Research Article

The Relationship Between Depressive Symptoms and Health Services Utilization in U.S. Chinese Older Adults

Dexia Kong, MSW, MBE,¹ Mengting Li, PhD,² Jinjiao Wang, PhD, RN,³ Joan K. Davitt, PhD, MSS, MLSP,⁴ and Xinqi Dong, MD, MPH^{2,*}

¹School of Social Policy and Practice, University of Pennsylvania, Philadelphia. ²Rush University Medical Center, Chicago, Illinois. ³School of Nursing, University of Rochester Medical Center, Rochester. ⁴School of Social Work, University of Maryland, Baltimore.

*Address correspondence to: Xinqi Dong, MD, MPH, Department of Internal Medicine, Rush University Medical Center, 1645 West Jackson Blvd, Suite 675, Chicago, IL 60612. E-mail: xinqi_dong@rush.edu

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Abstract

Background and Objectives: Depressive symptomatology is a significant predictor of increased health services utilization and health care cost in the general older adult population. However, there is scant information on the relationship between depressive symptoms and health service utilization among U.S. Chinese older adults. The objective of this study was to examine the relationship between depressive symptoms and physician visits, emergency department (ED) visits, and hospitalization.

Research Design and Methods: Cross-sectional data were derived from the Population Study of Chinese Elderly in Chicago (PINE) collected between July 2011 and June 2013 ($N = 3,159$). Depressive symptoms were measured by the nine-item Patient Health Questionnaire (PHQ-9). Bivariate and multivariate logistic regression analyses were conducted to examine the relationship between depressive symptoms and physician visits, ED visits, and hospitalization.

Results: U.S. Chinese older adults with depressive symptoms were more likely to have at least one ED visit (odds ratio [OR] = 1.8, 95% confidence interval [CI] = 1.44–2.28) and hospitalization (OR = 1.9, 95% CI = 1.47–2.33) in the past 2 years than those without depressive symptoms, while adjusting for sociodemographic and health-related covariates. Other significant factors associated with health services utilization in this population included number of people in household, health insurance coverage, and acculturation.

Discussion and Implications: Depressive symptoms are positively associated with hospitalization and ED visits among U.S. Chinese older adults. Routine screenings of depressive symptoms should be part of the clinical encounter in these care settings so that appropriate treatment or timely mental health service referrals could be provided to this population to ultimately optimize their utilization of health services.

Keywords: Depressive symptoms, Emergency services, Hospitalization, Minority aging, Physician visits

Chinese older adults represent one of the largest and fastest growing older minority populations in the United States (Dong, Wong, & Simon, 2014; Hoeffel, Rastogi, Kim, & Hasan, 2012). Approximately 11% of 3.9 million Chinese living in the United States were 65 years and older, with a population of 366,761 in 2010. The population

experienced a growth rate of 55% in the past decade, far exceeding the rate of 15% of the general older adult population (National Asian Pacific Center on Aging, 2013; U.S. Census Bureau, 2010). With the rapid growth of this population, empirical evidence on their health service utilization (HSU) patterns have been accumulating (Kang, Kim,

& Kim, 2016; Kuo & Torres-Gil, 2001; Miltiades & Wu, 2008). However, existing studies examining HSU among U.S. Chinese older adults focus on physical health needs along with sociodemographic characteristics as the major determinants. Even though depressive symptoms are associated with significant increases in HSU and elevated health care costs in the general older adult population, there is scant information on the relationship between depressive symptoms and HSU among U.S. Chinese older adults (Fischer et al., 2002; Huang et al., 2000).

The relationship between depressive symptoms and HSU is of particular relevance to Chinese older adults in the United States for two reasons. First, depressive symptoms have been reported to be prevalent in this population (Dong, Chang, Wong, & Simon, 2012). According to various studies, approximately 20%–30% of U.S. Chinese older adults experience depressive symptoms, a rate higher than that of the general older adult population (Blazer, 2003; Mui & Kang, 2006). Second, an emerging body of literature suggests Chinese tend to present mainly somatic symptoms of depression due to stigma and culturally determined symptom conceptualization and expressions (Wu, Chi, Plassman, & Guo, 2010; Zaroff, Davis, Chio, & Madhavan, 2012). Frequently reported somatic complaints related to distress in Chinese populations include bodily pain, insomnia, fatigue, dizziness, and chest heaviness (Parker, Cheah, & Roy, 2001; Wu et al., 2010). As a result, older Chinese adults with depressive symptoms are inclined to seek help from hospitals, physicians, and traditional medicine practitioners (Himelhoch, Weller, Wu, Anderson, & Cooper, 2004; Kung & Lu, 2008).

U.S. Chinese older adults who seek medical services for depressive symptoms represent an indispensable health care concern with substantial fiscal, medical, and psychological implications. These patients undergo unnecessary medical procedures, which lead to delays to appropriate psychiatric treatments and prolonged personal suffering, while the underlying problem remains undertreated (Kirmayer, 2001; Suen & Tusaie, 2004). However, despite the negative consequences of the tendency to use medical services for depressive symptoms among U.S. Chinese older adults, we have limited understanding of the relationship between depressive symptoms and HSU in this population. This study attempts to bridge this knowledge gap by: (a) investigating factors associated with utilization of three types of health services, including physician visits, emergency department (ED) visits, and hospitalization; and (b) examining the extent to which depressive symptoms are associated with the utilization of the three types of health services.

Conceptual Framework

This study was guided by Andersen's Behavioral Model of Health Services Use (ABM). The ABM is widely recognized as a useful and comprehensive theoretical framework

for examining HSU in diverse populations (Choi, 2011; Wolinsky, 1994). According to the model, HSU is dependent on individuals' predispositions to use health services (predisposing factors), ability to mobilize resources to obtain the services (enabling factors), and service needs (need factors) (Aday & Andersen, 1974; Andersen, 1995; Andersen & Newman, 2005). Predisposing factors include demographic and social structural characteristics, such as age, gender, marital status, education, and ethnicity (Andersen, 1995). Commonly used measures of enabling factors include health insurance coverage, living arrangement, social support, and acculturation. Particularly, acculturation was added to compensate for the lack of consideration of cultural and structural barriers faced by immigrant populations in the original ABM (Kuo & Torres-Gil, 2001; Nguyen, 2012). Need factors include self-perceived needs reported by individuals and professional-evaluated needs, such as chronic condition diagnoses.

Methods

Population and Settings

This study used baseline data from the Population Study of Chinese Elderly in Chicago (PINE) collected between July 2011 and June 2013. The PINE study represents the largest epidemiological study of Chinese older adults in Western countries (Dong et al., 2014). The purpose of the PINE study was to examine the psychological and social well-being of U.S. Chinese older adults (Dong et al., 2014). Eligible participants were (a) self-identified as Chinese; (b) at least 60 years old; and (c) a resident in the Greater Chicago area. A total of 3,159 community-dwelling Chinese older adults aged 60 years and older in the greater Chicago area participated in the study (Simon, Chang, Rajan, Welch, & Dong, 2014). Data were collected by trained bilingual and bicultural research assistants through face-to-face home interviews in participants' preferred language or dialects (Chen, Simon, Chang, Zhen, & Dong, 2014).

Measures

Dependent Variables

Dependent variables of this study included physician visits, ED visits, and hospitalization in the past 2 years as reported by the participants at the time of the interview. Physician visits was measured by the question, "How many times have you been to physician/doctor's clinic in the past two years?" ED visits was assessed by the question, "How many times have you visited an emergency room in the past two years?" Hospitalization was assessed by the question, "How many times have you been hospitalized in the past two years?" The three dependent variables were coded as dichotomous variables (yes/no) in this analysis to reduce measurement errors associated with self-reported utilization of health services (Bhandari & Wagner, 2006).

Independent Variables

The key independent variable was depressive symptoms (need factor), measured by the nine-item Patient Health Questionnaire (PHQ-9). The nine items match with the nine diagnostic criteria for depressive disorders in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), including loss of interest or pleasure in doing things, feeling down, sleep problems, feeling tired or having little energy, change in appetite, feeling bad about self, inability to concentrate, feeling restless, and suicidal thoughts (Donnelly & Kim, 2008; Kroenke & Spitzer, 2002; Yeung et al., 2008). Study participants rated the extent to which they experienced each item using a Likert scale ranging from 0 = not at all to 3 = nearly every day. The final score is a sum of the scores for the nine items, ranging from 0 to 27. A higher score indicates a greater level of depressive symptoms. A prior study reported excellent reliability (Cronbach's $\alpha = 0.91$) and validity (sensitivity = 81%, specificity = 98%) of the PHQ-9 as a screening instrument for depression among Chinese Americans (Yeung et al., 2008). The PHQ-9 was also found to have comparable psychometric properties and diagnostic performance as one of the most commonly used instrument to measure depressive symptoms, namely the Center for Epidemiologic Studies Depression scale (CES-D), in Chinese populations (Chin, Choi, Chan, & Wong, 2015). The Cronbach's α of the scale for the study sample was 0.82 (Chang, Beck, Simon, & Dong, 2014). The presence of depressive symptoms was defined as having a PHQ-9 score of 5 or greater as a cut-point of 5 represents the threshold for mild depression (Kroenke & Spitzer, 2002).

Covariates

Predisposing factors included age (in years), gender (female/male), marital status (married/ not married), and education (in years).

Enabling factors included acculturation, number of people in household, health insurance coverage (yes/no), and income. Acculturation was measured by a 12-item multidimensional scale developed by Marin and colleagues (Marin, Sabogal, Marin, Otero-Sabogal, & Perez-Stable, 1987). The scale consists of three domains, including five items on language use, three items on media use, and four items on ethnic social relations. A higher score indicates a greater level of acculturation. Previous studies reported excellent reliability (Cronbach's $\alpha = 0.94$) of the scale among Chinese Americans (Yick, 2000). The Cronbach's α of the scale for the study sample was 0.88 (Dong, Bergren, & Chang, 2015). Number of people in household was measured by asking participants the number of people in their households besides themselves. Income was annual personal income from all sources reported by the participants. Income was an ordinal variable with 10 levels, ranging from 1 (\$0-\$4,999) to 10 (\$75,000 and above).

Need factors included perceived health and number of chronic conditions. Perceived health was assessed using a

single-item question, "in general, how would you rate your health?" on a four-point scale ranging from 1 = poor to 4 = very good. Number of chronic conditions was the total number of chronic conditions from the following nine categories, including heart disease, stroke, cancer, high cholesterol, diabetes, high blood pressure, hip fracture, thyroid, and osteoarthritis. A higher score indicates a greater evaluated medical need, ranging from 0 to 7 in this study.

All measures were translated into Chinese and back-translated to ascertain consistency. The Chinese versions of the measures were reviewed by an experienced bilingual and bicultural geriatrician and a group of community stakeholders to ensure validity (Chang et al., 2014).

Data Analysis

Descriptive statistics were used to summarize the sample characteristics. Spearman correlation coefficients were calculated to determine the associations among the predisposing, enabling, and need factors. A correlation coefficient of greater than 0.85 was used to diagnose multicollinearity between variables (Schroeder, Lander, & Levine-Silverman, 1990). Multivariate logistic regression analyses were conducted to examine the association between depressive symptoms and the three HSU variables (occurrence of physician visits, ED visits, and hospitalization in the past 2 years), controlling for the covariates. A series of logistic regression models were conducted using the step-wise technique: model 1 contained the predisposing factors; model 2 contained the variables in model 1 and acculturation; model 3 contained the variables in model 2 and the enabling factors; model 4 contained the variables in model 3 and the need factors. Missing data were addressed by listwise deletion in all models. All statistical analyses were conducted using SAS Version 9.2 (SAS Institute Inc., Cary, NC).

Results

Sample Characteristics

Of the 3,159 participants, 58% were female, 71% were married, 76% had health insurance, 85% had an annual income of less than \$10,000, 61% rated their health to be poor or fair, and 20% experienced depressive symptoms (Table 1). On average, the participants were 73 years old, had 8.7 years of education, lived with two other persons in the household, and experienced two chronic conditions. The mean acculturation score of the participants was 15.3, indicating low levels of acculturation (Dong et al., 2015). In terms of health services use, approximately 82% of the sample had no ED visits or hospitalization in the past 2 years at the time of the interview. During the same time period, 86% of the sample accrued one or more physician visits. Overall, compared to Chinese older adults who were female, those who were male were more likely to be married, to live with

Table 1. Sample Characteristics

	Total (<i>n</i> = 3,159)	Male (<i>n</i> = 566)	Female (<i>n</i> = 2,588)	<i>p</i> Value
Age, mean (<i>SD</i>)	72.8 (8.3)	72.8 (7.9)	72.9 (8.6)	.715
Gender, <i>n</i> (%)				
Male	1,325 (42.0)	--	--	--
Female	1,829 (58.0)	--	--	--
Marital status, <i>n</i> (%)				
Married	2,234 (71.0)	1,175 (37.3)	1,059 (33.6)	
Not married	915 (29.0)	148 (4.7)	767 (24.4)	<.0001
Education, mean (<i>SD</i>)	8.7 (5.1)	9.9 (4.8)	7.9 (5.1)	<.0001
Acculturation, mean (<i>SD</i>)	15.3 (5.1)	15.5 (5.4)	15.1 (4.9)	.004
Number of people in household, mean (<i>SD</i>)	1.9 (1.9)	2.0 (1.8)	1.8 (1.9)	<.0001
Health insurance, <i>n</i> (%)				
Yes	2,383 (76.0)	977 (31.1)	1,406 (44.8)	
No	754 (24.0)	339 (10.8)	415 (13.2)	.055
Income, mean (<i>SD</i>)	2.0 (1.1)	1.9 (1.2)	2.0 (1.1)	.008
Overall health status, <i>n</i> (%)				
Poor	601 (19.1)	224 (7.1)	377 (11.9)	
Fair	1,319 (41.8)	551 (17.5)	768 (24.3)	
Good	1,096 (34.7)	483 (15.3)	613 (19.4)	
Very good	139 (4.4)	67 (2.1)	72 (2.3)	.022
Medical comorbidities	2.1 (1.5)	1.9 (1.5)	2.2 (1.4)	<.0001
Depressive symptoms				
Yes	638 (20.3)	212 (6.8)	426 (13.6)	
No	2,499 (79.7)	1,104 (35.2)	1,395 (44.5)	<.0001
Physician visits				
Yes	2,707 (86.0)	1,088 (34.5)	1,619 (51.4)	
No	442 (14.0)	237 (7.5)	205 (6.5)	<.0001
ED visits				
Yes	566 (18.0)	253 (8.0)	313 (9.9)	
No	2,588 (82.0)	1,072 (34.0)	1,516 (48.1)	.152
Hospitalization				
Yes	559 (17.7)	252 (8.0)	307 (9.7)	
No	2,596 (82.3)	1,073 (34.0)	1,523 (48.3)	.103

Note: ED = Emergency department.

more household members, have higher levels of education and acculturation, lower income, and fewer chronic conditions. On the other hand, U.S. Chinese older adults who were female were more likely to perceive their health to be fair or poor, experience depressive symptoms, and have physician visits than their male counterparts. Bivariate correlation coefficients among the study variables ranged from 0.01 to 0.51 (results not shown). Multicollinearity was not observed between the study variables.

Association Between Depressive Symptoms and Physician Visits

Age (odds ratio [OR] = 1.03, 95% confidence interval [CI] = 1.01–1.05), being female (OR = 1.55, 95% CI = 1.18–2.02), acculturation (OR = 1.06, 95% CI = 1.02–1.10), number of people in household (OR = 0.93, 95% CI = 0.87–0.99), health insurance (OR = 8.58, 95% CI = 6.32–11.64), perceived health

(OR = 0.55, 95% CI = 0.46–0.65), and number of chronic conditions (OR = 1.82, 95% CI = 1.62–2.04) were significantly associated with the likelihood of having any physician visits in the past 2 years (Table 2).

Association Between Depressive Symptoms and ED Visits

Age (OR = 1.03, 95% CI = 1.02–1.05), being female (OR = 0.75, 95% CI = 0.60–0.93), education level (OR = 1.04, 95% CI = 1.02–1.06), acculturation (OR = 1.02, 95% CI = 1.00–1.04), number of people in household (OR = 0.93, 95% CI = 0.87–0.99), income (OR = 0.87, 95% CI = 0.78–0.97), perceived health (OR = 0.63, 95% CI = 0.55–0.72), number of chronic conditions (OR = 1.33, 95% CI = 1.24–1.43), and depressive symptoms (OR = 1.81, 95% CI = 1.44–2.28), were significantly associated with the likelihood of having any ED visits in the past 2 years (Table 3).

Table 2. Association Between Depressive Symptoms and Physician Visits

	Model A	Model B	Model C	Model D
	OR (95% CI), <i>p</i> value			
Age	1.13 (1.11, 1.15) ^a	1.14 (1.12, 1.16) ^a	1.05 (1.03, 1.07) ^a	1.03 (1.01, 1.05) ^b
Female	1.87 (1.49, 2.35) ^a	1.87 (1.49, 2.35) ^a	1.91 (1.49, 2.46) ^a	1.55 (1.18, 2.02) ^a
Marital status (Married)	0.87 (0.64, 1.18)	0.94 (0.69, 1.28)	1.19 (0.85, 1.67)	1.31 (0.92, 1.87)
Education	1.02 (0.99, 1.04)	0.99 (0.97, 1.02)	0.99 (0.97, 1.02)	0.98 (0.95, 1.01)
Acculturation		1.08 (1.05, 1.12) ^a	1.05 (1.02, 1.09) ^b	1.06 (1.02, 1.10) ^b
Number of people in household			0.93 (0.88, 0.99) ^c	0.93 (0.87, 0.99) ^c
Health insurance (No)			8.39 (6.30, 11.17) ^a	8.58 (6.32, 11.64) ^a
Income			0.96 (0.85, 1.07)	1.01 (0.89, 1.14)
Perceived health				0.55 (0.46, 0.65) ^a
Number of chronic conditions				1.82 (1.62, 2.04) ^a
Depressive symptoms	1.87 (1.35, 2.58) ^a	1.86 (1.35, 2.57) ^a	1.98 (1.40, 2.79) ^a	1.19 (0.82, 1.73)

Note: CI = Confidence interval; OR = Odds ratio.

^a*p* < 0.001, ^b*p* < 0.01, ^c*p* < 0.05.

Table 3. Association Between Depressive Symptoms and ED Visits

	Model A	Model B	Model C	Model D
	OR (95% CI), <i>p</i> value			
Age	1.05 (1.04, 1.06) ^a	1.05 (1.04, 1.06) ^a	1.04 (1.02, 1.05) ^a	1.03 (1.02, 1.05) ^a
Female	0.87 (0.70, 1.07)	0.87 (0.70, 1.07)	0.84 (0.68, 1.04)	0.75 (0.60, 0.93) ^b
Marital status (Married)	0.95 (0.75, 1.20)	0.96 (0.76, 1.22)	1.00 (0.79, 1.27)	1.02 (0.80, 1.31)
Education	1.05 (1.03, 1.07) ^a	1.05 (1.03, 1.07) ^a	1.05 (1.02, 1.07) ^a	1.04 (1.02, 1.06) ^a
Acculturation		1.01 (0.99, 1.03)	1.02 (1.00, 1.04)	1.02 (1.00, 1.04) ^c
Number of people in household			0.92 (0.87, 0.98) ^b	0.93 (0.87, 0.99) ^c
Health insurance (No)			1.43 (1.07, 1.92) ^c	1.22 (0.91, 1.66)
Income			0.85 (0.76, 0.94) ^b	0.87 (0.78, 0.97) ^b
Perceived health				0.63 (0.55, 0.72) ^a
Number of chronic conditions				1.33 (1.24, 1.43) ^a
Depressive symptoms	2.63 (2.13, 3.23) ^a	2.63 (2.14, 3.24) ^a	2.60 (2.11, 3.20) ^a	1.81 (1.44, 2.28) ^a

Note: CI = Confidence interval; ED = Emergency department; OR = Odds ratio.

^a*p* < 0.001, ^b*p* < 0.01, ^c*p* < 0.05.

Association Between Depressive Symptoms and Hospitalization

Age (OR = 1.03, 95% CI = 1.02–1.04), being female (OR = 0.67, 95% CI = 0.53–0.83), number of people in household (OR = 0.93, 95% CI = 0.87–0.98), health insurance (OR = 1.51, 95% CI = 1.10–2.08), income (OR = 0.88, 95% CI = 0.78–0.99), perceived health (OR = 0.59, 95% CI = 0.51–0.68), number of chronic conditions (OR = 1.32, 95% CI = 1.23–1.41), and depressive symptoms (OR = 1.85, 95% CI = 1.47–2.33), were significantly associated with the likelihood of having any hospitalizations in the past 2 years (Table 4).

Association Between Depressive Symptoms and Health Services Utilization by Gender

There was no significant gender difference regarding the relationship between depressive symptoms and health services utilization (Table 5).

Discussion

To our best knowledge, this is the first study that systematically examined the association between depressive symptoms and utilization of both primary and acute care services in U.S. Chinese older adults. Our findings highlight the significance of depressive symptoms, acculturation, number of people in household, and health insurance coverage in the utilization of health services in this population.

The principal finding that U.S. Chinese older adults with depressive symptoms had nearly two times higher odds to have any ED visits and hospitalization in the past 2 years than their counterparts, controlling for the number of chronic conditions, perceived health, and other sociodemographic factors, is consistent with previous research (Chou, Ho, & Chi, 2005; Huang et al., 2000). There are three possible mechanisms underlying the positive association between depressive symptoms and HSU. First, depressive symptoms are associated with negative health behaviors, such as physical inactivity, smoking, and drinking, which

Table 4. Association Between Depressive Symptoms and Hospitalization

	Model A	Model B	Model C	Model D
	OR (95% CI), <i>p</i> value			
Age	1.05 (1.04, 1.07) ^a	1.05 (1.04, 1.06) ^a	1.04 (1.02, 1.05) ^a	1.03 (1.02, 1.04) ^a
Female	0.77 (0.63, 0.96) ^c	0.77 (0.63, 0.96) ^c	0.75 (0.61, 0.93) ^b	0.67 (0.53, 0.83) ^a
Marital status (Married)	0.92 (0.73, 1.17)	0.92 (0.72, 1.16)	0.95 (0.75, 1.21)	0.97 (0.76, 1.24)
Education	1.02 (1.00, 1.04)	1.02 (1.00, 1.04)	1.02 (1.00, 1.04)	1.01 (0.99, 1.03)
Acculturation		0.99 (0.97, 1.01)	1.00 (0.98, 1.02)	1.00 (0.98, 1.03)
Number of people in household			0.92 (0.87, 0.98) ^b	0.93 (0.87, 0.98) ^b
Health insurance (No)			1.76 (1.29, 2.39) ^a	1.51 (1.10, 2.08) ^b
Income			0.85 (0.76, 0.96) ^b	0.88 (0.78, 0.99) ^c
Perceived health				0.59 (0.51, 0.68) ^a
Number of chronic conditions				1.32 (1.23, 1.41) ^a
Depressive symptoms	2.76 (2.24, 3.40) ^a	2.76 (2.24, 3.40) ^a	2.75 (2.23, 3.39) ^a	1.85 (1.47, 2.33) ^a

Note: CI = Confidence interval; OR = Odds ratio.

^a*p* < 0.001, ^b*p* < 0.01, ^c*p* < 0.05.

are known risk factors for chronic illnesses, such as diabetes and heart disease. The resulting declining health could ultimately increase utilization of health services (Katon, 2011). Second, depressive symptoms may amplify symptoms of chronic medical illnesses and functional impairment, both of which are predictive of subsequent HSU (Katon, 2011). Specifically, persons with depressive symptoms are less likely to adapt to the aversive symptoms of chronic conditions than their counterparts. As a result, they report increased symptom burden even after adjusting for duration and severity of the chronic conditions (Katon, 2011; Katon, Lin, & Kroenke, 2007). Studies have also shown that depressive symptoms are associated with disability and functional decline (Katon, 2011). Third, adverse outcomes of depressive symptoms, such as declined cognitive functioning and sense of self-efficacy, lack of energy, and social isolation, can lead to poor adherence to medical treatment regimens and reduced ability to self-manage chronic conditions, which could thereby increase utilization of health services (Grenard et al., 2011; Katon, 2011).

However, in the present study, the association between depressive symptoms and service utilization held for acute care settings only. The association between depressive symptoms and physician visits was not significant once perceived health and the number of chronic conditions were added to the model. First, this suggests that the number of chronic conditions and perceived health may be stronger predictors of physician visits than depressive symptoms. Moreover, this may partly be attributable to the culturally-determined help-seeking behaviors among U.S. Chinese older adults. Specifically, it is reported that Chinese older adults rely on their extensive families for help until a mental disorder becomes unmanageable in the family (Sue, Cheng, Saad, & Chu, 2012; Wynaden et al., 2005). They may then seek help from traditional Chinese medicine and physicians from their country of origin to address their mental health concerns (Pang, Jordan-Marsh, Silverstein, &

Cody, 2003; Wynaden et al., 2005). These help-seeking behaviors could obfuscate the relationship between depressive symptoms and physician visits. Another possible explanation is that compromised self-care capacity associated with depressive symptoms may lead to deterioration or complications of chronic conditions, which might increase the likelihood to seek acute care services in older Chinese adults. Nevertheless, the lack of such relationship in the present study is unexpected and bears further investigation.

The study findings underline the significance of three other factors in HSU among U.S. Chinese older adults, including number of people in household, health insurance coverage, and acculturation. Specifically, U.S. Chinese older adults who lived with fewer household members were more likely to utilize all three types of health services. A possible explanation is that Chinese older adults who are more isolated lack social ties that could buffer detrimental effects of stress during adverse life events, thereby increasing distress and worsening overall well-being (Cacioppo & Hawkey, 2003). This finding underlines the need to provide additional support to U.S. Chinese older adults who are more socially isolated.

In addition, the high odds ratios associated with health insurance coverage in the physician visits and hospitalization models warrant attention. Compared to U.S. Chinese older adults who were not insured, those who were insured had nine times higher odds to have one or more physician visits and twice as high odds to have one or more hospitalization in the past 2 years. We speculate that the structural barriers to health insurance represent the major reason for the disparities in receipt of health services in this population. Twenty-four percent of the study sample was not insured, a rate much higher than that of the general U.S. older adult population (Barnett & Vornovitsky, 2016). The lack of health insurance is attributed to the fact that noncitizen immigrants are not eligible to receive public insurance, such as Medicare and Medicaid (Derose, Escarce, & Lurie, 2007). Health implications of the lack of health insurance in this population should be investigated.

Table 5. Association Between Depressive Symptoms and Health Services Utilization by Gender

	Physician visits		ED visits		Hospitalization	
	Male	Female	Male	Female	Male	Female
OR (95% CI), <i>p</i> value						
Age	1.05 (1.01, 1.08) ^b	1.01 (0.98, 1.05)	1.04 (1.02, 1.06) ^a	1.02 (1.00, 1.04) ^c	1.03 (1.01, 1.05) ^b	1.03 (1.01, 1.05) ^b
Marital status (Married)	1.22 (0.60, 2.48)	1.27 (0.84, 1.94)	0.96 (0.60, 1.54)	1.01 (0.75, 1.36)	1.01 (0.63, 1.62)	0.96 (0.71, 1.30)
Education	1.01 (0.97, 1.06)	0.95 (0.91, 0.99) ^b	1.05 (1.02, 1.09) ^b	1.03 (1.00, 1.06) ^c	1.01 (0.97, 1.04)	1.02 (0.99, 1.04)
Acculturation	1.06 (1.00, 1.13)	1.06 (1.01, 1.11) ^c	1.01 (0.98, 1.04)	1.03 (1.00, 1.06) ^c	1.00 (0.97, 1.03)	1.01 (0.98, 1.04)
Number of people in household	0.94 (0.85, 1.03)	0.93 (0.85, 1.01)	0.95 (0.87, 1.05)	0.91 (0.84, 0.99) ^c	0.99 (0.90, 1.08)	0.88 (0.81, 0.96) ^b
Health insurance (No)	9.19 (5.92, 14.27) ^a	9.29 (5.94, 14.52) ^a	1.01 (0.65, 1.56)	1.45 (0.95, 2.22)	1.46 (0.93, 2.28)	1.58 (1.00, 2.48) ^c
Income	1.12 (0.94, 1.34)	0.91 (0.77, 1.09)	0.95 (0.82, 1.10)	0.79 (0.67, 0.94) ^b	0.91 (0.78, 1.07)	0.85 (0.72, 1.02)
Perceived health	0.45 (0.35, 0.58) ^a	0.63 (0.50, 0.79) ^a	0.55 (0.44, 0.68) ^a	0.69 (0.57, 0.83) ^a	0.55 (0.45, 0.68) ^a	0.62 (0.51, 0.75) ^a
Number of chronic conditions	2.13 (1.77, 2.55) ^a	1.65 (1.41, 1.93) ^a	1.36 (1.22, 1.51) ^a	1.31 (1.19, 1.44) ^a	1.34 (1.20, 1.49) ^a	1.30 (1.18, 1.43) ^a
Depressive symptoms	1.75 (0.94, 3.24)	0.96 (0.60, 1.54)	1.76 (1.22, 2.55) ^b	1.84 (1.38, 2.47) ^a	1.88 (1.30, 2.71) ^a	1.87 (1.39, 2.51) ^a

Note: CI = Confidence interval; ED = Emergency department; OR = Odds ratio.
^a*p* < 0.001, ^b*p* < 0.01, ^c*p* < 0.05.

Moreover, acculturated Chinese older adults in the United States were more likely to have at least one physician and ED visit in the past 2 years. It is likely that increased acculturation may indicate enhanced English proficiency and ability to navigate the health care system and reduced cultural barriers, which consequently improve access and utilization of health services (Dong et al., 2015). However, the association between acculturation and hospitalization was not significant in this study. One possible explanation is hospitalization may be more related to acute illnesses than cultural factors (Kuo & Torres-Gil, 2001).

Lastly, there were significant differences between men and women in this sample related to depressive symptoms and HSU. Specifically, more women reported any depressive symptoms compared to men. In the multivariate models, women were more likely to have physician visits but less likely to have ED or hospitalization compared to men. Although beyond the scope of this study, future studies should investigate whether gender differences in depressive symptoms are resulted from higher levels of stigma for older Chinese men to report such symptoms. Future research should also examine gender differences in utilization of different types of health services (i.e., why older Chinese men were more likely to use ED and inpatient services while women were more likely to use physician services). Stigma may also play a role in Chinese men's help-seeking behaviors.

Strengths and Limitations

Different from existing studies, most of which focus on one type of health service to examine predictors of HSU, the inclusion of three different types of health services (including both primary and acute care services) allows a comprehensive and nuanced investigation of the relationship between depressive symptoms and HSU. Several limitations should be considered in interpreting the findings from this study. First, since participants in this study were recruited from the Greater Chicago area, it is not clear whether the findings could be generalizable to older Chinese adults residing in other geographic areas or to other ethnic groups. Second, the effects of other variables that may predict HSU, such as health beliefs, satisfaction with health services, and citizenship status, were not examined in this study. Third, HSU is self-reported in this study, the inaccuracy of which has been well documented (Wallihan, Stump, & Callahan, 1999). Further, the cross-sectional nature of the PINE data limits our ability to determine the temporal relations between depressive symptoms and HSU. Lastly, considering stigma associated with mental illness among Chinese, depressive symptoms may be under-reported, leading to potential response bias in the findings.

Directions for Future Research

Future studies should elucidate the mechanisms of how depressive symptoms affect HSU among U.S. Chinese older adults. Brief screening tools, such as the PHQ-2 (an

abbreviated version of the PHQ-9), which may be more favored by clinicians in the ED and hospital settings due to time constraints, should be culturally adapted for use as the initial screening tool for depressive symptoms with older Chinese adults (Chen et al., 2010). Qualitative studies should be conducted to explore culturally informed somatic symptoms of depression that could be used as proxy markers to assist its early detection in this population (Parker et al., 2001).

Conclusion

Depressive symptoms are positively associated with hospitalization and ED visits among U.S. Chinese older adults. Therefore, screening of depressive symptoms should be part of the clinical encounter in these care settings so that appropriate treatment or timely mental health service referrals could be provided to this population to ultimately optimize their utilization of health services. Furthermore, health professionals in hospitals and ED settings need to be cognizant of the tendency to express distress in somatic complaints in the Chinese population.

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Conflict of Interest

None reported.

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