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ORIGINAL ARTICLE

Association between acculturation, dental floss use, dental visits and unmet dental needs among Asians in the United States: Findings from National Health and Nutrition Examination Survey (NHANES) 2011–2018

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Abstract

Objectives: The objectives of this study were to examine the associations between acculturation and dental floss, regular dental visits and unmet dental care needs among Asian Americans, as well as the moderating effects of these associations.

Methods: This study analysed national representative samples from the National Health and Nutrition Examination Survey (NHANES) 2011–2018. A total of 2763 Asian Americans aged 20 and older were included in this analysis. The primary predictor, acculturation score, was determined by three questions: (i) language spoken at home (higher score for English), (ii) country of birth (higher score for United States) and (iii) length of time in the United States. Dental floss use, dental visits and unmet dental care needs were included as outcomes in this study. Descriptive statistics and logistic regressions were used to analyse the samples.

Results: Acculturation was significantly associated with dental health behaviours: Individuals with higher levels of acculturation were more likely than less acculturated individuals to use dental floss (81.0% vs. 63.9%, respectively) and visit the dentist regularly (76.7% vs. 66.9% respectively). Insurance status moderated the association between acculturation and dental visits: Acculturation was significantly associated with dental visits in the past year among insured individuals (OR = 1.70, 95% CI: 1.29–2.23), but not among uninsured individuals. Unmet dental care needs were present in 11.1% of participants. While costs and insurance were the top two determinants of access to care, individuals with and without insurance differed with regard to their third major reason for unmet dental care needs: Being 'too busy' and not wanting to spend money on dental care.

Conclusions: Among the Asian population in the United States, those with high acculturation scores were more likely to engage in dental flossing and visit the dentist regularly compared to those Asians with lower acculturation scores. To encourage dental flossing and regular dental visits among Asians with lower acculturation scores, cultural adaptation and language accessibility suggests being considered. Future

research is necessary to confirm the moderating effect of insurance status on the association between acculturation and regular dental visits. Additionally, our findings emphasize the impact of costs and insurance on access to dental care among Asians in the United States, highlighting the importance of future public health programmes in addressing these barriers.

KEYWORDS
acculturation, Asian American, dental health services, nutrition survey, oral hygiene

1 | INTRODUCTION

In the United States, oral health issues are prevalent, with 40% of adults reporting oral pain in the past year,[1] 25% of adults aged 20–64 having untreated cavities,[2] and 80% of people experiencing at least one cavity by the age of 34.[1] Regular dental visit and professional cleaning have been shown to significantly reduce the risk of periodontal diseases, dental caries, tooth loss and diabetes, and can even decrease the risk of cardiovascular diseases by 14%.[3,4] In addition to professional dental visits, dental flossing is a highly effective method for interdental cleaning.[5] It significantly improves the condition of proximal gingival, which in turn helps prevent periodontitis and tooth loss.[5] However, despite these known benefits, only 66.7% of adults reported visiting a dentist or dental clinic in the previous year,[6] and only 31.6% of United States adults floss daily.[7] This lack of dental care has led to a high prevalence of unmet dental needs, affecting up to 20% of the population, including 15% of the population with untreated cavities.[8] Individuals who do not receive regular dental care are three times more likely to have untreated cavities.[8] The repercussions of this neglect are substantial, with emergency dental care costs exceeding $45 billion annually for adults.[1] Given the strong correlation between dental health and overall health and well-being, the importance of research in dental health is increasingly recognized.[9]

Asian Americans, the fastest growing demographic group in the United States, have seen their population nearly double in the last two decades and it is projected to surpass 46 million by 2060.[10] However, this group is usually reported poorer dental health and less frequent utilization of dental services than non-Hispanic Whites.[11] In particular, fewer Chinese have had a dental visit in the past year compared to non-Hispanic Whites (52.1% vs. 64.5% respectively).[11,12] Thus, studying the oral health behaviour of the growing Asian American population is curial to addressing these disparity.[12–14]

Acculturation is a dynamic process where individuals or groups from one culture gradually incorporate the customs, beliefs and values of another culture, while concurrently preserving their unique cultural heritage.[15,16] This process can influence oral health behaviour and dental service utilization due to varying perceptions of health, understanding healthcare system navigation and the resources available for the same.[17–19] Several measures are commonly used to gauge acculturation, including 13-item Rating Scale for Mexican Americans-II (ARSMA-II),[20] 12-item Marin Short Acculturation Scale[21] and some 1–3 items short measurements, such as English language proficiency level, length of stay in the United States and US citizenship.[17,22,23]

These individual acculturation factors have been studied to understand their impact on oral health outcomes and dental care access, but the findings have been inconsistent. For instance, one study used a 12-item scale to measure acculturation and found no association between acculturation and dental service use among older Korean Americans.[24] In contrast, another study found a significant association between behavioural acculturation and dental office visits, but not between psychological acculturation and such visits.[25] Moreover, while some studies have reported an association between English proficiency and dental care among Asian Americans,[11,26] others have found no significant correlation between English proficiency and the likelihood of scheduling dental appointments.[17] Similarly, the evidence is mixed when it comes to US citizenship as a factor associated with dental care access among this population.[17,27] In conclusion, the associations between acculturation and dental care among Asian-Americans remain unclear due to these inconsistent findings. The objectives of this study were to examine the associations between acculturation and dental floss, regular dental visits and unmet dental care needs among Asian Americans, as well as the moderating effects on these associations, using national representative samples from the National Health and Nutrition Examination Survey (NHANES) 2011–2018.

2 | METHODS

2.1 | Study design and data source

This study used data from NHANES 2011–2018 cycles. The continuous NHANES is a complex, multistage probability sample of non-institutionalized civilians in the United States that has been given every 2 years since 1999. During each survey iteration, a nationally representative sample of approximately 10000 people answer questions about their health, nutrition and behaviours. Some subgroups, such as Asian Americans, are oversampled to ensure precise health estimates and nutritional indicators of minority groups. From the 2011 to 2012 cycle, an Asian acculturation indicator (language spoken at home) was implemented. All NHANES activities were approved by the National Center for Health Statistics' Research Ethics Review Board, with participants giving informed consent. The resulting anonymized database is publicly accessible.

From the 39 156 NHANES participants interviewed and examined during the selected cycles, 4566 reported as Asian-Americans. Among them, 4055 participants completed the acculturation assessment, with 2922 were aged 20 or older. After excluding 159 participants with non-positive weights, the study encompassed data from 2763 participants.

2.2 | Measures

The primary predictor, acculturation score, was determined by three questions: (1) language spoken at home, (2) country of birth and (3) length of time in the USA, as has been used in other studies.[22,23] The language spoken at home was scored from 0 to 2 (2 = English only or pro-English, 1 = both English and non-English equally, 0 = non-English or pro-non-English). Country of birth and length of time in the USA were analysed collectively and divided into four categories, scored from 0 to 3: 3 = US born; 2 = foreign born and lived in the USA for ≥20 years; 1 = foreign born and lived in the USA for 10–19 years; 0 = foreign born and lived in the USA for <10 years. These scores were added together to generate a total acculturation score ranging from 0 (least acculturated) to 5 (most acculturated). For analyses where acculturation was considered a binary variable, scores ≥3 were considered more acculturated (vs. less).

This study included three dental health outcomes: usage of dental floss use, frequency of dental visits and unmet dental care needs. As per the NHANES survey protocol, dental floss usage was defined through the question: 'How many days use dental floss/device in the past week?' This question aimed at adults aged 30 and older. The responses were classified into two categories: 0 day usage was considered 'NO' and 1 or more days as 'YES'. The dental visits variable was determined according to two questions: 'When did you last visit a dentist?' and 'What was the main reason you last visited the dentist?' Respondents were grouped into regular and irregular dental visitors. Regular dental visits included those who visited a dentist within the past 12 months for routine care (a 'check-up', examination and/or cleaning). All others were considered as irregular dental visitors. Unmet dental care needs were measured based on respondents' disclosure of needing but failing to access dental care within the past 12 months ('yes'—classified as having an unmet dental need). Among those who indicated having an unmet dental need, participants were further asked about their primary barriers to dental care, such as cost, lack of insurance, inconvenient office hours and other dentists' recommendation against care.

Sociodemographic covariates included gender (male vs. female), age (20–40 vs. >40), education (below college level vs. at least some college education), marital status (married, living with partner vs. widowed, divorced, separated and never married), poverty-to-income ratio (<1.5, 1.5–3.5, and >3.5), insurance status (Private, Medicare or Medicaid, Other insurance and No insurance) and smoking status (current, former and never smoker). The poverty-to-income ratio measures a family's economic situation relative to the poverty threshold. For example, a ratio of 1.5 (or 150%) indicate that

a family's income is one and a half times above poverty line. Families with incomes below 150% of the federal poverty level are generally considered as low income and may be eligible for certain government programmes such as Medicaid.[28]

2.3 | Statistical analyses

Descriptive statistics were used to assess demographic differences. Univariate and multivariable logistic regressions were conducted to investigate the association between acculturation and oral health indicators. For logistic regression analysis, the poverty-to-income ratio was grouped to two categories (1.5 vs. ≥1.5), and insurance was grouped to two categories (insured vs. uninsured). The selected adjusted variables included gender, age, education level, poverty-to-income ratio and insurance status. Stratifying analyses were also used to investigate the moderating effect of insurance status on the associations between dental health indicators and acculturation. Survey-related commands (e.g. PROC SURVEYLOGISTIC and SURVEYFREQ) were used to address complex sampling design and to adjust for the effect of the complex survey design. The primary sampling unit and stratum for each observation were considered.[29] We set the alpha level at 0.05 and generated 95% confidence intervals. All statistical analyses were performed using SAS software, version 9.4.

3 | RESULTS

Table 1 shows sociodemographic and behavioural characteristics of 2763 Asian in the United States. Most participants were female (54.2%), over 40 years old (55.7%), held a college degree (72.6%) and were married or cohabitating (71.9%). About 22.2% reported poverty to income ratios below 1.5, 63.1% had private insurance and 8.8% were current smokers. Low acculturation (score <3) was reported by 63.1% participants. Most respondents used dental floss weekly (69.7%), had regular dental visits in the past year (71.0%) and 11.1% need dental care but could not get it last year.

Figure 1 shows percentage of dental floss use, regular dental visits and unmet dental care needs based on acculturation score. Acculturation scores were positively associated the percentage of individuals using dental floss: At an acculturation score of 0, only 52.0% of participants used dental floss; however, when the acculturation score reached 5, 86.7% of participants used dental floss. As for regular dental visits, it increased almost linearly from scores 0 to 3, but then dropped slightly at scores 4 and 5. Participants with an acculturation score of 0 reported a lower visit rate (55.4%) compared to those with scores of 3 (80.2%) and 5 (71.7%). The proportion of participants with unmet dental needs remains relatively constant across acculturation scores, ranging from 12.5% to 17.4%.

Table 2 shows the demographic characteristics of study participants by dental floss use, regular dental visits and unmet dental care needs. Dental floss use utilization was higher among those who

TABLE 1 Demographic characteristics of study participants (*N* = 2763).

Variables	N (weight %)
Gender	
Male	1322 (45.8)
Female	1441 (54.2)
Age (years)	
20–40	1088 (44.3)
40 or more	1675 (55.7)
Adult education level	
Below college	792 (27.4)
Somewhat college or above	1971 (72.6)
Marital status	
Married, living with partner	2009 (71.9)
Widowed, divorced, separated, never married	753 (28.1)
Poverty-to-income ratio	
<1.5	565 (22.2)
1.5–3.5	735 (29.6)
>3.5	1122 (48.1)
Insurance status	
Private	1688 (63.1)
Medicare or Medicaid	461 (16.2)
Other insurance	213 (7.6)
No insurance	389 (13.1)
Smoking status	
Current smoker	247 (8.8)
Former smoker	417 (13.5)
Never smoker	2097 (77.7)
Acculturation level	
More acculturated (≥3)	996 (36.9)
Less acculturated (<3)	1767 (63.1)
Dental floss use	
Yes	1573 (69.7)
No	700 (30.3)
Regular dental visits	
Yes	1276 (71.0)
No	521 (29.0)
Unmet dental care needs	
Yes	299 (11.1)
No	2361 (88.9)

were more acculturated (81.0%, 95% CI: 78.0%–83.9%) compared to those who were less acculturated (63.9%, 95% CI: 60.6%–67.3%). Regular dental visits were also higher among more acculturated respondents (76.7%, 95% CI: 73.9%–79.4%) than less acculturated ones (66.9%, 95% CI: 62.8%–71.0%). The proportion of respondents with unmet dental care needs were similar for both acculturated groups (10.2% vs. 11.7% respectively). Heath insurance status significantly influenced all three variables. Insured participants were more likely than uninsured participants to use dental floss (71.5% vs. 56.7% respectively), visit a dentist in the past year (74.7% vs. 41.2% respectively) and obtain dental care when needed (23.7% vs. 9.3% respectively). Similarly, income ratio was also significantly impacted dental floss use, regular dental visits and unmet dental care needs, with higher income group consistently reporting better outcomes than the lower income group. Gender was significantly associated with dental floss use; marital status was significantly associated with regular dental visits; and education level was significantly associated with dental floss use and unmet dental care needs. Age and smoking status were not associated with any of these variables of interest.

Table 3 shows the association between acculturation and dental floss use. More acculturated individuals were roughly twice as likely as less acculturated individuals to use dental floss/device in the crude model (OR = 2.41, 95% CI: 1.92–3.01) and in the adjusted model (OR = 1.98, 95% CI: 1.50–2.62). In addition, females, higher educated, higher income and insured Asian Americans reported higher dental floss use than their counterparts. After stratifying by insurance, more acculturated respondents were about twice as likely as the less acculturated respondents to use dental floss with insurance (OR = 1.90, 95% CI = 1.41–2.56); among those without insurance, the more acculturated were about three times as likely as the less acculturated (OR = 3.17, 95% CI = 1.49–6.73). Next, acculturation was assessed with regard to accessing dental care. Individuals of Asian descent with higher acculturation scores were more likely to report dentist visits last year in both the crude (OR = 1.63, 95% CI: 1.30–2.04) and adjusted models (OR = 1.41, 95% CI: 1.09–1.84), compared to those with lower acculturation scores. Asian Americans over 40, women, those with higher incomes and those with insurance were significantly more likely to report dental visits in the past 12 months than their counterparts. A moderate effect of insurance status was found on the association between acculturation and dental visits. After stratifying by health insurance status, acculturation was significantly associated with dental visits in the past year among Asian Americans who had insurance (OR = 1.70, 95% CI: 1.29–2.23), but not among those without insurance. Finally, acculturation was assessed with regard to unmet dental care needs. No associations were identified in the crude model, adjusted model nor in the models stratified by health insurance status. Income ratio and insurance status, however, were significantly associated with unmet dental care needs.

To further comprehend the impact of insurance on unmet dental care needs among Asians in the United States, the findings in Table 4 presents the reasons behind these unmet needs, categorized by insurance status. Overall, 11.1% of Asian Americans had unmet dental care needs. The prevalence of unmet dental care needs was twice as likely among uninsured Asian Americans than insured. The top two reasons for uninsured and insured Asian Americans were similar: 'Could not afford the cost' and 'Insurance did not cover procedures'. The third main reason among insured Asian Americans was 'too busy', whereas the third reason among uninsured Asian Americans was that they 'did not want to spend money'.
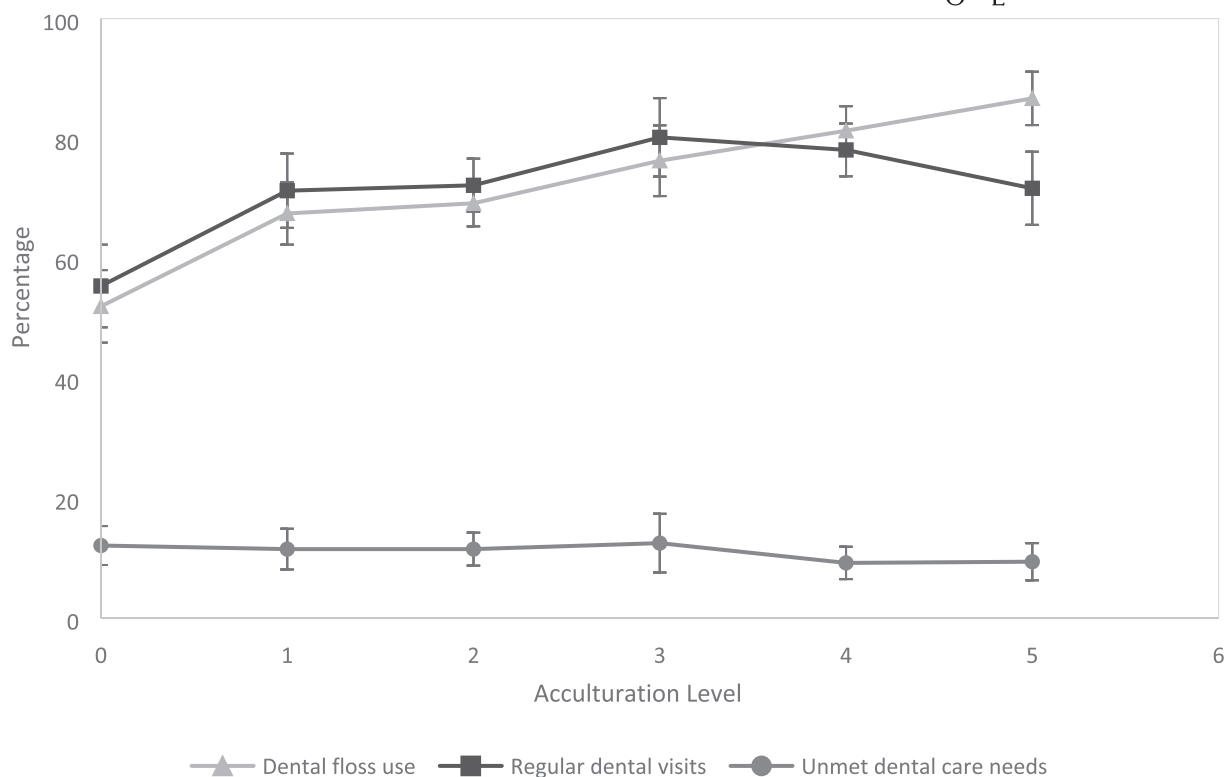
FIGURE 1 Distribution of dental floss, regular dental visits and unmet dental care needs among Asian individuals, categorized by acculturation level (NHANES, 2011–2018).

4 | DISCUSSION

In this study, individuals of Asian descent with higher acculturation score were more likely to use dental floss and have had a dental visit in the past year. This is in accordance with findings of a previous systematic review which also demonstrated that immigrant and ethnic minorities higher levels of acculturation reported better dental knowledge and oral health behaviours such as flossing, dental services utilization.[18] The study extends these trends to Asian population specifically.

In particular, dental floss use and regular dental visits were positively associated with acculturation, while having unmet dental care needs was not related to acculturation. Heath insurance status was significantly linked to dental floss usage, regular dental visit, unmet dental care needs and insurance status moderated the association between acculturation and dental visits. Unmet dental care needs were largely driven by costs and insurance coverage for care; however, many respondents reported being too busy to access dental care. The effects of acculturation level on dental floss use, regular dental visits and unmet dental care needs are discussed below.

In the United States, 68% US adults over the age 30 floss regularly,[7] versus just 20% of Chinese adults[30] and 16% of Korean[31] adults and 11% of adults in India.[32] Considering flossing is more common among US adults than among most Asian adults, it can be speculated that more acculturated individuals may adopt the habit of flossing from their local friends. Those with higher English fluency and longer residency in the United States are more likely to

socialize, potentially adopting health behaviour from native Americans. This suggests that the assimilation of dental flossing habits from American culture could contribute to improved dental health among acculturated Asians. However, this interpretation relies on the presumption that friendships and the bidirectional sharing of health behaviours naturally occur over time. Therefore, to promote dental flossing behaviour and regular dental visits among Asians, it is necessary to consider cultural adaptation and language accessibility. Additionally, CareQuest indicates that Asians experience a higher level of discrimination in accessing oral healthcare than their white counterparts (49% vs. 33% respectively).[33] Thus, alongside promoting cultural adaptation and language accessibility, efforts should also be directed towards addressing these disparities in order to ensure equitable oral healthcare access for Asians.

Several additional variables beyond acculturation were associated with accessing dental care. For example, it was found that insurance status was strongly associated with dental visits; this is in line with previous reports on this topic.[18,34] After stratifying insurance status in our study, acculturation was still significantly associated with regular dental visits among insured participants, but not among uninsured participants. This finding reveals a significant moderating effect of insurance status on the association between acculturation and dental visits, a connection previously not well understood. It appears that having dental insurance is a necessary prerequisite for accessing care among all groups, given the high cost of such care otherwise. Gender, age, education and income level were all not associated with dental visits among uninsured participants. Again, it is

TABLE 2 Demographic characteristics and smoking status of study participants by dental floss use, regular dental visit and unmet dental care needs.

	Dental floss use		Regular dental visit		Unmet dental care needs	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Acculturation level						
More acculturated	765	81.0 (78.0–83.9)	744	76.7 (73.9–79.4)	992	10.2 (7.9–12.5)
Less acculturated	1508	63.9 (60.6–67.3)	1053	66.9 (62.8–71.0)	1668	11.7 (9.9–13.5)
Gender						
Male	1067	65.3 (61.7–68.9)	870	67.5 (64.0–71.1)	1267	9.9 (7.5–12.2)
Female	1206	73.4 (70.6–76.1)	927	74.0 (70.8–77.2)	1393	12.2 (10.4–13.9)
Age (years)						
19–40	599	69.8 (64.9–74.6)	743	64.2 (60.4–68.0)	1031	10.3 (7.8–12.7)
40 or more	1674	69.7 (67.2–72.2)	1054	76.8 (73.7–79.8)	1629	11.8 (10.1–13.5)
Adult education level						
Below college	715	59.1 (54.6–63.6)	410	64.9 (58.8–70.9)	746	16.5 (14.0–19.0)
Somewhat college or above	1558	74.3 (71.5–77.1)	1387	72.7 (69.8–75.7)	1914	9.1 (7.4–10.9)
Marital status						
Married, living with partner	1849	69.7 (67.1–72.4)	1331	73.3 (70.1–76.6)	1933	10.7 (9.0–12.5)
Widowed, divorced, separated, never married	423	69.9 (65.6–74.1)	466	64.5 (60.7–68.3)	726	12.1 (9.5–14.7)
Poverty-to-income ratio						
<1.5	446	57.3 (51.8–62.8)	263	58.8 (53.5–64.2)	533	19.4 (15.9–22.9)
≥1.5	1542	73.9 (71.3–76.5)	1324	73.7 (70.7–76.7)	1805	8.5 (6.9–10.2)
Insurance status						
Yes	1985	71.5 (68.7–74.3)	1586	74.7 (72.0–77.3)	2297	9.3 (7.8–10.8)
No	286	56.7 (49.1–64.4)	209	41.2 (34.5–47.8)	360	23.7 (19.3–28.2)
Smoking status						
Current smoker	189	62.9 (55.2–70.6)	135	59.4 (51.4–67.5)	242	17.3 (11.4–23.3)
Former smoker	385	68.6 (63.4–73.7)	249	69.2 (62.8–75.6)	404	11.0 (7.9–14.0)
Never smoker	1698	70.7 (67.8–73.6)	1411	72.3 (69.2–75.4)	2012	10.4 (8.9–12.0)

likely that lack of insurance constitutes a significant barrier to care with a stronger impact than any other demographic factor. However, once this barrier is removed (i.e. among all insured individuals), acculturation remains important.

In the United States, Medicaid provides low cost or even free dental coverage for eligible individuals, but the eligibility for Medicaid is largely based on income, and the extent of dental benefits can vary significantly from state to state.[35] Thus, lack of health insurance cannot be exclusively associated with socio-economic status. We had hypothesized that acculturation would remain a significant predictor of dental care access among the uninsured, as lower acculturation levels may hinder individuals' ability to obtain insurance or find free care clinics due to limited English language and health literacy. In general, uninsured individuals tend to have lower health literacy than insured individuals, possibly making cultural origin less significant as a factor. According to the results from the 2007 California Health Interview Survey, among uninsured individuals only 15.9% have adequate health literacy.[36] The study also found that those with low

literacy were more likely than those with adequate literacy to be employed full-time, but less likely than to be offered employer-based health insurance, suggesting that low health literacy might be a major risk factor for lacking health insurance.[36] Health literacy has been shown to be a strong predictor of health behaviour and of health outcomes.[37-39] For instance, a study on Somali refugees in Massachusetts found that subjects with higher health literacy were much more likely to have had a preventive dental care visit within the past year.[40] Conversely, it is possible that individuals without oral health concerns may not prioritize dental health insurance, and hence might be less inclined to visit a dentist, regardless of their acculturation levels. In summary, the interaction between acculturation and insurance status remains an important topic, especially in understanding why acculturation does not predict dental visit behaviour among uninsured Americans. More longitudinal studies with larger sample sizes are needed to confirm this effect.

In addition, the study found that acculturation is not associated with having unmet dental care needs. The high cost of dental

TABLE 3 Associations between acculturation and dental floss use, regular dental visit and unmet dental care needs.

	Dental floss use		Regular dental visits		Unmet dental care needs	
	SLR	MLR	SLR	MLR	SLR	MLR
(1) Association between acculturation and dental health indicators among *all study participants*						
Acculturation						
More versus Less acculturated	2.41 (1.92–3.01)	1.98 (1.50–2.62)	1.63 (1.30–2.04)	1.41 (1.09–1.84)	0.86 (0.66–1.11)	1.02 (0.70–1.48)
Gender						
Female versus Male		1.54 (1.25–1.88)		1.34 (1.08–1.67)		1.35 (1.05–1.73)
Age (years)						
40+ versus 19–40		1.05 (0.82–1.35)		1.80 (1.47–2.22)		1.13 (0.82–1.57)
Education						
Somewhat college+ versus Below college		1.48 (1.18–1.86)		1.28 (0.91–1.79)		0.74 (0.52–1.05)
Poverty-to-income ratio						
<1.5 versus ≥1.5		1.49 (1.17–1.90)		1.52 (1.11–2.09)		0.51 (0.38–0.69)
Insurance status						
Yes versus No		1.51 (1.00–2.27)		3.15 (2.33–4.26)		0.39 (0.29–0.51)
(2) Association between acculturation and dental health indicators among *insured participants*						
Acculturation						
More versus Less acculturated	2.26 (1.76–2.89)	1.90 (1.41–2.56)	1.70 (1.29–2.23)	1.51 (1.12–2.03)	0.84 (0.62–1.16)	1.00 (0.66–1.52)
Gender						
Female versus Male		1.60 (1.27–2.02)		1.31 (1.02–1.67)		1.46 (1.11–1.92)
Age						
40+ versus 19–40		1.14 (0.86–1.52)		1.83 (1.46–2.28)		1.15 (0.84–1.57)
Education						
Somewhat college+ versus Below college		1.43 (1.09–1.88)		1.23 (0.83–1.82)		0.69 (0.46–1.02)
Poverty-to-income ratio						
<1.5 versus ≥1.5		1.45 (1.07–1.96)		1.57 (1.09–2.27)		0.52 (0.37–0.73)
(3) Association between acculturation and dental health indicators among *uninsured participants*						
Acculturation						
More versus Less acculturated	3.13 (1.76–5.57)	3.17 (1.49–6.73)	0.87 (0.45–1.68)	0.86 (0.43–1.70)	1.28 (0.83–1.98)	1.15 (0.65–2.03)
Gender						
Female versus Male		1.24 (0.78–1.99)		1.57 (0.88–2.79)		1.04 (0.69–1.58)
Age (years)						
40+ versus 19–40		0.68 (0.38–1.20)		1.52 (0.88–2.62)		1.14 (0.62–2.12)
Education						
Somewhat college+ versus Below college		1.97 (1.31–2.98)		1.52 (0.78–2.94)		0.94 (0.60–1.48)
Poverty-to-income ratio						
<1.5 versus ≥1.5		1.89 (0.87–4.12)		1.30 (0.67–2.52)		0.52 (0.31–0.86)

Abbreviations: MLR, multiple logistic regression; SLR, simple logistic regression.

services appears to exert a stronger influence on dental care utilization than acculturation. This findings aligns with previous research that has highlighted costs as a major predictor of access to care.[8] Within the study, the two primary reasons Asians cited for not receiving dental care were 'inability to afford the cost' and 'insurance not covering procedures'. The consistent reporting of insurance not covering needed procedures, even among individuals with health insurance, is unfortunate but predictable. For example,

TABLE 4 The reasons for unmet dental care needs among Asians in the United States by insurance status.

	With insurance	Without insurance
Could not afford the cost	103 (36.8%)	74 (58.7%)
Insurance did not cover procedures	51 (18.2%)	13 (10.3%)
Did not want to spend the money	17 (6.1%)	9 (7.1%)
Dental office is too far away	7 (2.5%)	2 (1.6%)
Office does not open at convenient time	11 (3.9%)	2 (1.6%)
Afraid or do not like dentists	6 (2.1%)	3 (2.4%)
Unable to take time off from work	16 (5.7%)	5 (4%)
Too busy	32 (11.4%)	5 (4%)
Expected dental problems to go away	14 (5%)	5 (4%)
Other reason could not get dental care	23 (8.2%)	8 (6.3%)
Total	280 (100%)	126 (100%)

Note: An individual could choose more than one reason.

adults insured through Medicaid are not automatically enrolled in dental benefits, and depending on their state of residence, may not be eligible for these benefits.[41] Interestingly, the third-most common reason insured individuals did not receive needed dental health interventions was because they were 'too busy', while uninsured individuals reported that they 'did not wish to spend money on dental care'. Employment often provides access to health and dental insurance, suggesting that uninsured individuals may lack access to care due to not having full-time work with benefits. However, once they obtain a job that provide these benefits, they might struggle to take time off for needed care. Hence, it is suggested that there might need to be a wider cultural shift in the American workforce to potentially encourage and enable employees to utilize paid time off for their healthcare needs.

4.1 | Limitations and strengths

This study has serval limitations. Firstly, as NHANES data are collected in cross-sectional iterations, this limits the potential to examine changes over time. Secondly, the lack of classification for Asians based on their country of origin neglects the rich diversity and heterogeneity in oral health behaviours among Asian ethic subgroups. This means that these results should be cautiously applied to individuals or specific subcultures. Thirdly, certain undocumented individuals might have been inadvertently excluded due to fear of disclosing their status. Another point of consideration is that questions about dental floss usage were only posed to participants aged 30 and above. Furthermore, medical insurance was often used as a proxy when information on dental health insurance was

not specifically available. Lastly, a noteworthy limitation pertains to the dichotomization of several variables for analysis.[42] Although this practice, common in oral epidemiology, simplifies interpretation, it also has drawbacks.[42] Specifically, dichotomization can lead to loss of critical information and potentially underestimates the variation between groups.

Despite the aforementioned limitations, it contributes to the literature by providing national-scale evidence regarding oral health behaviours, dental services utilization and unmet dental care needs among Asian Americans. A key consideration is that our acculturation scale incorporated three factors, offering a potentially more accurate measure than scales using fewer items. To the best of our knowledge, no previous studies have applied this acculturation scale in assessing dental care and unmet needs among US-based Asians. A significant finding was the moderating effect of insurance status on the association between acculturation and dental visits among Asians, which provides an exploratory baseline on this topic and highlight the importance of further research in this area.

5 | CONCLUSION AND IMPLICATIONS

This study showed more acculturated Asians in the United States were more likely than their less acculturated counterparts to use dental floss and visit dentist regularly. In order to encourage dental flossing and regular dental visits among less acculturated Asian American, it is necessary to consider cultural adaptation and ensure language accessibility. This study also found a significant interaction between insurance status and the relationship between acculturation and dental visits among Asian Americans. However, future research is necessary to confirm this moderating effect. Additionally, the findings emphasize the significant influence of costs and insurance on access to dental care among Asians in the United States, highlighting the importance of future public health programmes in addressing these barriers.

AUTHOR CONTRIBUTIONS

CONFLICT OF INTEREST STATEMENT

DATA AVAILABILITY STATEMENT

STUDY REGISTRATION

As a secondary analysis of existing public survey data, this study was not formally registered.

ANALYTIC PLAN PRE-REGISTRATION

As a secondary analysis of existing survey data, the analysis plan was not formally pre-registered.

ANALYTIC CODE AVAILABILITY

Analytic code used to conduct the analyses presented in this study are not publicly available. The code used for this study was developed by the study team, and may be accessed by emailing the corresponding author.

MATERIALS AVAILABILITY

Materials used to conduct the study are publicly available.

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