

Relationship between General Health Behaviors and Oral Health Behaviors in 2015–2016 NHANES Adult Population

Rami Saadeh^{1,2} Irene Bober-Moken² Suman Challa²

¹Department of Public Health and Community Medicine, Faculty of Medicine, Jordan University of Science and Technology, Irbid, Jordan

²Department of Comprehensive Dentistry, School of Dentistry, University of Texas Health Sciences Center at San Antonio, San Antonio, Texas, United States Address for correspondence Rami Saadeh, BDS, MSPH, PhD, Department of Public Health and Community Medicine, Faculty of Medicine, Jordan University of Science and Technology, Irbid, Jordan 22110 (e-mail: rasaadeh@just.edu.jo).

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Abstract	 Objectives The aim of this study was to examine the relationship between general health behaviors and oral health behaviors in adults who participated in the interview component of the National Health and Nutrition Examination Survey (NHANES) of 2015 to 2016. Materials and Methods This was a cross-sectional study design of a national data set that included 5,992 adults who represented a sample of civilian, noninstitutionalized US population. Statistical Analysis Chi-squared test of independence was used to describe the relationship of demographic information with oral health behaviors of participants. Multivariate logistic regression was used to determine the association between general and oral health behaviors.
 Keywords general health behaviors oral health behaviors adults National Health and Nutrition Examination Survey risk behaviors 	Results More than half (53.6%) of the participants had seen a dentist in the past 12 months and the main reason for that visit was for a regular checkup, cleaning, or examination. More than one-quarter (28.7%) reported visiting a dentist because something was hurting or bothering them. Most respondents (63.4%) reported being hardly ever or never having been embarrassed by their mouth condition. Age at one's first sexual encounter, having a new sexual partner, mental health counseling, moderate-intensity sports, and computer use were significantly associated with positive oral health behaviors. Conclusions For maximum effectiveness, health promotion efforts should target risk behaviors common to both oral and general health.

Introduction

General health is associated with the health of all organs of the body, one of which is the mouth. The mouth and body are intertwined; diseases of the mouth can adversely affect an individual's overall health and quality of life.¹ Diseases of the cardiovascular system, immune system, diabetes, as well as neurological and congenital disorders are linked to the health of the oral cavity.²⁻⁵ Likewise, diseases of the mouth, such as dental infections and teeth loss, can adversely affect chronic diseases such as diabetes, kidney disease, and cardiovascular disease.^{4,6} The connection between the oral health and general health is believed to be due to common risk factors and/or behaviors, for example, smoking, alcohol use, physical activity, and maintaining proper weight.

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Samnieng et al, in a geriatric population, found that general health practices were associated with the clinical oral health status such as the number of teeth present, decayed teeth, periodontal disease, oral malodor, and salivary flow rate.⁷ Petersen et al found that adolescents with high levels of preventive oral health practices also demonstrated general health-promoting behaviors.⁸ This is supported by Tada and Maksukubo's study that found tooth-brushing frequency was the most predictive indicator of general health behavior.⁹

Since there are common risk factors that are directly or indirectly related to poor oral health and poor general health,⁷ it is crucial to examine these factors and the nature of their relationship with each other. One of the benefits of understanding the relationship between general and oral health behaviors is to manage poor behaviors to improve other behaviors related to them, thereby reducing unfavorable general and oral health conditions.7 Another benefit is costeffectiveness. It is more cost-effective to integrate oral health promotion into general health promotion than to target single oral health diseases.8 Hence, if certain health behaviors are strongly correlated, it will be more efficient to target all such behaviors in similar interventional or promotional programs, which in turn can also result in positive outcomes for nontargeted behaviors. Similarly, if associations between certain risk factors are weak, then changes in one behavior is not expected to cause changes in all other behaviors.^{8,10}

Therefore, this study aims to examine the relationship between general health behaviors and oral health behaviors in adults who participated in the National Health and Nutrition Examination Survey (NHANES) of 2015 to 2016.

Materials and Methods

This project used the 2015–2016 NHANES data set focusing on the findings of the 5,992 adults (\geq 18 years old) who participated in the home interview. NHANES is a cross-sectional assessment of the health and nutrition status of US children and adults conducted every 2 years. It uses stratified, multistage probability sampling, to produce a representative sample of the civilian, noninstitutionalized US population.¹¹ There is an oversampling of low-income persons, African Americans, Mexican Americans, adolescents aged 12 to 19 years, and persons 60 years and older.

The data are accessible to the public through the Centers for Disease Control and Prevention NHANES data Web site.¹² This project was exempted from the institutional review board review because it used anonymous secondary data set.

NHANES has a complex design that employed unequal chances of selection for the respondents by race and Hispanic origin, income, age, and sex. Each respondent in the NHANES sample is given a case weight, which estimated the number of people in the target population that each person represents.

Variables describing oral health behavior were selected as dependent variables: time of last visit to a dentist, the main reason for that visit, embarrassment of the mouth condition in the previous year, and flossing frequency. Each of these variables was rescaled in the multivariate regression analysis because there were many scales (i.e., many answer choices) in each of these variables that affected the analysis and the interpretation of the results. Therefore, time to last visit to a dentist was rescaled from 7 scales to 4, embarrassment of the mouth was rescaled from 5 scales to 3, and flossing frequency, which was a continuous variable, was recategorized into a categorical variable of 2 scales; flossing less than three times per week and flossing three or more times per week.

Health care utilization (i.e., health facility used and mental therapy), physical activity, sexual behavior, and tobacco use were selected as independent variables. Six demographic variables were considered covariates: gender, age, race, citizenship status, level of education, and ratio of family income. All demographic variables were categorical except age, which is a continuous variable. Individuals 80 years and older are top coded at 80 years of age. In the multivariate regression analysis, age is categorized into four categories: adults < 30 years old, 30 to 44 years old, 45 to 64 years old, and ≥ 65 years old. NHANES uses the Department of Health and Human Services poverty guidelines to calculate the ratio of family income to poverty¹³ and scaled it 1 to 5. The ratio was calculated by dividing family (or individual) income by the poverty guidelines specific to the survey year. Values at or above 5.00 were coded as 5.00.14

Logistic regression was used to examine the relationship of demographic data and the dependent variables; statistically significant findings were controlled for in all analyses to rule out the effect of demographics on oral health behaviors. The data were weighted according to population distributions of different demographic groups and complex sampling methods were used to adjust sampling biases.

Descriptive statistics were used to describe the sample. Chi-squared independent test was used to assess the association of demographic data with oral health behaviors. Binary logistics regression was used to examine the association of independent variables with flossing frequency. Multinomial logistic regression was used to examine the associations of independent variables with the categorical dependent variables (i.e., time to last visit to a dentist, main reason for a visit, and previous embarrassment of the mouth). SPSS Statistical Software Version 23 (IBM Corp., Armonk, N.Y., United States) was used to perform the analysis. Bonferroni correction was used to determine adjusted *p*-values for multiple hypothesis testing. A *p*-value of 0.05 or less was considered statistically significant.

Results

There were 5,992 adults, and approximately 83% of them were US citizens. There were 2,887 (48.2%) men and 3,105 (51.8%) women. Age of participants ranged from 18 to 80 (or older) years, with a mean age of 48.12 (±18.52) years. More than half of the sample population consisted of non-Hispanic whites (1,914 or 31.9%) or non-Hispanic blacks (1,265 or 21.1%). The remaining race/ethnicity distribution was Mexican Americans (1,064 or 17.8%), other Hispanics (798 or 13.3%), non-Hispanic Asians (726 or 12.1%), and other races (225 or 3.8%).

Less than half (43.4%) of the participants had a high school diploma or less, 28% had some college, and 23% had college or graduate degrees. The mean ratio of family income to poverty was 2.4 (±1.6). The association of demographic data with oral health behavior is seen in **- Table 1**.

More than half of participants (52.5%) visited a doctor's clinic or a health maintenance organization of medical care, around one-quarter (24.2%) visited a clinic or a health center, and the rest visited a hospital or another place. Less than 10% (8.8%) reported receiving mental health therapy.

Just more than one-fifth (20.7%) of participants reported having vigorous work activity with a mean of 4.03 days/week (\pm 1.83), and 37.7% had moderate work activity with a mean of 4.2 days/week (\pm 1.80). Of those who exercised, 26% had

vigorous recreational activity with a mean of 3.3 days/week (\pm 1.57), and ~41% had moderate recreational activity with a mean of 3.5 days/week (\pm 1.80). Twenty-three percent of participants reported that they walk or use bicycle, with a mean of 4.6 days/week (\pm 1.95).

Approximately 67% of participants spent 1 to 5 hours/day watching TV or playing video games in the last 30 days, and 16.5% reported more than 5 hours/day. Forty-five percent reported spending 1 to 5 hours/day using a computer in the last 30 days with around 35% never having used a computer in the last 30 days. Sixty percent did not respond to the question regarding tobacco use. Of the 40% who answered, 34.4% reported smoking daily, 18% used e-cigarettes, and 14% used smokeless tobacco, and ~55%

Table 1	The relationshi	p of demograp	hics with oral h	ealth behaviors	in US adults aged	18 to ≥ 80 v	/ears (n = 5.9)	92) (NHANE	ES 2015-2016.	weiahted)
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	Gender	ler Age (%)		Citizen	ship (%)	Education ^a (%)		Race ^b (%)		Family income ratio (%)		
	(%)											
Last visit to a dentist	M; F	p < 0.001	<30; 30–45; 45–65; >65	p < 0.001	Y, N	<i>p</i> < 0.001	1; 2; 3	p < 0.001	H; W; B; A; O	p < 0.001	<1; 1–2.5; 2.5–4; 4–5	p < 0.001
<1 y ago	45; 55		19.0; 23.6; 35.5; 21.8		92.8, 7.2		29; 30.8; 40.2		12; 67.9; 0.2; 6.4; 3.6		9.6; 23.4; 19.8; 47.2	
1–3 y ago	50.4; 49.6		27.6; 27.0; 31.4; 14.0		88.4, 11.6		43.3; 35.3; 21.4		20.1; 56; 14.9; 5; 4		19.2; 32.6; 23.8; 24.4	
≥3 y ago	53.7; 46.3		18.2; 26.8; 34.8; 20.2		88.4, 11.6		50.2; 32.8; 16.9		19; 61.1; 11.6; 4.4; 4		22; 40; 18.1; 19.9	
Never been to a dentist	69.6; 30.4		33.9; 36.7; 19.9; 9.4		37, 63		76.2; 14.7; 9.1		53.7; 10.3; 19.9; 15.5; 0.6		50.2; 36.8; 6.4; 6.5	
Main re visit	ason to	<i>p</i> = 0.634		<i>p</i> < 0.001		p < 0.001		<i>p</i> < 0.001		<i>p</i> < 0.001		<i>p</i> < 0.001
Went in on own for checkup	46.8; 53.2		22.5; 27.9; 32.3; 17.3		91.5, 8.5		28.5; 31.5; 40		13.5; 66.9; 10; 6.5; 3.2		9.8 23.9 19.7 46.6	
Was called in for a checkup	48.8; 51.2		20.2; 23.5; 37.2; 19.0		96.1, 3.9		24.9; 31.7; 43.5		8.7; 69.8; 9.1; 5.6; 6.8		9.4; 18.2; 22.6; 49.8	
Some- thing was hurting	50; 50		17.6; 23.7; 37.7; 21.0		89.7, 10.3		51.5; 34; 14.5		17.7; 58.1; 15.2; 4.4; 4.6		22; 37.9; 19.3; 20.8	
Treat- ment of a condi- tion	48.5; 51.5		18.2; 16.9; 37.4; 27.4		88.2, 11.8		43.2; 32.2; 24.6		20.7; 61.2; 10.2; 4.9; 3		19.2; 37.0; 22.5; 21.3	
Embarra the mou last yea	assment of uth in the r	p = 0.005		p = 0.054		<i>p</i> = 0.433		p < 0.001		p < 0.001		p < 0.001
Often	41.1; 48.9		NA; 27.6; 52.1; 20.3		89.5, 10.5		51.2; 36.3; 12.5		19.8; 58.9; 15.4; 1.6; 4.3		29.4 41.5 14.8 14.2	
Occa- sionally	40.6; 59.4		NA; 32; 43.4; 24.6		91.9, 8.1		40.4; 39.9; 19.7		14.8; 67.2; 10.2; 3; 4.8		17.2; 33.6; 25.3; 23.9	
Never/ hardly	49.1; 50.9		NA; 32; 42.3; 25.6		90.8,,9.2		33.2; 29.9; 36.9		13.3; 66.6; 10.3; 6.4; 3.4		10.6; 25.3; 19.7; 44.4	
Flossing	times/wk	p < 0.001		p < 0.001		<i>p</i> < 0.001		<i>p</i> < 0.001		p = 0.095		<i>p</i> < 0.001
≥3 times	41.5; 58.5		NA; 27.4; 46.3; 26.3		92.5, 7.2		27.6; 32.8; 39.6		13.3; 66.9; 9.8; 6.3; 3.7		10.1 24.1 18.7 47.1	

Abbreviations: chi-squared test of independence was used in the analysis; NA, not available. ^aEducation:1 is high school graduate or less, 2 is some college, and 3 is college graduate or higher.

^bRace: H is Hispanic, W is white, B is Black, A is Asian, and O is other.

reported never smoking. Those who tried to quit smoking were ~55%.

Among those who shared information about their sexual behavior, 5% reported having sex for the first time when they were younger than 12 years, and 52% between 12 and 18 years old. Those who reported using protection when performing oral sex were 8%, and 82.4% reported that they never used protection. In addition, 18% reported having a new sexual partner each year, and 45% reported that they never used condom when having sex, and about one-quarter reported using condoms all the time when having sex.

More than half of the study sample participants had seen a dentist in the previous year (53.6%), and only 2.4% had never been to a dentist. Twenty-seven percent had not seen a dentist for more than a year but less than 5 years, and approximately 16% reported their last dental visit being more than 5 years ago. The most common reason for the last visit to a

dentist was going in for checkup, examination, or cleaning (47.3%). More than one-quarter (28.7%) reported visiting a dentist because something was hurting or bothering them. The majority of respondents (63.4%) reported being hardly ever or never having been embarrassed by their mouth condition, less than 20% were often or occasionally embarrassed, and 20.9% did not report anything. Approximately 44% reported flossing less than three times per week, 35% reported more than three times a week, and 21% did not report anything.

Multivariate Analysis

Participants who reported having a new sexual partner each year were three times more likely to visit a dentist compared with those who did not have new sexual partners each year (**-Table 2**). Having sex at an earlier age was significantly associated with having visited a dentist because something was bothering or hurting.

Table 2 Relationship of sexual behavior with oral health behaviors

	OR	p-Value ^a	95% CI
Time since last visit to a dentist ^a			
Less than a year ago			
Have new partner each year	3.06	0.036	1.08-8.67
Didn't have a new partner each year	1		
More than a year but not more than 3 y ago	1		
Have new partner each year	3.09	0.036	1.06-9.02
Didn't have a new partner each year	1		
More than 3 y ago	1		
Have new partner each year	3.59	0.021	1.21-10.63
Didn't have a new partner each year	1		
Main reason of the last visit to a dentist $^{\mathrm{b}}$	1		
Something was wrong bothering or hurting			
Had sex when was 12 y or younger	2.80	0.002	1.46-5.38
Had sex when was 12–18 y old	1.81	0.001	1.28–2.55
Had sex at 18 y or older	1		
Went for treatment of a condition that dentist disc	overed earlier		
Have new partner each year	0.462	0.028	0.232-0.921
Didn't have a new partner each year	1		
Embarrassment of the mouth ^c			
Often embarrassed			
Had sex when was 12 y or younger	3.36	0.005	1.45–7.79
Had sex at 18 y or older	1		
Occasionally embarrassed			
Use condom half of the time	0.245	0.019	0.075–0.797
Use condoms more than half of the time	0.255	0.015	0.085–0.768
Use condoms always	1		

Abbreviations: CI, confidence interval; OR, odds ratio.

Note: Only significant variables are included.

^a"Never have been to a dentist" is the reference group for time since the last visit to a dentist.

^b"Went in on own for checkup, examination, or cleaning" is the reference group for main reason of the last visit.

^c"Hardly ever or never embarrassed of the mouth" is the reference group for embarrassment of the mouth.

Regarding the relationship of health care utilization with oral health behaviors, two variables were used to predict oral health behaviors: the facility that was usually used for health care and mental health counseling. None of the associations between the health care facilities used and oral health behaviors were statistically significant. Mental health counseling was significantly associated with timing of the last dental visit. Those having had mental health counseling were more likely to have visited a dentist within the previous year (odds ratio [OR]: 5.013; 95% confidence interval [CI]: 1.006-24.971, p = 0.049) or have visited a dentist more than a year ago but less than 3 years ago (OR: 6.984; 95% CI: 1.396-34.926, p = 0.018) compared with those who never visited a dentist. Furthermore, they were more likely to visit a dentist for treatment of a condition that was discovered earlier (OR: 1.78; 95% CI: 1.16–2.71, p = 0.008) and were more likely to be occasionally or often embarrassed than never embarrassed (OR: 1.70; 95% CI: 1.0–2.90, p = 0.049) and (OR: 2.22; 95% CI: 1.44–3.43, p < 0.0001), respectively. Flossing frequency was not statistically significant.

As seen in **Table 3**, computer use was statistically significant with the timing of the last dental visit, being embarrassed of their mouth condition or flossing frequency. Other sedentary physical activities (i.e., watching TV or playing video games) were not statistically significant.

Those doing moderate-intensity sports, fitness, or recreational activities during the week were more likely to have seen a dentist within the last year, were less likely to have visited a dentist because something was bothering or hurting them, and were more likely to floss their teeth more than three times per week. Moderate-intensity activity at work was associated with being embarrassed by their

Tabl	e 3	Re	ations	hip oʻ	f p	hysical	activity	with	oral	health	bel	naviors
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	OR	<i>p</i> -Value	95% CI
Time since last visit to a dentist ^a	·	·	·
Less than a year ago			
Moderate recreational activity	1.62	0.042	1.02-2.57
No moderate recreational activity	1	0.009	1.23-4.40
Use computer 1 h or less	2.33	0.001	1.69–7.28
Use computer 2–4 h	3.05		
Doesn't use computers	1		
More than a year but less than 3 y ago	·		
Use computer 2–4 h	3.68	0.001	1.76–7.7
Doesn't use computers	1		
More than 3 y ago	·	·	
Use computer 1 h or less	2.02	0.031	1.07-3.85
Use computer 2–4 h	2.92	0.005	1.39-6.07
Doesn't use computers	1		
Main reason of the last visit to a dentist	b	·	·
Something was wrong, bothering or hurting			
Vigorous work activity	1.56	< 0.0001	1.24-2.06
No vigorous work activity	1		
Walk or bike	0.79	0.036	0.63-0.98
Doesn't walk or bike	1		
Moderate recreational activity	0.74	0.003	0.601-0.902
No moderate recreational activity	1		
Embarrassment of the mouth in the last	year ^c		
Often embarrassed			
Moderate work activity	1.38	0.046	1.01-1.90
No moderate work activity	1		
Vigorous recreational activity	0.63	0.049	0.40-0.99
No vigorous recreational activity	1		
Use computer 5 h or more	1.93	0.026	1.08-3.43
Doesn't use computers	1		
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	OR	p-Value	95% CI	
Occasionally embarrassed	I	I	J	
Moderate work activity	1.65	0.009	1.31-2.40	
No moderate work activity	1			
Use computer 2–4 h	1.7	0.015	1.11-2.60	
Use computer 5 h or more	2.16	0.018	1.14-4.11	
Doesn't use computers	1			
Flossing more than three times per wee	ek ^d			
Moderate recreational activity	1.36	0.003	1.11-1.66	
No moderate recreational activity	1			
Use computer 1 h or less	1.33	0.014	1.06-1.66	
Doesn't use computers	1			

Table 3 continued

Abbreviations: CI, confidence interval; OR, odds ratio.

Note: Only significant variables are included.

"Never been to a dentist" is the reference group for time since last visit to a dentist.

^b"Went in on own for checkup, examination, or cleaning" is the reference group for main reason of the last visit.

^c"Hardly ever or never embarrassed of the mouth" is the reference group for embarrassment of the mouth.

d"Flossing less than three times/week" is the reference group for flossing times.

mouth's condition. **- Table 3** summarizes the significant associations.

Trying to quit smoking was the only significant predictor of the relationship between tobacco use and oral health behaviors. Those who tried to quit smoking were less likely to have visited a dentist because something was bothering or hurting them compared with those who never tried to quit smoking (OR: 0.64; 95% CI: 0.42–0.96, p = 0.031). Moreover, they were more likely to be often embarrassed by the condition of their mouth (OR: 1.64; 95% CI: 1.03–2.74, p = 0.042).

Discussion

NHANES data show that participants have generally healthy oral health practices, including regular visits to the dentist for regular checkup, cleaning, or examination without the need to be reminded by the dental office. This positive attitude of maintaining regular dental checkups can be attributed to having health insurance or a higher socioeconomic status. This finding is consistent with studies conducted outside the United States.^{2,15-17} Unfortunately, NHANES data in this 2-year wave did not indicate if dental insurance was included in the participants' overall health insurance coverage. However, having dental coverage does not necessary indicate receipt of dental care. The Medical Expenditure Panel Survey, in 2004, revealed that only 57% of those having private dental coverage had visited a dental clinic compared with 32% of those having public dental coverage had visited a dental clinic, and only 27% of those with no dental coverage had visited a dental clinic.18 The fact that some study participants in this sample did not visit a dentist in the last 5 years, some had never visited a dentist, and some visited a dentist only when they had pain or discomfort, suggests that such participants might have difficulty in accessing oral health care, had a negative attitude toward health, or both.

It is not easy to predict reasons of poor oral health behaviors. However, studies in different populations, including Korean, Japanese, Brazilian, Thai, Chinese, Turkish, and the US populations,^{4.7,8,19-22} have shown that poor oral health behaviors are significantly associated with poor general health behaviors. Although there are few resources to explain the connection between the two, health theories were insightful. Hollister and Anema reviewed several health theories and their possible application to oral health,¹⁰ and Dumitrescu et al tested five social-cognitive models to explain predictors of personal oral health behaviors and intentions to improve them.²³ Conclusions of these studies and others^{24,25} showed that health beliefs significantly affect oral health behaviors.

The relationship between demographic data and oral health behaviors indicates that an individual's demographic background significantly affects their oral health behaviors, which is consistent with many studies and national reports.^{2,8,17,20,22,26,27} General health behaviors have also been shown to have significant relationships with an individual's demographics.^{17,20,28} Therefore, controlling for demographic data in the analysis decreased the number of significant associations between independent and dependent variables, yet some associations were still statistically significant.

Results of the examined associations in this study were not always as expected when compared with other studies. For example, the association of age at one's first sexual encounter with the main reason of visiting a dentist, the association of mental health counseling with time since the last visit to a dentist and with embarrassment of mouth, and the association of sedentary activities with being embarrassed by the condition of mouth indicated that better or less risky health behaviors are associated with better oral health behaviors and vice versa, which were consistent with findings in other studies.^{8,9,17,27} On the other hand, there are possible explanations for unexpected associations. Those who have a new partner each year might be concerned about the medical consequences of their continuous new relationships that can result in a disease transmission and, therefore, seek medical care regularly, including oral health care.²⁹ Another explanation, at least among women, could be the perceived importance of needing good oral health to attract a significant other. Studies have shown that women were more interested in their physical appearance and the use of preventive and dental care services than men.^{27,30} Another unexpected finding was the association of computer use with positive oral health behaviors. However, the extended use of computers in this adult population may be related to employment opportunities in jobs associated with a higher socioeconomic status; the latter may usually be associated with a healthier life style. Computer and internet use influencing oral health behaviors and health status was reported among Korean adolescents.^{31,32}

Inconsistency is also found among studies. For example, Jiang et al found that physical activity and sedentary activities (i.e., watching television, playing computer games) were weakly associated with dental health status and needs in Chinese urban adolescents.³³ However, Coulter et al reported a strong association of oral health with mental and physical health in a nationally representative sample of HIV-infected persons receiving medical care,³⁴ which is in accordance with what Petersen et al reported that vigorous physical activity was strongly associated with positive oral and general hygiene practices.⁸ However, our findings indicate that moderate, not vigorous, recreational activities were associated with positive oral health behaviors.

Overall, a positive oral health behavior does not necessitate positivism in all general health behaviors as suggested by Tada et al, who found that some relationships of oral health behaviors with general health behaviors were positive and some were not.⁹

Limitations

Although NHANES data are one of the most representative national data available, the study design is limited by sampling only a civilian, noninstitutionalized US population. Using a secondary data analysis design limited the number and types of variables available to select from, resulting in difficulty to decide if the outcome variables (i.e., oral health behaviors) included in this study were the most suitable for examining the association between general and oral health behaviors. In addition, it is inappropriate to conclude a causal relationship between these variables because of cross-sectional nature of the study design. There were a lot of missing values in some variables that hindered the inclusion of answers of many individuals who could increase the credibility of the results if their answers were available. Another challenge that compromises the credibility of the results is the self-reported nature of the survey, which increased the chance of recall bias, especially when questions ask about information of behaviors that occurred years ago.

Public Health Implications

Results of this study found that an individual's demographics has a major influence on oral health behaviors as do some general health behaviors (i.e., age at one's first sexual encounter, having a new sexual partner, mental health counseling, moderate-intensity sports, and computer use). Based on such findings, general and oral health promotion efforts should target risk behaviors common to both oral and general health. However, future research is recommended to examine more in depth the significant relationship found between such general health behaviors and oral health behaviors, to emphasize findings of this study and to help health promotion initiatives in designing effective programs.

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Conflict of Interest

None declared.

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