor oral health can harm a patient's oral functions and can cause pain. In the US, access to a dentist or regularity of dentist visits is not ensured. As a result, certain groups of people tend to have poorer oral health or higher rates of dental diseases. We see this in certain minority groups. This project is a literature review of articles from both Google Scholar and Pubmed. It is based on secondary sources from other existing research papers. The review will be an examination of the causes and driving factors behind higher rates of poor oral health in the Hispanic community of the United States. More specifically, is the oral health of the Hispanic population in the United States different from the oral health of other US Citizens as a result of various inequalities? The review will determine if socioeconomic status (SES), oral health literacy, or acculturation are factors that disproportionately affect Hispanics. It will also examine if these factors explain irregular dentist visits or the view of oral health as insignificant. Poor oral health will be based on rates of tooth decay and periodontal disease. The findings of the review suggest that there are associations between factors such as SES, oral health literacy, and acculturation and Hispanic's oral health. These factors are included in the numerous influences on Hispanics oral health status.

Introduction

Periodontal disease and tooth decay are both diseases that can be indicators of oral health status. Periodontal disease is an infection of the gum. It is typically caused by poor brushing or flossing habits that allow plaque to build up on the teeth and harden. It can be identified through swollen and bleeding gums. If not treated, the gums, bones, and tissue that support teeth will eventually be destroyed, causing teeth to become loose and have to be removed. Tooth decay begins when bacteria in your mouth make acids that attack the tooth's enamel. This leads to a cavity. If tooth decay is not treated, it can cause infection or tooth loss (*National Institute of Dental and Craniofacial Research*, 2023).

More studies that examine the causes behind the variances in the rates of these diseases need to be done. Acknowledging different rates of these diseases can not only help highlight further need for oral hygiene, but it can also call attention to disparities such as access to care, lack of culturally appropriate care or mistrust in Western medicine. Multiple studies report that race/ethnicity is highly associated with discrimination or maltreatment when it comes to dental health. In fact, a recent study discovered that non-Hispanic blacks, as well as Hispanics, were more likely to report experiencing acute and chronic discrimination when it comes to dental visits. Discrimination being reported as unfair treatment because of sociodemographic characteristics (Cogburn et al., 2019). It is also evident that many factors come into play besides just race. Social determinants of health, such as income, wealth, educational background, and employment opportunities, have many effects on health outcomes

(Wheeler et al., 2017). For example, adults that have less than a high school education are associated with a three-fold increase in untreated tooth decay compared to individuals with some college education (Assari et al., 2018). Yet even still, little research has been done to determine which minorities are unreasonably affected by socioeconomic status and or education level, and how that subsequently influences the rates of these diseases.

The three main factors this review will examine are acculturation, oral health literacy, and SES. Acculturation is the measure of assimilation to a different culture. In the case of this review, acculturation will be viewed as Hispanic immigrants adaptation to the United States (Nguyen et al., 2022). Oral health literacy is a person's ability to process and understand oral health information in order to make appropriate health decisions. For example, a person's ability to understand the importance of brushing and flossing regularly. Socioeconomic status is generally education level, income level or employment status.

Hispanics have disproportionately higher rates of dental caries and periodontal diseases (Nguyen et al., 2022). Periodontitis, which is a more serious form of gum disease, is an inflammatory disease caused by a bacterial infection that damages the periodontal tissues and destroys the alveolar bone. Periodontitis prevalence is highest in Hispanics (63.5%) and non-Hispanic blacks (59.1%), followed by non-Hispanic Asian Americans (50.0%), and lowest in non-Hispanic whites (40.8%) (Eke et al., 2015). More research has to be done on identifying why Hispanics have such high rates of oral diseases compared to other races or even other minorities. The outlasting effects of either untreated tooth decay or periodontal disease can be permanent and painful. Having high rates of these diseases is also associated with other systemic diseases such as cardiovascular disease or diabetes. Hispanics shouldn’t be more prone to these problems or diseases as a result of various inequalities.

Using secondary data and including patient survey datasets, this paper will examine what factors are driving the high rates of periodontal disease and tooth decay in Hispanics in the United States. It will compare Hispanics socioeconomic status, oral health literacy, and acculturation to those of different races to see if they are disproportionately affected. The goal is to clearly determine if these factors are influential on the oral health status of Hispanics.

Review

Socioeconomic Status (education, income)

Socioeconomic status (SES) factors such as education and income are highly effective in deciding a population's access to oral health care (Assari et al., 2018). A large section of research papers have examined and identified poorer health and the role of SES for Blacks compared to Whites (Assari et al., 2018). However, it is unknown if SES has the same effects on Hispanics. Hispanics generally have poorer oral health compared to non-Hispanic Whites in the United States, but factors such as income, employment, and marital status still need to be looked at. In closing, this review will determine whether or not Hispanics generally lower SES status leaves them more at risk for tooth decay or periodontitis.

Acculturation and Oral health literacy

Researchers have assessed oral health literacy and acculturation as independent variables affecting frequency of dental care use, but little have considered the interactions

between the two (Nguyen et al., 2022). Determining whether correlation exists between the two can lead to more accurate predictions on frequency of dental care use, and can help identify whether Hispanics are a high-risk group for low access to preventative dental care necessary to promote oral health.

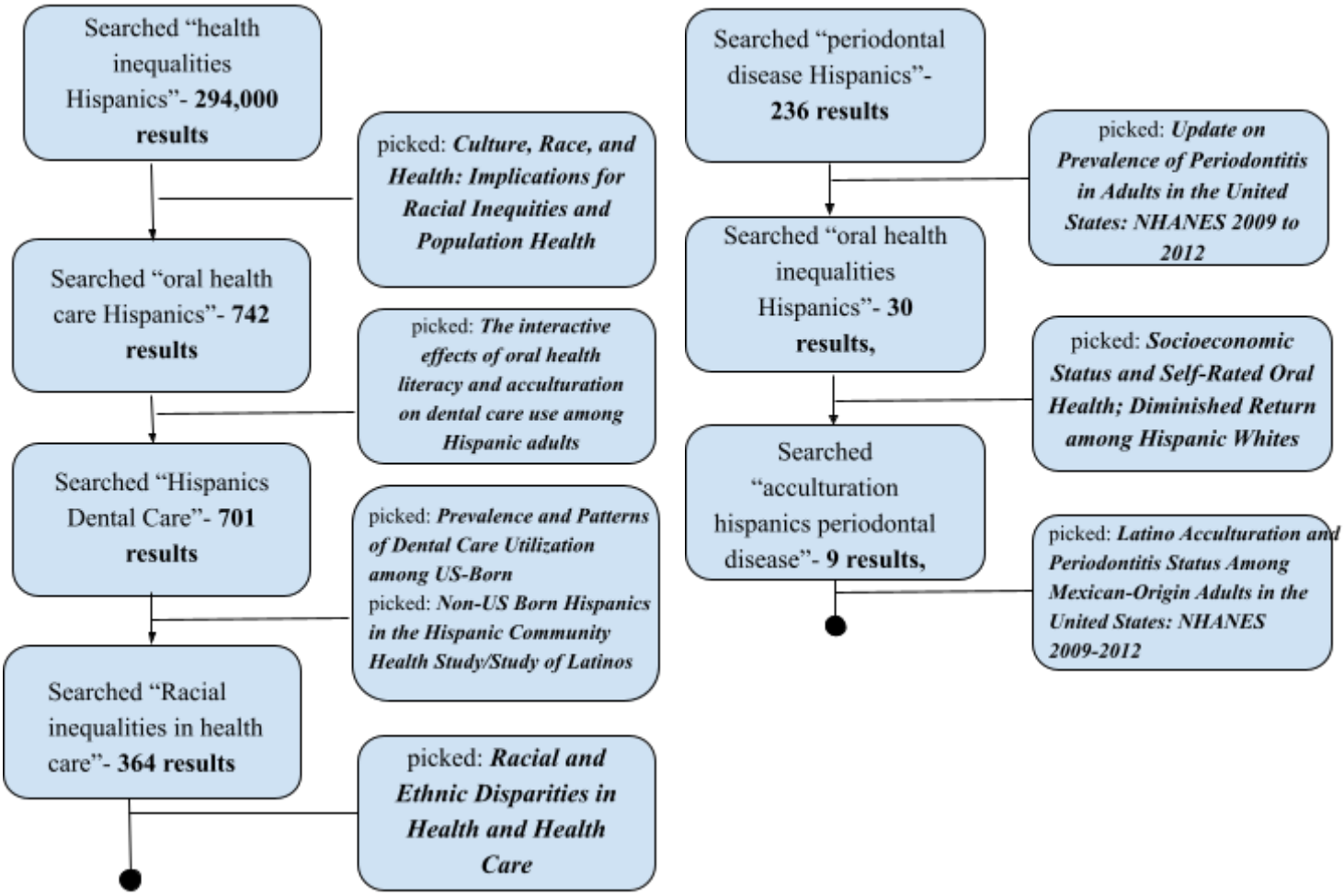
With acculturation, it is typically seen that the more acculturated someone is, the more frequently they have dental visits and the better their oral health. In other words, acculturation should have a positive effect on someone's oral health. Being more acculturated could mean someone replacing or modifying certain societal or cultural elements such as clothes, language, or religion to fit the culture in which they are assimilating into. For this paper, it could mean a Hispanic deciding to speak English over Spanish in a survey. This review will determine whether or not Hispanics are affected by assimilation into the United States and if it is one of the factors affecting their oral health.

Low educated individuals and those with low levels of oral health literacy do not view oral health as a major component of overall health, and are expected to have less frequent dental visits (Assari et al., 2018). This review will determine whether there are disadvantages to gaining oral health literacy in the Hispanic community and if that affects oral health.

Methodology

Secondary data was taken from two sources: Pubmed and Google Scholar. On the two databases, various keywords were used in searches. For choosing which articles were the most suitable, the same guidelines were followed. First, it was made sure that PubMed or Google Scholar highlighted all keywords that were searched and that those keywords were used throughout the article. Once a select few articles contained all keywords, the abstracts were read. About 2-3 articles from the searches contained all keywords and sufficient information in their abstracts. From there, a single article from each search was chosen as the most appropriate and included in the review. All articles used in the review were picked from these guidelines. An inclusion and exclusion outline was used when selecting reliable and accurate sources. The inclusion outline only included sources that contained data on minorities as well as Hispanics, sources that investigated populations solely studied in the United States, and sources that included data on periodontal diseases or tooth decay/caries. The exclusion outline ruled out sources that either talked about Hispanics outside of the United States or focused on Hispanic children rather than adults. Figure 1 provides an outline for what keywords were used in searches, and which articles were picked from those searches.

Figure 1 (Searches in Pubmed and Google Scholar)



Results

Multiple national surveys, studies, and scales were used in the articles being reviewed. These measures had acronyms that may be widely unknown. The following background explains these abbreviations which are later mentioned in the Key Findings Table.

Background on Measures used

Short Acculturation Scale for Hispanics (SASH)- A scale including 3 subsections: language use, media, and ethnic social relations. Responses to all of the items are given on a five point bipolar scale where 1 would be "Speak only Spanish" and 5 would be "Speak only English". The middle (3) would include "Both equally". For the scale to be scored, the average rating across all answered items is calculated. An average of 2.99 is the recommended cut point. Scores above this point represent higher levels of acculturation and scores below this point represent lower levels of acculturation.

Comprehensive Measure of Oral Health Knowledge (CMOHK)- An oral health literacy questionnaire composed of 23 items that assesses knowledge on prevention and management of dental caries, periodontal disease, and oral cancer. The correct response for each item is given a score of 1 and a wrong answer is scored as 0. There is a cumulative score ranging from 0 (least conceptual knowledge level) to 23 (highest conceptual knowledge level).

The Hispanic Community Health Study/Study of Latinos (HCHS/SOL)- A community based study of 16,415 self-identified Hispanic/Latino men and women from 2006-2013, designed to investigate risk and protective factors for chronic health conditions. The HCHS/SOL recruited adults aged 18 to 74 of Cuban, Dominican, Mexican, Puerto Rican, Central, and South American background. They were selected from households in Bronx, New York; Chicago, Illinois; Miami, Florida; and San Diego, California. Study participants completed interviewer-administered questionnaires and underwent oral health assessments.

Collaborative Psychiatric Epidemiology Surveys (CPES)- *A survey which* included 11,207 adults who were nationally representative. They were either non-Hispanic Whites (7587) or Hispanic Whites (3620). The dependent variable was self-rated oral health and was treated as a dichotomous measure. The independent variables were education, income, employment, and marital status. Ethnicity, age and gender were also factors considered. Household income was self-reported. Income was treated as a continuous measure in this study and was divided by USD 10,000. Education was measured as a variable with the following four categories: (1) less than 11 years; (2) 12 years; (3) between 13 and 15 years; and (4) 16 years or more. Education was a continuous variable.

National Health and Nutrition Examination Survey (NHANES)- Since 1999, NHANES has been a continuous, annual survey producing national estimates on selected health characteristics within two-year periods. NHANES oversamples different sub-populations to improve estimate accuracy and a nationally representative sample of all races/ethnicities is used. Examinations are conducted in a mobile examination center by trained examiners who were registered dental hygienists in 2009 –2010 and licensed dentists in 2011 – 2012.

Key Findings Table

The following table highlights the main takeaways from the articles included in the review. The table mentions the articles aim's, the sample size and population they studied, the measures used, the method of data collection used, and their key findings/results.

Article Title and Number	Aim of the study	Method of data collection	Sample size/ Population studied	Measures	Key Findings
Prevalence and Patterns	To describe the dental	-Data from participants	13,792 participants	- Short Acculturation	-About 3 in 4 of participants perceived a

of Dental Care Utilization among US-Born and Non-US Born Hispanics in the Hispanic Community Health Study/Study of Latinos (Akinkugbe et al., 2020)	care usage patterns of Hispanics and Latinos based on acculturation	of the Hispanic Community Health Study (HCHS) were analyzed -Survey, time since last dental visit was dichotomized into <1 and ≥1 y.	of the Hispanic Community Health Study (HCHS)	Scale for Hispanics (SASH) -Immigrant generation	need for dental care, and half reported that they had health insurance coverage. -60% of US-born participants with pain had a past-year dental visit, opposed to 48% of their non–US born counterparts. - 51% of US-born participants who perceived needing dental care had a past-year dental visit compared to only 39% of Non–US born participants.
The interactive effects of oral health literacy and acculturation on dental care use among Hispanic adults (Nguyen et al., 2022)	To assess whether interactions exist between oral health literacy and acculturation when effecting dental care use for Hispanic adults	- Survey, question asked was, "Dental care use in the past year (yes/no)?" - Acculturation (low vs. high) -Oral health literacy (low vs high)	338 self identifying Hispanic adults	-Comprehensive Measure of Oral Health Knowledge (CMOHK) -Short Acculturation Scale for Hispanics (SASH) -Language in which the survey was completed	- Prevalence of untreated decay in Hispanic adults aged 20–64 is significantly higher (36%) than non-Hispanic white adults (22%). - A larger proportion of participants with high oral health literacy used dental care in the past year than participants with low oral health literacy (74.5% and 56.0%). -49.1% of participants scored low on the CMOHK (<15 points) and 47.6% scored high (≥15 points).
Socioeconomic Status and Self-Rated Oral Health; Diminished Return among Hispanic Whites (Assari et al., 2018)	To compare Non-Hispanic and Hispanic Whites and the effects of SES on self-rated oral health	-Data from the Collaborative Psychiatric Epidemiology Surveys (CPES), 2001–2003 - Self-rated oral health (low vs high)	11,207 adults, either non-Hispanic White Or Hispanic White.	-Dependent variables: self-rated oral health -Independent variables: education, income, employment, and marital status	-Education, income, employment, and marital status are associated with oral health in non-Hispanic Whites [(OR Education= 0.57, P <0.1); (OR Income = 0.63, P <0.001); (OR Employment = 0.27, P <0.1); (OR Marital Status = 0.45, P <0.1)]

					Odds Ratios explained -For non-Hispanic Whites, having an education decreases the odds of having poor oral health by 43%. -For non-Hispanic Whites, income levels decrease the odds of having poor oral health by 37%. -For non-Hispanic Whites, employment decreases the odds of having poor oral health by 73%. -For non-Hispanic Whites, marital status decreases the odds of having poor oral health by 55%. -For Hispanic Whites there is no statistically significant relationship between oral health and SES (OR Education = 0.71, OR Income = 1.14, OR Employment = 0.76, OR Marital Status = 3.17)
Update on Prevalence of Periodontitis in Adults in the United States: NHANES 2009 to 2012 (Eke et al., 2015)	Describes prevalence, severity, and extent of periodontitis in the US adult population.	Data from the 2009–2010 and 2011–2012 cycles of the National Health and Nutrition Examination Survey (NHANES)	Civilian Adults 30 years and older in the 50 states of the US and the District of Columbia	-Periodontitis defined by combinations of clinical attachment loss and periodontal probing depth from six sites per tooth on all teeth, except third molars	-Periodontitis prevalence is highest in Hispanics (63.5%) and non-Hispanic blacks (59.1%), followed by non-Hispanic Asian Americans (50.0%), and lowest in non-Hispanic whites (40.8%). - Prevalence varies two-fold between the lowest and highest levels of socioeconomic status, whether defined by poverty or education.
Latino Acculturation	To examine the	Data from the National	Data from the 2009 to	-Hispanic Community	-Mexican-origin adults who preferred to speak Spanish

and Periodontitis Status Among Mexican-Origin Adults in the United States: NHANES 2009-2012 (Garcia et al., 2017)	association between Latino acculturation indicators (language and citizenship/nativity status) and periodontitis.	Health and Nutrition Examination Survey (NHANES) 2009–2012 -“ What language(s) do you usually speak at home?”.	2012 NHANES cycles was aggregated to solely consist of individuals who self-identified as being of Mexican-origin.	Health Study/Study of Latinos (HCHS/SOL) - Diagnosis of periodontitis was based on the severity and extent of gingival inflammation, bleeding of the gums, pocket depth, clinical attachment level, and amount of alveolar bone loss - Preferred language and frequency -Nativity and citizenship status	are 1.8 times more likely to have periodontitis compared to Mexican-origin adults who preferred to speak English. -Mexican-origin adults who preferred to speak Spanish are 1.3 times as likely to develop periodontitis compared to those who preferred to speak English. - Individuals with the lowest educational status had the highest prevalence of periodontitis (65.9%).

Expansion of Results

Based on the article by Akinkugbe, having health insurance coverage is significantly associated with a past-year dental visit. While non–US born participants perceived a need for dental care as did their US-born counterparts, only a fraction reported a past-year dental visit. It can be hypothesized that various inequalities are causes for why Hispanic immigrants were less likely to have a past year dental visit, even if they perceived a need for one.

Nguyen found that Hispanics have disproportionately higher rates of dental caries and periodontal diseases. The article also concludes that those with high oral health literacy and low acculturation were more likely to have used dental care than participants with low oral health literacy and low acculturation.

Assari’s findings suggest that SES indicators have an association with better oral health in non-Hispanic Whites, and there is no association in Hispanic Whites. Assari concluded that there is a disadvantage for Hispanic Whites when it comes to education, income, employment, and marital status.

Eke’s findings reveal that the highest prevalence of periodontitis in the adult US population is seen among Hispanics, adults with the lowest education, and those with less than 100% of Federal Poverty Level.

Lastly, Garcia's results suggest that language, which is a significant indicator of acculturation, has a significant effect on periodontitis. Mexican-origin adults who are more acculturated and prefer to speak English, have lower rates of periodontitis.

Discussion

Socioeconomic Status (education, income)

Education and income are protective factors against poor oral health and help enhance population access to oral health care (Assari et al., 2018). In this review, many studies looked at SES factors and investigated their role in the oral health of Hispanics. Evidence from the review suggested that Hispanics generally have poorer oral health compared to non-Hispanic Whites in the United States. In fact, Hispanics have disproportionately higher rates of dental caries and periodontal diseases (Nguyen et al., 2022). In one study, education, income, employment, and marital status were highly associated with better oral health in non-Hispanic Whites. However, none of these associations were found for Hispanic Whites. These factors benefitted non-Hispanic whites while they had no effect on Hispanic whites. For example, having a higher education would result in better oral health. However, in Hispanic Whites, oral health would not become any better. This may be a result of ethnicity. The study concluded that all of these factors better protected non-Hispanic Whites rather than Hispanic Whites (Assari et al., 2018). High education and income levels resulted in better oral health in non-Hispanic whites, but had no association in Hispanics. These components of SES disadvantage Hispanics.

While this study did use a survey of a large number of adults, there were limitations to the data collection. The first limitation being that the data came from 2003. The study itself suggested that inequalities in SES as well as oral health may have changed since then. Oral health was also self-rated. This may have limited validity. Lastly, the mode in which the interviews in the survey were done may have had some impact. Less than 20% of the interviews were conducted by phone. The study stated that some individuals could not be contacted by phone and could only undergo a face-to face-interview, being a possible cause for sampling bias. Even with these limitations, the fact that the study had a nationally representative sampling pool and was in the thousands (11,207) was advantageous to having more accurate results.

Multiple studies looked at rates of tooth decay and periodontal diseases when determining poor oral health. These diseases are reliable gauges for oral health status. The results of a study done by Assari found that Hispanic Whites aged 35–44 years were twice as likely to have untreated tooth decay compared to non-Hispanic Whites due to low SES; Individuals with less than a high school education were three times more likely to have destructive periodontal disease compared to individuals with some college education; and that among adults aged 35–44 years, having less than a high school education was associated with a three-fold increase in untreated tooth decay in comparison to the individuals with college education (Assari et al., 2018). This study used the idea that Hispanics were associated with having lower SES and education levels.

In a different study, the factors of SES and race/ethnicity were also viewed together. When summarized, the article confirmed that the highest prevalence of periodontitis in the adult US population is seen among Hispanics, adults with the lowest education, and in adults below the Federal Poverty Level (Eke et al., 2015). The Federal Poverty Level being a measure of income issued every year by the Department of Health and Human Services. The study had

many strengths to the way data on periodontitis was collected. Tooth examinations were very thorough. The study stated that a gold standard in clinical periodontal examinations is clinical assessment for periodontal measures at six sites around each tooth. NHANES 2009–2012 applied this gold standard. The study was also made up of a large dataset combined from two nationally representative NHANES survey cycles. While there were many strengths to the data in this article, there were still some limitations to who and how data was collected. It was stated that no data was collected around third molars so any disease present on those teeth was missed. Exclusion of individuals for medical reasons, incomplete oral examinations, and not sampling institutionalized persons, may have also introduced sampling bias.

Overall it can be seen that lower socioeconomic status is highly associated with higher rates of tooth decay or periodontitis. As many studies signify, there is a connection between Hispanics being disadvantaged by educational and economic factors when it comes to their oral health. Hispanics' higher probability to have low SES results in their poorer oral health, and therefore we can hypothesize that their poorer oral health is defined by high rates of tooth decay or periodontal disease.

Acculturation and Oral health literacy

When studying acculturation, this review viewed it as the assimilation of Hispanic immigrants into the United States. This included examining things such as preferred language or nativity status. Researchers expect to see that acculturation has a positive influence on oral health. In a study done by Akinkugbe, this was found to be true. Acculturation was found to positively affect oral health status. The higher the acculturation score, the greater the proportion who reported a past-year dental visit. However, the study did digress that acculturation is a process rather than a state, and that there needs to be studies that evaluate oral health trajectories over time. Overall the study argued that acculturation does have association with frequency of dental visits but that more studies of oral health trajectories over several years need to take place (Akinkugbe et al., 2020). Along with viewing acculturation over a longer period of time, the study also mentioned that despite their use of several measures to assess acculturation (SASH, MESA nativity subscore, language preference, and immigrant generation), the measures may not fully capture the continuum of acculturation. The study does however righteously pride itself on being the first study to examine a diverse and large national sample of Hispanic/Latinos' dental care utilization according to acculturation measures and background characteristics.

In a study done by Nguyen where both acculturation and oral health literacy were looked at, there was no significant difference in dental use for participants with differing levels of acculturation. Participants with high oral health literacy and low acculturation were significantly more likely to have used dental care in the past year than participants with low oral health literacy and low acculturation (Nguyen et al., 2022). The study suggests that oral health literacy and acculturation does not go hand in hand. Oral health literacy and its impact on dental visits has no effect on acculturation and its impacts. The results also confirmed that oral health literacy does have a relevant effect on dental care use compared to acculturation. Lower levels of oral health literacy, which we see in Hispanics, can be seen to affect frequency of dental visits and possibly oral health. One limitation to this study, however, was that the sample size was relatively small at only 338 participants. Not only this but the study states that most participants

were recruited from churches and social service organizations that serve Spanish speaking populations, possibly limiting generalizability.

Both rates of periodontal disease and tooth decay are affected by acculturation and oral health literacy. Periodontitis, which is a more serious form of gum disease, is an inflammatory disease caused by a bacterial infection that damages the periodontal tissues and causes destruction of the alveolar bone (Mayo Foundation for Medical Education and Research, 2023). Results from multiple studies suggested that language, an indicator of acculturation, was the most significant factor for rates of periodontitis. For example, Mexican-origin adults who preferred to speak Spanish were 1.8 times more likely to have periodontitis compared to Mexican-origin adults who preferred to speak English. Mexican-origin adults who preferred to speak Spanish were 1.3 times as likely to develop periodontitis compared to those who preferred to speak English as well (Garcia et al., 2017). While this study did conclude that language is an indicator of acculturation, they did digress that acculturation is a broad sociological concept which involves various dimensions. Although language and nativity/citizenship status are commonly used indicators of acculturation, they are somewhat insufficient in capturing the elaborateness of the whole concept. Regardless of the limitations, this study did still find that language preference was associated with periodontitis beyond other markers of acculturation and markers of access to healthcare.

When looked at holistically, indicators of acculturation and oral health literacy can be very significant causes for likeliness of dental visits among Hispanics and therefore their rate of periodontitis or tooth decay.

Conclusion

Hispanics are disadvantaged by SES factors such as education, income, employment, and marital status. Findings suggest that these factors are causes for poor oral health, and may be associated with rates of periodontal disease and tooth decay (commonly used indicators for oral health status). Acculturation and oral health literacy were also confirmed to be influential on dental visits and subsequently, oral health. SES, acculturation and oral health status have not been found to be direct causes for tooth decay or periodontal disease. The causes for these diseases are multifactorial and these factors are contributing components. The role of inequalities in SES, acculturation and oral health literacy on Hispanics and oral health should not be overlooked. Based on the findings of this review, further programs on aiding Hispanics to raise their oral health literacy levels should take place. Programs in Hispanic communities could highlight oral health and its importance in school and health classes. Additional resources to ensure that access to dental visits and oral health care is available to those with low SES should also be provided. This could include grants provided for needy communities.

References

1. Akinkugbe, A.A., et al. “Prevalence and patterns of dental care utilization among US-born and Non–US born Hispanics in the Hispanic Community Health Study/Study of Latinos.” *JDR Clinical & Translational Research*, vol. 6, no. 2, 2020, pp. 222–233, https://doi.org/10.1177/2380084420923338.

2. Assari, Shervin. “Socioeconomic status and self-rated oral health; diminished return among Hispanic whites.” *Dentistry Journal*, vol. 6, no. 2, 2018, p. 11, https://doi.org/10.3390/dj6020011.
3. COGBURN, COURTNEY D. “Culture, race, and health: Implications for racial inequities and Population Health.” *The Milbank Quarterly*, vol. 97, no. 3, 2019, pp. 736–761, https://doi.org/10.1111/1468-0009.12411.
4. Dye, Bruce A. “Dental Caries and Tooth Loss in Adults in the United States, 2011-2012.” U.S. Dept. of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics, 2015.
5. Eke, Paul I., et al. “Update on prevalence of periodontitis in adults in the United States: NHANES 2009 to 2012.” *Journal of Periodontology*, vol. 86, no. 5, 2015, pp. 611–622, https://doi.org/10.1902/jop.2015.140520.
6. Fleming, Eleanor, et al. “Prevalence of Tooth Loss among Older Adults: United States, 2015-2018.” U.S. Department of Health & Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics, 2020.
7. Garcia, Dina, et al. “Latino acculturation and periodontitis status among Mexican-origin adults in the United States.” *Family & Community Health*, vol. 40, no. 2, 2017, pp. 112–120, https://doi.org/10.1097/fch.0000000000000142.
8. Krouse, Helene J. “Covid-19 and the Widening Gap in health inequity.” *Otolaryngology–Head and Neck Surgery*, vol. 163, no. 1, 2020, pp. 65–66, https://doi.org/10.1177/0194599820926463.
9. Nguyen, Daisy Patiño, et al. “The interactive effects of Oral Health Literacy and acculturation on dental care use among Hispanic adults.” *Journal of Public Health Dentistry*, vol. 82, no. 3, 2022, pp. 295–302, https://doi.org/10.1111/jphd.12529.
10. “Periodontitis.” Mayo Clinic, Mayo Foundation for Medical Education and Research, 24 Feb. 2023, www.mayoclinic.org/diseases-conditions/periodontitis/symptoms-causes/syc-20354473.
11. “Tooth Decay.” *National Institute of Dental and Craniofacial Research*, U.S. Department of Health and Human Services, www.nidcr.nih.gov/health-info/tooth-decay#:~:text=Tooth%20decay%20begins%20when%20bacteria,infection%2C%20and%20even%20tooth%20loss. Accessed 29 Aug. 2023.
12. Wheeler, Sarahn M., and Allison S. Bryant. “Racial and ethnic disparities in health and Health Care.” *Obstetrics and Gynecology Clinics of North America*, vol. 44, no. 1, 2017, pp. 1–11, https://doi.org/10.1016/j.ogc.2016.10.001.