A Nationwide Study of Discrimination and Chronic Health Conditions Among Asian Americans

Gilbert C. Gee, PhD, Michael S. Spencer, PhD, Juan Chen, PhD, MSW, and David Takeuchi, PhD

Objectives. We examined whether self-reported everyday discrimination was associated with chronic health conditions among a nationally representative sample of Asian Americans.

Methods. Data were from the Asian American subsample (n = 2095) of the National Latino and Asian American Study conducted in 2002 and 2003. Regression techniques (negative binomial and logistic) were used to examine the association between discrimination and chronic health conditions. Analyses were conducted for the entire sample and 3 Asian subgroups (Chinese, Vietnamese, and Filipino).

Results. Reports of everyday discrimination were associated with many chronic conditions, after we controlled for age, gender, region, per capita income, education, employment, and social desirability bias. Discrimination was also associated with indicators of heart disease, pain, and respiratory illnesses. There were some differences by Asian subgroup.

Conclusions. Everyday discrimination may contribute to stress experienced by racial/ethnic minorities and could lead to chronic illness. (*Am J Public Health.* 2007;97:1275–1282. doi:10.2105/AJPH.2006.091827)

Although nearly everyone encounters some unfair treatment in the course of a lifetime, members of marginalized groups are more likely to experience and report discrimination than are members of groups with more power and privilege.[1] In extreme cases, discrimination may take the form of a hate crime and cause immediate harm. Chronic exposure to more subtle discrimination, however, might be equally important for health.[2,3] Over the long term, discrimination—biased actions against members of socially marginalized groups by individuals and institutions—may bring about socioeconomic and other disadvantages, contribute to exposure to environmental hazards such as pollution and job stress, result in inadequate health care, and lead to an accumulation of stressors over the life course.[4–9]

These multiple pathways suggest that discrimination may be an important determinant of numerous outcomes. Not surprisingly, reports of discrimination have been linked to many issues, including high blood pressure,[10,11] respiratory problems,[12] somatic complaints,[13] self-rated health,[14,15] mental health,[16,17] and chronic health conditions.[18,19]

Asian Americans provide an interesting test of the hypothesis that discrimination contributes to morbidity because of their image as a "model minority." According to this image, Asian Americans are assumed to hold a unique status as a "successful" minority, one free from discrimination.[20,21]

Challenging that assumption are studies documenting contemporary discrimination against Asian Americans.[22,23] For example, a recent national housing audit found that 1 in 5 Asian Americans experience systematic discrimination in home buying (the same level as African Americans).[24] The general US population has a dual view of Asian Americans. Although Asian Americans are seen as hardworking and economically prosperous, they are also viewed as untrustworthy and inscrutable.[25] One in 4 US residents report that they believe that Chinese Americans are taking away "American" jobs.[26] The increasing prominence of Asian nations as global competitors to the United States may also increase anti-Asian sentiment.[27,28] Additionally, Asian Americans are one of the fastest-growing groups in the United States, projected to increase from 10.7 million in 2000 to 33.4 million in 2050.[29] Although increasing diversity may increase tolerance, it may also generate intergroup conflict.[28,30] Accordingly, it is important to establish a baseline of reports by Asian Americans of discrimination and examine how these reports may be associated with their health.

Several studies of discrimination among Asians and Pacific Islanders in other countries can be found,[12,17,31,32] but studies in the United States are mostly based on small convenience samples.[33–38] Studies using randomly selected, population-based samples have come primarily from 2 studies on the West Coast. The first was a household survey of 1503 Chinese Americans residing in Los Angeles in 1993 and 1994. Participants' replies to 2 questions on racial/ethnic and language and accent discrimination were associated with health-related quality of life and depressive symptoms,[20] and decreased use of mental health services.[39] The second was a household survey of 2200 Filipino Americans living in San Francisco and Honolulu in 1998 and 1999. This study found that both episodic and chronic experiences with discrimination were associated with depressive symptoms,[40] substance use,[41] and chronic health conditions.[19]

Although these studies found an association between self-reported discrimination and health, it is unclear to what extent the findings can be generalized to Asian Americans nationwide. In this study, we investigate the association between self-reported everyday discrimination and chronic conditions among a nationally representative sample of Asian Americans. In addition to examining Asian Americans in the aggregate, we examine 3 of the largest Asian American ethnic groups: Chinese, Filipino, and Vietnamese Americans. Ongoing, routine discrimination may represent a type of chronic stressor that can be especially toxic to ethnic minorities.[6,19,19,42–44] The accumulation of tolls related to discrimination on an everyday basis may contribute to allostatic load (the "wear and tear" of body systems resulting from an

accumulation of stressors over time), erode protective resources such as wealth and social support, and lead to a variety of chronic illnesses.[5,45,46] Accordingly, we examine chronic health conditions as the outcome.

The association between perceived discrimination and health conditions may be confounded by survey response factors. We investigated one such factor, social desirability bias, a bias caused by the tendency of people to respond to surveys in ways that present a favorable impression of themselves.[47–49] Individuals concerned about protecting their self-image or who do not want to accept a lower social status may underreport discrimination. Social desirability may also be related to a behavior that is especially relevant for Asian populations, the prevention of "loss of face" (shaming of oneself or one's family).[50,51] We investigated whether the association between perceived discrimination and health conditions holds after controlling for social desirability bias and other sociodemographic factors.

METHODS

Sample

Data were from the National Latino and Asian American Study, a household survey conducted in 2002 and 2003. Our analyses focus on the Asian American respondents.

The sampling design has been detailed elsewhere.[52,53] Briefly, the design included 3 components: (1) a core sampling of primary sampling units (metropolitan statistical areas and counties) and secondary sampling units (from continuous groupings of census blocks) with probability proportional to size, from which housing units and household members were sampled; (2) high-density supplemental sampling of census block groups in which the targeted ethnic groups made up more than 5% of the population; and (3) second-respondent sampling to recruit participants from households where a primary respondent had already been interviewed. Sample weights were developed to account for joint probabilities of selection for these 3 components and designed to allow the sample estimates to be nationally representative.[53]

Respondents were at least 18 years of age and resided in the United States. Trained interviewers, with linguistic and cultural backgrounds similar to those of the respondent, administered the survey in the respondent's chosen language: English, Cantonese, Mandarin, Tagalog, Vietnamese, or Spanish. Instruments were translated into these languages through standard techniques (translation of the instrument to a given language, followed by translation back to English for verification). Interviews were conducted face-to-face unless respondents requested a telephone interview. A total of 2095 adults (1611 primary and 484 secondary respondents) were included in our sample. The response rates (calculated using the American Association for Public Opinion Research, Response Rate Method 3—or AAPOR-RR3 method)[53] for primary and secondary respondents were 69.3% and 73.7%, respectively. Our sample included 600 Chinese, 508 Filipino, 520 Vietnamese, and 467 others (141 Indians, 107 Japanese, 81 Koreans, 39 Pacific Islanders, and 99 members of small subgroups). These 467 "others" were included in our aggregate analysis but excluded from the subgroup analysis.

Measures

Chronic conditions were assessed with the World Mental Health Composite International Diagnostic Interview (WMH-CIDI), a self-reported checklist of lifetime physical and psychophysiological disorders. Developed by the World Health Organization, the WMH-CIDI was designed for cross-cultural epidemiological research.[54] Individuals were asked if they had ever had any of the following: arthritis or rheumatism, chronic back or neck problems, frequent or severe headaches, other chronic pain, hay fever and other seasonal allergies, stroke, heart attack, heart disease, high blood pressure, asthma, tuberculosis, other chronic lung disease, diabetes or high blood sugar, ulcer in stomach or intestine, HIV/AIDS, epilepsy or seizure, and cancer. The number of chronic conditions in our sample ranged from 0 to 10.

Some conditions may be more closely linked to the stress process than others. To examine this potential heterogeneity, we divided chronic conditions into 4 major classifications: *cardiovascular* (heart attack, stroke, heart disease, high blood pressure), *respiratory* (hay fever, asthma, tuberculosis, and other chronic lung diseases, including emphysema and chronic obstructive pulmonary disease), *pain* (chronic back or neck problems, frequent or severe headaches, arthritis, ulcer, other chronic pain) and *other* (diabetes, HIV/AIDS, cancer, epilepsy or seizures). Each of these 4 categories was coded "1" if the respondent had any of the conditions and "0" if not.

Everyday discrimination was assessed using a 9-item scale adopted from the Detroit Area Study,[44] which measures perceptions of chronic and routine unfair treatment.[42] The items were as follows: (1) "You are treated with less courtesy than other people," (2) "You are treated with less respect than other people," (3) "You receive poorer service than other people at restaurants or stores," (4) "People act as if they think you are not smart," (5) "People act as if they are afraid of you," (6) "People act as if they think you are dishonest," (7) "People act as if you are not as good as they are," (8) "You are called names or insulted," and (9) "You are threatened or harassed." As with prior studies,[2,55] an exploratory factor analysis found support for a 1-factor structure (eigenvalue=4.87; factor loadings=0.67–0.79); hence, we used this measure as a unidimensional scale. Items were summed and then divided by 9. The range of responses was 1 to 6, with 1 indicating that respondents never perceived experiencing unfair treatment and 6 indicating that respondents experienced it almost every day. The Cronbach α for our sample was 0.91. After this series of questions, respondents were asked what they considered to be the main reason for their experiences of everyday discrimination (e.g., their ethnicity); these reasons were mutually exclusive.

Social desirability bias was measured using the Marlowe–Crowne 10-item scale,[47] in which the number of affirmative replies to the following items are summed: "I never met a person that I didn't like," "I always win at games," "I have never been bored," "I never get annoyed when people cut ahead of me in line," "I never get lost, even in unfamiliar places," "I have always told the truth," "My table manners at home are as good as when I eat out," "I have never lost anything," "No matter how hot or cold it gets, I am always quite comfortable," and "It doesn't bother me if someone takes advantage of me." The range in our sample

was 0 to 10, with 0 indicating no social desirability bias.

We assessed education using 4 categories (less than a high school diploma, high school graduate, some college education, and college graduate or beyond). Current employment was contrasted with unemployment. Per capita income was measured as the total household income (with missing values imputed) divided by the number of people in the household.

English language proficiency was assessed by the question, "How well do you speak English?" Responses were coded "excellent/good" or "fair/poor."

Gender, age, marital status (married vs others), nativity (US-born vs other), and region (Northeast, Midwest, South, West) were also assessed.

Analyses

We computed weighted descriptive statistics for the entire sample and for Asian subgroups. Our analyses took into account sample design effects by using the *svy* commands of Stata 9.2 (Stata Corp, College Station, Tex), which allow for estimation of standard errors in the presence of stratification and clustering. To account for within-household clustering, we also included a covariate in our analyses to indicate a first or second respondent from a household.

We used negative binomial regression to perform multivariate analyses of the number of chronic health conditions. One outlier was removed from the final models. We used logistic regression to model the specific conditions (cardiovascular, respiratory, pain, and other). First we analyzed the total sample, which allowed us to make inferences about all Asian Americans nationwide, including those not oversampled in our study (e.g., Pakistanis). We then analyzed the 3 largest groups represented in our study (Vietnamese, Filipinos, and Chinese) to examine potential ethnic heterogeneity. We centered continuous measures at their means (i.e., each continuous variable was subtracted by the overall sample mean of that variable; thus, the intercept represented the predicted number of chronic conditions for the "average" person in our sample) to reduce multicollinearity and to facilitate the interpretation of the intercept.[56] Our analyses focused on everyday discrimination, and we also included the attribution of discrimination to race/ethnicity, nationality, or skin color as a covariate in initial models.

RESULTS

Table 1 shows characteristics of the sample. On average, participants reported 1.3 chronic conditions. Half of the sample were women, and most were married, employed, aged in their early 40s, and foreign born. Per capita income averaged $39 700. There were ethnic differences. Vietnamese respondents had a large proportion of immigrants, reported the lowest levels of English proficiency, and had the lowest per capita income. Their employment rate was similar to those of the other groups, however, and they had the highest marriage rate. Filipino respondents reported the highest level of English proficiency, although most were immigrants. Chinese respondents reported the highest per capita income and the largest percentage of college graduates, although a fifth did not complete high school

Reports of everyday discrimination varied by group. Filipinos reported the highest level, followed by Chinese and then Vietnamese. When respondents were asked for the main reason for everyday discrimination, the predominant reply was race, ethnicity or skin color, followed by other, income or education, age, gender, height or weight, and sexual orientation. Patterns regarding perceived reasons for discrimination were generally similar between the Asian subgroups, although Vietnamese respondents were more apt to attribute discrimination to income or education and Filipinos were more likely to cite height or weight.

Multivariate analyses focused on everyday discrimination. Final models examined only everyday discrimination; they did not include the main reasons for discrimination because these were not significantly associated with health conditions above and beyond the level of everyday discrimination, a finding echoed in the literature.[2]

Reports of discrimination were weakly correlated with score on the social desirability bias scale (r=−0.24, −0.15, −0.12, and −0.14 for Chinese, Filipinos, Vietnamese, and all Asians, respectively).

Table 2 shows the relationship between everyday discrimination and total chronic conditions, adjusted for covariates. As hypothesized, everyday discrimination was positively associated (b=.27) with chronic conditions for the entire sample. The parameter estimate for Chinese (b=.19) was lower than those for Vietnamese (b=.28) and Filipinos (b=.26). However, a test of the interaction between Chinese ethnicity and discrimination was not statistically significant, so the strength of the association was equal across the ethnic groups.

Additionally, social desirability bias did not influence the association between discrimination and chronic conditions. For the total sample, social desirability bias was not significantly associated with chronic conditions (b=.0009) and did not reduce the parameter estimates for everyday discrimination (b=.27). Across the subgroups, social desirability bias was associated with chronic conditions only for Filipinos (b=−.05), but adding it to the model does not change our inference about everyday discrimination for Filipinos or any other group.

Table 3 shows the associations between everyday discrimination and the disaggregated chronic conditions. For cardiovascular conditions, discrimination was a significant predictor for the total sample (odds ratio [OR]=1.7), Vietnamese (OR=1.9), and Chinese (OR=1.7). Discrimination was nonsignificant for Filipinos, but the parameter estimate was in the expected direction (OR=1.2). For respiratory conditions, discrimination was a significant predictor for the total sample (OR=1.3), Vietnamese (OR=1.5), and Filipinos (OR=2.0); it was nonsignificant, but the estimate was in the expected direction for Chinese (OR=1.2). For pain conditions, discrimination was a significant predictor for the total sample (OR=1.7), Vietnamese (OR=2.1), and Filipinos (OR=1.5); it was nonsignificant but the estimate was in the expected direction for Chinese (OR=1.3). For other health conditions, discrimination was not a significant predictor.

We further examined individual chronic conditions (e.g., headaches and backaches separately). The results from these analyses were consistent with those reported for the

TABLE 1—Weighted Sample Characteristics of Asian and Pacific Islander Americans, by Ethnicity: National Latino and Asian American Study, 2002–2003

	All Asian and Pacific Islander Americans	Vietnamese Americans	Filipino Americans	Chinese Americans
Total sample, no.	2095	520	508	600
Weighted percentage	100.0	12.9	21.6	28.7
Chronic conditions				
Total, mean (SD)	1.3 (0.1)	1.3 (0.1)	1.6 (0.1)	1.3 (0.1)
Cardiovascular conditions, %	19.5	20.1	27.8	17.0
Respiratory conditions, %	35.0	35.9	38.7	39.0
Pain-related conditions, %	32.6	25.2	36.5	33.0
Other, %	21.4	22.6	25.7	22.8
Discrimination				
Everyday discrimination, mean (SD)[a]	1.81 (0.03)	1.45 (0.04)	1.93 (0.05)	1.75 (0.03)
Main reason for discrimination, %				
Ancestry, national origin, race/ethnicity, or skin color	56.1	53.8	57.3	55.2
Gender or sex	4.2	3.7	4.6	5.0
Age	5.8	7.8	5.1	6.9
Height or weight	2.2	2.0	4.6	1.8
Sexual orientation	0.5	0.0	0.0	0.6
Income or education	8.2	12.6	7.6	8.7
Other	23.1	20.1	20.8	21.9
Social desirability bias, mean (SD)[b]	2.3 (0.1)	2.4 (0.2)	2.0 (0.1)	2.5 (0.2)
Demographic characteristics				
Women, %	52.5	54.6	55.5	53.6
Age, y, mean (SD)	41.3 (0.9)	43.7 (0.8)	43.0 (1.1)	43.0 (1.1)
Current marital status, %				
Married	65.4	72.5	60.8	68.0
Never married	25.1	19.4	26.7	20.9
Widowed, separated, or divorced	9.6	8.1	12.6	11.2
Region, %				
Northeast	15.7	17.2	8.2	17.4
Midwest	8.9	2.2	6.7	8.2
South	7.8	18.0	7.9	3.9
West	67.6	62.6	77.2	70.5
Education				
Less than high school graduate	14.3	31.8	10.9	17.4
High school graduate	17.9	21.0	20.3	16.2
Some college	25.2	23.5	32.0	20.8
College graduate or beyond	42.6	23.8	36.8	45.6
Currently employed, %	63.7	61.5	64.5	64.2
Household income				
Mean, $	84 180	63 515	90 913	89 852
Range, $, %				
0–14 999	14.3	19.2	9.6	18.3
15 000–34 999	12.0	24.8	10.1	11.5
35 000–74 999	28.5	27.7	29.5	23.2
≥75 000	45.2	28.3	50.8	47.0
Household size, mean (SD)	2.9 (0.1)	3.5 (0.1)	3.1 (0.1)	2.6 (0.1)
Per capita income, $, mean (SD)	39 751 (1526)	24 272 (2257)	40 396 (3186)	45 555 (3622)
Foreign-born, %	76.9	97.0	70.2	82.0
Self-rated spoken English good or excellent, %	66.2	27.9	80.7	51.8

[a]Determined using a 9-item survey, adopted from the Detroit Area Study, measuring perceptions of chronic and routine unfair treatment (scale = 1–6); see "Methods" section.
[b]Social desirability bias is a bias due to a tendency of people to respond to surveys in ways that present a favorable impression of themselves. It was measured with the Marlowe–Crowne 10-item scale; see "Methods" section.

4 categories (Table 3). We show the results for the 4 categories (cardiovascular, pain, respiratory, and other) rather than for the individual conditions (e.g., stroke, asthma) to be more parsimonious. Social desirability bias was not associated with any health condition for any group and did not influence the association between discrimination and health in any analysis.

We performed additional analyses (available upon request from the authors) to examine the robustness of our models. First, we examined an alternative specification of discrimination using a 3-item measure derived from Vega et al.[57] Models using that indicator were generally consistent with those reported here. Second, everyday discrimination was modeled continuously to be consistent with how other studies have used this measure; however, it is not a truly continuous scale. We estimated models that treated discrimination as a binary variable (never vs any) and obtained similar results. Third, supplemental analyses included percentage of Asians in a respondent's census tract and urbanicity (rural vs urban), but neither factor influenced our findings.

DISCUSSION

To our knowledge, this is the first nationally representative study of self-reported discrimination and chronic health conditions among Asian Americans. Reports of everyday discrimination were associated with increased numbers of chronic health conditions, after we controlled for social desirability bias, age, gender, language proficiency, nativity, region, per capita income, education, employment, and marital status.

The chronic conditions were disaggregated into 4 major categories. Analyses of these categories were consistent with the notion that self-reported discrimination represents an important psychosocial stressor. The "psychobiological reactivity" perspective suggests that the cardiovascular, endocrine, and immune responses to stressors are closely interlinked.[58,59] Consistent with this perspective, we found that reports of discrimination were associated with reports of cardiovascular conditions. Similarly, other studies have found relationships between self-reported everyday

TABLE 2—Association Between Self-Reported Everyday Discrimination and Total Chronic Health Conditions, by Ethnicity: National Latino and Asian American Study, 2002–2003

	All Asian and Pacific Islander Americans (n = 2095)		Vietnamese Americans (n = 520)		Filipino Americans (n = 508)		Chinese Americans (n = 600)	
	Model 1, b (SE)[a,b]	Model 2, b (SE)[a,b]	Model 1, b (SE)[a]	Model 2, b (SE)[a]	Model 1, b (SE)[a]	Model 2, b (SE)[a]	Model 1, b (SE)[a]	Model 2, b (SE)[a]
Everyday discrimination	0.28 (0.04)**	0.28 (0.04)**	0.28 (0.08)**	0.28 (0.08)**	0.27 (0.05)**	0.26 (0.05)**	0.18 (0.07)**	0.19 (0.07)**
Social desirability bias		0.00 (0.01)		0.02 (0.03)		−0.05 (0.02)*		0.03 (0.02)

Note. Everyday discrimination was determined using a 9-item survey, measuring perceptions of chronic and routine unfair treatment (scale = 1–6); see "Methods" section. Social desirability was measured with a 10-item scale indicating the tendency of people to respond in surveys in ways that present a favorable impression of themselves. Model 1 included only everyday discrimination, and model 2 included everyday discrimination and social desirability bias.
[a]Analyses controlled for age, gender, per capita income, education, employment, marital status, region, nativity, language proficiency, and same household. Analyses are weighted to be nationally representative.
[b]Analysis controlled for ethnicity, in addition to all the covariates noted in footnote a.
*P > .05; **P > .01.

TABLE 3—Association Between Self-Reported Everyday Discrimination and Categories of Chronic Health Conditions, by Ethnicity: National Latino and Asian American Study, 2002–2003

	All Asian and Pacific Islander Americans (n = 2095)		Vietnamese Americans (n = 520)		Filipino Americans (n = 508)		Chinese Americans (n = 600)	
	Model 1, OR (95% CI)[a,b]	Model 2, OR (95% CI)[a,b]	Model 1, OR (95% CI)[a]	Model 2, OR (95% CI)[a]	Model 1, OR (95% CI)[a]	Model 2, OR (95% CI)[a]	Model 1, OR (95% CI)[a]	Model 2, OR (95% CI)[a]
Cardiovascular conditions								
Everyday discrimination	1.69 (1.20, 2.39)**	1.69 (1.21, 2.38)**	1.85 (1.07, 3.18)*	1.87 (1.03, 3.39)*	1.19 (0.88, 1.60)	1.16 (0.88, 1.52)	1.65 (1.03, 2.65)*	1.69 (1.00, 2.83)*
Social desirability bias		1.02 (0.09, 1.12)		1.07 (0.93, 1.23)		0.89 (0.76, 1.04)		1.07 (0.89, 1.27)
Respiratory conditions								
Everyday discrimination	1.37 (1.18, 1.58)***	1.37 (1.18, 1.58)***	1.47 (1.04, 2.08)*	1.45 (1.01, 2.06)*	2.06 (1.63, 2.61)**	2.02 (1.61, 2.54)**	1.17 (0.84, 1.64)	1.21 (0.87, 1.67)
Social desirability bias		1.00 (0.93, 1.06)		1.06 (0.92, 1.22)		0.99 (0.90, 1.09)		1.07 (0.97, 1.18)
Pain conditions								
Everyday discrimination	1.69 (1.45, 1.98)***	1.71 (1.46, 1.99)***	2.11 (1.34, 3.33)**	2.12 (1.33, 3.38)**	1.50 (1.12, 2.01)**	1.51 (1.15, 1.99)**	1.23 (0.90, 1.67)	1.25 (0.92, 1.70)
Social desirability bias		0.98 (0.92, 1.04)		0.96 (0.87, 1.06)		0.9 (0.80, 1.01)		1.04 (0.95, 1.14)
Other conditions								
Everyday discrimination	0.88 (0.63, 1.24)	0.89 (0.63, 1.25)	1.12 (0.57, 2.21)	1.13 (0.57, 2.23)	1.18 (0.85, 1.63)	1.18 (0.86, 1.63)	0.57 (0.27, 1.20)	0.54 (0.25, 1.17)
Social desirability bias		0.98 (0.92, 1.04)		1.04 (0.88, 1.24)		1.07 (0.93, 1.22)		0.92 (0.72, 1.18)

Note. OR = odds ratio; CI = confidence interval. Everyday discrimination was determined using a 9-item survey, adopted from the Detroit Area Study, measuring perceptions of chronic and routine unfair treatment (scale = 1–6); see "Methods" section. Social desirability was measured with a 10-item scale indicating the tendency of people to respond to surveys in ways that present a favorable impression of themselves. Model 1 included only everyday discrimination, and model 2 included everyday discrimination and social desirability bias.
[a]Analyses controlled for age, gender, per capita income, education, employment, marital status, nativity, language proficiency, region, and same household. Discrimination was modeled as a continuous variable in all models. Analyses are weighted to be nationally representative.
[b]Analysis controlled for ethnicity, in addition to all covariates noted in footnote a.
*P > .05; **P > .01; ***P > .001.

discrimination and blood pressure, hypertension, and cardiovascular reactivity.[11,60–63]

Our data also indicated 2 associations that deserve further investigation. First, everyday discrimination was associated with greater odds of respiratory conditions. Karlsen and Nazroo[12] also reported that minorities experiencing verbal abuse or physical attacks were at increased risk of experiencing respiratory illness. Since the work of Holmes in the 1950s, research has suggested that stressors lead to susceptibility to tuberculosis and reactivation of latent infection.[64] More recently, Cohen and others have demonstrated how stressful events can increase susceptibility to upper respiratory illness.[65–67] Our findings, although preliminary, suggest that discrimination may be a potential factor that contributes to vulnerability or reactivation of respiratory problems.

Second, everyday discrimination was also associated with indicators of pain (chronic back or neck problems, frequent or severe headaches, chronic pain, ulcers). Bowen-Reid and Harrell reported that racist experiences were associated with somatic complaints (e.g., headaches, nausea).[13] Gee et al. reported that

discrimination was associated with use of analgesics and tranquilizers, drugs often used to treat pain.[41] More generally, studies have suggested that stressors can lead to the onset and aggravation of chronic pain and headaches.[68–70]

Remarkably, a scale designed to measure everyday discrimination among African Americans in Detroit was a useful tool for assessing discrimination and health among Asian Americans nationwide. Asian Americans in our study reported slightly lower levels of everyday discrimination (mean=1.9 on a 1–6 scale) than did African Americans in Detroit (mean=2.3).[44] However, this measure may not fully capture the types of unfair experiences relevant to Asian Americans, such as discrimination because of one's accent and immigration status.[34,39,71] That said, our findings suggest some commonality in the reporting of everyday discrimination. Increasing awareness of these common bonds may be important in helping to build coalitions.

There were some group differences in the reporting of discrimination, in health conditions, and in the association between discrimination and health conditions. These differences would be expected, given the heterogeneous history of Asian Americans in the United States. For example, historical discrimination against Chinese Americans was mainly through exclusion using laws that forbade citizenship, land ownership, and restricted immigration. However, historical discrimination against Filipinos included forced inclusion through the colonization of the Philippines by the United States. Vietnamese Americans face potential discrimination because of their status as refugees and the legacy of the Vietnam War. Obviously, the experiences of these groups are much more complex than can be captured in our study, but excellent discussions can be found elsewhere.[72–74]

In our study, Filipinos reported the highest levels of discrimination, followed by Chinese and then Vietnamese. Two other studies found that Filipinos reported more discrimination than Chinese.[33,75] Cabesas et al. suggested that the greater reporting of discrimination among Filipinos results from their darker skin color or increased familiarity with discrimination because of colonization.[75] Consistent with this observation, Filipinos in our sample were more likely than the other Asian ethnic groups to state that the main reason for discrimination was race, ancestry, or skin color. Further, the higher rates among Filipinos might result from socioeconomic differences, as some evidence suggests greater wage discrimination among Filipinos than among Chinese.[76] A full investigation of how groups report discrimination is beyond the scope of this study but worthy of future research.

Although groups were generally similar in their reporting of health conditions, there were some differences in the association between discrimination and specific conditions. Discrimination was significantly associated with cardiovascular conditions for Vietnamese and Chinese. Discrimination was nonsignificant, but the parameter estimate was in the expected direction for Filipinos. A prior study using a larger sample of Filipino Americans found an association between discrimination and cardiovascular conditions for Filipinos,[19] suggesting that our null findings might result from chance or low power. Discrimination was significantly associated with pain and respiratory conditions for Vietnamese and Filipinos, but not Chinese Americans. The estimate for Chinese was in the expected direction, which also suggests low power or chance findings. However, these differential associations might also indicate cultural, structural, and historical differences in the reporting of discrimination and health.

Limitations

Reports of discrimination and health are subject to response factors, including social desirability bias. Social desirability bias might be associated with decreased reporting of discrimination and illness if participants wish to avoid expressing themselves as victims or to "save face."[51] Social desirability bias was correlated with decreased reporting of discrimination, but it was significantly associated with health in only 1 of 20 models, a finding likely due to chance alone. Most important, our inferences between self-reported discrimination and health conditions were not influenced by social desirability bias. However, there are no perfect measures of social desirability bias,[77] and future research should include other personality factors (e.g., optimism) and response factors (e.g., memory). That said, ours is one of the few discrimination studies that have included social desirability bias.

There were a few other limitations. Health conditions were not verified by clinical diagnosis and do not represent incident cases. However, this measure of health conditions has been used in prior studies and correlated with clinical measures of morbidity.[19,54,79] Further, the data are cross-sectional and cannot establish causal directions between measures. For example, although we presume that discrimination leads to illness, it might be that illness leads individuals to contact the health system and subsequently report discrimination. Several longitudinal studies have found that discrimination predicts health and not the converse,[80,81] but more longitudinal research is needed. On balance, our study has several strengths, including use of a timely and nationally representative sample, disaggregation of several Asian ethnic groups, and use of standard measures.

Conclusions

Although Asian Americans are sometimes portrayed as a "model minority" who are presumed to no longer experience discrimination, our study shows that they do report discrimination, and these reports are associated with health. Future research should investigate other specific Asian American groups (e.g., Thai), assess other forms of discrimination (e.g., institutional), and examine the practices (e.g., multicultural curriculum in elementary school) and policies (e.g., fair housing legislation) that prevent discrimination from occurring. Recent resolutions by the American Public Health Association to study and intervene on racism as a fundamental cause of ethnic disparities provide a firm ground from which to develop such policies.[82] ■

About The Authors

Gilbert C. Gee is with the Department of Health Behavior and Health Education, School of Public Health, University of Michigan, Ann Arbor. Michael S. Spencer and Juan Chen are with the School of Social Work, University of Michigan, Ann Arbor. David Takeuchi is with the School of Social Work, University of Washington, Seattle.

Requests for reprints should be sent to Gilbert C. Gee, PhD, Department of Health Behavior and Health Education, School of Public Health, University of Michigan,

1420 Washington Heights, Rm M5224, Ann Arbor, MI 48109 (e-mail: gilgee@umich.edu).

This article was accepted August 24, 2006.

Contributors

G.C. Gee originated the study questions and led the writing and analysis. M.S. Spencer assisted with the conceptualization and writing. J. Chen assisted with the analysis. D. Takeuchi led the data collection and contributed to the conceptualization of the article.

Acknowledgments

The National Latino and Asian American Study is funded by the National Institute of Mental Health (grants U01 MH62209 and U01 MH62207), with additional support from the Office of Behavioral and Social Science Research and the Substance Abuse and Mental Health Services Administration.

We thank Wendy Lin and 3 anonymous reviewers for their helpful feedback.

Human Participant Protection

Institutional review board approval was granted to G.C. Gee by the University of Michigan for data analysis purposes and to D. Takeuchi by the University of Washington for data collection and analysis.

References

1. Krieger N, Rowley DL, Herman AA, Avery B, Phillips MT. Racism, sexism, and social class: implications for studies of health, disease, and well-being. *Am J Prev Med.* 1993;9:82–122.

2. Kessler RC, Michelson KD, Williams DR. The prevalence, distribution and mental health correlates of perceived discrimination in the United States. *J Health Soc Behav.* 1999;40:208–230.

3. Williams DR, Neighbors H. Racism, discrimination and hypertension: evidence and needed research. *Ethn Dis.* 2001;11:800–816.

4. Gee GC, Payne-Sturges DC. Environmental health disparities: a framework integrating psychosocial and environmental concepts. *Environ Health Perspect.* 2004; 112:1645–1653.

5. Geronimus AT. To mitigate, resist, or undo: addressing structural influences on the health of urban populations. *Am J Public Health.* 2000;90:867–872.

6. Williams DR, Neighbors H, Jackson JS. Racial/ethnic discrimination and health: findings from community studies. *Am J Public Health.* 2003;93:200–208.

7. Krieger N. Does racism harm health? Did child abuse exist before 1962? On explicit questions, critical science, and current controversies: an ecosocial perspective. *Am J Public Health.* 2003;93:194–199.

8. LaVeist TA, Rolley NC, Daila C. Prevalence and patterns of discrimination among US health care consumers. *Int J Health Serv.* 2003;33:331–344.

9. Institute of Medicine. *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care.* Washington, DC: National Academies Press; 2002.

10. Brondolo E, Rieppi MA, Kelly KP, Gerin W. Perceived racism and blood pressure: a review of the literature and conceptual and methodological critique. *Ann Behav Med.* 2003;25:55–65.

11. Krieger N, Sidney S. Racial discrimination and blood pressure: the CARDIA Study of young black and white adults. *Am J Public Health.* 1996;86:1370–1378.

12. Karlsen S, Nazroo JY. Relation between racial discrimination, social class, and health among ethnic minority groups. *Am J Public Health.* 2002;92:624–631.

13. Bowen-Reid TL, Harrell JP. Racist experiences and health outcomes: an examination of spirituality as a buffer. *J Black Psychol.* 2002;28:18–36.

14. Schulz A, Israel B, Williams D, Parker E, Becker A, James S. Social inequalities, stressors and self reported health status among African American and white women in the Detroit metropolitan area. *Soc Sci Med.* 2000;51:1639–1653.

15. Stuber J, Galea S, Ahern J, Blaney S, Fuller C. The association between multiple domains of discrimination and self-assessed health: a multilevel analysis of Latinos and blacks in four low-income New York City neighborhoods. *Health Serv Res.* 2003;38(6 Pt 2): 1735–1760.

16. Landrine H, Klonoff EA, Corrall I, Fernandez S, Roesch S. Conceptualizing and measuring ethnic discrimination in health research. *J Behav Med.* 2006;29: 79–94.

17. Noh S, Kaspar V. Perceived discrimination and depression: moderating effects of coping, acculturation, and ethnic support. *Am J Public Health.* 2003;93: 232–238.

18. Finch BA, Hummer RA, Kolody B, Vega WA. The role of discrimination and acculturative stress in Mexican-origin adults' physical health. *Hisp J Behav Sci.* 2001; 23:399–429.

19. Gee GC, Chen J, Spencer M, et al. Social support as a buffer for perceived unfair treatment among Filipino Americans: differences between San Francisco and Honolulu. *Am J Public Health.* 2006;96:677–684.

20. Gee GC. A multilevel analysis of the relationship between institutional racial discrimination and health status. *Am J Public Health.* 2002;92:615–623.

21. Young K, Takeuchi DT. Racism. In: Lee LC, Zane NWS, eds. *Handbook of Asian American Psychology.* Thousand Oaks, Calif: Sage; 1998:401–432.

22. Lee RG. Fu Manchu lives! Asian Pacific Americans as permanent aliens in American culture. In: Ong P, ed. *The State of Asian Pacific America: Transforming Race Relations.* Los Angeles, Calif: LEAP Publications; 2000: 159–190.

23. Umemoto K. From Vincent Chen to Joseph Ileto: Asian Pacific Americans and hate crime policy. In: Ong P, ed. *The State of Asian Pacific America: Transforming Race Relations.* Los Angeles, Calif: LEAP Publications; 2000:243–278.

24. Turner MA, Ross SL, Bednarz BA, Herbig C, Lee SJ. *Discrimination in Metropolitan Housing Markets: Phase 2–Asians and Pacific Islanders.* Washington, DC: Urban Institute; 2003.

25. Lee T. Racial attitudes and the color lines(s) at the close of the twentieth century. In: Ong P, ed. *The State of Asian Pacific America: Transforming Race Relations.* Los Angeles, Calif: LEAP Publications; 2000:103–158.

26. *American Attitudes Towards Chinese Americans and Asian Americans.* New York, NY: Committee of 100; 2001.

27. Zhou M, Xiong YS. The multifaceted American experiences of children of Asian immigrants: lessons for segmented assimilation. *Ethn Racial Stud.* 2005;28: 1119–1152.

28. Zhou M, Gatewood JV. Mapping the terrain: Asian American diversity and the challenges of the twenty-first century. *Asian Am Policy Rev.* 2000;9:5–29.

29. Census Bureau projects tripling of Hispanic and Asian populations in 50 years; non-Hispanic whites may drop to half of total population [press release]. Washington, DC: US Census Bureau; March 18, 2004.

30. Kibria N. The contested meanings of "Asian American": racial dilemmas in the contemporary US. *Ethn Racial Stud.* 1998;21:939–958.

31. Bhui K, Stansfeld S, McKenzie K, Karlsen S, Nazroo J, Weich S. Racial/ethnic discrimination and common mental disorders among workers: findings from the EMPIRIC Study of Ethnic Minority Groups in the United Kingdom. *Am J Public Health.* 2005;95: 496–501.

32. Noh S, Beiser M, Kaspar V, Hou F, Rummens J. Perceived racial discrimination, depression, and coping: a study of Southeast Asian refugees in Canada. *J Health Soc Behav.* 1999;40:193–207.

33. Kuo WH. Coping with racial discrimination: the case of Asian Americans. *Ethn Racial Stud.* 1995;18: 109–127.

34. Liang CTH, Li LC, Kim BSK. The Asian American Racism-Related Stress Inventory: development, factor analysis, reliability, and validity. *J Couns Psychol.* 2004; 51:103–114.

35. Shrake EK, Rhee S. Ethnic identity as a predictor of problem behaviors among Korean American adolescents. *Adolescence.* 2004;39:601–622.

36. Yeh CJ, Arora AK, Inose M, Okubo Y, Li RH, Greene P. The cultural adjustment and mental health of Japanese immigrant youth. *Adolescence.* 2003;38: 481–500.

37. Yoshikawa H, Wilson PA, Chae DH, Cheng JF. Do family and friendship networks protect against the influence of discrimination and HIV risk among Asian and Pacific Islander gay men? *AIDS Educ Prev.* 2004; 16:84–100.

38. Fisher CB, Wallace SA, Fenton RE. Discrimination distress during adolescence. *J Youth Adolesc.* 2000;29: 679–695.

39. Spencer MS, Chen J. Discrimination and mental health service use among Chinese Americans. *Am J Public Health.* 2004;94:809–814.

40. Mossakowski KN. Coping with perceived discrimination: does ethnic identity protect mental health? *J Health Soc Behav.* 2003;44:318–331.

41. Gee GC, Delva J, Takeuchi DT. Relationships between self-reported unfair treatment and prescription medication use, illicit drug use, and alcohol dependence among Filipino Americans. *Am J Public Health.* 2007;97:933–940.

42. Essed P. *Understanding Everyday Racism: an Interdisciplinary Theory.* Newbury Park, Calif: Sage; 1991.

43. Schulz A, Williams D, Israel B, et al. Unfair treatment, neighborhood effects, and mental health in the Detroit metropolitan area. *J Health Soc Behav.* 2000; 41:314–332.

44. Williams DR, Yu Y, Jackson JS, Anderson NB. Racial differences in physical and mental health: socioeconoomic status, stress, and discrimination. *J Health Psychol.* 1997;2:335–351.

45. Jones CP. Invited commentary: "race," racism, and the practice of epidemiology. *Am J Epidemiol.* 2001; 154(4):299–304.

46. Geronimus AT, Hicken M, Keene D, Bound J. "Weathering" and age patterns of allostatic load scores among blacks and whites in the United States. *Am J Public Health.* 2006;96:826–833.

47. Crowne DP, Marlowe D. A new scale of social desirability independent of psychopathology. *J Consult Psychol.* 1960;24:349–354.

48. Pauls CA, Wacker J, Crost NW. The two components of social desirability and their relations to resting frontal brain asymmetry. *J Individ Differences.* 2005;26: 29–42.

49. Paulhus DL, Harms PD, Bruce MN, Lysy DC. The over-claiming technique: measuring self-enhancement independent of ability. *J Pers Soc Psychol.* 2003;84: 890–904.

50. Gong F, Gage SL, Tacata L. Helpseeking behavior among Filipino Americans: a cultural analysis of face and language. *J Community Psychol.* 2003;31: 469–488.

51. Zane N, Yeh M. The use of culturally based variables in assessment: studies on loss of face. In: Kurasaki K, Okazaki S, Sue S, eds. *Asian American Mental Health: Assessment Theories and Methods.* Dordrecht, Netherlands: Kluwer Academic Publishers; 2002:123–140.

52. Alegria M, Takeuchi DT, Canino G, Duan N, Shrout P, Meng X. Considering context, place, and culture: The National Latino and Asian American Study. *Int J Methods Psychiatr Res.* 2004;13:208–220.

53. Heerenga S, Warner J, Torres M, Duan N, Adams T, Berglund P. Sample designs and sampling methods for the Collaborative Psychiatric Epidemiology Studies (CPES). *Int J Methods Psychiatr Res.* 2004;13: 221–240.

54. *Disability Assessment Schedule II (WHO-DAS II).* 1998. Geneva, Switzerland: World Health Organization.

55. Krieger N, Smith K, Naishadham D, Hartman C, Barbeau EM. Experiences of discrimination: validity and reliability of a self-report measure for population health research on racism and health. *Soc Sci Med.* 2005;61:1576–1596.

56. Aiken LS, West SG. *Multiple Regression: Testing and Interpreting Interactions.* Newbury Park, Calif: Sage Publications; 1991.

57. Vega WA, Zimmerman R, Gil A, Warheit G, Apospori E. Acculturation strain theory: its application in explaining drug use behavior among Cuban and other Hispanic youth. In: De La Rosa M, Recio JL, eds. *Drug Abuse Among Minority Youth.* Rockville, Md: National Institute on Drug Abuse; 1993;144–166.

58. Cohen S, Hamrick N, Rodriguez MC, Feldman PJ, Rabin BS, Manuck SB. The stability of and intercorrelations among cardiovascular, immune, endocrine, and psychological reactivity. *Ann Behav Med.* 2000;22: 171–179.

59. Boyce WT, Chesney M, Alkon A, et al. Psychobiologic reactivity to stress and childhood respiratory illness: results of two prospective studies. *Psychosom Med.* 1995;57:411–422.

60. Armstead CA, Lawler KA, Gordon G, Cross J, Gibbons J. Relationship of racial stressors to blood pressure responses and anger expression in black college students. *Health Psychol.* 1989;8:541–556.

61. Ryan AM, Gee GC, LaFlamme DJ. The association between self-reported discrimination, physical health and blood pressure: findings from African Americans, black immigrants, and Latino immigrants in New Hampshire. *J Health Care Poor Underserved.* 2006;17: 116–132.

62. Guyll MM, Matthews KA, Bromberger JT. Discrimination and unfair treatment: relationship to cardiovascular reactivity among African American and European American women. *Health Psychol.* 2001;20: 315–325.

63. Harrell JP, Hall S, Taliaferro J. Physiological responses to racism and discrimination: an assessment of the evidence. *Am J Public Health.* 2003;93:243–248.

64. Lerner BH. Can stress cause disease? Revisiting the tuberculosis research of Thomas Holmes, 1949–1961. *Ann Intern Med.* 1996;124:673–680.

65. Cohen S, Frank E, Doyle WJ, Skoner DP, Rabin BS, Gwaltney JM. Types of stressors that increase susceptibility to the common cold in healthy adults. *Health Psychol.* 1998;17:214–223.

66. Cohen S, Hamrick N, Rodriguez Ms, Feldman PJ, Rabin BS, Manuck SB. Reactivity and vulnerability to stress-associated risk for upper respiratory illness. *Psychosom Med.* 2002;64:302–310.

67. Cohen S, Tyrrell DAJ, Smith AP. Psychosocial stress and susceptibility to the common cold. *N Engl J Med.* 1999;325:606–612.

68. deLeeuw R, Schmidt JE, Carlson CR. Traumatic stressors and post-traumatic stress disorder symptoms in headache patients. *Headache.* 2005;45(10): 1365–1376.

69. Fernandez E, Sheffield J. Relative contributions of life events versus daily hassles to the frequency and intensity of headaches. *Headache.* 1996;36: 595–602.

70. Blackburn-Munro G, Blackburn-Munro RE. Chronic pain, chronic stress and depression: coincidence or consequence? *J Neuroendocrinol.* 2001;13: 1009–1023.

71. Hein J. Interpersonal discrimination against Hmong Americans: parallels and variation in microlevel racial inequality. *Sociol Q.* 2000;41:413–429.

72. *The New Face of Asian Pacific America: Numbers, Diversity & Change in the 21st Century.* San Francisco, Calif: Asian Week; 2004.

73. Okihiro G. *The Columbia Guide to Asian American History: A Resource Guide to Asian American Literature.* New York, NY: Columbia University Press; 2001.

74. Chan S. *Asian Americans: An Interpretive History.* 1st ed. Boston, Mass: Twayne Publishers; 1991.

75. Cabesas A, Tam TM, Lowe BM, Wong AS, Turner K. Empirical study of barriers to upward mobility for Asian Americans in the San Francisco Bay Area. In: Nomura GM, Endo R, Sumida SH, Long RC, eds. *Frontiers of Asian American Studies.* Pulman: Washington State University Press; 1989: 85–97.

76. Mar D. Four decades of Asian American women's earnings: Japanese, Chinese, and Filipino American women's earnings: 1960–1990. *Contemp Econ Policy.* 2000;18:228–237.

77. Barger SD. The Marlowe-Crowne affair: short forms, psychometric structure, and social desirability. *J Pers Assess.* 2002;79:286–305.

78. Meyer IH. Prejudice as stress: conceptual and measurement problems. *Am J Public Health.* 2003;93: 262–265.

79. Kessler RC, Ustun TB. The World Mental Health (WMH) survey initiative version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *Int J Methods Psychiatr Res.* 2004; 13:93–121.

80. Jackson JS, Brown TN, Williams DR, Torres M, Sellers SL, Brown K. Racism and the physical and mental health status of African Americans: a thirteen year national panel study. *Ethn Dis.* 1996;6(1–2):132–147.

81. Pavalko E, Mossakowski KN, Hamilton V. Does perceived discrimination affect health? Longitudinal relationships between work discrimination and women's physical and emotional health. *J Health Soc Behav.* 2003;44:18–34.

82. American Public Health Association. Research and intervention on racism as a fundamental cause of ethnic disparities in health. *Am J Public Health.* 2001; 91:515–516.