HHS Public Access

Author manuscript

J Aging Health. Author manuscript; available in PMC 2023 February 21.

Published in final edited form as:

J Aging Health. 2014 October ; 26(7): 1116–1136. doi:10.1177/0898264314543471.

A Psychometric Assessment of the Psychological and Social Well-Being Indicators in the PINE Study

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Abstract

Objective: This report aims to establish the reliability and validity of five psychological and social well-being indictors in their applications to a U.S. Chinese aging population.

Method: The Population Study of Chinese Elderly in Chicago (PINE) is a population-based epidemiological study of Chinese older adults in the Greater Chicago area. Internal consistency reliability was assessed by determining the coefficient alpha and inter-item correlation coefficients. Content validity was assessed by bilingual and bicultural study researchers and community leaders.

Results: The reliability and validity analysis supported the use of the Chinese version of the psychological and social well-being indicators in the PINE study. The value of Cronbach's alpha for fives scales ranged from .64 to .82, indicating reasonable internal consistency. Content validity was established through intensive review by a panel of experts.

Discussion: The instruments discussed in this report are reliable and valid measures to assess key dimensions of psychological and social distress of Chinese older adults.

Keywords

population-based study; aging; psychometrics

Introduction

The development of adequate measurements is an essential prerequisite for psychological and social research on the well-being of older adults. Evidence supports that psychological and social distress is a major cause of morbidity and mortality, which imposes an immense burden on older adults, family members, communities, and health services (Dong, Simon, et al., 2011; Dong, Simon, et al., 2009). Furthermore, minority older adults are more likely to be disproportionally affected by psychological and social distress including forms of

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Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

depressive symptoms, loneliness, or issues of elder abuse and lack of social support (Dong, Chen, Chang, & Simon, 2013; Kim et al., 2010; Mui, 1996a).

However, barriers exist to the timely detection of distress and intervention with at-risk minority older adults. Culture has been reported as a critical factor that is intertwined with health beliefs, values, preferences, and practices, which often shape the expression of distress and have a significant impact on the clinical presentation of distress of related problem (Kleinman, 1980; Kleinman, Eisenberg, & Good, 1978). In light of the limited evidence of psychometrically sound screening instruments that are culturally sensitive and linguistically appropriate, an accurate assessment of psychological and social well-being of Chinese older adults may thus be challenging (Dong et al., 2010; Mui, 1996b).

The Chinese community is the largest and the fastest growing Asian American subgroup population in the United States, numbering approximately 4 million (American Community Survey, 2011). Whereas the U.S. Chinese population is becoming a larger proportion of the country's growing minority–majority, population-based research on the health of Chinese older adults has been scarce. In view of this issue, the objective of this study is to investigate the psychometric properties of several psychological and social well-being indictors in their applications to a U.S. Chinese aging population drawn from the Population Study of Chinese Elderly in Chicago (PINE). These measures include: (a) Patient Health Questionnaire–9 (PHQ-9); (b) Three-item loneliness scale from the Revised University of California at Los Angeles (R-UCLA) Loneliness Scale; (c) Perceived Social Support Measure drawn from the National Social Life, Health, and Aging Project (NSHAP); (d) Filial Piety Measure drawn from Gallois and colleagues, 1999; (e) Elder abuse Screening Measure modified from the Hwalek–Sengstok Elder Abuse Screening Test (H-S/EAST) and Vulnerability to Abuse Screening Scale (VASS). A brief introduction of these indicators, including the historical developments, and existing research gaps, are summarized as follows:

PHQ-9

Developed in the mid-1990s, PHQ-9 is the self-report version of the Primary Care Evaluation Mental Disorders (PRIME-MD) that is used as a screening and diagnostic tool for mental health disorders including depression. It comprises of nine diagnostic symptom criteria that correspond to the diagnosis of the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association, 1994), which is the criteria for major depressive disorder. With nine items, PHQ-9 is substantially shorter than most other depression screening measures. Evidence suggests that the PHQ-9 is fitting for screening late-life depression, because of its brevity and well-validated measures (Arean & Ayalon, 2006; Nease & Malouin, 2003). In addition, the PHQ-9 scale includes the somatic domains of depressive symptoms that are common in Asian older adults (Donnelly & Kim, 2008). There is a growing body of literature supporting the excellent psychometric properties of PHQ-9 instrument in the aging population in Western countries (Lamers et al., 2008; Richardson, He, Podgorski, Tu, & Conwell, 2010; Tomaszewski et al., 2011), Asian countries including China and South Korea (Chen et al., 2010; Han et al., 2008), as well as Chinese American population (Chen et al., 2010; Yeung et al., 2010; Yeung et al., 2008).

However, to our knowledge, validation studies of its use among U.S. Chinese older adults have been limited.

Three-Item Loneliness Scale

R-UCLA Loneliness Scale is a well-validated 20-question instrument developed to measure loneliness—a distinct psychological construct (Russell, Peplau, & Cutrona, 1980). As one of the most widely used measures of loneliness, the scale was developed to assess subjective feelings of loneliness or social isolation, and items for the original version of the scale were based on statements used by lonely individuals to describe feelings of loneliness. Scores on the loneliness scale have been found to predict adverse mental and physical health outcomes (Russell et al., 1980). In view of the 20-item R-UCLA scale may be too long and complex for a large survey, a 3-item R-UCLA scale with simplified response categories was subsequently developed (Hughes, Waite, Hawkley, & Cacioppo, 2004). Despite studies support good reliability and internal validity of the scale in the general population, the reliability and validity of the 3-item R-UCLA scale to Chinese American older adults remains to be established.

Perceived Social Support Measure

Drawn from the NSHAP, the perceived social support measure provides a comprehensive basis for analyses of social support in population-based studies of older adults. Social support were assessed through understanding the quality of support from three different sources of support, including spouse, family members, and friends. The support acts were categorized under positive support (open up and rely on) and negative strain (make demands and criticize), as key indicators of the relationship quality (Cornwell & Waite, 2009; Waite & Das, 2010). Factor analysis studies have confirmed the structure of two domains and showed evidence in its associations to psychological well-being (Siovitz-Erza & Leitsch, 2010; Walen & Lachman, 2000). Although the measure has been validated in a U.S. national representative sample, its psychometric properties of the measure's Chinese version remain relatively unknown.

Filial Piety Measure

Filial piety is a holistic concept in Chinese culture that encompasses both material and mental support from young generation to the old (Ho, 1996). Evidence suggests that the perception of filial piety has an important impact on the psychological and social well-being of Chinese older adults. (Dong, Chang, Wong, & Simon, 2012; Mjelde-Mosse, Chi, & Lou, 2006). Despite its significance in intergenerational relationships of Chinese families, filial piety has been relatively under-researched in gerontological literature. One of the most immediate research needs is to develop a valid and reliable instrument to assess the perception of filial piety from the viewpoints of older adults. Based on extensive theoretical and empirical work of researchers in the Asian communities (Gallois et al., 1999; Sung, 1995), Filial Piety Measure was planned around six main areas from behavioral orientation and emotional orientation factors. The filial piety acts included respect, make happy, greet, care, obey, and financial support. To our knowledge, the measure has not been validated in the Chinese population.

Elder Abuse Screening Measure

A 10-question elder abuse screening measure is modified from H-S/EAST (Hwalek & Sengstock, 1986; Schofield & Mishra, 2003) and VASS (Schofield & Mishra, 2003). There are many screening tools aimed to detect elder abuse in various settings including community, clinical and institutional settings. Many measures may be lengthy and capture specific subtypes of abuse (Fulmer, Guadagno, Bitondo, & Connolly, 2004). The development of the H-S/EAST followed a larger effort to identify indicators and to detect circumstances considered correlates of the presence of elder abuse, and not intended to target specific symptoms of abuse. Based on similar conceptual backgrounds, items in H-S/EAST and VASS were brief, were easily administered, and identify general facets of elder abuse instead of subtypes. Modified VASS has been administered in Chinese aging populations both in mainland China and the United States, and demonstrated good internal consistency (Dong, Beck, & Simon, 2009; Dong, Chang, Wong, Wong, & Simon, 2011; Dong, Simon, & Gorbien, 2007). However, the application of H-S/EAST and VASS scales to U.S. Chinese older adults needs further exploration.

Method

Population and Settings

Data were derived from the PINE. The PINE study is a community-engaged population-based study of 3,159 Chinese older adults aged 60 and above in Greater Chicago area. The PINE Study is designed to understand the complex relationships between these indicators of psychological and social well-being. With limited time for the in-home interview, the measurements of psychological and social well-being needed to maintain reliable, and valid, yet culturally and linguistically sensitive for the target population. Psychological and social well-being was operationalized through measures including depression, loneliness, social support, filial piety, and elder abuse. All study procedures were approved by the institutional review boards of the Rush University Medical Center.

With a culturally and linguistically sensitive study design guided by community-based participatory research approach (CBPR), the PINE study is the product of a synergistic collaboration between academic (Rush University Medical Center) and community partners in the Greater Chicago area. The community advisory board (CAB) plays a pivotal role in providing insights and strategies for conducting research. The board is composed of community leaders and stakeholders from a variety of organizations who have frequent interactions with the aging population and a broad range of expertise in community fairs. CAB members worked extensively with the investigative team to identify health needs, evaluate instruments, and recruit participants with the goal of ensuring cultural sensitivity and appropriateness.

Study Procedures

The PINE study was conducted from 2011 to 2013. Participants aged 60 and above at the point of the interview were invited to the in-person survey with trained multi-lingual and multi-cultural research assistants. All participants were consented and interviewed in either Chinese (Cantonese or Mandarin) or English. With more than 20 social services agencies,

community centers, health advocacy agencies, faith-based organizations, senior apartments, and social clubs serving as the basis of study recruitment sites, eligible participants were approached through routine social services and outreach efforts serving Chinese Americans families in the Chicago city and suburban areas. Out of 3,542 eligible participants, 3,159 agreed to participate in the study, yielding a response rate of 91.9%. The study was approved by the Institutional Review Boards of the Rush University Medical Center. More detailed descriptions of the study design and recruitment procedure have been reported elsewhere (Dong, Wong, & Simon, 2014).

Measures

Depression—The PHQ-9 scale instrument has nine questions about how often the participant has been bothered by depressive symptoms during the past 2 weeks, each of which is scored 0 (“not at all”), 1 (“several days”), 2 (“a week or more”), or 3 (“nearly every day”). Responses are summarized for a total score, with higher scores indicating higher severity of depressive symptoms: 0 to 4 indicates no depression, 5 to 9 mild depression, 10 to 14 moderate depression, 15 to 19 moderately severe depression, and 20 to 27 for severe depression.

Loneliness—In the three-item R-UCLA Loneliness Scale, questions were asked regarding feelings of lacking companionship, feeling left out of life, and feeling isolated from others. The response categories were coded 1 (hardly ever), 2 (some of the time), and 3 (often). Each participant’s responses to the questions are then summarized, with higher scores indicating greater levels of loneliness.

Social support—Participants’ levels of social support were assessed through understanding the frequency of receipt of support from spouse, family members, and friends, respectively. Positive support was measured by how often they open up to spouse/family members/friends, and how often they rely on spouse/family members/friends for help. Negative strain was measured how often they feel their spouse/family members/friends demand too much on them, and how often they have been criticized by spouse/family members/friends. Respondents indicated answers to each question on a three-point scale ranging from 0 = *hardly ever* to 3 = *often*.

Filial piety—To examine older adults’ expectations and perceived performance of filial piety care among children, the 12-item-assessment is comprised of six filial actions (respect, make happy, care, greet, obey, and financial support) derived from two main components, including behavior orientations and emotional orientations. We first explored participants’ expectation of each of the six filial piety actions, using a five-point scale (5 = *very much* and 1 = *very little*). For example, how much do you expect your children to respect you? How much do you expect your children to care for you? We then asked respondents that in actuality, the amount of filial piety care received from children in the six filial piety actions from the viewpoints of older adults, with the same response scale. For instance, how much do your children respect you? How much do your children care for you? Participants who reported having no children would not have answered the questions.

Elder abuse—Participants were asked whether any of the 10 acts occurred after they turned 60. We defined physical abuse as the willful infliction of injury, or cruel punishment resulting in physical harm and pain. For example, we asked “Has anyone close to you tried to hurt or harm you?” We assessed psychological abuse by asking “Has anyone close to you called your names or put you down or made you feel bad recently?” Caregiver neglect was defined as the failure of caregivers to provide goods or services necessary for the well-being of older adults. For instance, we ask “Has someone in your family made you stay in bed or tell you that you are sick when you know you are not?” Financial exploitation was assessed by asking “Is there anyone who has taken your money without you ok?” The answers were coded as yes or no.

Statistical Analysis

The psychometric properties of the aforementioned measures were examined to validate their adequacy and expand use with U.S. Chinese older adults. Internal consistency reliability was assessed by determining the coefficient alpha and inter-item correlation coefficients. The coefficient alpha is a measure of the degree to which scale items measure a homogeneous construct and is among one of the most important index of test reliability (Henson, 2001; Kline, 2000). An alpha of .6 or above is considered acceptable. Content validity was assessed by a group of bilingual and bicultural study researchers and experts in both Chinese cultural issues and health and aging topics. Missing data for the PHQ-9, the three-item R-UCLA scale, the modified VASS and H-S/EAST scales, the Filial Piety measure, and the perceived social support measure were 0.57%, 0.95%, 0.60%, 2.41%, and 0.35%, respectively. Data analyses were performed using SAS, Version 9.2

Results

Demographic Characteristics

Of 3,159 participants, 58.9% were female. Their ages ranged from 60 to 105 years with a mean of 72.8, and standard deviation (*SD*) of 8.3. The mean number of years of completed education was 8.7 years (*SD* ± 5.1). The majority of the participants (85.1%) received less than US$10,000 in annual income. The mean years living in the United States was 20.0 (*SD* ± 13.2). With respect to language preferences, 75.7% of the participants preferred to speak in Cantonese or Toishanese dialects, 22.4% of the participants preferred Mandarin, and 2.2% of the participants preferred English. Based on the available census data drawn from U.S. Census 2010 and a random block census project conducted in the Chinese community in Chicago, the PINE study is representative of the Chinese aging population in the Greater Chicago area with respect to key demographic attributes including age, sex, income, education, number of children, and country of origin (Dong, Wong, & Simon, 2014).

Scale Reliability

In the PINE study cohort, the standardized Cronbach’s alpha of PHQ-9 was .82. The inter-item correlations among nine items of the PHQ-9 ranged from .18 to .54 and all correlations were significant at the .001 level (Table 1). The highest inter-item correlation coefficient was shown between “little interests in doing things” and “feeling down, depressed, and

hopeless." The lowest inter-item correlation coefficient was shown between "moving or speaking so slowly that other people could have noticed" and "trouble falling or staying asleep, or sleeping too much."

With respect to the loneliness measurement, studies on a nationally representative sample of U.S. older adults reported its good internal reliability, with a Cronbach's alpha of .81 (Siovitz-Erza & Leitsch, 2010). In our cohort, the alpha coefficient of reliability for the loneliness scale was .78. The inter-item correlations among the three items ranged from .43 to .62, showing that the constructs were not too closely correlated to indicate uni-dimensionality. However, Item 3 (How often do you feel isolated from others?) had a weaker correlation with the other items, and the alpha can be improved to .80 if this item is removed. All correlations were significant at the .001 level (Table 2).

Internal consistency reliability was .88 for the Filial Piety Measure. The inter-item correlations among the 12 items of the measure ranged from .13 to .77 and all correlations were significant at the .001 level (Table 3). Perceived expectations of respect, greet, and happiness showed some of the highest inter-item correlation coefficients, whereas perceived receipt of financial support reported some of the lowest inter-item correlation coefficients with the rest of the items on the expectation subscale.

Perceived Social Support Measure has shown acceptable results of Cronbach's alpha of .64. If items were removed from the spouse or family subscales, the alpha would be lowered, although marginally to .61 to .63. However, the same trend was not observed in the friends subscale (Table 4). In addition, some items in the friends subscale did not show significant correlations to spouse or family support items. This may be interpreted within the Chinese cultural context that family support is often perceived as the pivotal source of comfort and closeness, particularly for immigrant older adults.

For Elder Abuse Screening Measure, studies in Chinese populations in the United States and in Mainland China reported good reliability of the modified VASS scale (Dong, Simon, et al., 2011; Dong et al., 2007). In our study, the modified VASS and H-S/EAST scales reported good reliability, with Cronbach's alpha of .80 (Table 5). All correlations were significant at the .001 level.

Content Validity

The original English versions of the instruments were first translated into Chinese by a bilingual research team. Due to the vast linguistic diversity of our study population, the Chinese version was then back translated by bilingual and bicultural investigators fluent in dialects including Mandarin and Cantonese to confirm consistency in the meaning of the Chinese version with the original English version. Both written scripts (traditional and simplified Chinese characters) were subsequently examined. An experienced bilingual and bicultural geriatrician then led a group of community stakeholders to review the wording of the Chinese versions. To ensure validity, community stakeholders—enlisted from over 20 CAB members—met regularly during CAB meetings in the project preparation phase to ascertain that the meanings of the items in Chinese conveyed the meanings to Chinese older adults.

Discussion

The main objective of this report was to examine the psychometric properties of the Chinese version of psychological and social well-being screening scales administered in a population-based study. Consistent with previous literature on validation studies of PHQ-9, the three-item R-UCLA scale, and the modified VASS and H-S/EAST scales, our analysis show the alpha coefficient of reliability of these three instruments were satisfactory among U.S. Chinese older adults (Chen et al., 2010; Dong et al., 2007; Dong, Simon, et al., 2009; Hughes, Waite, Hawkley, & Cacioppo, 2004; Yeung et al., 2008). The Chinese version of PHQ-9 has been validated in a clinical setting of aging Chinese population in mainland China with satisfactory results of Cronbach's alpha of .91 (Chen et al., 2010). In the Chinese American population, PHQ-9 has shown excellent reliability ($\alpha = .91$) in a community sample (Yeung et al., 2008). However, there exists incomplete knowledge in its psychometric properties among community-dwelling U.S. Chinese older adults. To fill in the research gap, our findings suggest that PHQ-9 reported good reliability with an alpha of .82 in the PINE cohort.

With respect to the three-item R-UCLA loneliness measurement, studies on a nationally representative sample of U.S. older adults reported its good internal reliability, with a Cronbach's alpha of .81 (Siovitz-Erza & Leitsch, 2010). Similarly, in our cohort, the alpha coefficient of reliability for the three-item R-UCLA loneliness scale was .78.

With respect to the Elder Abuse Screening Measure, studies in Chinese populations in the United States and in mainland China reported good reliability of the modified VASS scale, with Cronbach's alpha of .79 to .86 (Dong et al., 2007; Dong, Simon, et al., 2009). In the PINE study, the measure also reported good reliability, with Cronbach's alpha of .80. Our findings suggest that although these assessments of depression, loneliness, and elder abuse were developed in the Western cultural contexts, they are appropriate for Chinese older adults.

Evidence suggests that the prevalence of depressive symptoms among Chinese older adults approach those of most Western countries or even higher in some studies (Kuo, Chong, & Joseph, 2008; Lai, 2005; Mui, 1996a; Mui & Kang, 2006; Stokes, Thompson, Murphy, & Gallagher-Thompson, 2001). With demonstrated reliability and validity in this U.S. Chinese aging population, PHQ-9 may serve as a practical instrument for depression screening.

A number of local-context-specific factors were taken into account when adapting this scale among Chinese American older adults. First, its inclusion of somatic depressive items was appropriate to capture the commonly expressed somatic and cognitive symptoms, instead of depressed feelings among Chinese older adults. Due to the cultural tradition of correct social behavior and emphasis on inhibition of emotions, Chinese older adults are more likely to manifest depressive symptoms in somatic terms (Tabora & Flaskerud, 1994). Second, a screening instrument would be best in the form of a simple self-report questionnaire due to the lower literacy and educational level of Chinese older adults. Our findings show that the brevity and the fourchoice answers of PHQ-9 scale worked well in the less-acculturated group of Chinese American older adults, and was therefore suitable for detecting depressive

symptoms in population-based surveys. Moreover, owing to the fact that Chinese older adults exhibit the highest suicide rate compared with other racial and ethnic groups in the United States (Centers for Disease Control and Prevention, 2010; Foo, 2003), PHQ-9 may be fitting to prevent the likelihood of suicide in that the higher score of Item 9 of PHQ-9 scale predicts higher likelihood that the patient is suicidal (Walker et al., 2010). Mental health professionals and practitioners alike are needed to ascertain accurate diagnosis for those who screen positive, examine somatic symptoms that are more prevalent in Chinese older adults, and be able to explain depression to older adults in a culturally sensitive manner with the goal to overcome stigmatization of psychiatric and psychological problems.

Our study not only provides the first population-level confirmation of the internal consistencies of some of the well-known scales in a sample of U.S. Chinese aging population, including PHQ-9 and the three-item R-UCLA scale; but also, our findings provide evidence of sound psychometric properties to assessments of filial piety, social support, and elder abuse among Chinese older adults. Among five well-being indicators, filial piety measure demonstrates excellent reliability. In the area of elder abuse research —an understudied yet prevalent public health issue in global Chinese populations—the screening measure we tested in this study also shows good psychometric properties. Our assessment of these measures helps us gain insights on some of the core cultural ideals in evaluating psychological and social well-being of persons strongly influenced by Confucius teachings.

Traditionally, Chinese culture defines one's role and responsibility in relation to others. The "five relationships" prescribes one's social behaviors, and provide a supportive network that connects individuals together (Mencius & Lau, 2005). Above all, family support comes first. However, during the course of immigration, traditional social relationships may be disrupted due to the vast cultural, social, and economic transitions. U.S. Chinese older adults may find it increasingly difficult to maintain desired social relationships. Studies suggest that these structural, social, and emotional challenges in the context of immigration may weaken intergenerational relationships and social support, which may in turn negatively affect the health of U.S. Chinese older adults, and provides fertile ground for psychological and social distress (Dong, Chang, Wong, & Simon, 2012; Dong, Chang, et al., 2011; Dong et al., 2010). Therefore, developing measurements that are applicable to the older adults in their cultural contexts is instrumental in advancing gerontology research and public health practice.

This study has several limitations. First, the scales were administered to a community-dwelling immigrant population of U.S. Chinese older adults. Therefore, the results may not be generalizable to patients in clinical or institutional settings. For a fuller and wider application of the measurement, future validation studies should also include Chinese older adults in Asian societies. In addition, the PINE study is an in-home person-to-person interview. The instruments were administered by well-trained bilingual and bicultural research assistants in a face-to-face interview setting, which may have influenced participants to provide socially desirable answers and increase the risks of under-reporting. Further studies are warranted to explore the potential bias of interview methods. Third, the study focused on validation and evaluation of psychometric properties of the measurements

in a cross-sectional study design and associations may be temporal. Additional validation studies are needed to examine the temporal stability, convergent and discriminant validity, and inter-rater reliability of these measures. Previous studies have suggested the predictive validity between depression and other psychological well-being measures among general population (Arroll et al., 2010; Martin, Rief, Klaiberg, & Braehler, 2006). Future research is needed to further examine the predictive relationship between depression, social isolation, elder abuse, and other psychological and social well-being measures.

Nevertheless, this study represents the first step in advancing our knowledge in studying the psychological and social well-being of Chinese older adults in the United States. The measures are brief, easy to administer in large population surveys, and demonstrate reasonable to excellent psychometric properties. The reliable tools may also assist public health practitioners and community gatekeepers to assess target problems among Chinese older adults with greater precision.

Conclusion

To our knowledge, this is the first population-based study of U.S. Chinese older adults to examine the psychometric proprieties of psychological and social research instruments. In conclusion, the reliability and validity of the information presented support the use of the Chinese version of the psychological and social well-being indicators in the PINE study. Taken together, the measurements are reliable and valid tools for assessing the health and well-being of U.S. Chinese older adults.

Acknowledgments

We are grateful to the Community Advisory Board members for their continued effort in this project. Particular thanks are extended to Bernie Wong, Vivian Xu, Yicklun Mo with Chinese American Service League (CASL), Dr. David Lee with Illinois College of Optometry, David Wu with Pui Tak Center, Dr. Hong Liu with Midwest Asian Health Association, Dr. Margaret Dolan with John H. Stroger Jr. Hospital, Mary Jane Welch with Rush University Medical Center, Florence Lei with CASL Pine Tree Council, Julia Wong with CASL Senior Housing, Dr. Jing Zhang with Asian Human Services, Marta Pereya with Coalition of Limited English Speaking Elderly, Mona El-Shamaa with Asian Health Coalition.

Funding

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Dr. Dong and Dr. Simon were supported by National Institute on Aging grants (R01 AG042318, R01 MD006173, R01 CA163830, R34MH100443, R34MH100393, P20CA165588, R24MD001650 & RC4 AG039085), Paul B. Beeson Award in Aging, The Starr Foundation, American Federation for Aging Research, John A. Hartford Foundation and The Atlantic Philanthropies.

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Table 1.

PHQ-9 Item-Total Correlations and Correlation Coefficients.

PHQ-9	Alpha if item deleted	1	2	3	4	5	6	7	8	9
Little interest or pleasure in doing things	.79	1.0								
Feeling down, depressed, or hopeless	.78	.54***	1.0							
Trouble falling or staying asleep, or sleeping too much	.80	.31***	.36***	1.0						
Feeling tired or having little energy	.79	.40***	.41***	.49***	1.0					
Poor appetite or overeating	.80	.34***	.36***	.31***	.39***	1.0				
Feeling bad about yourself—or that you are a failure or have let yourself or your family down	.80	.36***	.46***	.26***	.32***	.22***	1.0			
Trouble concentrating on things, such as reading the newspaper or watching television	.80	.38***	.35***	.28***	.38***	.30***	.33***	1.0		
Moving or speaking so slowly that other people could have noticed	.81	.20***	.28***	.18***	.32***	.24***	.24***	.24***	1.0	
Thoughts that you would be better off dead, or of hurting yourself in some way	.82	.22***	.34***	.19***	.21***	.20***	.27***	.20***	.22***	1.0

Note. PHQ-9 = Patient Health Questionnaire–9.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 2.

R-UCLA Loneliness Scale Item-Total Correlations and Correlation Coefficients.

R-UCLA Loneliness Scale	Alpha if item deleted	Lack of companionship	Left out of life	Isolated from others
Lack of companionship	.64	1.0		
Left out of life	.65	.62***	1.0	
Isolated from others	.80	.43***	.43***	1.0

R-UCLA = Revised University of California at Los Angeles.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 3.

Perceived Social Support Measure Item-Total Correlations and Correlation Coefficients.

Source	Social support domains	Alpha if item deleted	Spouse				Family members				Friends			
			Open up	Rely on	Make demands	Criticize	Open up	Rely on	Make demands	Criticize	Open up	Rely on	Make demands	Criticize
Spouse	Open up	.61	1.0											
	Rely on	.61	.58***	1.0										
	Make demands	.62	.12***	.06**	1.0									
	Criticize	.62	.14***	.03	.48***	1.0								
Family members	Open up	.60	.33***	.24***	.08***	.07**	1.0							
	Rely on	.61	.30***	.29***	.03	.01	.62***	1.0						
	Make demands	.63	.03	.05*	.27***	.18***	.00	−.01	1.0					
	Criticize	.62	.05**	.04*	.20***	.32***	.06**	.02	.41***	1.0				
Friends	Open up	.62	.12***	.15***	−.01	.00	.30***	.23***	.02	−.01	1.0			
	Rely on	.63	.11***	.22***	−.05*	−.05*	.22***	.26***	.00	.04*	.63***	1.0		
	Make demands	.64	.01	.03	.14***	.07**	.03	.03	.19***	.08***	−.03	−.03	1.0	
	Criticize	.64	.00	.02	.09***	.16***	.02	.03	.15***	.21***	−.08***	−.07***	.39***	1.0

*$p < .05$.

**$p < .01$.

***$p < .001$.

Table 4.

Filial Piety Measure Item-Total Correlations and Correlation Coefficients.

		Expectation						Perceived receipt					
Filial piety actions	**Alpha if item deleted**	**Care**	**Respect**	**Greet**	**Happiness**	**Obey**	**Financial support**	**Care**	**Respect**	**Greet**	**Happiness**	**Obey**	**Financial support**
Expectation													
Care	.87	1.0											
Respect	.87	.59***	1.0										
Greet	.87	.62***	.73***	1.0									
Happiness	.87	.60***	.74***	.77***	1.0								
Obey	.87	.55***	.63***	.64***	.67***	1.0							
Financial support	.88	.44***	.35***	.39***	.39***	.39***	1.0						
Perceived receipt													
Care	.87	.37***	.13***	.18***	.18***	.19***	.17***	1.0					
Respect	.87	.21***	.31***	.26***	.27***	.26***	.08***	.54***	1.0				
Greet	.87	.22***	.22***	.35***	.29***	.26***	.11***	.57***	.66***	1.0			
Happiness	.87	.26***	.25***	.31***	.43***	.32***	.15***	.56***	.63***	.71***	1.0		
Obey	.87	.25***	.23***	.28***	.33***	.46***	.16***	.49***	.61***	.58***	.64***	1.0	
Financial support	.88	.24***	.17***	.18***	.21***	.16***	.48***	.43***	.28***	.34***	.35***	.33***	1.0

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 5.

Elder Abuse Measure Item-Total Correlations and Correlation Coefficients.

Elder abuse	Alpha if item deleted	Family conflict	Uncomfortable with someone in the family	Nobody wanted around	Gave too much trouble	Afraid of someone	Hurt or harm	Made to stay in bed	Called name or put down	Forced to do things	Belongings taken without okay
Family conflict	.78	1.0									
Uncomfortable with someone in the family	.77	.49***	1.0								
Nobody wanted around	.78	.34***	.47***	1.0							
Gave too much trouble	.78	.32***	.34***	.44***	1.0						
Afraid of someone	.78	.29***	.27***	.22***	.32***	1.0					
Hurt or harm	.78	.28***	.25***	.25***	.26***	.47***	1.0				
Made to stay in bed	.80	.12***	.10***	.10***	.13***	.25***	.28***	1.0			
Called name or put down	.77	.41***	.43***	.38***	.37***	.33***	.31***	.17***	1.0		
Forced to do things	.78	.27***	.27***	.22***	.22***	.39***	.43***	.26***	.31***	1.0	
Belongings taken without okay	.80	.20***	.22***	.22***	.17***	.22***	.24***	.20***	.28***	.35***	1.0

* $p < .05$.

** $p < .01$.

*** $p < .001$.