THE GERONTOLOGICAL SOCIETY OF AMERICA®

Research Article

Is Migration at Older Age Associated With Poorer Psychological Well-Being? Evidence from Chinese Older Immigrants in the United States

Man Guo, PhD,[1,][*] Meredith Stensland, PhD,[1] Mengting Li, PhD,[2] Xinqi Dong, MD, MPH,[3] and Agnes Tiwari, PhD[4]

[1]School of Social Work, University of Iowa. [2]Rush Institute for Healthy Aging, Rush University Medical Center, Chicago, Illinois. [3]Institute for Health, Health Care Policy and Aging Research, Rutgers University, New Brunswick, New Jersey. [4]School of Nursing, University of Hong Kong.

*Address correspondence to: Man Guo, PhD, School of Social Work, University of Iowa, 308 North Hall, Iowa City, IA 52242. E-mail: man-guo@uiowa.edu

Abstract

Background and Objectives: The migrating age of an individual has far-reaching implications for their acculturation experience, social integration, and well-being. This study addressed two questions: Is migrating at older age associated with poorer psychological well-being? If so, what factors account for such differences?
Research Design and Methods: Using data of 3,138 Chinese elderly people in Chicago, we compared the levels of depression and quality of life among individuals who migrated in young adulthood (before 35), adulthood (35–49), midlife (50–64), and later life (65+). Negative binominal and logistic regressions were performed to examine the associations between age at migration and the two outcomes, controlling for demographics and four sets of explanatory variables (socioeconomic status, health status, acculturation level, and family/social relations).
Results: The findings revealed mixed results. Migrating in later life was associated with more depressive symptoms, but also a higher chance of reporting good quality of life. Late-life immigrants' greater depression was partially contributed to their low income, lack of access to health care, poor physical health, and weak social relations. In contrast, regardless of the explanatory variables, migrating at middle age was associated with lower quality of life.
Discussion and Implications: Acknowledging that the older immigrant population is segmented with unique susceptibilities improves understanding of heterogeneity among the older immigrant populations and allows for targeted intervention. Gerontological practitioners should include migration history during their intakes and more actively screen for depression with socially isolated Chinese older immigrants who migrated at a later age.

Keywords: Depression, Diversity and ethnicity, Globalization/immigration, Intergenerational relationships, Life course/life span, Minority issues, Well-being

Population aging and immigration are two formidable trends that transform the demographic profiles of many countries. At the crucial intersection of the two trends is the rapidly increasing older immigrant population. In the United States, immigrants aged 65 and older account for 12% of both the older and immigrant populations (Batalova, 2012). It is estimated that by 2050, nearly one out of five (19%) older Americans will be foreign born (Leach, 2008).

Although older immigrants in general have better physical health than their U.S.-born counterparts (Choi,

2012), studies have reported higher rates of depression and mental distress among various groups of older immigrant compared to non-Hispanic White elderly people (Guo & Stensland, 2017; Sorkin, Pham, & Ngo-Metzger, 2009). As the U.S. population gets older and more diverse, understanding the mental health needs of older immigrants is becoming increasingly important.

One critical approach to address this issue is to identify segments of older immigrants who have high mental health risks and low levels of individual well-being. Older immigrants are a diverse group, varying greatly in their reasons for migration, acculturation levels, and economic and social resources. Prior research has frequently used length of residence in the new country to capture variations in their migration experience. But a recent systemic review showed that this commonly used variable was largely unrelated to depression among Korean and Chinese older immigrants (Guo & Stensland, 2017).

A much less studied aspect of older immigrants' heterogeneity is the age at which they migrated. Considering U.S. immigration policies, immigrants who arrived at younger age are more likely to come to the United States for education and employment, whereas the majority of late-life immigrants migrated to reunite with their family members (Scommegna, 2013). Such a difference has significant implications for immigrants' acculturation experience, social interaction, and later-life well-being. In addition, life-course theory states that events and experiences that individuals face have differential consequences depending on when they occur in the life course (Elder & Johnson, 2003). Individuals who migrated at different age may face unique challenges, stressors, and resources associated with that particular life stage, which in turn may lead to divergent work, family, and health trajectories in their life course. It is widely believed that immigration at older age is associated with diminished adaptive capacity and fewer resources for adaptation such as language skills, income, and U.S. work experience (J. L. Angel & R. J. Angel, 1992). If so, late-life immigrants may have poorer mental health and lower level of well-being than those who arrived at early age. Empirically, very few studies have tested this assumption.

To better understand the heterogeneity among older immigrants and its implications for individual well-being, this study used a large population-based study of U.S. Chinese older immigrants to address two research questions: (a) Is migrating at older age associated with lower psychological well-being among Chinese older immigrants? (b) If so, what factors account for such differences? The findings are critical to help identify vulnerable older immigrant segments and provide targeted and tailored interventions.

Age at Migration and Mental Health: What Do We Know

Given the linguistic, economic, social, and health disadvantages of migrating in old age, it is reasonable to speculate that late-life migration is associated with poorer psychological well-being (J. L. Angel & R. J. Angel, 1992). A key assumption in the studies of acculturation is that the primary barrier to becoming assimilated is linguistic (Angel, Buckley, & Sakamoto, 2001). Individuals who migrated in older age often had limited opportunity and an unsupportive environment to acquire a new language, resulting in greater linguistic barriers and emotional distress (Marinova-Todd, Marshall, & Snow, 2000). The language barriers also go hand-in-hand with limited employment opportunities and difficulties in accessing social and health services (Batalova, 2012). Due to insufficient time to accumulate the requisite employment credits, immigrants who arrived at mid- or late-life are also disadvantaged in receiving entitlement benefits (Borjas, 2011). In the realm of social relations, immigrants who arrived as older adults are more dependent on their families for various support than those who arrived during childhood or early life (Treas, 2008). This often produces feelings of helplessness and lack of control, compromising their well-being. Late-life immigrants also demonstrate less involvement in group activities and have a smaller social network than native-born older adults and their counterparts back in the home country (Guo, Liu, Xu, Mao, & Chi, 2018; J. L. Angel & R. J. Angel, 1992). Lastly, many older immigrants migrate after retirement, a period marked by health deterioration and loss (Blumstein et al., 2004), further increasing their risks of having mental health problems.

Although the above literature provides persuasive rationales of why migrating at an older age may be associated with lower levels of individual well-being, empirical studies testing the associations between age at migration and various mental health outcomes have yielded mixed findings. These mixed results indicate a poor understanding of this topic, warranting further investigation. Some studies reported that individuals who migrated at an older age had more depressive symptoms (Blumstein et al., 2004; Lee, 2015; Lum & Vanderaa, 2010; T. Kim et al., 2015), lower life satisfaction (J. L. Angel & R. J. Angel, 1992), and greater sense of loneliness (Wu & Penning, 2015) than those who migrated at a younger age. In contrast, one study showed that individuals who migrated at an older age had fewer depressive symptoms than those who migrated at a younger age (M. T. Kim et al., 2015), In addition, several studies found that age at migration was not associated with depressive symptoms (Aichberger et al., 2010), lifetime prevalence of mood, affective, anxiety disorders (Woodward et al., 2012), or psychological distress (Tran, Jorm, Johnson, Bambrick, & Lujic, 2015).

Whereas the topic warrants more investigation, a potential explanation of the mixed findings is that age at migration and individual well-being may not be best captured by a linear relationship. A few studies took a more nuanced approach to compare the well-being of older immigrants who arrived during certain *age ranges*. For instance, one study found that only if people migrated before age 21 did

they appear to age as "well" as native (Berdes & Zych, 1996). In this study, those who migrated between 21 and 50, and after 50, reported similarly lower quality of life (QoL) than those who migrated before 21. Another study showed that midlife migration (after age 35) was associated with more emotional distress than those who migrated prior to age 15 (Angel et al., 2001). Lum and Vanderaa (2010) further found that among three groups—those who migrated before 18, between 18 and 50, and after 50—only the second group (18–50) had greater depression than the natives. Together, these findings yield a more complex picture of how immigration process may affect individual well-being as it interweaves with an individuals' life course. They also point to the importance of examining the implication of immigration in the context of life course and life stages. Despite the findings, these studies are limited in two ways. First, the age ranges tested are very wide (e.g., 21–50 in Berdes & Zych, 1996; 35 or older in Angel et al., 2001; 18–50 in Lum & Vanderaa, 2010). They did not differentiate between nuances in different age groups (e.g., migrating at early adulthood vs. midlife). Second, none of the studies had a meaningful group that captured the experience of individuals who migrated as older adults (i.e., those aged 65 or older).

The Present Study

Building on the prior research, this study examined whether migrating as older adults is associated with poorer psychological well-being. For the purpose of investigation, we focused our study on Chinese Americans, the largest subgroup of Asian Americans. Asian Americans are the fastest-growing minority group in the United States, with almost 75% being foreign born (Pew Research Center, 2013). Asian American's mental health issues are much less studied compared to African American and Latino populations (Guo, Li, Liu, & Sun, 2015). Among all the empirical studies on age at migration and well-being reviewed above, only one study was on Korean Americans (M. T. Kim et al., 2015), and none was on Chinese Americans.

Chinese Americans have the highest lifetime prevalence rate of depression among Asian American groups (National Alliance on Mental Health, 2011). Older adults in this population not only have higher anxiety, higher sense of loneliness, and similar or higher depression rates than the general older population (Chang, Beck, Simon, & Dong, 2014; Chen et al., 2013; Dong, Chen, & Simon, 2014; Simon, Chang, Zhang, Ruan, & Dong, 2014), but also higher suicidal ideation than their counterparts back in China (Dong, Chen, Wong, & Simon, 2014). By focusing on Chinese Americans, the largest ethnic group in the world with high mental health risks, this study will shed important light on the nature of ethnic aging in the immigrant context.

Although the existing evidence is still equivocal, given the prevailing notion that late-life migration is associated with additional stressor in the acculturation process, we hypothesized:

> H_1: *Chinese older immigrants who migrated as older adults (65 or older) have poorer psychological well being than those who migrated in earlier life stages.*

This study further explored the explanatory variables that may contribute to potential mental health differences associated with age at migration. Given that late-life migration is often associated with additional vulnerabilities related to socioeconomic status (SES), physical health, acculturation level (mainly language skills), and family/social relations, we hypothesized:

> H_2: *Variations in SES, physical health, acculturation level, and family and social relations among Chinese older immigrants who migrated at different ages all contribute to their differences in psychological well-being.*

Design and Methods

Sample

Data were derived from the baseline Population Study of Chinese Elderly (PINE), the largest population-based study on Chinese elderly people in the United States. Guided by community-based participatory research approach, a total of 3,157 community-dwelling older adults aged 60 and older were recruited from more than 20 social service agencies, community centers, faith-based organizations, and senior apartments in the Greater Chicago area between 2011 and 2013 (Dong, Wong, & Simon, 2014). Interviews were conducted at respondents' homes by bilingual interviewers. The PINE sample is representative of the Chinese older population in the greater Chicago area (Simon, Chang, Rajan, Welch, & Dong, 2014). The working sample included 3,138 participants who reported information of age at migration.

Measures

Age at migration

Age at migration was calculated by subtracting the age by the years spent in the United States. It was further categorized into four groups: (a) before 35, (b) 35–49, (c) 50–64, and (d) 65 or older, roughly corresponding to young adulthood, adulthood, midlife, and later life. We did not differentiate those who migrated as children (i.e., before 18) from the rest of the groups because less than 1% of the respondents migrated before 18.

Psychological well-being

Psychological well-being was assessed by depression and QoL. Depression was measured by Patient Health Questionnaire-9 (PHQ-9; American Psychiatric Association, 1994). Respondents rated how often they experienced nine depressive symptoms during the past 2

weeks (0 = not at all, 1 = several days, 2 = a week or more, 3 = nearly every day). The sum score ranges from 0 to 27, with higher scores indicating higher levels of depression (α = .82). QoL was rated on a four-point scale (1 = poor, 2 = fair, 3 = good, 4 = very good). A dummy variable was created to indicate good or very good QoL (1 = yes).

Explanatory variables
Explanatory variables included variables representing SES, health status, acculturation, and family and social relations. *SES* was measured by years of education, personal annual income (1= $0–$4,999, 2 = $5,000–$9,999, 3 = ≥$10,000), and whether the respondent had any health insurance (1 = yes). *Health status* was measured by Katz Activity of Daily Living (ADL) Index (Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963) and the Lawton Instrumental Activities of Daily Living (IADL) Scale (Lawton & Brody, 1970), respectively. The sum scores of the two scales ranged from 0 to 24 and 0 to 36, respectively, with a higher score indicating higher physical impairment (α = .92 and .90, respectively). *Acculturation* variables included years in the United States and level of acculturation. To assess acculturation levels, respondents answered 12 questions about their preference for speaking a given language in different settings, in media use, and preferred ethnicity of those they interact on a five-point Likert scale (Marin, Sabogal, Marin, Otero-Sabogal, & Perez-Stable, 1987), which was validated to work for Chinese older immigrant populations (Dong, Bergren, & Chang, 2015). The total acculturation scores ranged from 12 to 60, with a higher score indicating a higher level of acculturation (α = .91). Limited by secondary analysis, we measured *family and social relations* by two dummy variables to indicate whether the migration was family oriented (e.g., reuniting with spouse/children/relatives, caring for grandchildren) (1 = yes) and whether the respondent lived with children (1 = yes). The respondents also reported their number of friends (1 = none, 2 = 1–9, 3 = ≥10), and sense of community, which was measured by a 12-item Sense of Community Index (Perkins, Florin, Rich, Wandersman, & Chavis, 1990). The sum scores ranged from 19 to 58, with higher scores reflecting greater levels of sense of community (α = .69).

Demographic characteristics
Demographic variables included gender (1 = female) and marital status (1 = married). Age was not included in the analyses because it has a perfect linear relationship with age at migration and years in the United States.

Data Analysis
We compared group differences in sample characteristic and the key study variables with analysis of variance and chi-square tests. Correlations among key study variables were then presented. Negative binominal and logistic regressions were performed to examine whether age at migration was associated with depression and QoL,

respectively, controlling for demographics and four sets of explanatory variables (SES, health status, acculturation, family and social relations). We carried out multistage analyses to understand individual influence of each set of the explanatory variable. Model 1 was adjusted for demographic characteristics only. Models 2–5 were adjusted for SES, health status, acculturation, and family and social relations, respectively. Model 6 is the full model with all study variables.

Results

Table 1 summarizes sample characteristics by respondents' age at migration (<35, 35–49, 50–64, 65+). On average, those who migrated as older adults (i.e., late-life immigrants) were 6–9 years older than the rest groups, and were less likely to be women (52.25%) or married (65.74%). Although late-life immigrants were on average best educated (average 9.71 years of education), they had the lowest income among the four groups: more than half of them had an annual income that was less than $5K, and only 2.4% of them had an annual income of $10K or more, compared to relevant figures of 39.03%, 20.61%, and 10.84% among the rest three groups. Late-life immigrants were also least likely to have any forms of health insurance (68.40%). Likely due to their older age, they reported highest levels of both ADL and IADL difficulties across the four groups.

The four groups had lived in the United States for average 44, 27, 15, and 9 years, respectively. All the four groups reported low levels of acculturation (*grand mean* = 15.25 on a scale from 12 to 60), even among those who migrated in young adulthood (*mean* = 21.35).

Comparing family and social relations revealed that those who migrated as older adults were most likely to move for family reasons (87.15%, in contrast to 60.19% among those who migrated before 35) and live with children (41.71%, in contrast to 27.71% among those who migrated before 35). They also reported overall fewer friends and lower sense of community.

With regard to psychological well-being, although there is a general trend that individuals who migrated at later age had on average more depressive symptoms, those who migrated after 65 (56.44%) were similarly likely as those who migrated in young adulthood (56.87%) to report good or very good QoL. In contrast, those in adulthood were least likely to report good/very good QoL (44.87%), followed by those who migrated in midlife (50.32%).

Table 2 reports correlations among age at migration, explanatory variables, and the two indicators of psychological well-being. Age at migration was significantly correlated with nearly all other study variables. Specifically, Chinese immigrants who migrated at an older age had lower income, less access to health insurance, and lower levels of acculturation. They were also more likely to migrate for family reasons, to live with adult children, and had fewer friends and lower sense of community. Interestingly, older age at

Table 1. Sample Characteristics of the PINE Study by Age at Migration (*N* = 3,138)

	Total	Migration time				
		Young adulthood (before 35)	Adulthood (35–49)	Midlife (50–64)	Later life (65 or later)	
	(*N* = 3,138)	(*n* = 314)	(*n* = 789)	(*n* = 1,568)	(*n* = 467)	*p* value[a]
	Mean (*SD*)	Mean (*SD*)	Mean (*SD*)	Mean (*SD*)	Mean (*SD*)	
Demographic characteristics						
Age (60–105)	72.78 (8.30)	70.12 (8.20)	70.50 (7.65)	72.48 (8.00)	79.01 (7.05)	<.001
Women	57.87%	56.69%	60.71%	58.35%	52.25%	.029
Married	71.10%	67.20%	70.34%	73.85%	65.74%	.002
Socioeconomic status						
Years of education (0–26)	8.73 (5.05)	9.40 (4.98)	8.61 (4.46)	8.36 (4.97)	9.71 (6.06)	<.001
Personal annual income						
$0–$4,999	33.31%	16.13%	27.23%	33.68%	54.15%	<.001
$5,000–$9,999	51.80%	44.84%	52.16%	55.48%	43.45%	
≥$10,000	14.88%	39.03%	20.61%	10.84%	2.40%	
Having health insurance	75.90%	85.94%	80.15%	73.96%	68.40%	<.001
Physical health						
ADL difficulties (0–24)	0.39 (2.09)	0.34 (2.23)	0.26 (1.55)	0.34 (1.93)	0.78 (3.06)	<.001
IADL difficulties (0–36)	3.72 (6.37)	2.57 (5.65)	2.86 (5.38)	3.75 (6.21)	5.84 (8.11)	<.001
Acculturation						
Years in the United States (0.1–90)	19.98 (13.09)	43.78 (11.56)	26.94 (8.68)	14.88 (8.25)	9.31 (6.43)	<.001
Level of acculturation (12–60)	15.25 (5.10)	21.35 (9.71)	15.33 (4.72)	14.19 (2.98)	14.60 (3.87)	<.001
Family and social relations						
Family-oriented migration	73.71%	60.19%	66.79%	75.89%	87.15%	<.001
Living with children	35.00%	27.71%	35.36%	34.27%	41.76%	<.001
Number of friends						.002
0	14.37%	12.82%	12.44%	14.11%	19.53%	
1–9	50.72%	45.19%	52.66%	50.93%	50.43%	
≥10	34.91%	41.99%	34.90%	34.96%	30.04%	
Sense of community (19–58)	40.65 (5.40)	41.09 (5.15)	40.84 (5.09)	40.69 (5.36)	39.90 (6.14)	.007
Psychological well-being						
Depression	2.65 (4.13)	2.40 (3.92)	2.52 (4.16)	2.62 (4.06)	3.16 (4.14)	.001
Good/very good QoL	50.51%	56.87%	44.87%	50.32%	56.44%	<.001

Note: ADL = activities of daily living; IADL = instrumental activities of daily living; QoL = quality of life.
[a]Chi-square tests for categorical variables and analysis of variance for continuous variables were performed to compare group differences.

migration was associated with more depressive symptoms but also a higher chance of reporting good/very good QoL.

Table 3 presents the results of negative binomial regressions testing the association between age at migration and depression. When only adjusted for gender and marital status (Model 1), participants who migrated in young adulthood and adulthood had significantly fewer depressive symptoms than those who migrated in later life. Such group differences disappeared in both Models 2 and 3, when SES and health status variables were added, respectively. With income (β = −.146), health insurance (β = −.199), and IADL difficulties (β = .062) being significant predictors in these models, the findings suggest that the higher level of depression among late-life immigrants may be partly attributive

to their lower income, less access to health insurance, and more IADL difficulties.

When acculturation-related variables were adjusted in Model 4, group differences observed in the Model 1 remained the same, suggesting that these variables were not powerful explanations of why late-life immigrants had more depressive symptoms than the other groups. Interestingly, longer stay in the United States was related to more depressive symptoms (β = .010), meaning that late-life immigrants' shorter stay in the United States may actually protect them against depression.

When family and social relations variables were added into Model 5, those who migrated in young adulthood still had significantly fewer depressive symptoms than those

Table 2. Correlation Among Key Study Variables in the PINE Study

	1	2	3	4	5	6	7	8	9	10	11	12
1. Age at migration	1.00											
2. Education	.014	1.00										
3. Income	-.275***	.017	1.00									
4. Health insurance	-.116***	-.028	.226***	1.00								
5. Years in the United States	-.071***	-.102***	.346***	.465***	1.00							
6. Level of acculturation	-.216***	.408***	.139***	.011***	.128***	1.00						
7. Family-oriented migration	.174***	-.048**	-.114***	-.107***	-.205***	-.001	1.00					
8. Living with children	.055**	-.050**	-.113***	-.215***	-.202***	-.030	.135***	1.00				
9. Number of friends	-.061**	.166***	.062**	-.007	-.013	.081***	-.084***	-.067**	1.00			
10. Sense of community	-.049**	-.033	.080***	.148***	.123***	.019	-.130***	-.212***	.209***	1.00		
11. Depression	.066**	-.031	-.044*	.048**	.006	.008	.052**	-.015	-.164***	-.160***	1.00	
12. Good/very good QoL	.035*	.076***	.062**	.054**	.003	.090***	-.070***	.007	-.001	.207***	-.169***	1.00

Note: QoL = quality of life.

$*p < .05. \ **p < .01. \ ***p < .001.$

Table 3. Results of Negative Binominal Regressions on Depression Among the PINE Respondents

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	β	β	β	β	β	β
Age at migration (ref: 65+)						
Before 35	−.246*	−.115	−.044	−.577**	−.281*	.177
35–49	−.202*	−.163	−.082	−.372**	−.170	.082
50–64	−.169	−.143	−.112	−.228*	−.150	−.021
Women	.281***	.287***	.254***	.292***	.360***	.328***
Married	−.213**	−.198**	−.119	−.160*	−.194**	−.166*
Socioeconomic status						
Education		.002				.011
Income		−.146***				−.159***
Health insurance		−.199**				.030
Physical health						
ADL difficulties			−.025			−.036*
IADL difficulties			.062***			.065***
Acculturation						
Years in the United States				.010**		−.005
Level of acculturation				.000		.016*
Family and social relations						
Family-oriented migration					.062	.025
Living with children					−.213***	−.163*
Number of friends (ref: 0)						
1–9					−.399***	−.177*
≥10					−.592***	−.376***
Community cohesion					−.044***	−.042***

Note: ADL = activities of daily living; IADL = instrumental activities of daily living.

*$p < .05$. **$p < .01$. ***$p < .001$.

who migrated in later life, but the group difference between those who migrated in adulthood and late-life disappeared. The findings provide some support to the confounding effect of family and social relations on age at migration and depression. It is likely that late-life immigrants have both advantages (i.e., more likely to live with children, which was related to fewer depressive symptoms) and disadvantages (i.e., smaller friend network and weaker social cohesion, which were related to more depressive symptoms) in these social relationships. As such, the social domain factors may have mixed and more nuanced implications on their psychological well-being.

In the last model, all the demographics and explanatory variables were added. All the group differences disappeared, suggesting that together, these explanatory variables largely explained why migrating at older age was associated with more depressive symptoms.

Table 4 presents results of logistic regressions predicting QoL, following the similar procedures. Table 4 shows that participants who migrated in adulthood and in midlife were less likely to report good/very good QoL than those who migrated in later life. Such findings remained robust when different sets of explanatory variables were entered individually or collectively in subsequent models. Table 4 further shows that late-life immigrants were as likely as those who migrated in young adulthood to report good/

very good QoL, even after controlling for SES (Model 2), physical health (Model 3), and family and social relations (Model 5). However, when adjusting for acculturation-related variables (Model 4), those who migrated in young adulthood were actually less likely to report good/very good QoL than those who migrated in later life. Given the positive association between acculturation level and QoL (OR = 1.044, CI: 1.027–1.061), the finding suggests that late-age immigrants' low level of acculturation suppressed their likelihood of reporting good QoL. If late-age immigrants were having higher acculturation levels, they would be more likely to report good QoL than those who migrated in young adulthood.

Discussion and Implications

Using a large sample from older Chinese immigrants in the United States, this study sought to answer two questions: (a) Whether migrating in older age is associated with poorer psychological well-being (H_1) among this population? (b) Whether SES, physical health, acculturation level, and family/social relations may contribute to the differences associated with age at migration (H_2)? Overall, our findings provided mixed support to the first hypothesis. On the one hand, migrating in later life is linked with more depressive symptoms in this population; on the other hand, it appears

Table 4. Results of Logistic Regressions on Quality of Life Among the PINE Respondents

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Age at migration (ref: 65+)						
Before 35	1.007 (0.754–0.136)	0.853 (0.626–1.163)	0.968 (0.718–1.304)	0.590* (0.385–0.904)	0.883 (0.652–1.197)	0.569* (0.345–0.937)
35–49	0.614*** (0.487–0.775)	0.575*** (0.451–0.732)	0.563*** (0.443–0.716)	0.518*** (0.390–0.686)	0.530*** (0.415–0.676)	0.441*** (0.318–0.611)
50–64	0.772* (0.626–0.952)	0.765* (0.616–0.949)	0.721** (0.581–0.894)	0.748** (0.602–0.929)	0.711** (0.572–0.886)	0.683** (0.538–0.867)
Women	1.298*** (1.115–1.511)	1.376*** (1.177–1.609)	1.328*** (1.138–1.550)	1.338*** (1.148–1.559)	1.278** (1.091–1.497)	1.394*** (1.180–1.645)
Married	0.940 (0.797–1.110)	0.932 (0.783–1.110)	0.891 (0.750–1.058)	0.986 (0.828–1.175)	0.984 (0.828–1.168)	0.956 (0.791–1.155)
Socioeconomic status						
Education		1.035*** (1.020–1.051)				1.030*** (1.013–1.048)
Income		1.131*** (1.053–1.215)				1.100** (1.019–1.188)
Health insurance		1.246* (1.047–1.481)				1.161 (0.943–1.430)
Physical health						
ADL difficulties			0.942* (0.896–0.991)			0.959 (0.910–1.011)
IADL difficulties			0.986 (0.972–1.001)			0.985 (0.969–1.002)
Acculturation						
Years in the United States				1.008 (0.999–1.016)		1.004 (0.993–1.016)
Level of acculturation				1.044*** (1.027–1.061)		1.035*** (1.015–1.055)
Family and social relations						
Family-oriented migration					0.720*** (0.606–0.854)	0.757** (0.635–904)
Living with children					1.296** (1.107–1.517)	1.390*** (1.174–1.645)
Number of friends (ref: 0)						
1–9					0.960 (0.768–1.199)	0.824 (0.635–0.904)
≥10					0.775* (0.611–0.981)	0.594*** (0.461–0.766)
Community cohesion					1.089*** (1.073–1.105)	1.092*** (1.075–1.109)

Note: ADL = activities of daily living; CI = confidence interval; IADL = instrumental activities of daily living; OR = odds ratio.
*p < .05. **p < .01. ***p < .001.

to contribute to a higher QoL. These findings were relatively robust, controlling for demographics, socioeconomic, acculturative, physical health, and familial/social relation factors. Our findings further support the second hypothesis. We found that variations in SES, physical health, acculturation, and family/social relations all played a role in the aforementioned differences across age at migration, but in difference ways.

Chinese late-life immigrants' more depressive symptoms were found to be partially attributive to their low income and lack of access to health insurance. Interestingly, late-life immigrants in our sample were better educated than immigrants who migrated in earlier life stages. It seems that the expertise or skills that these older adults had back in China could not be transferred to the new society. Likely, these older people not only lacked the language proficiency

requisite of well-earning jobs, they also were ineligible to receive Social Security benefits, which are the major source of income for U.S.-born elderly people. Given the exchange rate between U.S. Dollar and Chinese Yuan (1: 6.4 in 2011), any pensions or savings that these older adults had in China would not help guarantee them a comfortable living in the United States either. With limited access to health insurance, these older immigrants face additional layer of economic vulnerability if health care is needed. These economic hardships are major emotional stressors that often predict depression (Murrell, Himmelfarb, & Wright, 1983). In addition, these late-life immigrants, some of whom might be quite resourceful in the home country, may have to heavily rely on their families for all kinds of support. Their decreased economic and social status could also result in their sense of loss.

In accounting for physical health, this study shows that Chinese late-life immigrants' higher functional limitations also contributed to their higher levels of depression. However, given that late-life immigrants were older than the rest groups, this finding likely speaks more towards old age health ailments in general rather than physical vulnerability of migrating in older age.

Acculturation level does not appear to account for the age group differences in depression. It is notable that the sample overall had low levels of acculturation, including those who had resided in the United States for a long period of time. It is likely that this particular variable demonstrated limited variation, reducing its explanatory power considerably. Though past research suggests that length of residence is largely unrelated to depression (Guo & Stensland, 2017), we found that participants who had lived in the United States for a longer period of time tended to have more depressive symptoms. In this sense, migrating as an older adult means having lived in the United States a shorter period of time, thereby serving as a protective factor for psychological well-being.

The findings further suggest that variations in family and social relations among Chinese older immigrants partially account for age group differences in their depression symptoms. Chinese older immigrants tend to receive more support from their family than from friends or neighbors (Wong, Yoo, & Stewart, 2007). Our findings show that social relations in these two domains may have an important nuance in their implications for individual well-being. On the one hand, living with family members seems to be an advantage of Chinese late-life immigrants that protects their psychosocial well-being. On the other hand, few friends and low social cohesion may play a role in late-life migrants' depression. A study showed that having many friends was more important to reduce depression among Chinese older immigrants than their counterparts back in China (Liu, Guo, Xu, Mao, & Chi, 2017). In line with this finding, our study shows that late-life immigrants' adaption to new lifestyle requires additional support from friends and neighborhoods beyond the immediate family.

Despite higher levels of depression, Chinese late-life migrants in our study were able to preserve a higher QoL after the stressful immigration process, regardless of demographics, SES, acculturative, physical health, and social factors. The findings reveal the complex way in which different aspects of psychological well-being may be affected by the immigration process. Whereas depression is often assessed within a short time frame and more responsive to stressful life events that present imminent mental health threats, QoL is a more grand assessment of one's overall life situation. It is likely that Chinese late-life immigrants were more satisfied with their life than those who migrated in younger age because the aging process grants them better emotional aptitude and superior control over the experience of emotions, making them more readily able to achieve desired emotional states than younger people (Scheibe, English, Tsai, & Carstensen, 2013). This regulation may allow late-life immigrants to cope and buffer the negative effect of immigration in a way that is more adaptive than young-adult or middle-aged immigrants. From another perspective, the United States is one of the world's wealthiest countries with advanced medical technology. Settling down in the United States in older age may also instill a strong sense of pride and achievement for Chinese late-life immigrants, improving their assessment of life quality.

On the flip side of the coin is a notable finding indicating the vulnerability of Chinese immigrants who migrated during middle-aged years, as they appeared to have poorer QoL. This finding is in line with research outside of immigration in which middle-aged individuals, in response to different life stressors, responded less favorably than their older counterparts with regard to subjective well-being (Gomez, Krings, Bangerter, & Grob, 2009), perceived control (Infurna, Gerstorf, & Zarit, 2011), and life satisfaction (Wurm, Tomasik, & Tesch-Römer, 2008). Lifetime exposure to traumatic life events decreases as age increases (Benjet et al., 2016). The perceived and actual costs (financial, lifestyle, and psychological) of life events also appear to be more damaging to individuals in their 40s and 50s than those in the retirement phase (Jordanova et al., 2007). As individuals age, they tend to experience less emotional changes related to their life experiences and may adapt more effectively to these changes than those in younger age (Diener, Sandvik, & Larsen, 1985). In the immigration context, middle-aged immigrants may experience more employment-related stress than late-life immigrants, and they may also experience greater stress associated with both childcare and old age care. In this sense, individuals who migrated at middle age may be most vulnerable as they are trying to establish their own status in a new society while at the same time meeting the family needs of both upper and lower generations.

This study has several limitations. First, there is no consensus definition of what constitutes young adulthood, adulthood, midlife, and later life. In the present study, it was defined as before 35, 35–49, 50–64, and 65 or older

according to the life-course theory and sample distribution (Angel et al., 2001; Lum & Vanderaa, 2010). This should be noted in interpreting the findings and comparison with other age-at-migration studies. Second, in our sample, very few participants migrated before age of 18. The implications of migrating as a child or teenager were not fully captured in our data. Third, limited by secondary data analysis, we did not fully capture family dynamics besides living arrangement and reasons for migration. Future research shall include variables such as support exchanges between family members to better understand the mental health implications of such important social relations. Fourth, the majority of the participants had low income and low level of acculturation. Thus, the findings may not be generalized to Chinese older immigrants with high SES or high level of acculturation. Lastly, given its cross-sectional design, this study cannot speak to causal relationships. Longitudinal studies are needed to follow immigrants who migrated at different age to better observe the consequential mental health implications.

Despite these limitations, the study is among the first to rely on the life-course theory to formally test whether and why migrating at later age is associated with poorer psychological well-being. By using late-life immigrants as the reference group and comparing them to those who migrated in young adulthood, adulthood, and mid life, our study revealed a more complete picture of how immigration interweaves with individual life courses to influence their well-being in later life. Although the sample was from a group of Chinese older immigrants in Chicago, the findings are relevant to other minority groups who share similar struggles of language difficulties, lack of access to health insurance, and who strongly endorse similar family norms (Guo et al., 2015). The findings that Chinese later-life immigrants' lower income and lack of access to health care contributed to their poorer well-being are alarming to other minority groups, as Chinese Americans in general have higher income and better access to health care compared to the overall foreign-born populations in the United States (Zong & Batalova, 2017). More studies should be carried out in other minority groups to better understand the needs of later-life immigrants in general.

As such, our findings have important implications for social and health services/policies aiming to improve the psychological well-being of older immigrants. Our study showed that entering the country at different ages seems to have differential impacts on individual well-being. Those who arrived at older age may be more susceptible to depressive symptoms. Policy should reflect our findings showing low income and poor health insurance access as important contributors to late-life migrants' depression. Social service agencies must place emphasis on actively reaching out to "hidden" enclaves of older immigrants to assess eligibility for programs offering financial assistance. As insurance is generally required to receive affordable services or services at all, health care reform should seek to establish equitable distribution of services. Additionally, policy should mandate funding for initiatives that provide translation services, cultural competency training, and educational services on navigation of the system. As weak social relations also contribute to greater depression, programs are needed to enhance social integration and community engagement of late-life immigrants.

While existing research emphasizes the vulnerability of those who migrated in later life, social programs and interventions have overlooked the needs of immigrants who migrated at middle age. More studies are needed to better understand the unique challenges of this immigrant population. At the same time, more programs are needed to improve their employment skills and language capacities, to assess their caregiving burden, and to address their "hidden" mental health risks.

In sum, acknowledging that the older immigrant population is segmented with unique susceptibilities not only improves understanding of heterogeneity among this population, but also allows for targeted subpopulation assessments, which, in turn, would facilitate the delivery of more appropriate and effective treatment to those most in need. Gerontological practitioners should include migration history during their intakes and more actively screen for depression with socially isolated Chinese older immigrants who migrated at a later age. This study also revealed the vulnerability of Chinese older immigrants who migrated at middle age, calling for further study into the needs of middle-aged immigrant populations. More programs are also needed to help alleviate potential stress associated with acculturation, family obligations, and employment of this immigrant group.

Conflict of Interest

None reported.

References

Aichberger, M. C., Schouler-Ocak, M., Mundt, A., Busch, M. A., Nickels, E., Heimann, H. M., … Rapp, M. A. (2010). Depression in middle-aged and older first generation migrants in Europe: Results from the Survey of Health, Ageing and Retirement in Europe (SHARE). *European Psychiatry*, **25**, 468–475. doi:10.1016/j.eurpsy.2009.11.009

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders: DSM-IV*. Washington, DC: American Psychiatric Association.

Angel, J. L., & Angel, R. J. (1992). Age at migration, social connections, and well-being among elderly Hispanics. *Journal of Aging and Health*, **4**, 480–499. doi:10.1177/089826439200400402

Angel, J. L., Buckley, C. J., & Sakamoto, A. (2001). Duration or disadvantage? Exploring nativity, ethnicity, and health in midlife. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, **56**, S275–S284. doi:10.1093/geronb/56.5.s275

Batalova, J. (2012). *Senior immigrants in the United States*. Washington, DC: Migration Policy Institute.

Benjet, C., Bromet, E., Karam, E. G., Kessler, R. C., McLaughlin, K. A., Ruscio, A. M., … Koenen, K. C. (2016). The epidemiology of traumatic event exposure worldwide: Results from the World Mental Health Survey Consortium. *Psychological Medicine*, **46**, 327–343. doi:10.1017/S0033291715001981

Berdes, C., & Zych, A. A. (1996). The quality of life of Polish immigrant and Polish American ethnic elderly. *Polish American Studies*, **53**, 17–62.

Blumstein, T., Benyamini, Y., Fuchs, Z., Shapira, Z., Novikov, I., Walter-Ginzburg, A., & Modan, B. (2004). The effect of a communal lifestyle on depressive symptoms in late life. *Journal of Aging and Health*, **16**, 151–174. doi:10.1177/0898264303262650

Borjas, G. J. (2011). Social security eligibility and the labor supply of older immigrants. *ILR Review*, **64**, 485–501. doi:10.1177/001979391106400304

Chang, E. S., Beck, T., Simon, M. A., & Dong, X. (2014). A psychometric assessment of the psychological and social well-being indicators in the PINE study. *Journal of Aging and Health*, **26**, 1116–1136. doi:10.1177/0898264314543471

Chen, R., Chang, E., Ruan, J., Li, Y., Li, C., Simon, M., & Dong, X. (2013). Perceived stress in a community-dwelling U.S. Chinese population: Findings from a cross sectional study of Chinese older adults in Chicago. PowerPoint presentation at Gerontology Society of America (GSA) 66th Annual Scientific Meeting, New Orleans, LA.

Choi, S. H. (2012). Testing healthy immigrant effects among late life immigrants in the United States: Using multiple indicators. *Journal of Aging and Health*, **24**, 475–506. doi:10.1177/0898264311425596

Diener, E., Sandvik, E., & Larsen, R. J. (1985). Age and sex effects for emotional intensity. *Developmental Psychology*, **21**, 542–546.

Dong, X., Bergren, S. M., & Chang, E. S. (2015). Levels of acculturation of Chinese older adults in the greater Chicago area—the Population Study of Chinese Elderly in Chicago. *Journal of the American Geriatrics Society*, **63**, 1931–1937. doi:10.1111/jgs.13604

Dong, X., Chen, R., & Simon, M. A. (2014). Anxiety among community-dwelling U.S. Chinese older adults. *The Journals of Gerontology, Series A: Biological Sciences and Medical Sciences*, **69**(Suppl. 2), S61–S67. doi:10.1093/gerona/glu178

Dong, X., Chen, R., Wong, E., & Simon, M. A. (2014). Suicidal ideation in an older U.S. Chinese population. *Journal of Aging and Health*, **26**, 1189–1208. doi:10.1177/0898264314541696

Dong, X., Wong, E., & Simon, M. A. (2014). Study design and implementation of the PINE study. *Journal of Aging and Health*, **26**, 1085–1099. doi:10.1177/0898264314526620

Elder, G. H., & Johnson, M. K. (2003). The life course and aging: Challenges, lessons, and new directions. In R. A. Settersten (Ed.), *Invitation to the life course: Toward new understandings of later life* (pp. 49–81). Amityville, NY: Baywood.

Gomez, V., Krings, F., Bangerter, A., & Grob, A. (2009). The influence of personality and life events on subjective well-being from a life span perspective. *Journal of Research in Personality*, **43**, 345–354. doi:10.1016/j.jrp.2008.12.014

Guo, M., Li, S., Liu, J., & Sun, F. (2015). Family relations, social connections, and mental health among Latino and Asian older adults. *Research on Aging*, **37**, 123–147. doi:10.1177/0164027514523298

Guo, M., & Stensland, M. (2017). A systematic review of correlates of depression among older Chinese and Korean immigrants in the United States: What we know and don't know. *Aging & Mental Health*. doi:10.1080/13607863.2017.1383971

Guo, M., Liu, J. Y., Xu, L., Mao, W. Y., & Chi, I. (2018). Intergenerational relations and psychological well-being of Chinese older adults with migrant children: Does internal or international migration make a difference? *Journal of Family Issues*, **39**, 622–643. doi:10.1177/0192513x16676855

Infurna, F. J., Gerstorf, D., & Zarit, S. H. (2011). Examining dynamic links between perceived control and health: Longitudinal evidence for differential effects in midlife and old age. *Developmental Psychology*, **47**, 9–18. doi:10.1037/a0021022

Jordanova, V., Stewart, R., Goldberg, D., Bebbington, P. E., Brugha, T., Singleton, N., … Meltzer, H. (2007). Age variation in life events and their relationship with common mental disorders in a national survey population. *Social Psychiatry and Psychiatric Epidemiology*, **42**, 611–616. doi:10.1007/s00127-007-0209-9

Katz, S., Ford, A. B., Moskowitz, R. W., Jackson, B. A., & Jaffe, M. W. (1963). Studies of illness in the aged. The index of ADL: A standardized measure of biological and psychosocial function. *The Journal of the American Medical Association*, **185**, 914–919.

Kim, M. T., Kim, K. B., Han, H. R., Huh, B., Nguyen, T., & Lee, H. B. (2015). Prevalence and predictors of depression in Korean American elderly: Findings from the Memory and Aging Study of Koreans (MASK). *The American Journal of Geriatric Psychiatry*, **23**, 671–683. doi:10.1016/j.jagp.2014.11.003

Kim, T., Nguyen, E. T., Yuen, E. J., Nguyen, T., Sorn, R., & Nguyen, G. T. (2015). Differential role of social connectedness in geriatric depression among Southeast Asian ethnic groups. *Progress in Community Health Partnerships: Research, Education, and Action*, **9**, 483–493. doi:10.1353/cpr.2015.0075

Lawton, M. P., & Brody, E. M. (1970). Assessment of older people: Self-maintaining and instrumental activities of daily living. *Nursing Research*, **19**, 278.

Leach, M. A. (2008). America's older immigrants: A profile. *Generations*, **32**, 34–39.

Lee, Y. M. (2015). Somatic symptoms and depressive symptoms among older adult Korean immigrants. *Journal of Gerontological Nursing*, **41**, 50–58. doi:10.3928/00989134-20140609-01

Liu, J. Y., Guo, M., Xu, L., Mao, W. Y., & Chi, I. (2017). Family relationships, social connections, and depressive symptoms among Chinese older adults in international migrant families. *Journal of Ethnic & Cultural Diversity in Social Work*, **26**, 167–184. doi:10.1080/15313204.2016.1206496

Lum, T. Y., & Vanderaa, J. P. (2010). Health disparities among immigrant and non-immigrant elders: The association of acculturation and education. *Journal of Immigrant and Minority Health*, **12**, 743–753. doi:10.1007/s10903-008-9225-4

Marin, G., Sabogal, F., Marin, B. V., Otero-Sabogal, R., & Perez-Stable, E. J. (1987). Development of a short acculturation scale

for Hispanics. *Hispanic Journal of Behavioral Sciences*, **9**, 183–205.

Marinova-Todd, S. H., Marshall, D. B., & Snow, C. E. (2000). Three misconceptions about age and L2 learning. *TESOL Quarterly*, **34**, 9–34. doi:10.2307/3588095

Murrell, S. A., Himmelfarb, S., & Wright, K. (1983). Prevalence of depression and its correlates in older adults. *American Journal of Epidemiology*, **117**, 173–185.

National Alliance on Mental Health. (2011). Chinese American mental health. Retrieved from http://www.namisa.org/uploads/5/0/7/8/5078292/chinese_american_mh_facts2011.pdf

Perkins, D. D., Florin, P., Rich, R. C., Wandersman, A., & Chavis, D. M. (1990). Participation and the social and physical environment of residential blocks: Crime and community context. *American Journal of Community Psychology*, **18**, 83–115.

Pew Research Center. (2013). *The rise of Asian Americans*. Washington, DC: Population Reference Bureau Pew Research Center. Retrieved from http://assets.pewresearch.org/wp-content/uploads/sites/3/2013/04/Asian-Americans-new-full-report-04-2013.pdf

Scheibe, S., English, T., Tsai, J. L., & Carstensen, L. L. (2013). Striving to feel good: Ideal affect, actual affect, and their correspondence across adulthood. *Psychology and Aging*, **28**, 160–171. doi:10.1037/a0030561

Scommegna, P. (2013). Elderly immigrants in the United States. Washington, DC. Retrieved from http://www.prb.org/Publications/Reports/2013/us-elderly-immigrants.aspx

Simon, M. A., Chang, E.-S., Rajan, K. B., Welch, M. J., & Dong, X. (2014). Demographic characteristics of US Chinese older adults in the greater Chicago area: Assessing the representativeness of the PINE study. *Journal of Aging and Health*, **26**, 1100–1115. doi:10.1177/0898264314543472

Simon, M. A., Chang, E. S., Zhang, M., Ruan, J., & Dong, X. (2014). The prevalence of loneliness among U.S. Chinese older adults. *Journal of Aging and Health*, **26**, 1172–1188. doi:10.1177/0898264314533722

Sorkin, D. H., Pham, E., & Ngo-Metzger, Q. (2009). Racial and ethnic differences in the mental health needs and access to care of older adults in California. *Journal of the American Geriatrics Society*, **57**, 2311–2317. doi:10.1111/j.1532-5415.2009.02573.x

Tran, D. T., Jorm, L., Johnson, M., Bambrick, H., & Lujic, S. (2015). Effects of acculturation on lifestyle and health status among older Vietnam-born Australians. *Asia-Pacific Journal of Public Health*, **27**, NP2259–NP2274. doi:10.1177/1010539513491419

Treas, J. (2008). Transnational older adults and their families. *Family Relations*, **57**, 468–478. doi:10.1111/j.1741-3729.2008.00515.x

Wong, S. T., Yoo, G. J., & Stewart, A. L. (2007). An empirical evaluation of social support and psychological well-being in older Chinese and Korean immigrants. *Ethnicity & Health*, **12**, 43–67. doi:10.1080/13557850600824104

Woodward, A. T., Taylor, R. J., Bullard, K. M., Aranda, M. P., Lincoln, K. D., & Chatters, L. M. (2012). Prevalence of lifetime DSM-IV affective disorders among older African Americans, Black Caribbeans, Latinos, Asians and non-Hispanic White people. *International Journal of Geriatric Psychiatry*, **27**, 816–827. doi:10.1002/gps.2790

Wu, Z., & Penning, M. (2015). Immigration and loneliness in later life. *Ageing & Society*, **35**, 64–95. doi:10.1017/s0144686x13000470

Wurm, S., Tomasik, M. J., & Tesch-Römer, C. (2008). Serious health events and their impact on changes in subjective health and life satisfaction: The role of age and a positive view on ageing. *European Journal of Ageing*, **5**, 117–127. doi:10.1007/s10433-008-0077-5

Zong, J., & Batalova, J. (2017). *Chinese immigrants in the United States*. Washington, DC: Migration Policy Institute.