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PINE STUDY II: Research Article

Self-reported Discrimination and Depressive Symptoms Among Older Chinese Adults in Chicago

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Abstract

Background: Discrimination is part of life for many Americans, especially ethnic minorities. Focusing on older Chinese Americans, this study examines the association between self-reported discrimination and depressive symptoms and identifies subgroups that are more likely to report experiencing discrimination.

Methods: We conducted cross-sectional analysis of data collected from adults (age 60+ years) of Chinese origin residing in the Greater Chicago area (N = 3,004). Self-reported discrimination was assessed by the Experiences of Discrimination instrument and was dichotomized (yes vs no). Depressive symptoms were measured by the Patient Health Questionnaire (PHQ-9). Logistic regression of self-reported discrimination and negative binominal regression of depressive symptoms were conducted.

Results: About 21.5% of the sample reported having experienced discrimination. The odds of reporting discrimination are higher for those who are younger, have higher education and income, are more acculturated, have been in the United States longer, live outside Chinatown, and have higher levels of neuroticism and conscientiousness. Self-reported discrimination is significantly and positively associated with depressive symptoms, independent of sociodemographic characteristics, migration-related variables, and personality factors.

Conclusion: Findings suggest a robust relationship between self-reported discrimination and depressive symptoms in older Chinese Americans. They further suggest that the relatively advantaged groups—younger, higher socioeconomic status, more acculturated, and living outside Chinatown—are more likely to report experiencing discrimination.

Keywords: Racial discrimination—Mental health—Acculturation—Personality—Chinese Americans

Discrimination refers to unfair and "unequal treatment based on group membership" (1), an unfortunate part of life for many Americans—especially ethnic minorities. Discrimination has been conceptualized as a social stressor, characterized as uncontrollable and unpredictable, and therefore perhaps particularly detrimental to health (2,3). In this study, we focused on older Chinese Americans' experiences of discrimination based on race/ethnicity. We identified subgroups more likely to report experiencing discrimination and investigated the association between self-reported discrimination and depressive symptoms in older Chinese adults living in the Greater Chicago area.

Correlates of Self-reported Discrimination

Discrimination is sensitive and challenging to measure. Most prior studies relied on self-report and used the terms "self-reported discrimination" or "perceived discrimination" to denote subjective experiences of discrimination. Previous studies demonstrated that age was negatively correlated with self-reported discrimination (4–6) and that people with more socioeconomic resources were more likely than those with fewer to report experiencing discrimination (4,7). Some studies among ethnic minority populations found that more acculturated individuals perceived higher levels of discrimination (7); others reported this as the case for immigrants only (8). A study of Chinese American adults found that living in close proximity to more Chinese reduced the likelihood of reporting discrimination (7), suggesting that ethnic enclaves may provide protection from discrimination.

Discrimination and Depression

A number of systematic reviews and meta-analyses have evaluated literature examining relationships between self-reported discrimination and health (1,2,9–12). They generally concluded that perceived

discrimination had a robust relationship with poor mental health—including more depressive symptoms. Reviews of studies focusing on Asian Americans also support a significant relationship between self-reported discrimination and depressive symptoms (13–15). A recent comprehensive meta-analysis of multiple racial and ethnic groups reports that, among all groups, the association between racism and depression had the largest effect size for Asian Americans and that it was significantly larger than that for African Americans (10). Asian Americans include subgroups with different cultures, languages, socioeconomic positions, and immigration history (13). Lumping them into one category is likely to mask their differences in experiences of and mental health effects from discrimination.

Though they are the largest subgroup of Asian Americans, Chinese Americans' experience of discrimination is under-researched. In particular, the situation of older Chinese Americans is largely absent from the literature. Those studies that focused on effects of perceived discrimination on Chinese Americans' mental health were based on samples of adolescents (16) and adults aged 18 and older (17). To our knowledge, only one extant study focuses on older Chinese Americans (18). It shows that 21.3% of older Chinese Americans reported experiencing discrimination and that without adjustment, the following characteristics are associated with reporting discrimination: living in Chinatown, younger age, higher education, higher income, fewer children, more years in the United States, more years in the community, and poor health. The relationship between discrimination and depression was not investigated in that study.

Depressive symptoms are prevalent in older Chinese Americans (19–21). A host of factors, including financial situations, health and functional status, family relationships, social support, living arrangements, personality, acculturation levels, and recency of immigration, have been identified as correlative with depressive symptoms in older Chinese Americans (20–22). Macro-level factors, such as discrimination, are less studied, even though they have the potential to influence depressive symptoms of a large number of older Chinese Americans.

Potential Confounding of Personality Factors

Prior studies have seldom considered the role of personality factors in the relationship between self-reported discrimination and depressive symptoms. Personality characteristics may influence perceptions of unfair treatment (23). For example, individuals with high levels of neuroticism may be more vigilant in perceiving discrimination. Neuroticism is a known vulnerability factor to depression (24). Hence, it is possible that personality factors confound the relationship between perceived discrimination and depressive symptoms. In addition, personality traits may influence social status such as education (25). Without adjusting for personality factors, interpretation of the relationship between social characteristics and self-reported discrimination may be limited.

Hypotheses

In this study, we tested two hypotheses. First, based on prior studies, we expected Chinese Americans in the sample who are younger, have higher education and income, are more acculturated, have been in the United States for a longer time, and live outside Chinatown to be more likely to report experiencing discrimination, controlling for personality factors. Second, we expected self-reported discrimination to be positively associated with depressive symptoms in older Chinese Americans, independent of sociodemographic characteristics, migration-related variables, and personality factors.

Methods

Data and Sample

Data for this study were from the Population-based Study of Chinese Elderly in Chicago (PINE) that conducted in-home interviews with 3,159 Chinese adults age 60 and older in the Greater Chicago area between 2011 and 2013. The interviews were conducted in respondents' preferred language (Chinese, English) and dialect (Cantonese, Taishanese, Mandarin, Teochew). PINE used a community-based participatory research approach (26). Respondents were recruited through social service agencies, community centers, faith-based organizations, senior apartments, and social clubs. Demographic characteristics of the PINE sample were comparable to those available from the 2010 U.S. Census and a random street-block census of the Chinese community in Chicago (27). We included in this analysis data from 3,004 respondents who had complete data in all study variables. Compared to those excluded due to missing data (n = 155), the analyzed sample was significantly younger; more educated; more likely to be married, recently immigrated, and living outside Chinatown.

Variables and Measures

Self-reported discrimination

We measured this variable using the Experiences of Discrimination instrument, which has shown adequate validity and test–retest reliability (28). Respondents reported whether they had experienced discrimination in nine situations (see Table 2) because of race, ethnicity, or color. We counted all *yes* answers to construct a continuous measure that we dichotomized (1 = yes, 0 = no), due to skewed distribution.

Depressive symptoms

We measured depressive symptoms using the nine-item Patient Health Questionnaire (PHQ-9), which asks respondents to rate on a 4-point scale (0 = not at all, 3 = nearly every day), about depression symptoms experienced in the previous 2 weeks. All items were summed to form scale scores, higher scores indicating more symptoms (α = .82). The PHQ-9 has been validated in Chinese Americans (29).

Sociodemographic characteristics

Two sets of characteristics—ascribed and achieved status—were included in this analysis. The former included age and gender. Age was measured in chronological years. Gender was dichotomized (female = 1, male = 0). Achieved status included education, income, and marital status. Education was measured as years of schooling. Because of skewed distribution, it was collapsed into three categories (0–6; 7–12; and 13+ years of regular school). Respondents' total annual income was collapsed into three categories (<5,000; 5,000 to <10,000; and 10,000+ USD) due to skewed distribution. Marital status was coded as currently married (= 1) or not (= 0).

Migration-related variables

Three migration-related variables—acculturation, years in the United States, and Chinatown residence—were included in the analysis. Acculturation was assessed by the PINE Acculturation Scale—12 items, each rated on a 5-point Likert-type scale (12). All items were summed to form scale scores, higher scores indicating higher levels of acculturation (α = .91). Number of years respondents had been in

the United States measured recency of immigration. The Chinatown-residence variable was dichotomized and coded based on respondents' address: inside Chinatown = 1; outside Chinatown = 0.

Personality factors

Two personality traits—neuroticism and conscientiousness—were assessed in PINE. Both were derived from the NEO Five-Factor Inventory (30). Neuroticism was assessed by 6 items, and conscientiousness by 12 items. Respondents rated level of agreement (1–5) with each item. The sum of all items (reversed-coded one item for neuroticism and four for conscientiousness) represented scale scores. Higher scores indicate greater agreement with the trait (α = .64 and .82 for neuroticism and conscientiousness scales, respectively).

Data Analysis

To identify subgroups likely to report experiencing discrimination, we conducted logistic regression with the binary self-reported discrimination variable as dependent variable. Independent variables were entered in four blocks—ascribed status (age, gender), achieved status (education, income, marital status), migration-related variables (acculturation, years in United States, Chinatown residence), and personality factors (neuroticism, conscientiousness)—to help discern potential suppression and confounding effects. To test the hypothesis that self-reported discrimination is positively associated with depressive symptoms, we estimated negative binominal regression models because the distribution of the PHQ-9 was highly skewed (45% of respondents scored 0). We controlled for variables that could be exogenous predictors of both self-reported discrimination and depressive symptoms (sociodemographic status, migration-related variables, personality factors). Robust standard errors were applied to account for nonindependence of sampling units within neighborhoods. All models were repeated using continuous measures of self-reported discrimination; result patterns are similar to those presented below. Multicollinearity was not found to be an issue. SAS version 9.2 was used for all analyses (SAS Institute, Cary, NC).

Results

Descriptive Statistics

Table 1 presents sample characteristics. Average respondents were 72.6 years old. A majority was married (72%) with low education (79% had no more than 12 years of schooling) and incomes (85% had less than USD 10,000). Virtually all were immigrants residing in the United States for 20 years on average.

Social Patterning of Self-reported Discrimination

Table 2 shows the prevalence for the nine discriminatory situations assessed by the Experiences of Discrimination instrument. *Public places* was the most common situation in which respondents reported encountering discrimination (10.7%), followed by *at work* (8%), *getting service in stores or restaurants* (3.2%), and *getting medical care* (2.6%). Overall, 21.5% of respondents reported experiencing discrimination in at least one of nine situations. Table 1 also presents distributions of these experiences by Chinatown residence, acculturation levels, and recency of immigration. Compared to those living inside Chinatown, respondents living outside Chinatown had significantly higher prevalence of reported discrimination in any of the nine situations and a few individual situations (getting medical care, in store/restaurant, and from police/in court). More acculturated respondents (above the sample mean on the PINE Acculturation Scale) were consistently positive for all situations than the less acculturated (below or equal to the sample mean). Those in the United States longer (above the sample mean on years in United States) reported higher prevalence in most situations than more recent immigrants (below or equal to sample mean).

Table 1. Descriptive Statistics

Variables	Mean (*SD*)	%
Age (y; range = 60–104)	72.6 (8.2)	
Gender		
Male		42.3
Female		57.7
Education (in years of schooling)		
0–6		43.1
7–12		35.6
13+		21.3
Income (in USD)		
<5,000		33.7
5,000 to <10,000		51.3
10,000+		15.0
Marital status		
Married		72.2
Not married		27.8
Acculturation (range = 12–52)	15.2 (4.9)	
Years in United States (range = 0.1–90)	19.9 (13.2)	
Chinatown residence		
Yes		58.2
No		41.8
Neuroticism (range = 6–30)	14.1 (4.0)	
Conscientiousness (range = 16–60)	47.0 (6.2)	
Self-reported discrimination		
Yes		21.5
No		78.5
Depressive symptoms (range = 0–27)	2.6 (4.0)	

Logistic regression was conducted to examine correlates of reported discrimination in any situation versus none: Table 3 presents these results. The sequential entry of independent variables (Models 1–4) indicates that their associations with self-reported discrimination were relatively independent. Estimation of Model 4, the full model, suggests that keeping other variables in the model constant, odds of experiencing discrimination were 5% lower for every year increase in age; 41% lower for those with 0–6 years education than those with 13 or more years education; and 37% lower for those in the lowest income category than those in the highest income category. Higher levels of acculturation and longer time in the United States increased, whereas living in Chinatown (vs outside) decreased, odds of reporting discrimination. Those with higher levels of neuroticism and conscientiousness were more likely to report experiencing discrimination.

Association of Self-reported Discrimination and Depressive Symptoms

Table 4 presents estimates of negative binomial regression models for depressive symptoms. Without any adjustment, self-reported discrimination was significantly and positively correlated with depressive symptoms (incidence rate ratio = 1.34, 95% confidence interval = 1.26–1.43, $p < .001$; Model 1). Its effects (incidence rate ratio = 1.47, 95% confidence interval = 1.37–1.58, $p < .001$; Model 2) increased after controlling for ascribed and achieved status, suggesting suppression effects of these variables. Adding migration-related variables in the model did not affect the coefficient for

Table 2. Prevalence of Discriminatory Experiences: Total Sample, and by Chinatown Residence, Acculturation Levels, and Recency of Immigration

		Chinatown		Acculturation		Recency of Immigration	
Discriminatory Situations	Total Sample (%)	Inside (%)	Outside (%)	High[a] (%)	Low[a] (%)	Not Recent[b] (%)	Recent[b] (%)
At school	0.5	0.6	0.5	1.6[d]	0.2	0.6[e]	0.4
Getting hired	1.7	1.6	1.7	4.5[d]	0.8	2.6[e]	0.8
At work	8.0	7.3	9.1	13.2[d]	6.4	11.2[e]	5.1
Getting housing	1.2	1.0	1.4	2.5[d]	0.8	1.8[e]	0.6
Getting medical care	2.6	2.1[c]	3.5	4.5[d]	2.1	2.7	2.6
In store/restaurant	3.2	2.1[c]	4.6	6.2[d]	2.3	4.1[e]	2.4
Getting bank loan	0.2	0.2	0.3	0.6[d]	0.1	0.4[e]	0.1
On street/in public place	10.7	9.9	11.8	15.9[d]	9.1	11.4	10.0
From police/in court	0.9	0.6[c]	1.3	1.6[d]	0.6	1.2	0.6
Any of the above	21.5	18.8[c]	25.3	32.7[d]	18.2	24.6[e]	18.7

Notes: [a]High = above the sample mean on the PINE Acculturation Scale; low = below or equal to the sample mean.
[b]Not recent = above the sample mean on years in United States; recent = below the sample mean.
[c]Significantly different from the subsample living outside Chinatown at $p < .05$.
[d]Significantly different from the subsample with low acculturation levels at $p < .05$.
[e]Significantly different from the recent immigrant subsample at $p < .05$.

Table 3. Logistic Regression of Self-reported Discrimination on Ascribed and Achieved Status, Migration-related Variables, and Personality Factors

Independent Variables	Model 1	Model 2	Model 3	Model 4
Age	0.97 (0.96, 0.98)***	0.96 (0.95, 0.97)***	0.95 (0.94, 0.96)***	0.95 (0.94, 0.97)***
Gender (omitted: male)				
Female	0.97 (0.90, 1.05)	1.01 (0.91, 1.13)	1.02 (0.90, 1.16)	0.95 (0.84, 1.07)
Education (omitted: 13+ y)				
0–6		0.56 (0.47, 0.65)***	0.57 (0.47, 0.70)***	0.59 (0.49, 0.71)***
7–12		0.84 (0.66, 1.08)	0.84 (0.67, 1.06)	0.87 (0.70, 1.08)
Income (omitted: USD 10,000+)				
<5,000		0.48 (0.36, 0.65)***	0.66 (0.51, 0.86)**	0.63 (0.49, 0.82)***
5,000 to <10,000		0.71 (0.55, 0.92)**	0.88 (0.69, 1.11)	0.89 (0.70, 1.12)
Marital status (omitted: not married)				
Married		0.93 (0.77, 1.12)	1.0 (0.79, 1.26)	1.03 (0.82, 1.29)
Acculturation			1.02 (1.0, 1.04)*	1.02 (1.0, 1.04)*
Years in United States			1.02 (1.01, 1.03)***	1.02 (1.01, 1.03)***
Chinatown residence (omitted: no)				
Yes			0.81 (0.73, 0.90)***	0.82 (0.74, 0.91)***
Neuroticism				1.11 (1.09, 1.12)***
Conscientiousness				1.03 (1.01, 1.04)***

Notes: Figures presented are odds ratios and (95% confidence intervals). Robust standard errors were applied to all models.
*$p < .05$; **$p < .01$; ***$p < .001$.

self-reported discrimination (Model 3). But adding personality factors resulted in reduced effects of self-reported discrimination on depressive symptoms (incidence rate ratio changed from 1.47 in Model 3 to 1.21 in Model 4, $p < .001$ for both).

Model 4 estimates (Table 4) suggest that those who reported experiencing discrimination, compared to those who did not, were expected to have a rate 1.21 times greater for depressive symptoms, controlling for all other variables in the model. In addition, those who were older, women, had lower income, lived outside Chinatown, had higher neuroticism and lower conscientiousness had more depressive symptoms than their respective counterparts.

Discussion

To our knowledge, this is the first study to examine the association between self-reported discrimination and depressive symptoms among older Chinese Americans. The sample was representative of the Chinese aging population in the Greater Chicago area (27). We found that self-reported discrimination is significantly associated with depressive symptoms, controlling for sociodemographic characteristics (age, gender, education, income, marital status), migration-related variables (acculturation, recency of immigration, Chinatown residence), and personality factors (neuroticism, conscientiousness). Moreover, we found that the relatively advantaged groups—younger, more educated, higher income, more acculturated, longer time in United States, living outside Chinatown—are more likely to report experiencing discrimination, even after controlling for personality factors, which also positively correlated with self-reported discrimination.

Many potential explanations exist for relatively advantaged groups' greater likelihood to report experiencing discrimination. One is that they may have more contacts with non-Chinese and

Table 4. Negative Binomial Regression of Depressive Symptoms on Self-reported Discrimination and Covariates

Independent Variables	Model 1	Model 2	Model 3	Model 4
Self-reported discrimination	1.34 (1.26, 1.43)***	1.47 (1.37, 1.58)***	1.47 (1.36, 1.60)***	1.21 (1.09, 1.36)***
Age		1.02 (1.01, 1.02)***	1.02 (1.01, 1.03)***	1.03 (1.02, 1.04)***
Gender (omitted: male)				
Female		1.28 (1.20, 1.36)***	1.30 (1.22, 1.39)***	1.18 (1.10, 1.27)***
Education (omitted: 13+ y)				
0–6		1.14 (1.02, 1.29)*	1.04 (0.89, 1.22)	1.03 (0.88, 1.19)
7–12		1.17 (1.02, 1.35)*	1.09 (0.93, 1.28)	1.10 (0.95, 1.27)
Income (omitted: USD 10,000+)				
<5,000		1.51 (1.35, 1.69)***	1.50 (1.31, 1.70)***	1.28 (1.06, 1.53)**
5,000 to <10,000		1.40 (1.21, 1.62)***	1.39 (1.17, 1.65)***	1.39 (1.13, 1.72)**
Marital status (omitted: not married)				
Married		0.86 (0.81, 0.93)***	0.86 (0.79, 0.93)***	0.98 (0.90, 1.06)
Acculturation			0.99 (0.99, 1.00)	1.0 (0.99, 1.01)
Years in United States			1.0 (1.0, 1.0)	1.0 (0.99, 1.0)
Chinatown residence (omitted: no)				
Yes			0.86 (0.72, 1.02)	0.75 (0.62, 0.91)**
Neuroticism				1.14 (1.13, 1.16)***
Conscientiousness				0.98 (0.97, 1.0)*

Notes: Figures presented are incidence rate ratio and (95% confidence intervals). Robust standard errors were applied to all models.
*$p < .05$; **$p < .01$; ***$p < .001$.

hence more opportunities to receive discriminatory treatment (7). For example, those who are more educated are likely to interact outside the Chinese community, in turn increasing exposure to discrimination. Another explanation is awareness. A certain level of understanding of equity norms in American society may be required to recognize discrimination, especially if subtle (7). Individuals with low levels of acculturation, for example, may lack the knowledge to recognize or attribute an experience to discrimination. It is important to note that our measure only captured subjective perceptions of discrimination. The congruence between self-reported discrimination and objectively observed discrimination is unclear (23). Thus, findings should not be interpreted as indicating the likelihood of actually receiving discriminatory treatment. However, as reported above, the subjective perception of discrimination is significantly associated with depressive symptoms, even after controlling for a host of covariates.

Overall, our findings align with prior research (2,10,13,14). Relative to previous studies, our study has two unique strengths and focuses on a population that has not been intensively studied. We used a race-explicit measure of discrimination with adequate psychometric properties (28). This helps reduce measurement errors and ambiguity in interpretation of results, compared to past studies that used single-item and non-race-specific measures of discrimination. Moreover, we controlled for personality factors, which most prior studies did not consider, in the analysis.

Including personality factors helps clarify the relationships between social characteristics, self-reported discrimination, and depressive symptoms. First, although neuroticism and conscientiousness increase the likelihood of reporting discrimination, they do not affect the estimates of other independent variables. This suggests that perceptions of discrimination emerge from social experiences independent of individuals' personalities. Second, in the models for depressive symptoms, the coefficient for self-reported discrimination was reduced, but remained statistically significant, after controlling for neuroticism and conscientiousness. These findings suggest that part of the association between self-reported discrimination and depressive symptoms is driven by their common correlation with the two personality characteristics. Nonetheless, the relationship between personality traits and depression is controversial. For example, some researchers have argued that neuroticism is a proxy measure of depressive symptoms (31).

Being old and Chinese in the United States may carry double jeopardies. The perception that Chinese are a successful minority may contribute to failure to recognize them as targets of racial discrimination (7), and ageism may compound the ignorance. One implication of our findings, particularly salient for health professionals, is the need to recognize that perceived discrimination plays a role in the mental health of older Chinese Americans. Acknowledging older Chinese Americans' experiences of discrimination and providing opportunities to discuss the experience is a first step. In particular, those with high depression levels and certain characteristics—young–old adults, high education and incomes, high acculturation levels, living outside Chinatown—may wish inquiries about their experience of unfair or unequal treatment.

Some limitations should be noted when interpreting our findings. First, the temporal relationship between self-reported discrimination and depressive symptoms cannot be ascertained, as cross-sectional data were analyzed. Second, our measure of discrimination does not address ongoing, routine, everyday discrimination, which may be particularly potent in affecting depression of ethnic minorities (32). Furthermore, the measure is subject to reporting bias as many factors may influence the awareness, attribution, and reporting of discriminatory treatments (6). Third, our sample was drawn from an urban Mid-western population and may not reflect the situation of older Chinese adults in other urban or rural areas of the country.

In conclusion, this study has shown that experiences of discrimination are associated with depressive symptoms in older Chinese Americans and that the relatively advantaged groups are more likely to report experiencing discrimination. Further research is needed to understand mechanisms linking self-reported discrimination and depression in older Chinese Americans; compare effects of everyday versus lifetime discrimination; and expand outcomes to other physical and mental health indicators.

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