Social Psychiatry and Psychiatric Epidemiology (2019) 54:1275–1284
https://doi.org/10.1007/s00127-019-01691-0

ORIGINAL PAPER

Acculturative stress, disability, and health treatment utilization among Asian and Latin American immigrants in the United States

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Received: 25 September 2018 / Accepted: 9 March 2019 / Published online: 20 March 2019

Abstract

Purpose Empirical research has largely ignored the potential links between immigration-related stress and disability as well as immigration-related stress and health service utilization despite increasing scholarship on the association between acculturative stress and health. This study examined the associations between acculturative stress, disability, and health treatment utilization among Asian and Latin American immigrants in the United States.

Methods Data were from the National Latino and Asian American Study (NLAAS), a nationally representative survey of Asians and Latinos living in the United States. The analytic sample contained 2653 immigrants. We utilized multivariable logistic regression and negative binomial regression analyses to examine the associations between acculturative stress and disability domains. We also examined the association between acculturative stress and treatment utilization, as this may have implications for how to best intervene to address any functional disability related to acculturative stress.

Results Acculturative stress was significantly associated with self-reported disability across five domains: self-care, cognition, mobility, time out of role, and social interaction. Additionally, acculturative stress was significantly associated with a greater frequency of disability domains. Acculturative stress was not significantly associated with utilization of services from mental health or general health sectors, but was significantly and positively associated with utilization of non-health care services. The findings were robust regarding the inclusion of everyday discrimination as well as demographic and socioeconomic covariates.

Conclusions Acculturative stress may be an important yet overlooked correlate of disability among immigrants in the United States. Non-health care services may provide an effective pathway for intervening for these individuals.

Keywords Migration · Disability · Treatment · Acculturative stress · Discrimination

Introduction

Acculturative stress is a significant correlate of physical and mental health outcomes among immigrants in the United States [1, 2]. Acculturation refers to the process through which immigrants adapt to new sociocultural environments by adjusting their attitudes and behaviors closer to the norms

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s00127-019-01691-0) contains supplementary material, which is available to authorized users.

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of the host society [3, 4]. The stress resulting from this sociocultural adjustment is termed acculturative stress, which emerges when immigrants encounter hostility from the host society, struggle to navigate their environments without fluency in the language, and cope with the loss of the social support they had in their countries of origin [5–7].

Acculturative stress is considered a type of social stress that can tax the body's stress response system and precipitate pathophysiologic changes in the body [8]. Acculturative stress may repeatedly activate the HPA axis, resulting in an excess release of glucocorticoid (cortisol) and catecholamines (epinephrine, norepinephrine). Cortisol has been linked to hypertension, insulin resistance, and central adiposity [9], while catecholamines have been linked to elevated lipids, increased blood coagulability, and atherosclerosis, all of which are risk factors for myocardial infarction. Epinephrine specifically is a strong contributor to hypertension through increased peripheral vascular resistance [10]. Putatively, high levels of acculturative stress chronically activate the stress response system, which can result in neuroinflammation and sensitization of various regions of the brain, increasing risk for mental illness [11–13]. The health effects of repeated activation of the stress response system can also manifest in the forms of cognitive or functional impairments [14, 15].

Scholars have demonstrated the psychological toll that acculturative stress can have on immigrants. Several studies have cited greater risk for depression, anxiety, and other psychiatric symptoms and disorders among those who report acculturative stress [16–18]. Studies on Latinos throughout the United States suggest that acculturative stress predicts depression [19] and overall poorer self-rated mental health [2]. Using data from the National Latino and Asian American Study (NLAAS), studies have found that acculturative stress in Latino immigrants was associated with a higher risk of psychiatric disorders [16]. Similarly, the NLAAS data on Asians have shown acculturative stress to be related to increased psychosis-like experiences [17], worse self-rated mental health [20], and overall psychological distress [21].

Research on the link between acculturative stress and physical health has been less definitive than that of mental health, in that only certain aspects of acculturative stress (such as that which pertains to language problems, anxiety about legal status, and job insecurity) were found to be associated with poor self-rated physical health in Latinos [2, 22]. More recently, Panchang et al. [20] found a positive (yet statistically sensitive) association between acculturative stress and poorer physical health among female Asian immigrants. Generally, scholars have focused less on exploring the association between acculturative stress and physical health than they have on estimating the association between acculturative stress and mental health. The association between acculturative stress and physical health is further complicated by the possibility that certain immigrant groups migrate to the United States with health profiles that are substantially better than the population born in the United States. For instance, the oft-cited Hispanic paradox posits that Latino immigrants tend to be healthier than United States-born Latino and White populations [23–25].

While studies have examined the association between acculturative stress and mental and physical health, to our knowledge, there are no studies that examine the specific association between acculturative stress and disabilities. If acculturative stress does have the significant link to physical and mental health that some studies suggest, it is reasonable to test whether acculturative stress may be associated with impairments across different indicators of disability, as studies show that physical health and psychiatric diagnoses result in disability for various age groups [26–28].

Physical and mental health diagnoses are often correlated with disability, but it is important to examine disability in particular, because impairments are not always obvious and often go undetected in routine clinical interviews. Further, disability is arguably a better indicator of how mental and physical health affects everyday functioning, since diagnoses range in their ability to hinder participation in daily activities. Moreover, immigrants often underutilize formal treatment systems, including visits to physicians, psychiatrists, and non-medical doctors [29–33]. Factors such as limited English proficiency, documentation status, and lack of health care can impede formal treatment utilization [34–36], but little, if any, research has examined the link between acculturative stress and treatment-seeking behaviors. It is possible that acculturative stress may be associated with reduced utilization of formal treatment services by Asian and Latino immigrants, or that they may supplement services with additional non-traditional services. Any potentially negative impacts of acculturative stress on health and functioning are further compounded if acculturative stress also deters utilization of formal treatment systems, in that conditions remain untreated. This is especially problematic in the context of disability, as adults with physical or cognitive impairments are often less likely to receive health services, including preventive disease screenings [28]. More concretely, if acculturative stress inflames disability while at the same time depresses health service utilization to treat the underlying health conditions that cause disability, immigrants experiencing substantial levels of acculturative stress may be doubly disadvantaged.

This study analyzed data from the National Latino and Asian American Survey, a representative survey of Asian Americans and Latino Americans in the general United States population. We first sought to describe the prevalence of disability and acculturative stress among immigrants. Our operationalization of disability measures whether respondents are impaired from functioning fully across several

domains, including self-care, cognition, mobility, time out of role, and social interaction. The use of disability status in this study identifies respondents who report experiencing some of the most severe barriers to full functionality in the five examined domains. We then examined the associations between acculturative stress and five disability domains, adjusting for demographic and socioeconomic confounders as well as everyday discrimination. Discrimination has been associated with worse mental and self-reported physical health [37–40], and thus has the potential to confound the analysis of acculturative stress. We hypothesize that acculturative stress would be associated with increased risk for disability domains. Next, we examined whether acculturative stress was associated with formal and informal health service utilization. We tested for interaction by race (Asian and Latino) to assess whether the magnitude of the associations differ by race. While we cannot conclusively determine causality in these cross-sectional data, we also explored whether "reverse causality" explanations were likely or feasible by adjusting for an indicator of whether respondents migrated to the United States seeking medical attention.

Methods

Sample

We analyzed data from the NLAAS, a cross-sectional and nationally representative probability survey of Asians and Latinos in the general population conducted between 2002 and 2003. More detailed descriptions of the study can be found in prior studies [41]. The study includes 2095 Asian and 2554 Latino non-institutionalized respondents who were at least 18 years old at the time of the survey. The study design consisted of (1) a core sample of primary and secondary sampling units, (2) high-density sampling of census block groups within which the targeted ethnic groups comprised at least 5% of the population, and (3) recruitment of respondents through second-respondent sampling from households in which a primary respondent had been interviewed [42]. The NLAAS was a household survey that may have included undocumented immigrants, though data on the legal status of respondents were not collected aside from citizenship. The Internal Review Board Committees of the University of Washington, Cambridge Health Alliance, The University of Michigan, and Harvard Medical School approved all study procedures. The analytic sample included only foreign-born individuals, as these respondents were the only ones to complete the acculturative stress scale. Thus, this study analyzed outcomes of first-generation Asian and Latino immigrants in the United States. The analytic sample consisted of 2653 respondents, 1307 of which were Asian and 1346 of which were Latino.

Measures

Acculturative stress

This measure was only administered to those individuals born outside the United States. We operationalized acculturative stress using a nine-item acculturative stress scale included in the NLAAS survey and adapted from the Mexican American Prevalence and Services Survey [43]. The scale has been used to study both the Latino and Asian samples in NLAAS [17, 21]. Respondents were asked to answer nine dichotomous (yes/no) questions related to acculturative stress. These responses were added together in a scale ranging from 0 to 9. Cronbach's α was 0.66 for the nine-item scale among the analytic sample, which is adequate [44]. The nine-item scale was reduced to eight items for the regression models estimating the relationship between acculturative stress and health treatment utilization. The excluded item asked respondents about health service avoidance due to fear of immigration officials, which was not appropriate to include in models predicting health service utilization outcomes (Cronbach's α for the eight-item scale was 0.64). A complete list of items in the scale as well as their relative frequencies by race is reported in Table 2.

Disability

Disability was measured using the WHO Disability Assessment Schedule II (WHO-DAS II; [45]), a 36-item general disability instrument which elicits the frequency and intensity of impairments over the past 30 days across the following six disability domains: (1) cognition; (2) mobility; (3) self-care; (4) social Interaction; (5) role functioning; and (6) time out of role (see WHO-DAS II included in the online supplemental materials). Impairments could be due to health conditions, such as diseases or illnesses, other short/long-lasting health problems, injuries, and mental or emotional problems. Respondents were asked about the extent to which they experienced difficulties performing several activities, and the response options were: none, mild, moderate, severe, and extreme/cannot do. Each domain was scored and standardized to a scale from 0 (no disability) to 100 (full disability); however, most respondents reported having no disability. To address the skewness of the data, we dichotomized each domain to signify either having no disability or having any amount of disability (i.e., non-zero), as per previous studies using these data [46]. The WHO-DAS II items measuring participation in society were not collected for foreign-born individuals in the NLAAS. Studies demonstrate the validity and reliability of the WHO-DAS II disability instrument internationally, including when it

was used to study populations throughout Asia and Latin America [47–49].

Treatment utilization

We examined three types of treatment: (1) professional mental health treatment, (2) general medical sector health treatment, and (3) informal care. For mental health treatment, respondents were asked how many times they had seen a mental health provider in the past 12 months, which included: psychiatrist, psychologist, clinical social worker, counselor, hotline, or other professionals. For general health treatment, respondents were asked how many times they saw a medical doctor or non-medical doctor health professional in the past 12 months. For informal care, respondents were asked how many times they used an online support group, attended self-help group meetings, visited a spiritual advisor, visited a healer, or used alternative therapies in the past 12 months. We dichotomized all variables by coding them 1 if respondents reported having utilized these services at least once in the past 12 months.

Everyday discrimination

Everyday discrimination was measured using a nine-item scale capturing experiences with routine discrimination. The scale ranges from 0 to 45, with each of the nine questions ranging from 0 to 5, with 5 indicating discrimination "almost every day." Examples of questions include the frequency a respondent is treated with less respect than others, the frequency people act afraid of a respondent, and the frequency a respondent is threatened and/or harassed. The complete list of items of the scale is included in the online supplemental materials (Table S1). Cronbach's α was 0.90.

Pre-migration health

We constructed a proxy to represent the pre-migration health characteristics of respondents in the analytic sample. The proxy was coded as a dichotomous variable equal to 1 if respondents rated seeking medical attention in the United States as "somewhat" or "very important" in their decision to migrate and 0 if seeking medical attention was "not at all important". We assume that respondents who reported seeking medical attention in the United States as "somewhat" or "very important" in their decision to migrate were more likely to have pre-migration health issues in comparison to respondents who reported seeking medical attention as "not at all important."

Socio-demographic characteristics

Self-reported socio-demographic variables that had the potential to confound the analyses were included as covariates. Dummies were created based on race to distinguish Latino immigrants from Asian immigrants (reference: Asian). Other covariates included sex (reference: male), age (reference: 18–29, 30–44, 45–59, 60+), education level (less than high school, high school, some college, reference: college and beyond), marital status (married, divorced, reference: single), tertiles of income (reference: $\leq$\$20,999, $>$\$20,999 and $\leq$\$55,000, $\geq$\$55,400), and health insurance coverage (reference: none).

Analytic procedures

We accounted for complex multistage clustered design by estimating standard errors though designed-based analyses that utilized the Taylor series linearization method. United States metropolitan statistical areas or counties were the primary sampling units. We used sampling weights for all statistical analyses to account for individual-level sampling factors (i.e., non-response bias and unequal probabilities of selection). All analyses were performed using STATA SE 13. Multivariable logistic regression models were used to examine the associations between acculturative stress and disability domains, adjusting for potential socio-demographic confounders as well as discrimination. Negative binomial regression models were used to examine the association between the count of disability domains and acculturative stress, adjusting for the same covariates used in the logistic regression models. The overdispersion parameter α was significantly different from zero ($p<0.001$), indicating that negative binomial regression was preferred to Poisson regression.

A modified acculturative stress scale was used to examine its relation to treatment utilization, given that one of the items was avoidance of "seeking health services due to fear of immigration officials." The estimates for the associations between acculturative stress and health treatment utilization were modeled using logistic regression and adjusting for the same covariates included in the disability models. With the exception of cognitive disability, effect modification by race was not evident for disability domains or treatment utilization. For this reason, we analyzed the Latino and Asian samples together, while adjusting for race. Finally, we explored the direction of causality between acculturative stress and disability by testing whether a proxy for pre-migration health was associated with a relatively greater degree of acculturative stress. If relatively poorer pre-migration health is associated with greater levels of acculturative stress, then it may be that disability causes acculturative stress rather than acculturative stress causing disability, presenting the issue of reverse causality.

Results

Table 1 presents the weighted descriptive statistics of the analytic sample. The average acculturative stress score was 2.3 (SD 2.1). About 1.9% of respondents reported impairment in self-care, 6.2% reported cognitive impairment, 7.1% reported mobility impairment, 17.6% reported time out of role difficulties, and about 2.4% reported difficulty with social interactions. The mean everyday discrimination score was 6.2 (SD 6.9). Approximately 31% of the sample identified as Asian (8.7% Chinese, 6.8% Filipino, 4.5% Vietnamese, and 10.7% "other" Asian), with the remaining 69% identifying as Latino (38.1% Mexican, 4.5% Cuban, 4.7% Puerto Rican, and 21.9% "other" Latino). The NLAAS did not disaggregate the racial categories further than what Table 1 contains.

Table 2 presents the weighted frequencies for each indicator in the nine-item acculturative stress scale with results separated by race. The only indicators with differences by race that were indistinguishable from zero were feeling guilty about leaving family/friends in country of origin and being treated badly due to poor/accented English. The largest differences between Latino and Asian immigrant respondents were in the questions that dealt with legal status anxiety. Approximately 31% of Latino respondents reported being questioned about their legal status, whereas only 19% of Asians reported such treatment. About 18% of Latino respondents endorsed fears of deportation and 12% reported avoiding health services due to fear of immigration officials, whereas Asian respondents reported those fears at rates of about 2% and 0.60%, respectively.

The first set of analyses examined whether acculturative stress was related to disability domains. Table 3 presents the odds ratios (ORs) and 95% confidence intervals (95% CIs) for main effects across logistic regression models as well as the point estimates (b) and standard errors for negative binomial regression models, adjusting for demographic and socioeconomic covariates (see Table S2 for expanded results). A one-unit increase in the acculturative stress scale (range 0–9) was associated with 1.21 times the odds of endorsing impairments in self-care (95% CI 1.06–1.37), 1.19 times the odds of endorsing cognitive impairment (95% CI 1.10–1.30), 1.11 times the odds of endorsing mobility impairment (95% CI 1.03–1.19), 1.10 times the odds of endorsing any time out of role (95% CI 1.04–1.16), and 1.22 times the odds of endorsing difficulties with social interaction (95% CI 1.05–1.42), conditional on the covariates. The negative binomial regression model demonstrates that acculturative stress was significantly associated with a greater frequency of disability domains ($p < 0.001$).

Table 4 presents the results for the logistic regression analyses of the association between acculturative stress (using the modified scale ranging from 0 to 8) and health treatment utilization (see Table S3 for expanded results). Note that we adjusted for health insurance coverage in our models. The association between acculturative stress and mental health service utilization was insignificant, though everyday discrimination was positively predictive of mental health service utilization. Similarly, acculturative stress was not significantly associated with general medical sector treatment utilization. However, acculturative stress was significantly and positively associated with utilization of non-health care sector services (OR 1.12; 95% CI 1.04–1.22), even after adjusting for discrimination. None of the results for the health treatment outcomes were sensitive to the inclusion of the excluded item on the original nine-item acculturative stress scale.

Next, we examined whether the associations between acculturative stress and disability as well acculturative stress and health services varied by race, and we found that the associations only varied with respect to the cognitive disability domain. After including an interaction term between acculturative stress and race, the association between acculturative stress and cognitive disability was stronger for Asian immigrants than it was for Latino immigrants ($p < 0.05$), such that a one-unit increase in the acculturative stress scale (range 0–9) was associated with a 45% increase in the odds of reporting cognitive impairment for Asian immigrants (95% CI 1.24–1.70, $p < 0.001$), and a 23% increase in the odds for Latino immigrants (95% CI 1.12–1.36, $p < 0.001$), conditional on the covariates. No other significant interactions were observed.

The possibility that immigrants who came to the United States with pre-existing physical or mental health conditions experienced relatively greater acculturative stress was tested with the inclusion of a dummy for pre-migration health characteristics. Having reported that seeking medical attention was "somewhat" or "very important" in deciding to migrate to the United States was not significantly associated with a higher average level of acculturative stress.

Discussion

We found that among Asian and Latino American immigrants, acculturative stress was significantly associated with various disability domains, even after adjusting for sociodemographics and discrimination. To our knowledge, this is the first study to examine the association between acculturative stress and disability domains using representative data of Asian and Latino households in the general population of the United States. We also found that acculturative stress was associated with informal help seeking over the past 12 months, but not with formal treatment utilization from medical or psychiatric providers.

Table 1 Survey-weighted descriptive statistics for NLAAS immigrant subsample, stratified by race ($n = 2653$)

	Sample ($n = 2653$)	Asian ($n = 1307$)	Latino ($n = 1346$)
Acculturative stress scale (0–9)	2.3 (2.1)	1.8 (2.3)	2.6 (1.9)
Everyday discrimination scale (0–45)	6.2 (6.9)	6.8 (8.4)	5.9 (6.3)
Count of disability domains (0–5)	0.4 (0.8)	0.4 (1.1)	0.3 (0.7)
Self-care domain	1.9% (0.3)	2.1% (0.5)	1.8% (0.4)
Cognition	6.2% (0.9)	7.3% (0.9)	5.7% (1.1)
Mobility	7.1% (0.5)	6.2% (0.7)	7.5% (0.7)
Time out of role	17.6% (1.2)	19.7% (1.4)	16.7% (1.6)
Social interaction	2.4% (0.4)	2.2% (0.6)	2.5% (0.4)
Education (years)			
0–11 years	42.6% (2.0)	15.8% (1.7)	54.50% (2.0)
12 years	19.0% (1.1)	16.2% (1.4)	20.20% (1.2)
13–15 years	18.5% (1.4)	23.5% (1.9)	16.20% (1.5)
16 years+	19.9% (1.6)	44.5% (2.4)	9.00% (1.3)
Age (years)	39.5 (14.0)	42.0 (18.8)	38.4 (12.2)
18–29 years	26.8% (1.2)	21.3% (1.7)	29.3% (1.4)
30–44 years	41.3% (1.1)	39.2% (2.0)	42.2% (1.3)
45–59 years	21.9% (1.1)	27.1% (1.3)	19.6% (1.3)
60+ years	10.0% (0.9)	12.5% (1.9)	8.8% (1.0)
Sex			
Male	51.8% (1.4)	46.9% (1.7)	53.9% (2.0)
Female	48.2% (1.4)	53.1% (1.7)	46.1% (2.0)
Relationship status			
Married	74.0% (1.3)	77.2% (1.4)	72.5% (1.8)
Divorced	10.8% (0.8)	6.3% (0.9)	12.8% (1.2)
Single	15.2% (1.2)	16.5% (1.1)	14.7% (1.6)
Household income			
1st tertile: ≤ $20,999	33.2% (2.3)	20.0% (1.7)	39.1% (2.9)
2nd tertile: > $20,999 and ≤ $55,000	35.9% (1.4)	27.4% (1.9)	39.6% (1.9)
3rd tertile: ≥ $55,499	30.9% (1.9)	52.6% (2.3)	21.3% (2.0)
Health insurance			
Yes	66.1% (2.4)	86.3% (1.6)	57.1% (2.8)
No	33.9% (2.4)	13.7% (1.6)	42.9% (2.8)
Race/ethnicity			
Asian	30.8% (2.4)	100.0%	0.0%
Chinese	8.7% (1.1)	28.3% (3.1)	0.0%
Filipino	6.8% (0.9)	22.2% (2.7)	0.0%
Vietnamese	4.5% (0.8)	14.7% (2.2)	0.0%
Other Asian	10.7% (1.3)	34.7% (2.8)	0.0%
Latino	69.2% (2.4)	0.0%	100.0%
Mexican	38.1% (4.0)	0.0%	55.1% (4.4)
Cuban	4.5% (0.5)	0.0%	6.5% (0.8)
Puerto Rican	4.7% (0.5)	0.0%	6.8% (0.8)
Other Latino	21.9% (2.1)	0.0%	31.6% (3.5)
Medical attention important to migration			
Very important	12.8% (1.0)	16.5% (1.4)	11.1% (1.3)
Somewhat important	9.9% (0.8)	12.5% (1.3)	8.7% (1.0)
Not at all important	77.4% (1.2)	70.9% (1.9)	80.2% (1.4)

Estimates rounded to the nearest tenth (may not add to 100%)

Standard deviations for means and standard errors for proportions are reported in parentheses

Table 2 Acculturative stress scale components and proportions by race

Question	Sample (%)	Asian (%)	Latino (%)	*p* value
Felt guilty about leaving family/friends in country of origin	17.74	19.06	17.16	0.280
Experienced the same respect in the US as in the country of origin	28.21	22.60	30.71	< 0.001
Limited contact with family and friends	45.77	37.16	49.60	< 0.01
Interaction hard due to difficulty with English language	40.40	31.22	44.48	< 0.001
Treated badly due to poor/accented English	24.18	26.59	23.11	0.134
Difficult to find work due to Latino/Asian descent	29.33	24.50	31.47	< 0.05
Questioned about legal status	27.50	18.64	31.43	< 0.001
Think that you might be deported if you go to a social/government agency	13.09	1.77	18.11	< 0.001
Avoid health services due to immigration officials	8.26	0.58	11.68	< 0.001

The results are survey weighted

The *p* value displays the results of tests for differences in proportions (Chi-squared test)

Table 3 Results for logistic regression of disability domains on acculturative stress and negative binomial regression of count of disabilities on acculturative stress

	OR (95% CI)
Main effects	
I. Self-care	
Acculturative stress	1.21** (1.06–1.37)
Discrimination	1.04* (1.00-1.09)
II. Cognition	
Acculturative stress	1.19*** (1.10–1.30)
Discrimination	1.05** (1.02–1.09)
III. Mobility	
Acculturative stress	1.11* (1.03–1.19)
Discrimination	1.05** (1.02–1.08)
IV. Time out of role	
Acculturative stress	1.10** (1.04–1.16)
Discrimination	1.05*** (1.02–1.07)
V. Social	
Acculturative stress	1.22** (1.05–1.42)
Discrimination	1.04* (1.00-1.07)
Negative binomial regression	b (SE)
VI. Count of conditions	
Acculturative stress	0.11*** (0.03)
Discrimination	0.04*** (0.01)

Analysis controls for age, sex, education, income, marital status, health insurance coverage, and race/ethnicity

Odds ratios and 95% confidence intervals are reported for logistic regression. Point estimates and standard errors are reported for negative binomial regression

$N = 2600$ across all models

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

These findings are important in light of the fact that approximately 13.2% of Latinos in the United States are foreign born [50], while 59% of Asians are foreign born [51]. Unfortunately, these groups are known to underutilize formal health services despite the need for care [29–33]. By and large, the associations between acculturative stress and disability as well as acculturative stress and treatment utilization did not significantly differ by race, indicating that acculturative stress was a crosscutting social predictor of five disability domain outcomes and health treatment utilization in the non-health care sector among a wide variety of immigrants.

It is also possible that immigrants who came to the United States with pre-existing disabilities experienced acculturative stress at higher average rates. We were unable to formally test this, given the absence of data on health status prior to immigration. However, we constructed a proxy for pre-existing disability in immigrants by creating a dichotomous variable indicating whether the respondent reported that seeking medical attention was "somewhat" or "very important" in the decision to migrate to the United States. While this proxy may not be ideal, it is the only measure of pre-migration health available in the NLAAS. Having reported medical attention as important to migration was not significantly associated with higher average levels of acculturative stress, which offers some evidence that disability status (prior to/during immigration) was not causing acculturative stress, thus alleviating concerns of reverse causality.

As acculturative stress may make one feel distrustful of treatment systems [52, 53], it is possible that acculturation stressors may deter formal help seeking, but also encourage informal help seeking. In comparison to professional treatment settings, informal care may have presented fewer social barriers (e.g., discrimination, limited language proficiency, and documentation status). Thus, those who experienced relatively more acculturative stress, and as a result may have grown distrustful of formal treatment systems, may have been more likely to utilize informal care networks. An implication of this is the need to conduct more research on using social networks to nudge immigrant communities into

Table 4 Logistic regression analyses of health treatment utilization on acculturative stress

	OR (95% CI)
Main effects	
I. Mental health services	
Acculturative stress	1.01 (0.87–1.17)
Discrimination	1.07*** (1.04–1.10)
II. General medical sector	
Acculturative stress	1.09 (0.92–1.30)
Discrimination	1.06** (1.03–1.10)
III. Non-health care sector	
Acculturative stress	1.12** (1.04–1.22)
Discrimination	1.05*** (1.03–1.08)

Odds ratios and 95% confidence intervals reported for all specifications

Analysis controls for age, sex, education, income, marital status, health insurance coverage, and race/ethnicity

Sample size ranges from 2602 to 2609

Acculturative stress was measured on an eight-item scale to exclude the avoidance of health services indicator

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

formal services, such as the use of promotoras in Latino immigrant communities [54].

Potential limitations

Our findings should be interpreted bearing in mind a number of limitations. The data collected in the NLAAS are self-reported, running the risk of recall and social desirability biases. Second, the data were collected from 2002 to 2003, which may not reflect current population demographics and characteristics, although this notably is the most recent nationally representative data available for Asians and Latinos in US households that collect information on disability, health behaviors, and acculturative stress. Third, the cross-sectional nature of the data prevents any claims of causality, although we partially addressed this by including an indicator of pre-immigration health status. Fourth, as this was a household survey, individuals with severe disabilities were not included if they were institutionalized at the time of the survey. Fifth, the NLAAS data did not provide us with the opportunity to make inferences about the equivalence of disability domains or treatment acceptability across cultures. The cultural underpinnings of health outcomes and behavior warrant further interrogation, and we recommend mixed method approaches to examine the cultural dimensions more deeply. Finally, our study was unable to identify undocumented immigrants, which may have biased our results because being undocumented may be associated with acculturative stress and health service consumption. However, the acculturative stress scale included three questions about legal status anxiety. Although not discussed above, acculturative stress remained a significant predictor of disability and informal health-seeking behavior even after the exclusion of legal status anxiety questions. This provided evidence that anxiety over legal status, a potential proxy for undocumented immigration, did not singularly drive the results.

Conclusion

Our findings suggest that acculturative stress is associated with disability and informal health-seeking behaviors among Asian and Latin American immigrants in the United States. Researchers should assess further how acculturation-related stressors are linked with disability within cultural contexts, and how cultural scripts may influence help-seeking behaviors, with the goal of addressing barriers that deter formal treatment utilization. Asian and Latino immigrants comprise at-risk populations that require further attention and research to develop culturally tailored interventions that better serve the needs of these communities.

Compliance with ethical standards

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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