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### Authors

Ngo-Metzger, Quyen  
Sorkin, Dara H  
Mangione, Carol M  
[et al.](#)

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## Evaluating the SF-36 Health Survey (Version 2) in Older Vietnamese Americans

Quyen Ngo-Metzger, MD, MPH

Dara H. Sorkin, PhD

*University of California, Irvine*

Carol M. Mangione, MD, MSPH

*University of California, Los Angeles*

Barbara Gandek, MS

*Health Assessment Lab, Waltham, Massachusetts*

Ron D. Hays, PhD

*University of California, Los Angeles*

**Objectives:** The SF-36<sup>®</sup> Health Survey (Version 2; SF-36) was evaluated among older Vietnamese Americans to determine whether underlying dimensions of physical and mental health were similar to those of other groups in the United States. **Method:** Field testing of participants from senior centers. **Results:** The study provided support for the reliability and validity of the SF-36. Structural equation modeling provided confirmation of physical and mental health factors. However, the factor loadings for the SF-36 scales were more consistent with previous results from Asian countries than the typical pattern observed in the United States. **Discussion:** As the older populations in the United States become more diverse, it is important to have standardized health-related quality of life measures. However, the conceptualization of physical and mental health and associations among different scales may be different for Asian immigrants than for other groups. Thus, the interpretation of the SF-36 scores needs to account for cultural differences.

**Keywords:** *aging; Vietnamese; health-related quality of life; functional status; SF-36 Health Survey*

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Vietnamese Americans are the fastest growing Asian subgroup in the United States (Barnes & Bennett, 2002). Demographers project that by the year 2030 there will be 3.9 million Vietnamese Americans living in the United States and that they will form the largest Asian American subgroup in California, surpassing the number of Chinese, Japanese, or Filipinos (McPhee & Nguyen, 2000). Vietnamese refugees have come to the United States in multiple waves since the end of the Vietnam War. The first wave of refugees came in 1975, when many Vietnamese with ties to the U.S. government left their country for fear of reprisals from the new communist regime. The second phase occurred between 1978 and 1984, with the boat people fleeing religious and political persecution by escaping on small fishing boats. The third phase, from 1985 to 1990, consisted of Asian American children of U.S. servicemen and Vietnamese mothers. The fourth phase of immigration began in 1990, when the U.S. government's Humanitarian Operation allowed political prisoners recently released from communist labor camps to immigrate to the United States (Ong & Blumenberg, 1994) when the majority of older Vietnamese Americans migrated as political refugees.

Recent data from the National Health Interview Survey showed that Vietnamese immigrants reported poorer health than other Asian immigrants (Frisbie, Cho, & Hummer, 2001; Kuo & Porter, 1998). Older Vietnamese immigrants are at particularly high risk for physical and mental distress as a result of migrating later in life (age >55 years) and because of premigration trauma suffered when they were in communist labor camps and refugee camps. A high prevalence of depression and posttraumatic stress syndrome as a result of torture and imprisonment has been documented (Buchwald, Manson, Dinges, Keane, & Kinzie, 1993; Hinton et al., 1993; Kinzie, Boehnlein, Riley, & Sparr, 2002; Kinzie et al., 1982; Mollica, Wyshak, de Marneffe, Khuon, & Lavelle, 1987; Smith Fawzi et al., 1997). A total of 23% of Vietnamese women in a study in California were estimated to have clinical depression (McPhee et al., 1997). Data from the National Health Interview Survey show that 17% of Vietnamese (age adjusted) report fair or poor health compared with 9% of non-Hispanic Whites (Kuo & Porter, 1998).

Some studies have documented that older Vietnamese refugees have more adjustment and language acculturation problems than their younger counterparts (Strumpf, Glicksman, Goldberg-Glen, Fox, & Logue, 2001; Tran, 1990). Many elders reported a sense of loss and dislocation, along with feelings of linguistic and cultural isolation from mainstream American society (Strumpf et al., 2001). There are little data on their health-related quality of life (HRQOL). This lack of data may be the result of their linguistic isolation, because previous research has shown that individuals with

limited English-language proficiency are often excluded from research (Frayne, Burns, Hardt, Rosen, & Moskowitz, 1996). Developing culturally and linguistically appropriate quality of life instruments is the first step toward accurately measuring the HRQOL in this population.

The SF-36<sup>®</sup> Health Survey (SF-36) is a commonly used instrument to measure HRQOL (Ware & Sherbourne, 1992). It has been translated into more than 55 languages and has been widely used in the United States, Europe, and much of Asia (Ware & Gandek, 1998b). However, it has not been evaluated for use among older Vietnamese Americans. We do not know how well an instrument developed in Caucasian populations, such as the SF-36, would work in this population.

Previous research has suggested that Asian cultures categorize the body/physical and mind/psychological paradigm differently than Western cultures (Torsch & Ma, 2000; Yee, 1999; Yee, Nguyen, & Ha, 2003). Past evaluations of the SF-36 among Asians have shown cultural differences in the response patterns to the survey compared with those of the U.S. and Western European populations. For example, several studies conducted among Chinese Americans demonstrated that they conceptualize social roles and social functioning differently compared with the general U.S. population (Azen et al., 1999; Chang, Chun, Takeuchi, & Shen, 2000; Lubetkin, Jia, & Gold, 2003; Ren, Amick, Zhou, & Gandek, 1998). Furthermore, other studies done in Japan and Taiwan showed stronger correlations of the concepts of energy level and body pain with mental health (rather than physical health, as in Caucasian populations; Fuh, Wang, Lu, Juang, & Lee, 2000; Fukuhara, Ware, Kosinski, Wada, & Gandek, 1998; Tseng, Lu, & Gandek, 2003). It is unknown whether Vietnamese Americans conceptualize HRQOL similarly when compared with other Asian groups or the general U.S. population. Although the physical and mental components of the SF-36 have been widely evaluated and described in other populations, similar studies have not been conducted among Vietnamese Americans. Thus, we evaluated the nature of the underlying physical and mental dimensions of the SF-36 in this population. We hypothesized that older Vietnamese Americans would conceptualize their health more like other Asians than like the general U.S. population.

## **Method**

### **Instrument Development**

The Vietnamese Elders Health Survey included items regarding functional limitations in activities of daily living (ADL; adapted from Gill,

Hardy, & Williams, 2002; Gill, McGloin, Gahbauer, Shepard, & Bianco, 2001), the Geriatric Depression Scale–Short Form (GDS; Yesavage et al., 1982), and the SF-36 Health Survey (Version 2; Ware & Sherbourne, 1992). It also included items adapted from an acculturation scale that has been previously evaluated among Vietnamese Americans (Anderson et al., 1993). The scale measured the degree to which the respondent adopted the mainstream cultural patterns versus their native culture, including questions about preferences in language use (Vietnamese vs. English), social activities, and food. It included questions such as “What language do you use with most of your friends?” and “What language do you use at family gatherings?” Response categories included the following: only Vietnamese, mostly Vietnamese, Vietnamese and English equally, mostly English, and only English. Cronbach’s alpha for the scale was .82.

To assess functional limitations in ADL, eight items queried whether the respondent had difficulty and/or needed assistance walking, bathing, dressing, or getting in and out of a chair (Gill et al., 2001, 2002). For each ADL task, participants were asked two separate questions: (a) Within the last month, did you need help from another person to complete the task? (b) Within the last month, have you had difficulty with the task? Each task was scored as 0 for no help and no difficulty, 1 for difficulty but no help, and 2 for help regardless of difficulty. A summary score for ADL disability was created with a range of 0 to 8.

We used the GDS to assess depressive symptoms. The GDS contained 15 items that focus on the affective aspects of depression, such as feeling sad, hopeless, and helpless (Cwikel & Ritchie, 1988). The scale included questions such as “Do you feel happy most of the time?” and “Do you feel that your situation is hopeless?” Answer categories were yes/no. Scores ranged from 0 to 15, with scores between 0 and 4 considered normal, scores 5 to 9 indicating mild depression, and scores 10 to 15 indicating moderate to severe depression (Sheikh & Yesavage, 1986).

The SF-36 consists of 36 items that measured the following eight concepts: limitations in physical activities because of health problems (physical functioning), limitations in usual role activities because of physical health problems (role–physical), bodily pain (bodily pain), general health perceptions (general health), energy and fatigue (vitality), limitations in social activities because of physical or emotional problems (social functioning), limitations in usual role activities because of emotional problems (role–emotional), and psychological distress and well-being (mental health; Ware & Sherbourne, 1992).

The International Quality of Life Assessment (IQOLA) project was established to translate and evaluate the SF-36 and to establish norms for

standardized comparisons of population health internationally (Ware & Gandek, 1998b). Although this study was not part of the original IQOLA project, we followed the research protocols of the IQOLA project to produce the Vietnamese version of the SF-36 for use in the United States. This three-stage research protocol has been fully described elsewhere (Bullinger et al., 1998; Wagner et al., 1998). In brief, translation and adaptation procedures focused on translation of the SF-36 such that conceptual equivalence was maintained as much as possible while generating a translated version that was culturally appropriate (Bullinger et al., 1998; Wagner et al., 1998). Translators were bilingual individuals whose native language was the target language but who were fluent in English (Bullinger et al., 1998). Four bilingual individuals not involved in the translation process, including two clinicians, rated the quality of the translation. In addition, monolingual individuals with expertise in evaluating and using the SF-36 (BG and RH) took part in the committee reviews to reach consensus. Cognitive testing was done and results were used in an iterative translation process (Fowler, 1995).

### **Field Test**

The survey was tested among individuals recruited from three senior centers in Orange County, California. Orange County is home to the largest Vietnamese community in the United States, with a population of approximately 150,000 Vietnamese Americans. The three senior centers are in different cities in Orange County but are all located in geographic areas with large concentrations of Vietnamese Americans. Two of the three senior centers are primarily places where seniors can gather and socialize. The third senior center, in addition to being a meeting place for social activities, also provided physical rehabilitation services. Individuals were recruited in the context of a health fair held at each of the senior centers. Advertisements for the health fairs and the surveys were conducted on Vietnamese-language radio and newspapers. In addition, bilingual staff of the senior centers promoted the health fairs and surveys among their Vietnamese clients. Of the 236 individuals who came to the health fairs, 94% participated in the survey, 5% refused, and 1% was ineligible because of being less than 55 years old.

### **Data Analyses**

We used the IQOLA project approach to evaluate the reliability and validity of the translated Vietnamese SF-36 (Ware & Gandek, 1998a). Data analyses were conducted using SPSS 13.0 and AMOS 5.0 (Arbuckle, 2003; SPSS,

2005). Individual SF-36 items were scored using the standard *T*-score metric relative to the U.S. general population (Ware, Kosinski, & Dewey, 2000).

First, we compared summary statistics stemming from our Vietnamese version of the SF-36 with results previously obtained using the English version among older adults living in the United States. Next, item-level analyses were conducted to evaluate whether items met assumptions underlying scoring them as simple summated multi-item scales (Hays & Hayashi, 1990).

For each of the eight SF-36 scales, item-total correlations were evaluated as a measure of item convergence. Item-total correlations  $>.40$  were selected as the accepted standard (Hays, Hayashi, Carson, & Ware, 1988). In addition, we assessed item discrimination for each item and its hypothesized scale by comparing the item-total correlations within the scale with item-total correlations with the other seven remaining scales. We estimated internal consistency reliability of scales using Cronbach's alpha and correlations between scales.

Two underlying dimensions (physical and mental health) have been shown to underlie the eight SF-36 scales in the U.S. general population (Ware, Kosinski, & Keller, 1994; Ware & Sherbourne, 1992). We evaluated this model and an alternative model based on previous studies of the SF-36 among Asians and Asian Americans (Azen et al., 1999; Chang et al., 2000; Fuh et al., 2000; Fukuhara et al., 1998; Ren et al., 1998; Thumboo et al., 2001; Tseng et al., 2003). We compared goodness of fit of the two models using the comparative fit index (CFI) and the root mean square error of approximation (RMSEA; Bentler, 1990; Bentler & Bonett, 1980; Browne & Cudeck, 1993).

We then examined construct validity for the two physical and mental health latent constructs using the structural equation model that best fits the data. Specifically, we hypothesized that the mental health latent construct would correlate more strongly with the GDS and less so with limitations in ADL, controlling for gender and age. We also hypothesized that the physical health latent construct would correlate more strongly with ADL limitations and less so with the GDS, controlling for gender and age.

## Results

Table 1 describes the characteristics of the sample. The mean age was 69.12 years (standard deviation [*SD*] = 7.57), and 58% were males. The majority of the sample had less than a high school education. All were

**Table 1**  
**Demographic and Health Characteristics of the Sample (N = 211)**

	<i>n</i>	<i>%</i>	<i>M</i>	<i>SD</i>
Age (years)				
55-64	65	32.0		
65-74	84	41.0		
75-84	49	24.1		
85 and older	5	2.5		
Gender (male)	123	58.3		
Education (years)				
Eighth grade or less	81	38.4		
Some high school	39	18.5		
High school graduate	59	28.0		
Some college	11	5.2		
College graduate or more	18	8.5		
Years living in the United States				
0-10 years	87	43.9		
11-20 years	76	38.4		
21-30 years	30	15.2		
31 years or more	5	2.5		
Country of birth				
Vietnam	202	95.7		
Taiwan or Hong Kong	5	2.4		
Other country (not United States)	3	1.4		
Marital status				
Never married	3	1.4		
Married	150	71.1		
Divorced/separated	16	7.5		
Widowed	40	19.0		
Functional limitations in ADL			1.81	2.50
0	98	47.1		
1	36	17.3		
2	19	9.1		
3-5	27	13.0		
6 or more	28	13.5		
Depressive symptoms			6.47	4.03
0-3	58	27.5		
4-6	62	29.4		
7-9	39	18.5		
10 or more	52	24.6		

Note: *SD* = standard deviation; ADL = activities of daily living.

foreign born, with the mean age at the time of immigration being 55.49 years (*SD* = 13.06). Although the majority of the participants had lived in the United States for more than 10 years, on average they scored low on



**Table 2**  
**Reliability Coefficients (in Diagonals) and**  
**Correlations Between SF-36 Scales**

SF-36 Scales	PF	RP	BP	GH	VT	SF	RE	MH
PF	(.89)							
RP	.50	(.85)						
BP	.42	.49	(.76)					
GH	.45	.43	.64	(.74)				
VT	.37	.45	.66	.69	(.79)			
SF	.40	.53	.65	.50	.60	(.67)		
RE	.47	.66	.46	.42	.37	.53	(.83)	
MH	.28	.40	.60	.58	.64	.57	.41	(.80)

Note: PF = physical functioning; RP = role-physical; BP = bodily pain; GH = general health; VT = vitality; SF = social functioning; RE = role-emotional; MH = mental health.

the measure of acculturation ( $M = 16.31$ ;  $SD = 14.08$ ; range, 0 = *least acculturated* to 100 = *most acculturated*). A total of 53% had one or more functional limitations in ADL, and 25% met criteria for moderate to severe depression.

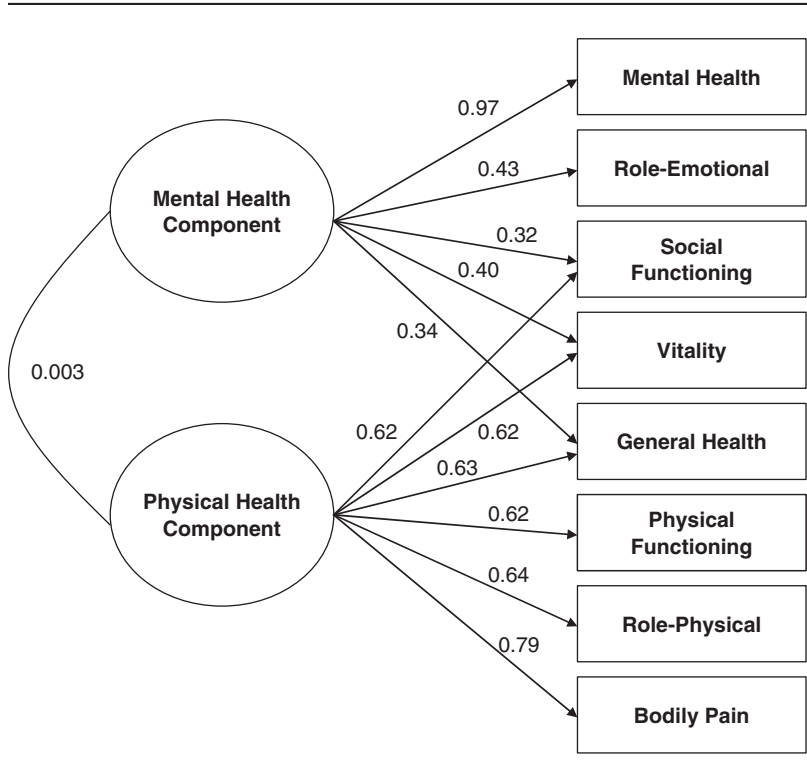
Item-level analyses showed that each of the SF-36 items correlated more highly with its own hypothesized scale than with the other seven scales (results not shown, available on request from Ngo-Metzger, first author). Internal consistency reliability estimates for all scales were greater than .70, except the Social Functioning Scale (Table 2). The slightly lower alpha coefficient (.67) for the Social Functioning Scale is consistent with other studies (Azen et al., 1999; Tseng et al., 2003).

### Factor Structure

Figure 1 shows the fit of the model corresponding to the typical structure of the SF-36 (Model I) with physical health defined uniquely by physical functioning, role limitations because of physical health, bodily pain, and general health perceptions. Mental health was defined uniquely by the mental health scale and role limitations because of emotional problems. Vitality, social functioning, and general health perceptions were allowed to load on both physical and mental health.

Figure 2 shows the alternative Asian model (Model II), which is based on the factor structure found in previous SF-36 studies conducted among diverse groups of Asians. In this model, physical health is defined uniquely

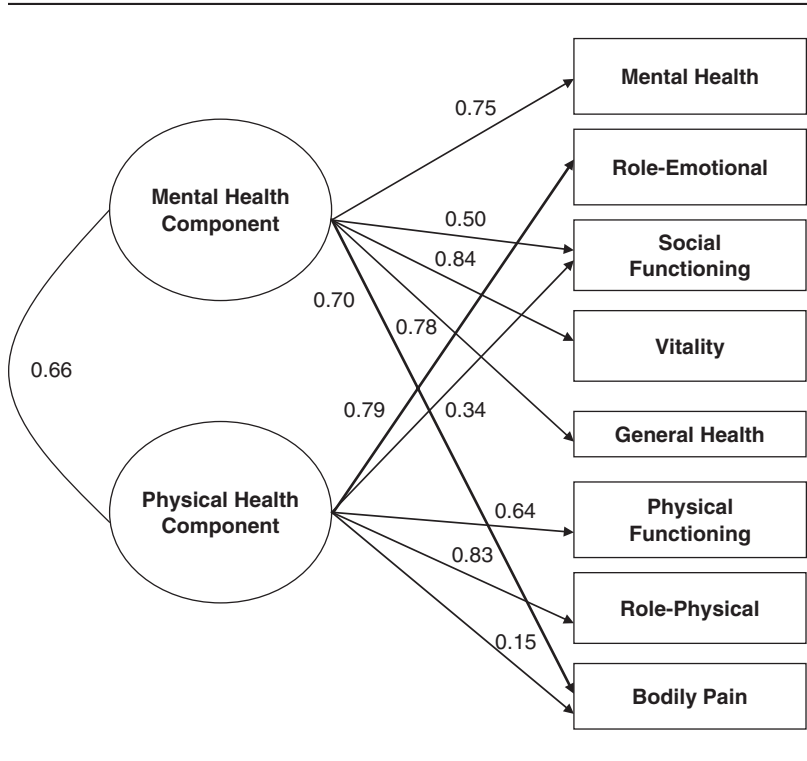
**Figure 1**  
**Structural Equation Model Using U.S. General Population Mental and Physical Health Factor Structures (Model I)**



by physical functioning, role limitations because of physical health, and role limitations because of emotional problems. Mental health is defined uniquely by the mental health scale, vitality, and general health perceptions. Bodily pain and social functioning are allowed to load on both physical and mental health.

Table 3 compares the two models. The bodily pain scale, which in prior studies in the United States is typically associated with the physical health latent construct, had moderate loadings on the physical health construct (.15) and stronger loading on the mental health factor (.70). In addition, the role-emotional scale, commonly associated with mental health, did not

**Figure 2**  
**Structural Equation Model Using Asian Population Mental and Physical Health Factor Structures (Model II)**



show an association with the mental health factor but instead had strong factor loadings on the physical health latent construct (.79). Finally, the vitality and general health perceptions scales, which tend to load on both mental and physical health factors in the United States were only associated with the mental health construct in this Vietnamese sample (loading of .84 for vitality and .78 for general health perceptions). The second model fit the data much better than the first model. The CFI is higher for Model II (.98) than for Model I (.73) and reaches an acceptable level (Bentler, 1990; Bentler & Bonett, 1980). The RMSEA is much lower for Model II (0.07) and meets the criteria of being < .08 (Browne & Cudeck, 1993).

**Table 3**  
**Comparison of the Two Models**

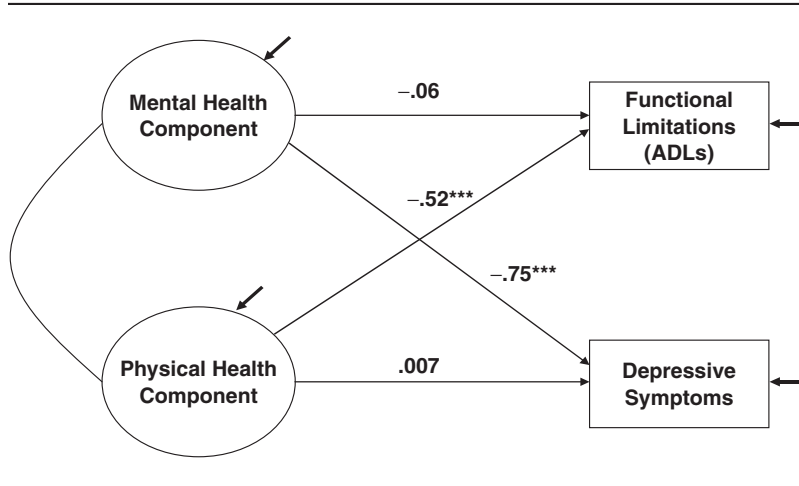
Factor Structures	Model I (U.S. General Population Model)		Model II (Asian Model)	
Physical health	Physical functioning	.62	Physical functioning	.64
	Bodily pain	.79	Bodily pain	.15
	Role-physical	.64	Role-physical	.83
	General health	.63	General health	—
	Vitality	.62	Vitality	—
	Social functioning	.62	Social functioning	.34
	Role-emotional	—	Role-emotional	.79
Mental health	Mental health	.97	Mental health	.75
	Vitality	.40	Vitality	.84
	Role-emotional	.43	Role-emotional	—
	Social functioning	.32	Social functioning	.50
	General health	.34	General health	.78
	Bodily pain	—	Bodily pain	.70
Chi square	247.87		35.87	
RMSEA	.254		.073	
CFI	.73		.98	
GFI	.81		.96	

Note: RMSEA = root mean square error of approximation; CFI = comparative fit index; GFI = goodness of fit index.

### Construct Validity

We hypothesized a priori that the mental health latent construct (derived from the best fitting structural equation model) would correlate significantly with the GDS and less so with ADL and that the physical health latent construct would correlate significantly with ADL and less so with the GDS, controlling for gender and age. Figure 3 presents the model with standardized path coefficients and significance levels. Although the chi-square value was significant,  $\chi^2(42, N = 211) = 126.75, p < .001$ , practical indexes of fit suggest that the model had an adequate fit to the data (CFI = .92; RMSEA = .09). Consistent with our primary hypothesis, the mental health latent construct was correlated significantly with depressive symptoms ( $\beta = -.75; p < .001$ ), whereas the physical health latent construct was correlated significantly with limitations in ADL ( $\beta = -.52; p < .001$ ). In this model, the mental health latent construct was not significantly associated with limitations in ADL ( $\beta = -.06; p = .59$ ), and the physical health latent construct was not

**Figure 3**  
**Structural Equation Model of Physical and Mental Health**  
**and ADL and Depressive Symptoms (Model III)**



significantly associated with depressive symptoms ( $\beta = .007$ ;  $p = .94$ ), controlling for gender and age.

### Discussion

In this sample of older Vietnamese Americans living in the United States, we found that the American Vietnamese SF-36 Health Survey (Version 2) has acceptable psychometric properties for the eight scales that comprise the survey instrument. Factor loadings for four of the eight scales on two underlying dimensions (physical and mental health) were consistent with what has been found in large population studies conducted in the United States and Western Europe (henceforth, abbreviated as the Western model; Keller et al., 1998; Ware et al., 1994). Specifically, physical functioning and role limitations because of physical health fitted the Western model for physical health and the mental health and social functioning scales fitted the Western model of mental health. However, the other four scales (bodily pain, role-emotional, vitality, and general health) behaved differently from the Western model. The bodily pain scale had a stronger loading on the mental health latent construct rather than primarily on the physical health

latent construct as found in Western populations. This finding replicates the studies of the SF-36 conducted among Japanese (Fukuhara et al., 1998) and Taiwanese (Fuh et al., 2000) individuals. The role-emotional scale had a strong loading on the physical health latent construct and not on the mental health construct as found in Western populations. This is a similar finding to that found among Japanese living in Japan (Fukuhara et al., 1998). The vitality and general health scales had loadings primarily on the mental health latent construct and not on both physical and mental latent constructs as found in Western populations. The strong association between the vitality and general health scales and the mental health component has been found previously among Chinese populations living in the United States and Taiwan (Chang et al., 2000; Fuh et al., 2000; Lubetkin et al., 2003; Ren et al., 1998; Tseng et al., 2003) and Japanese populations living in Japan (Fukuhara et al., 1998). The consistency of the findings of these factor analyses across different study samples suggests that many Asian populations may conceptualize mental and physical health differently than Western populations and that interpretation of the SF-36 physical and mental health components should take these differences into account.

The significance of cultural systems in shaping health perceptions, behaviors, and coping strategies has been well documented (Karasz, 2005; Kleinman, 1988; Torsch & Ma, 2000). The traditional health beliefs of many Asian populations do not involve a strict dichotomization of physical versus mental health. Instead, health is viewed as a balance of *yin* and *yang* (hot and cold) principles. The *yin-yang* principle originates in Taoism and states that good health is achieved when there is balance, or harmony, of opposing elements within the individual and between the individual and his or her environment (Torsch & Ma, 2000; Yee, 1999). This view of health regards mind, body, and spirit as an integrated whole, with the whole being greater than just the sum of its component parts (Torsch & Ma, 2000; Yee, 1999). Each component influences the other and is affected by the other. This view of health also includes social relationships and the environment. In traditional Chinese medicine, the four foundations of health are blood (*hsueh*), nourishment (*ying*), energy (*chee*), and resistance (*wei*; Reid, 1995). Blood and nourishment together form the *yin* (or hot) element that circulates internally within the body. Energy and resistance together form the *yang* (or cold) element that emanates from the body as protection. To maintain good health, Chinese medicine calls for a balance between these two hot and cold forces within the individual. Chinese medicine also regards six environmental conditions as external causes of illness (wind, cold, heat, dampness, dryness, and fire; Reid, 1995). Rapid shifts in environmental conditions are thought

to lead to a *yin-yang* imbalance, leading to illness. Excessive emotions such as worry and anger or conflicts in social relationships are also seen as being detrimental to good health (Torsch & Ma, 2000; Yee, 1999). Thus, Asians are likely to view body and mind as closely integrated entities because of their effects on each other. This holistic and integrated view of health has been found in studies of younger (Saetermoe, Scattone, & Kim, 2001) and older (Torsch & Ma, 2000) Asians living in the United States.

There are several limitations to our study. The respondents were recruited as part of a convenience sample of people who participated in activities at senior centers. Thus, our results may not be generalizable to other older Vietnamese individuals. Other limitations include the small sample size of participants, all of whom live in Southern California. However, Southern California is home to the largest community of Vietnamese outside of Vietnam, and our findings are consistent with those from other studies done among other Asian populations living in the United States and Asia.

The results of the study add to a body of literature that documents a consistent pattern of factor analyses of the SF-36, showing that Asians may have a different conceptualization of physical and mental health compared with Western populations. Even though the Vietnamese immigrants in our sample have lived in the United States for a substantial period of time, they still retain views of health that are similar to Asians living in different parts of Asia. This finding is most likely due to the fact that these individuals migrated later in life.

Researchers, clinicians, and policy makers need to recognize that HRQOL measures such as the SF-36 are valuable tools that can be used in older Asian populations. However, the factor structures of the physical and mental health components among these individuals may differ from the general U.S. population and thus need to be taken into account when calculating composite scores.

The IQOLA project enabled large-scale translation and evaluation efforts of the SF-36 across many different countries. However, the majority of the countries were western European. For meaningful comparison of SF-36 scores across different countries, including the many countries in East Asia, more work needs to be done to evaluate how cultural influences affect health perceptions, especially among older individuals with multiple comorbid diseases. The role of culture in conceptualizing health has been explored in depth primarily in anthropological research. Much more needs to be done in health-related quality of life research to better understand how culture shapes the ways diverse older individuals respond to survey questions, resulting in more valid comparisons across cultures.

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