



Racial Disparities in Oral Health; Analysis of 2020 Behavioral Risk Factor Surveillance System

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Abstract

Background: Poor oral health continues to be stratified around race in twenty-first-century America. This study examines the differential access to dental healthcare and oral health disparities by race. It specifically evaluates other socioeconomic and demographic factors to detect social determinants of dental health disparities among different racial groups in America.

Methodology: This is a large cross-sectional population-based study of the Behavioral Risk Factor Surveillance System of American Adult. The survey includes 401,958 American adults aged 18 and above who provided valid responses to variables of interest. Logistic regression modeling was conducted to examine the relationship between the reported last dental visit and race, adjusted for potential confounders.

Results: About 67.2% of respondents reported at the dentist within the last year and majority were Non-Hispanic Whites. (69.7%). Following adjustments, Black Non-Hispanics were 23.1% less likely to report dental visits within the last year, AOR 0.77 95% CI 0.75, 0.7, compared to White Non-Hispanics. Smokers and Male respondents had decreased odds of dental visits, AOR 0.63 95% CI 0.61, 0.64, and AOR 0.75 95% CI 0.73, 0.76 respectively. The odds of visiting a dentist within the last year increased with higher age, higher education level, and increased household income.

Conclusion: Despite several attempts to bridge racial disparities in access to oral health care, disparities persist. The preliminary results from our study strengthen the call for a deeper understanding of the patterns of racial disparities and ways in which it influences the utilization of health services.

Keywords: Oral health; Race; Disparities; Dental Visit; Dentistry

Introduction

The mouth remains the gateway to the body, yet oral health is an often-neglected aspect of overall health. Indeed, it is a comprehensive indicator of an individual's socioeconomic status, [1] and quality of life [2]. Beyond this, the overarching value of good oral health is that it confers confidence, promotes social values of communication and self-expression, and enhances basic functions of smell, taste, mastication, and deglutition [3]. The converse is true for poor oral health which is associated with a higher risk of chronic stress and depressive symptoms [4] and has long been theorized to rattle the normal functioning of other critical physiologic systems [5].

Poor oral health continues to serve as a yardstick for emotional, psychological, and physical markers of social inequalities and health disparities [6]. Evidence suggests that these inequalities disproportionately affect individuals of low socioeconomic status and racial groups. Imbalance in dental health care access among different races has been reported [7], and race continues to be an important stratifying factor in oral health disparities. Demonstrable institutional and structural discriminatory policies and culture can lead to differential access to educational and employment opportunities, and thus, inequalities in access to health care [8].

Amidst significant improvement in dental coverage, concerns about accessibility especially among minority and low-income

populations subsist. The problem seems deeper. African Americans and Hispanics enjoy a disproportionate share of public health insurance [9] yet are twice more likely to have untreated tooth decay than non-Hispanic White Americans [10]. Blacks and Hispanics are also more likely to report self-rated poor oral health compared to White Americans. Similarly, Cohen, *et al.* [11] reported that tooth decay, dental pain, and tooth loss are also more likely to be reported among Non-Hispanic Blacks compared to Non-Hispanic Whites.

According to a 2019 survey, about 83% of Americans rated their oral health challenges higher than mental health, exercise, and diet [12]. This growing desire highlights the need for increased access to dental clinics, but Americans are encumbered by the cost of such luxuries. The cost of dental visits was given as the primary reason for not visiting the dentist regularly [12] According to the American Dental Association [13], about 33% of American adults under 64 years do not have dental coverage. Even when they obtain dental insurance, it is largely skewed in favor of preventive therapy [14] and leaves the desired curative treatment to out-of-pocket expenditure. The burgeoning paradox is that those who need dental treatment, don't end up getting it. Gilbert [15] reported that non-Hispanic Blacks are more likely to report financial difficulties and are less likely to seek dental care than non-Hispanic Whites. The prevalence of untreated dental caries was higher for Blacks and Hispanics compared to the White population [13]. The consequences are also reflected in the kind of treatment sought. For instance, Root Canal Therapy was least preferred amongst African Americans compared to Whites [16].

Perhaps a more robust approach to understanding disparities may stem from patients' perspectives of access to health care. Negative experiences from previous hospital visits can influence trust, promote medical adherence, and improve access to quality of healthcare [17]. Studies have established implicit racial bias and cognitive racial stereotypes in the way clinicians prescribe treatment for their patients based on skin color. For instance, a 2005 study reported a higher referral rate for tooth extractions among black people compared to the white population [18]. A randomized controlled trial determined evidence of unconscious racial bias among dentists in clinical decision-making. Patel, Patel and Cotti [19] reported that the recommendation of Root Canal Treatment was significantly higher in white patients with similar conditions compared to black patients. The same report noted that being

black was strongly associated with a recommendation for tooth extraction. Okunseri and colleagues [20] studied the racial disparities in antibiotics prescription by dentists in the United States and reported that compared to Whites, Blacks had 21% higher odds of receiving antibiotics prescription from a dentist, after adjusting for dental procedures and other social demographic variables. These reports underscore the preference for black doctors by black patients, who seek them out, regardless of proximity, supposedly get better care from people who look like them and consequently report higher satisfaction with their care [13].

The separation of oral healthcare from medicine has been fingered as a propagating factor to the worsening oral health inequalities [21]. People seek dental care as part of holistic care for their body and not just the mouth. Over 2.2 million hospital emergency dental visits were recorded in 2016, most of whom are low-income Black Americans [22] However, we are plagued with the reality of a heightened deficiency in the number of dentists who work in the emergency departments of hospitals, where only 1 percent of dentists currently work [21]. Patients who present with pain to the eye, ear, or nose are seen and treated with a robust sense of adequacy in skills by medical practitioners, but these practitioners are left helpless when confronted with dental pain and pathologies. If a patient with dysentery, acute appendix, or stab injuries can be treated in the hospital, why should palliative antibiotics and referral notes to a dentist be the panacea for dental emergencies? Is the mouth different from the body? Atchison and Weitraub [23] argued that bridging oral health disparities can be achieved by putting the mouth back into the body.

Despite national efforts at bridging disparities in oral health through interventions and national policy framework, the problems subsist. Relatively few researchers have explored the racial divide in access to quality dental healthcare using national representative data. Studies examining racial impact in dental care for children predominate the space [24-26]. Fewer researchers have evaluated disparities in American adults but have limited coverage to states and regions. Even so, conflicting evidence abound on the effects of race in the face of other prevailing structural, societal, and economic factors. This research hopes to examine racial differences in access to dental health care. We will also investigate other socioeconomic variables and demographic factors in determining dental health disparities among different racial groups in America.

Methodology

This is a large population-based cross-sectional study of non-institutionalized Americans. We analyzed the 2020 Behavioral Risk Factor Surveillance System, a publicly available data from the Centers for Disease Control and Prevention (CDC), as it is the most recent survey that reported variables on oral health and race components. The Behavioral Risk Factor Surveillance System (BRFSS) is the nation's premier system of health-related telephone surveys that collect state data about U.S. residents regarding their health-related risk behaviors, chronic health conditions, and use of preventive services. It collects data from all 50 states in America, the district of Columbia and the US territories. (CDC, BFRSS,2020).

Study sample

The study sample comprises of American adults aged 18 and older who responded to the questionnaires and provided answers to the variables of interest. A total of 401,958 respondents were sampled. Participants who provided response to the variable interests were included in the analysis. Excluded from the statistical analysis were participants who declined to provide answers to interview questions or refused to answer the variables of interest. (N = 4667).

Study variables

The dependent variable is the utilization of oral health care services, which was assessed using the following item "How long has it been since you last visited a dentist or a dental clinic for any reason?" The responses were, (Within the past year, one year but less than two years ago, two years but less than five years ago, or more years ago and never). For convenience and ease of analysis, we re-coded this variable into those who visited the dentist within the past year and those who visited in one or more years. The independent variable for this study is race. We categorized race into Non-Hispanic White, Non-Hispanic Black, Hispanics, and AIAAN (American Indians, Asians and Alaskan Natives, Pacific Islanders). Other covariates used in this research include Age (18-44, 45-64, and 65 and above), Sex (Male and Female), level of education (did not graduate high school, graduated High School, attended College or Technical School, graduated from College or Technical School), Geographic Locale (Urban and Rural Settlement), Annual household Income (below \$50,000, and \$50,000 and above). Other variables include, diabetic status categorized as (Yes or No), last medical checkup (Within One year, and One or more years ago), number

of permanent teeth removed (1-5, 6 or more but not all, All teeth, None) delay of medical attention because of cost (Yes or No), and smoking status (Yes or No). All variables, except Sex (which is dichotomized), were re-coded for ease of analysis.

Statistical analysis

Analysis of data was done using IBM SPSS Statistics version 26 for Macintosh. Descriptive analysis was performed to analyze individual variables. A bivariate analysis using Chi-square test was done to identify the independent variables that are associated with the outcome variable. Following the results of the bivariate analysis, statistically significant variables were included in a multiple binary logistic regression to assess the effect of race on the outcome variable. Following each addition, variables that were not significant were considered for removal at an alpha set at 5%. Since all our variables were significant, they were added to the regression analysis. Unadjusted and adjusted odds ratio and 95% CI were reported after testing for interactions. Continuous variables, such as age were presented as categorical variables. Missing data were reported and excluded from analysis.

Results

Table 1 shows the breakdown of respondents' demographic information including age, level of education, sex, income, and geographic locality. About 303,886 persons representing 75.6% of our respondents were non-Hispanic White. About 7.6% identified as non-Hispanic Blacks, 9.1% of adults sampled identified as Hispanics, while 7.8% identified as either Asians, Alaskan Natives, Native Americans, or Pacific Islanders categorized as AIAAN. A total of 267,045 respondents representing about 67.2% reported seeing the dentist within the last one year. Majority of respondents, 139,831 were 65 years and above, and represented about 34.5% of sample population. Female respondents represented about 54.2% while respondents who were urban dwellers had a significant representation of about 85%. Majority had college degrees (38.8%), earned \$50,000 or more income, and had a medical checkup within the last one year (78.8%).

Table 2 represents bivariate analysis using Pearson's X2 test for statistics. Bivariate analysis was performed to establish the independent variables that will be included in the logistic regression analysis. From the result, we showed that race as an independent variable and other independent variables were significantly asso-

Variables		Frequency	Percentage %
Last dental visit			
	Within One Year	267,045	67.2
	One or more years	130,246	32.8
Race			
	Non-Hispanic White	303,886	75.6
	Non- Hispanic Black	30,390	7.6
	Hispanic	36,408	9.1
	AIAAN	31,274	7.8
SEX			
	Male	183,931	45.8
	Female	218,097	54.2
Age			
	18-44	122,005	30.4
	45-64	140,122	34.9
	65 and above	139,831	34.8
Smoking			
	Yes	52,488	13.8
	No	328,370	86.2
Diabetes			
	Yes	52,094	13.0
	No	349,050	87.0
Education			
	Did not graduate High School	26,248	6.6
	Graduated High School	107,096	26.8
	Attended College or Technical School	111,387	27.8
	Graduated from College or Technical School	155,340	38.8
Last Medical Checkup			
	Within 1 Year	311,146	78.8
	One or more years	83,705	21.2
Geographic Locality			
	Urban Counties	35,728	85.0
	Rural Counties	59,103	15.0

Household Income			
	Below \$50,000	150,636	46.8
	\$50,000 or more	171,265	53.2
Tooth Loss			
	1-5	116,271	29.6
	6 or More but not all	41,906	10.7
	All	24,745	6.3
	None	209,239	53.4
Medical Cost Delay			
	Yes	34,568	8.6
	No	366,252	91.4

Table 1: Descriptive analysis of American Adult population. Data was obtained from the 2020 Behavioral Risk Factor Surveillance System. (N = 401,958).

ciated with the dependent variable (Last dental visit), with alpha set at (<0.05). Since all independent variables showed statistical significance (<0.05), they were added to the final model of computation for the logistics regression.

Table 3 shows the results of the binary logistic regression analysis performed using last dental visit as the dependent variable. Eleven independent variables were computed for analysis in this model. The association between race and dental health services utilization was statistically significant. Relative to Non-Hispanic Whites, Non-Hispanic Blacks were 37.7% less likely to have used dental services within the last one-year; Unadjusted odds ratio 0.623; 95% confidence interval (CI) (0.608 - 0.639). Similarly, Hispanic Americans, UOR 0.60 95% CI (0.58 - 0.61) and American Indians, Asian Americans, Alaskan Natives (AIAAN) UOR 0.715 95% CI (0.70 - 0.73) showed lesser odds of seeing the dentist within the last one year.

Following adjustments with other Covariates, Non-Hispanic Blacks were 23% less likely to report dental visit within last year; AOR 0.77; 95% CI (0.75, 0.79). compared to Non-Hispanic White, Hispanics were 10.4% less likely to visit the dentist within the last one-year AOR 0.90; 95% CI (0.87, 0.93). Similarly, AIAANs also showed less odds in dental service utilization. AIAANs were 13%

Variables	Last Dental Visit		Chi-Square (P-Value)
	Within One Year (%)	More than one year (%)	
Race			0.001
Non-Hispanic White	209,604 (69.7)	91,214 (30.3)	
Non-Hispanic Blacks	17,570 (58.9)	12,266 (41.1)	
Hispanics	20,749 (57.8)	15,132 (42.2)	
AIAAN	19,122 (62.2)	11,634 (37.8)	
Sex			0.001
Male	116,528 (64.1)	65,184(35.9)	
Female	150,517 (69.8)	65,062 (30.2)	
Age			0.001
18-44	76,872 (63.7)	43,777 (36.3)	
45-64	94,161 (67.8)	44,649 (32.2)	
65 and above	96,012 (69.7)	41,820 (30.3)	
Smoking			0.001
Yes	24,148 (46.6)	27,625 (53.4)	
No	229,357 (70.6)	95,639 (29.4)	
Diabetes			0.001
Yes	30,824 (60.1)	20,442 (39.9)	
No	235,809 (68.3)	109,516 (31.7)	
Education			0.001
Did not graduate High School	10,255 (40.3)	15,199 (59.7)	
Graduated High School	60,834 (57.8)	44,435 (42.2)	
Attended College or Technical School	73,053 (66.2)	37,296 (33.8)	
Graduated from College or Technical School	121,800 (78.8)	32,736 (21.2)	
Geographic Locale			0.001
Urban Counties	226,413 (68.2)	105,586 (31.8)	
Rural Counties	36,361 (62.4)	21,875 (37.6)	
Household Income			0.001
Below \$50,000	81,509 (54.8)	67,260 (45.2)	
\$50,000 or more	133,633 (78.3)	36,997 (21.7)	
Last Medical Checkup			0.001
Within One Year	219,964 (71.4)	87,938 (28.6)	
One or more years	43,787 (52.7)	39,233 (47.3)	
Tooth Loss			0.001
1-5	81,137 (70.3)	34,315 (29.7)	
6 or More but not all	24,112 (58.2)	17,314 (41.8)	
All	6,120 (25.5)	17,882 (74.5)	
None	149,923 (72.3)	57,371 (27.7)	
Medical Cost Delay			0.001
Yes	15,898 (46.6)	18,212 (53.4)	
No	250,653 (69.2)	111,524 (30.8)	

Table 2: Bivariate analysis of BFRSS data of 2020 using Chi-square test to show relationship between last dental visit and independent variables.

P-value < 0.05.

Variables	Unadjusted Odds Ratio	Adjusted Odds Ratio
RACE		
Non-Hispanic White	1	1
Non-Hispanic Blacks	0.62 (0.61 - 0.64)	0.77 (0.75 - 0.79)
Hispanics	0.60 (0.58 - 0.61)	0.90 (0.87 - 0.93)
AIAAN	0.72 (0.70 - 0.73)	0.875 (0.85 - 0.91)
SEX		
Female	1	1
Male	0.77 (0.76- 0.78)	0.75 (0.73 - 0.80)
Age		
18-44	1	1
45-64	1.20 (1.182 - 1.22)	1.17 (1.14 - 1.19)
65 and above	1.31 (1.286 - 1.33)	1.44 (1.41 - 1.48)
Diabetes		
Yes	1	1
No	1.48 (1.40 - 1.46)	1.33 (1.29 - 1.36)
Smoking		
No	1	1
Yes	0.37 (0.36 - 0.37)	0.63 (0.61 - 0.64)
Education		
Did not graduate High School	1	1
Graduated High School	2.03 (1.97 - 2.09)	1.42 (1.37- 1.48)
Attended College or Technical School	2.90 (2.82 - 2.99)	1.68 (1.62- 1.74)
Graduated from College of Technical School	5.51 (5.36 - 5.67)	2.30 (2.22 - 2.40)
Geographic Locale		
Urban Counties	1	1
Rural Counties	0.78 (0.76 - 0.79)	0.89 (0.87 - 0.91)
Household Income		
Below 50,000	1	1
50,000 and above	2.98 (2.94- 3.03)	2.05 (2.02 - 2.09)
Last Medical Checkup		
More than one year	1	1
Within One Year	2.25 (2.21- 2.28)	2.27 (2.22 - 2.31)
Medical Cost Delay		
Yes	1	1
No	2.58 (2.52- 2.63)	1.66 (1.62 -1.71)
Tooth Loss		
1-5	1	1
6 or More but not all	0.59 (0.58 - 0.60)	0.69 (0.67 - 0.71)
All	0.15 (0.14 - 0.15)	0.17 (0.16 - 0.18)
None	1.11 (1.09 -1.12)	0.98 (0.96 - 1.0)

Table 3: Binary Logistic regression analysis of the 2020 BRFSS data set showing. Unadjusted and Adjusted odds ratios Race and other independent variables.

1* reference Category.

less likely to visit the dentist compared to White Americans. Frequency of dental visits were also reflective in the number of tooth loss in individuals. Compared to patients who have extracted less than 5 teeth, individuals who had extracted no teeth had a slightly decreased odds of dental visit AOR 0.98 95% CI (0.96 – 1.0). Participants who extracted all teeth were 83.1% less likely to visit the dental clinic AOR 0.17 95% CI (0.16 - 0.18).

Females reported more recent dental visits (69.4%) compared to males ($P < 0.001$). Consequently, Male respondents relative to females, were less likely to have visited dental clinic within the last 1-year AOR 0.75 95% CI (0.73, 0.80). Age of respondents also reflected in their overall dental needs and dental health service utilization. Individuals in higher age brackets “45-64 years” AOR 1.17; 95% CI (1.14, 1.19) and “65 years and above” AOR 1.44 95% CI (1.41, 1.48), had higher odds of dental visits compared to individuals between the ages of “18-44”. Respondents who reported not being diabetic were 48.2% more likely to see the dentist than diabetics. Conversely, individuals who reported smoking were 64% less likely to have dental visit compared to non-smokers.

All our sociodemographic variables (Education, Household income, and Geographic locale) showed statistical significance. Compared to individuals who did not graduate high school, High School graduates were 42% more likely to visit the dentist AOR 1.42; 95% CI (1.37, 1.48). Respondents who attended College or Technical schools also showed higher odds (67%) of visiting the dentist, AOR 1.678; 95% CI (1.62, 1.74). Similar findings were observed for college graduates who had an increased odds of dental visit within the previous year compared to persons who did not graduate high school. Compared to Adults who earned less than 50,000 dollars in a year, individuals who earned 50,000 dollars and above were more likely to report last dental visit AOR 2.05 95% CI (2.02 - 2.09). Rural dwellers showed 11% less odds of dental visits than urban dwellers AOR 0.89 95% CI (0.87, 0.91). Participants who also visited the doctor for medical checkup within the last one year were 2.266 times the odds more likely to have dental visits compared to those who did not AOR 2.27 (2.22 - 2.31). Finally, compared to individuals who delayed medical visits because of cost, respondents who didn't showed 66% increased odds of dental visits AOR 1.66 CI (1.62 -1.71).

Discussions

This study was undertaken to examine the influence of race as a predictive factor in the differential access to oral health. The result from this study demonstrates significant oral health inequalities among the United States' Adult population. The results indicate that about 1 in 3 persons surveyed did not see the dentist within the last one year, while only 1 in 5 persons sampled did not have a medical checkup within the last one year. This subtle difference continues to highlight the growing divide between the medical and dental specialties [21,22]. This result is also in line with report by Flores and Hin [27] who established 25% increased disparities in minority community for oral and medical health. Critics have pointed to the separate systems of medical and dental healthcare as a possible reason for the growing disparities [28]. Establishing regular dental examination as a routine for medical patients may limit the chances of missing undiagnosed dental diseases early and reduce dental comorbidities.

Central to this study is the relationship between race and oral health. Racial inequalities continue to populate discourse of health inequity and forms the foundation of this research. Highlighting extant health inequity in this research, African Americans were less likely to have a dental visit within a year, compared to White Adult Americans. This is perhaps alarming when a further review showed that African Americans (OR 0.769) showed a comparatively lower odd of dental visits among the various races reviewed (Hispanics; 0.896 and AIAANs; 0.875). The existential problems of access to dental healthcare among people of color continues to stunt efforts aimed at bridging the gaps in oral health for all. Recent studies have highlighted the continuous disparities in health inequity amongst individuals of color [29]. The result of this present study agrees with the results of Han [1] who noted that non-Hispanic Blacks reported disadvantaged oral health status when compared to Non-Hispanic Whites.

More than 90% of diabetics suffer from one form of oral complication [30]. Tooth decay, periodontal disease infections, geographic tongue, altered taste, fissured tongue, xerostomia, poor wound healing, and tooth loss are frequent oral manifestations of diabetes mellitus [31]. To attenuate the oral manifestations of diabetes, patients are encouraged to schedule regular periodic dental visits. In a systematic review that included about 27,894 participants across

14 countries, researchers observed that poor dental health attitude and poor oral health education characterize individuals with diabetes [32]. This supports the findings our study where non-diabetics were 48% more likely to see the dentist within the past year than respondents who are diabetics. Experts have called for collaborative efforts between primary physicians and dentists in ensuring holistic care for diabetics.

Similar to the findings from a systematic review where lower dental service utilization was reported for rural dwellers, lower education level and those with lower income, [33] findings from this study reinforce this position. Higher income earners, urban dwellers and Individuals with higher education levels showed increased odds of seeing the dentists. Persons who earn higher seemingly have more capacity to cater for their oral health than those who do not. People have often argued that health education should not be conflated with college education but findings from our study does not corroborate this stand. However, contrary to this study, researchers in a large population study reported that highly educated persons had 2.5 times the odds of not seeing the dentist within the last one year compared to less educated respondents [34]. The same report noted that high income earners were found to have 3 times the odds of not seeing the dentist compared to low-income individuals. Anecdotal evidence suggests that individuals who are less educated, and belong to the low socioeconomic class, experience far worse oral health disparities, and report worse outcomes due to uneven distribution of resources and varied socioeconomic status.

Urban counties ideally, afford more persons with the option of multiple dentists and dental offices and should reflect in the level of visits within the last one year. This is true from the analysis of this research as urban dwellers were 23% times more likely to visit dental clinic than rural inhabitants. In a clinical observational study in central Chile, researchers found increased caries prevalence among rural adolescents (73.58%) than for urban adolescents (64.59%). Although not statistically significant, the difference underscores the inherent disparities in accessing dental healthcare in rural localities [35] In another study in Quebec, researchers noted that rural inhabitants were less satisfied with their previous dental visits, citing cost and location of dental clinic as possible limiting factors to access oral healthcare [36] Another study in 2020 reported that adults from a more rural area were less

likely to have received a preventive procedure (AOR = 0.55, 95% CI: 0.35-0.87), and was worse for minority rural communities [37].

With medical cost comes the attendant effect of counterpart funding of health bills and payment for drugs. We examined delayed medical treatment because of cost as a possible indicator of health inequity and a possible predictor for dental health disparities. Results from our study showed that individuals who did not delay medical attention because of cost were 66.2% more likely to seek preventive and therapeutic dental services. The burden of oral diseases among people of color is worsened by inadequate dental insurance coverage. Black people are twice likely not to have insurance than White [38]. The American Care Act provides moderate dental care for children which includes preventive and prophylactic care. As currently constituted, the lack of dental coverage in the ACA remains a bane to advancing adult oral healthcare. The low reimbursement for Medicaid makes it also impossible for larger number of dental practitioners to embrace this insurance policy. While noting that 14 states who hold a significant population of Hispanics and Blacks have opted out of the Medicaid policy, the cost of dental healthcare for people of color may continuously deter persons from seeking dental healthcare.

The present study showed that people with more teeth present in the mouth were more likely to seek dental care than edentulous patients. Routine dental care and regular dental visit helps preserve existing tooth structures and guarantees better dental health outcome. Previous researchers have studied the oral health attitudes of edentulous patients with respect to utilizing healthcare. Akinboboye, Akeredolu, Sofola, Ogunrinde, and Oremosu [39] reported that partially edentulous patients were more likely to seek tooth replacement from a dentist. But this was attributed to the frequency of partial tooth loss as opposed to completely edentulous patients. Moreover, tooth loss has been shown to increase the risk of oral cancer by 3 folds even after controlling for alcohol use and smoking [40]. With regular care, even for edentulous patients, the chances of cancer detection are increased.

The findings from this research strengthen the call to understand the patterns of racial discrimination and how it influences the utilization of health services. Dental visits could be a wider experience of racial discrimination prevailing in the society, and a manifestation of the lacuna in the American healthcare system.

Therefore, it is imperative that government policies reinforce attempts at bridging the existential problems of healthcare inequalities and disparities, concerning oral health. The implication of the findings from this research could further discourse and research into the intricately convoluted issues of race and health.

Few caveats should be noted when interpreting the results of this secondary dataset analysis. First, our data draw from self-reported questionnaires and as such, may be subject to inaccuracy of measurement with a high tendency for recall bias. Secondly, because it is a large national data, inconsistent adoption of the optional reactions to race module across various states may limit the generalizability of our results. Thirdly, causal inference cannot be drawn from the results of our study since it is a cross sectional study. Lastly, the sampled respondents had a significant non-Hispanic population White population. Therefore, there may be a tendency for over sampling of a particular race. Despite these limitations, it bears mentioning that our study used a nationally representative dataset in exploring racial oral health disparities among Whites, Blacks, Asians, Alaskan natives, Native Americans, and Hispanics. Our results also present new frontiers in the discussion of race and disparities and hopes to lend a new perspective that will cause further research on the subject.

Conclusion

The issue of race as a factor in predicting access to dental health has been evaluated in our study. We have shown, using a large population dataset that oral health disparities exist, and continues to affect a larger segment of the American people after regressing for our predictive variables. The preliminary results from our study strengthen the call for a deeper understanding of the patterns of racial discrimination and ways in which it influences the utilization of health services.

Conflict of Interest

There is no conflict of Interests known to the authors.

Bibliography

- Han C. "Oral health disparities: racial, language and nativity effects". *SSM-Population Health* 8 (2019): 100436.
- Locker D. "Changes in chewing ability with ageing: a 7-year study of older adults". *Journal of Oral Rehabilitation* 29.11 (2002): 1021-1029.
- "US Department of Health and Human Services Oral Health Coordinating Committee. US Department of health and human services oral health strategic framework, 2014-2017". *Public Health Reports* 131.2 (2016): 242-257.
- Vasiliou A., et al. "Current stress and poor oral health". *BMC Oral Health* 16.1 (2016): 1-8.
- Hunter W. "Oral sepsis as a cause of disease". *British Medical Journal* 2 (1900): 215.
- Martin SA and Simon, L. "Oral health and medicine integration: overcoming historical artifact to relieve suffering". *The American Journal of Public Health* 107.1 (2017): S30-S31.
- Bastos JL., et al. "Health care barriers, racism, and intersectionality in Australia". *Social Science and Medicine* 199 (2018): 209-218.
- Williams DR., et al. "Racism and health: evidence and needed research". *Annual Review of Public Health* 40 (2019): 105-125.
- Feinberg M. "Minority oral health in America: despite progress, disparities persist". Kelly RL. Kelly report (2015).
- "Centers for Disease Control and Prevention". *Disparities in Oral Health* (2021).
- Cohen LA., et al. "Behavioral and socioeconomic correlates of dental problem experience and patterns of health care-seeking". *The Journal of the American Dental Association* 142.2 (2011): 137-149.
- Elflein J. "Health-related priorities among adults U.S. 2019". *Statista* (2019).
- American Dental Association. "Minority oral health in America: despite progress, disparities persist". *Kelly report* (2015): 121-126.
- Simon L. "Overcoming historical separation between oral and general health care: interprofessional collaboration for promoting health equity". *AMA Journal of Ethics* 18.9 (2016): 941-949.

15. Gilbert GH. "Racial and socioeconomic disparities in health from population- based research to practice-based research: The example of oral health". *Journal of Dental Education* 69.9 (2005): 1003-1014.
16. Tilashalski KR., et al. "Racial differences in treatment preferences: Oral health as an example". *Journal of Evaluation in Clinical* 13.1 (2007): 102-108.
17. Adegbenbo AO., et al. "Perception of racism explains the difference between Blacks' and Whites' level of healthcare trust". *Ethnicity and Disease* 16.4 (2006): 792-798.
18. Cabral ED., et al. "Influence of the patient's race on the dentist's decision to extract or retain a decayed tooth". *Community Dentistry and Oral Epidemiology* 33.6 (2005): 461-466.
19. Patel N., et al. "Unconscious Racial bias may affect dentists' clinical decisions on tooth restorability: a randomized clinical trial". *JDR Clinical and Translational Research* 4.1 (2019): 19-28.
20. Okunseri C., et al. "Trends and racial/ethnic disparities in antibiotic prescribing practices of dentists in the United States". *Journal of Public Health Dentistry* 78.2 (2018): 109-117.
21. Atchison KA and Weintraub JA. "Integrating oral health and primary care in the changing health care landscape". *North Carolina Medical Journal* 78.6 (2017), 406-409.
22. Chalmers NI. "Racial disparities in emergency department utilization for dental/oral health-related conditions in Maryland". *Frontiers in Public Health* 5 (2017): 164.
23. Atchison KA., et al. "Bridging the dental-medical divide: Case studies integrating oral health care and primary health care". *The Journal of the American Dental Association* 149.10 (2018): 850-858.
24. Como DH. "The persistence of oral health disparities for African American children: a scoping review". *International Journal of Environmental Research and Public Health* 16.5 (2019): 710.
25. Flores G and Tomany Korman SC. "Racial and ethnic disparities in medical and dental health, access to care, and use of services in US children". *Pediatrics* 121.2 (2008): e286-e298.
26. Lau M., et al. "Factors associated with human papillomavirus vaccine-series initiation and healthcare provider recommendation in US adolescent females: 2007 National Survey of Children's Health". *Vaccine* 30.20 (2012): 3112-3118.
27. Flores G and Lin H. "Trends in racial/ethnic disparities in medical and oral health, access to care, and use of services in US children: has anything changed over the years?". *International Journal for Equity in Health* 12.1 (2013): 1-16.
28. Northridge., et al. "Disparities in access to oral health care". *Annual Review of Public Health* 41 (2020): 513-535.
29. Lutfiyya MN., et al. "Dental care utilization: examining the associations between health services deficits and not having a dental visit in past 12 months". *BMC Public Health* 19.1 (2019): 1-13.
30. Nazir MA., et al. "The burden of diabetes, its oral complications and their prevention and management". *Open access Macedonian Journal of Medical Sciences* 6.8 (2018): 1545.
31. e Souza LHT, et al. "Racial Inequalities in Oral Health: A Population-Based Study". *Race and Social Problems* 13.2 (2021): 122-130.
32. Poudel P, et al. "Oral health knowledge, attitudes and care practices of people with diabetes: a systematic review". *BMC Public Health* 18.1 (2018): 1-12.
33. Reda SF, et al. "Inequality in utilization of dental services: a systematic review and meta-analysis". *American Journal of Public Health* 108.2 (2018): e1-e7.
34. Ju X, et al. "Use of oral health care services in the United States: unequal, inequitable-a cross-sectional study". *BMC Oral Health* 21.1 (2021): 1-9.
35. Giacaman RA., et al. "Oral health disparities among adolescents from urban and rural communities of central Chile". *Rural Remote Health* 18.2 (2018): 4312.
36. Alhozgi A., et al. "Rural-urban disparities in patient satisfaction with oral health care: a provincial survey". *BMC Oral Health* 21 (2021): 1-8.

37. Luo H., *et al.* "Rural-Urban differences in dental service utilization and dental service procedures received among US adults: Results from the 2016 medical expenditure panel survey". *The Journal of Rural Health* (2018).
38. Smith PD., *et al.* "Structural Racism and Oral Health Inequities of Black vs. non-Hispanic White Adults in the US". *Journal of Health Care for the Poor and Underserved* 32.1 (2021): 50-63.
39. Akinboboye BO., *et al.* "Utilization of teeth replacement service among the elderly attending teaching hospitals in Lagos, Nigeria". *Annals of Medical and Health Sciences Research* 4.1 (2021): 57-60.
40. Shi J Leng., *et al.* "Tooth loss and cancer risk: a dose-response meta-analysis of prospective cohort studies". *Oncotarget* 9.19 (2018): 15090.