Associations between Physical Disability and Chronic Diseases with Depressive Symptoms in Vietnamese-Origin Older Adults in the United States

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Article

Associations between Physical Disability and Chronic Diseases with Depressive Symptoms in Vietnamese-Origin Older Adults in the United States

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Abstract: Background. A strong association between Activities of Daily Living (ADL)/Instrumental Activities of Daily Living (IADL) disability, chronic disease, and depressive symptoms among different racial/ethnic groups of older adults has been well established. However, whether this relationship remains true among refugee populations such as Vietnamese in the United States has not yet been investigated. **Methods.** Using linear regressions, we tested the relationships between ADL/IADL disability, common chronic diseases, and depressive symptoms among 208 Vietnamese-origin older adults from the two convenience samples in 2017 and 2018 (≥65 years) from *the Vietnamese Aging and Care Survey (VACS)* in the Houston, Texas area. **Results.** Study participants (N=208) were 56.2% female of average 75.4 years old with low education and low socioeconomic status. Most self-rated their health as fair/poor (80%). Regression analyses showed significant associations between liver disease and total ADL/IADL difficulties with higher depressive symptoms. **Conclusions.** Older Vietnamese with more ADL/IADL disability and liver disease reported higher depressive symptoms. Complications from chronic conditions and pain might limit activities and impact older Vietnamese psychologically. Healthcare professionals can connect older Vietnamese with culturally and linguistically relevant adult daycare centers to provide them with social and exercise opportunities.

Keywords. chronic diseases; depressive symptoms; disability; older adults; Vietnamese

1. Introduction

A high prevalence of depressive symptoms among older adults (≥65 years) has been well-documented as it is a public health concern throughout the world [1]. Studies have found similar patterns among older adults across racial/ethnic groups that show having more chronic diseases is associated with increased levels of depressive symptoms [2–4]. Other studies have also found that older adults experience more depressive symptoms if they have some disability in addition to chronic diseases [5,6]. Arthritis, lung disease, stroke, and cancer have been associated with depressive symptoms among non-Hispanic Whites [7]. Black older adults with kidney disease were more likely to experience depressive symptoms in one study [8]. Diabetes, arthritis, and kidney disease have been associated with depressive symptoms among older Mexican Americans [9]. Among Chinese American older adults, depressive symptoms have been associated with hypertension, arthritis, high cholesterol, diabetes, and heart disease [10]. However, there is a paucity of information regarding the association of chronic diseases with depressive symptoms among refugee populations such as Vietnamese in the United States (U.S.).

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Vietnamese Americans are one of the most recently arrived but rapidly growing Asian-origin populations, and currently the 4th largest Asian subgroup in the U.S.[11]. Their substantial immigration started about 48 years ago, after the fall of Saigon in 1975 and many have settled in California and Texas [12]. Currently, over 2.2 million Vietnamese-origin Americans live in the U.S., and their number is growing [13]. Studies of Vietnamese Americans are important due to their lifelong adversity such as a long civil war, traumatic escape from Vietnam, boat journeys, pirate attacks, and government camps [14]. After migration to the U.S., they often faced low socioeconomic status, low English language proficiency, and cultural and lifestyle barriers [13]. These adverse experiences certainly impact aspects of physical, mental, and cognitive health and have a multi-generational impact [15]. However, the health of Vietnamese-origin people in the U.S. has not received significant attention in the literature.

To address these knowledge gaps, we developed *the **V**ietnamese **A**ging and **C**are **S**urvey **(VACS)*** and collected demographic and comprehensive health data on Vietnamese older adults and their family caregivers (N=199; VACS 1) in 2018 in Houston, Texas [16–19]. In 2021, 102 older adults and their family caregivers (N=204) participated in a follow-up study [20]. Houston has over 143,000 residents of Vietnamese origin, making it the 2nd largest Vietnamese-populated metropolitan area in the U.S.[21]. Limited studies in California have shown that Vietnamese older adults rate their health as poorer compared to their non-Hispanic White counterparts and also experience a higher prevalence of depressive symptoms [22,23]. A nationwide study [24] has found that Vietnamese-origin older adults have more Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL) disability than White, Black, Hispanic, and other Asian-origin older adults. Our VACS data found similar patterns with respect to their self-rated health, physical disability, and higher depressive symptoms, as well as high levels of loneliness [17].

The purpose of this analysis is to examine the association of ADL and IADL disability and chronic diseases with depressive symptoms in Vietnamese-origin older adults. We hypothesize that several strong relationships between ADL/IADL functional disability and chronic health conditions, and depressive symptoms would be found among Vietnamese-origin older adults in Houston, Texas.

2. Methods

2.1. Data and Sample

We used the Hispanic Established Populations for Epidemiological Studies of the Elderly (H-EPESE)[25] as a model and developed a cross-sectional health survey of Vietnamese-origin older adults who live in the Houston area. The survey was administered in 2017 and collected data on physical, mental, and cognitive health, disability, social support, use of social services, filial expectation from children, and religiosity from 131 older participants. In 2021, we developed VACS 2 and included additional instruments focused on cognitive function (e.g., Montreal Cognitive Assessment)[26,27], as well as COVID-19 related questions.

Inclusion criteria for both VACS 1 and 2 were self-identification as Vietnamese, ages 65 years and older, spoke English or Vietnamese and lived in the greater Houston, Texas area at the time of the survey. We excluded those who lived in long-term care facilities or were hospitalized. The final sample size was 208 Vietnamese-origin older adults (VACS 1: 131 and VACS 2: 77 older adults).

Data collection took place in November 2017 and April-May 2018 for VACS 1, and January-August 2021 for VACS 2. We distributed the study flyers in Vietnamese and English through Vietnamese social service agencies, senior centers, community centers, Vietnamese churches, temples, and adult day centers, and snowball sampling was widely used. A written consent form was obtained from all the participants prior to the survey. The study was approved by the University of Houston's Institutional Review Board (VACS 1: STUDY00000419 and VACS 2: STUDY00002733). For more details on sampling and data collection, please see our previous manuscripts [16–20].

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2.2. Measures

Depressive symptoms were measured with the Vietnamese version of the 20-item Center for Epidemiologic Studies Depression Scale (CES-D) [28,29]. Scores range from 0 to 60 with higher scores indicating greater depressive symptoms, and a score of 16 or greater indicating risk of clinical depression [30].

Functional disability was measured by Katz's ADL [31] and Lawton and Brody's IADL scale [32]. ADLs included bathing, dressing, toileting, transferring from a bed to a chair, walking across a small room, continence, and feeding. The ADL scale was scored whether the participant needed assistance to perform each activity (1 = yes or 0 = no) with higher scores indicating more disability (range from 0 to 7). The IADL scale requires more complex skills such as using the telephone, shopping, preparing food, housekeeping, laundry, using transportation, medication management, and managing finances. Items were scored if the study participant was able to perform each activity (0 = yes or 1 = no) (range from 0 to 9); higher scores suggest greater IADL disability.

Global Health was captured with a self-rated overall health (good/excellent vs fair/poor). Chronic diseases examined included arthritis, cancer, diabetes, heart problems, hypertension, liver disease, lung disease, and stroke. Respondents were asked if a doctor had ever told them they had each disease.

Sociodemographic characteristics included age, gender (female, male), marital status (married/partnered, not married/partnered), years of residence in the U.S., years of education, annual household income (<$25,000, $25,000-$50,000, >$50,000), living arrangement (live alone, live with others), and language spoken at home (Vietnamese, Vietnamese and other language).

2.3. Analyses

Descriptive statistics were used to characterize the sample stratified by depressive symptom status and sample. Sociodemographic variables included in regression analyses were identified based on a confound approach [33]. Variables significantly related to both the independent (ADL and IADL disability) and dependent (depression symptoms) variables were included in subsequent analyses. Arthritis and liver disease were identified as health conditions associated with depression (not shown in the table). For linear regression analyses, a combined variable of functional disability was created by summing ADL and IADL disabilities (range 0-16) to account for the high correlation (r = 0.57, p <0.001) between these variables, as well as expand range and sensitivity of the measurement [34,35]. A nested general linear model comparison was planned: The first model regressed depression on sociodemographics (marital status, gender), 2nd model added diseases (arthritis, liver disease), and the final model with the combined ADL/IADL disability. No multicollinearity was found in any combination of variables. Statistical analyses were conducted in R [36].

3. Results

Sample characteristics stratified by depression status are presented in Table 1. Depression was categorized based on a CES-D cutoff score of 16 [30]. The participants (N=208) were 56.2% female, on average 75.4 years old (age range 65-97), and 63% were married/partnered. All of them (100%) were born in Vietnam and had lived in the U.S. for an average of 25 years. They had completed an average of 8.2 years of education in Vietnam, and 90.4% reported low socioeconomic status (≤ $25K). The vast majority (80%) lived with their family members or relatives and spoke Vietnamese only (88%). Most rated their health as fair or poor (80%) and 76% of them reported at least one chronic disease. Compared to those with CES-D scores within normal ranges, those with elevated CES-D scores (16+) were more likely to be not married or not partnered (28.2% vs 50%, p = 0.002) and were more likely to report one or more chronic diseases (71.0% vs 83.3%, p = 0.041). Sample characteristics stratified by sample (Table 2) demonstrated that, compared to participants from VACS 2, VACS 1 participants lived in the U.S. longer (21.04 vs 26.70, p = 0.005) and reported less IADL difficulties (5.26 vs 4.28, p = 0.041).

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Table 1. Characteristics of Vietnamese-Origin Older Adults (≥65 years) (N = 208).

	Full Sample	Depression		*p*
		CES-D <16 (n=124)	CES-D ≥16 (n=84)	
Sample				
VACS 1	131 (63.0)	81 (65.3)	50 (59.5)	0.482
VACS 2	77 (37.0)	43 (34.7)	34 (40.3)	
Years of Age	75.42±7.17 (65-97)	75.07±7.15 (65-97)	75.94±7.22 (65-91)	0.393
Gender				
Female	117 (56.2)	65 (52.4)	52 (61.9)	0.226
Male	91 (43.8)	59 (47.6)	32 (38.1)	
Marital Status				
Married/partnered	131 (63.0)	89 (71.8)	42 (50.0)	0.002
Not married	77 (37.0)	35 (28.2)	42 (50.0)	
Years in the U.S.	24.56±13.92 (1-74)	24.54 ±14.40 (1-74)	24.60±13.27 (1-54)	0.977
Years of Education	8.22±5.49 (0-20)	8.52±5.31 (0-19)	7.77±5.74 (0-20)	0.338
Household Income				
< $25,000	188 (90.4)	111 (89.5)	77 (91.7)	0.762
$25,000-$50,000	13 (6.2)	9 (7.3)	4 (4.8)	
> $50,000	7 (3.4)	4 (3.2)	3 (3.6)	
Living Arrangement				
Live alone	42 (20.2)	23 (18.5)	19 (22.6)	0.588
Live with other(s)	166 (79.8)	101 (81.5)	65 (77.4)	
Language spoken at home				
Vietnamese only	183 (88.0)	109 (87.9)	74 (88.1)	1.000
Vietnamese & other	25 (12.0)	15 (12.1)	10 (11.9)	
Self-Rated Health				
Good/Excellent	42 (20.2)	31 (25.0)	11 (13.1)	0.055
Fair/poor	166 (79.8)	93 (75.0)	73 (86.9)	
Chronic Diseases	158 (76.0)	88 (71.0)	70 (83.3)	0.041
Arthritis	104 (50.0)	55 (44.4)	49 (58.3)	0.066
Cancer	10 (4.8)	6 (4.8)	4 (4.8)	1.000
Diabetes	85 (40.9)	52 (41.9)	33 (39.3)	0.812
Heart attack	41 (19.7)	21 (16.9)	20 (23.8)	0.296
Hypertension	154 (74.0)	90 (72.6)	64 (76.2)	0.673
Liver disease	13 (6.2)	3 (2.4)	10 (11.9)	0.013
Lung disease	10 (6.2)	5 (4.0)	5 (6.0)	0.760
Stroke	23 (11.1)	11 (8.9)	12 (14.3)	0.319
# of ADL disability	1.37±2.19	1.08±2.00	1.80±2.39	0.020
# of IADL disability	4.64±3.34	4.12±3.42	5.42±3.08	0.006
# of ADL and IADL disability	6.01±4.93	5.60±4.97	6.71±4.81	0.116

Note. M±SD (Range), N (%); M = mean; SD = standard deviation. ADL = Activities of Daily Living, Score ranges: 0-7; IADL = Instrumental Activities of Daily Living, Score ranges: 0-9. ADL/IADL score ranges: 0-16.

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Table 2. Characteristics of Vietnamese-Origin Older Adults by Sample (≥65 years) (N = 208).

	Full Sample	**VACS 1 (n=131)**	**VACS 2 (n=77)**	*p*
Years of Age	75.42±7.17 (65-97)	75.50±6.38 (65-90)	75.30±8.40 (65-97)	0.848
Gender				
Female	117 (56.2)	71 (54.2)	46 (59.7)	0.527
Male	91 (43.8)	60 (45.8)	31 (40.3)	
Marital Status				
Married/partnered	131 (63.0)	76 (58.0)	55 (71.4)	0.074
Not married	77 (37.0)	55 (42.0)	22 (28.6)	
Years in the U.S.	24.56±13.92 (1-74)	26.70±12.99 (1-68)	21.04±14.76 (1-74)	0.005
Years of Education	8.22±5.49 (0-20)	7.96±5.63 (0-20)	8.65±5.24 (0-18)	0.385
Household Income				
< $25,000	188 (90.4)	123 (93.9)	65 (84.4)	0.060
$25,000-$50,000	13 (6.2)	6 (4.6)	7 (9.1)	
> $50,000	7 (3.4)	2 (1.5)	5 (6.5)	
Living Arrangement				
Live alone	42 (20.2)	32 (24.4)	10 (13.0)	0.071
Live with other(s)	166 (79.8)	99 (75.6)	67 (87.0)	
Language spoken at home				
Vietnamese only	183 (88.0)	116 (88.5)	67 (87.0)	0.914
Vietnamese & other	25 (12.0)	15 (11.5)	10 (13.0)	
Self-Rated Health				
Good/Excellent	42 (20.2)	32 (24.4)	10 (13.0)	0.071
Fair/poor	166 (79.8)	99 (75.6)	67 (87.0)	
Chronic Diseases	158 (76.0)	96 (73.3)	62 (80.5)	0.410
Arthritis	104 (50.0)	63 (48.1)	41 (53.2)	0.566
Cancer	10 (4.8)	6 (4.6)	4 (5.2)	1.000
Diabetes	85 (40.9)	53 (40.5)	32 (41.6)	0.992
Heart attack	41 (19.7)	25 (19.1)	16 (20.8)	0.907
Hypertension	154 (74.0)	98 (74.8)	56 (72.7)	0.867
Liver disease	13 (6.2)	9 (6.9)	4 (5.2)	0.853
Lung disease	10 (6.2)	4 (3.1)	6 (7.8)	0.227
Stroke	23 (11.1)	11 (8.4)	12 (15.6)	0.172
# of ADL disability	1.37±2.19	1.32±2.17	1.45±2.24	0.672
# of IADL disability	4.64±3.34	4.28±3.34	5.26±3.27	0.041
# of ADL and IADL disability	6.01±4.93	5.60±4.97	6.71±4.81	0.116

Note. M±SD (Range), N (%); M = mean; SD = standard deviation. ADL = Activities of Daily Living, Score ranges: 0-7; IADL = Instrumental Activities of Daily Living, Score ranges: 0-9. ADL/IADL score ranges: 0-16.

Linear regression results predicting depressive symptoms as measured with the CES-D scores are shown in Table 3. When adjusting for other predictors in the final model, individuals with liver disease reported 7.90 [95% CI = 2.35, 13.45] higher CES-D points than those without. Older adults who reported more disability in combined ADLs and IADLs reported more depressive symptoms by 0.40 [95% CI = 0.12, 0.69] points on the CES-D for every additional ADL or IADL impairment. Marginal effects of predictors associated with CES-D total scores in the final model are presented in Figure 1.

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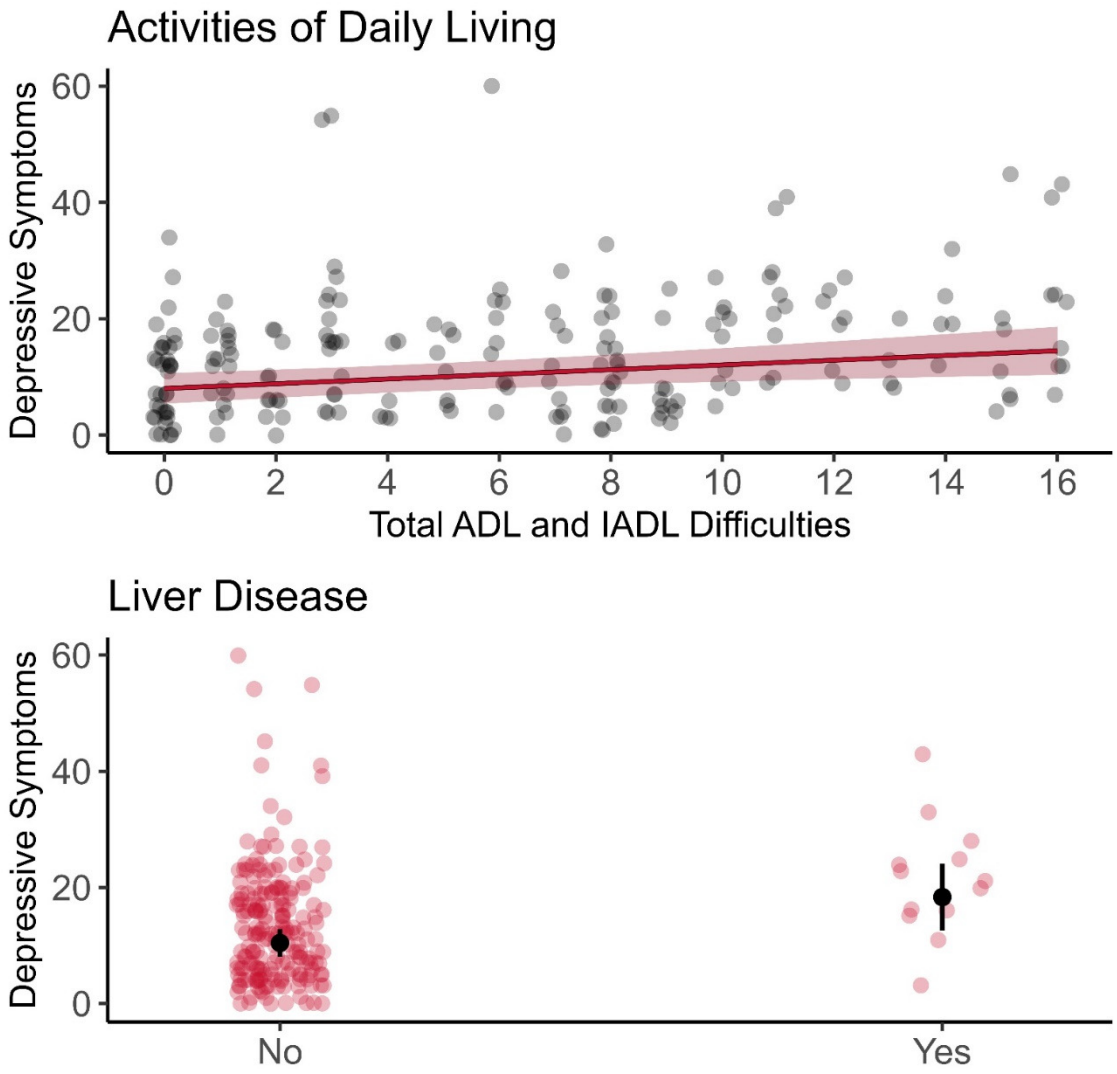

Figure 1. Marginal Effect Plots of Significant Predictors in Model 3. Marginal effect plots estimated using ggeffects are presented. Plots show marginal effects after controlling for all other variables in the model.

Table 3. Linear Regression Analysis Predicting Depressive Symptoms (N = 208).

Predictors	Model 1: Demographics	Model 2: Chronic Disease	Model 3: Functional Disability
(Intercept)	11.29 [9.11, 13.47]***	9.68 [7.30, 12.05]***	8.00 [5.38, 10.62]***
Gender [Female]	2.06 [-0.86, 4.97]	1.90 [-1.02, 4.82]	1.93 [-0.94, 4.81]
Marital Status [Not Married]	4.05 [1.05, 7.04]**	3.70 [0.77, 6.64]*	2.77 [-0.19, 5.73]+
Arthritis		2.69 [-0.11, 5.48]+	1.80 [-1.03, 4.62]
Liver Disease		7.69 [2.05, 13.33]**	7.90 [2.35, 13.45]**
ADL & IADL Disability			0.40 [0.12, 0.69]**
R2	0.057	0.110	0.143
Adjusted R2	0.047	0.093	0.122
AIC	1557.7	1549.5	1543.7
Residual *df*	205	203	202
Residual Sum of Squares	20956.09	19764.33	19033.38
Model Comparison F	-	6.324	7.757
Model Comparison *p*	-	0.002	0.006

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Note. Unstandardized regression coefficients are presented with 95% confidence intervals in brackets; *p*-value: + = <0.01, * = <0.05, ** = <0.01, *** = <0.001; IADL = Instrumental Activities of Daily Living; ADL = Activities of Daily Living.

4. Discussion

Using a combination of VACS 1 and 2 data, we examined the associations between chronic health conditions (i.e., 8 common chronic diseases), as well as functional disability (i.e., ADLs and IADLs), and depressive symptoms among 208 Vietnamese-origin older adults who lived in the greater Houston, Texas area. We found that having arthritis was positively associated with depressive symptoms in bivariate analysis. Minh Hoa et al.'s study (2003) (N = 2,119) found that 14.5% of Vietnamese adults in urban cities in Vietnam suffered musculoskeletal pain, and osteoarthritis was the most common disease. Mwangi and colleagues' 2015 study [37], examining common chronic diseases in 2,873 Vietnamese older adults in rural Vietnam also showed arthritis/osteoarthritis was the most common chronic disease (35%). Several other studies on older adults in Vietnam have shown similar patterns of high prevalence of osteoarthritis, chronic pain, and its association with depressive symptoms [38,39]. Based on these previous studies, our finding of an association between arthritis and depressive symptoms is well aligned with the literature. Having arthritis and suffering from chronic pain certainly would make older adults uncomfortable and distressed in their daily lives.

In addition, liver disease showed an even stronger association with depressive symptoms, which was robust to adjustment from sociodemographic factors. Similar to arthritis, liver disease, hepatitis B and C specifically, is a common chronic disease among Asian Americans, and older Vietnamese have historically been disproportionally affected by the disease in Vietnam [40]. Other studies have found a high prevalence of Hepatitis B among Vietnamese Americans [41], and a high incidence of liver cancer among Vietnamese-origin men and women [42]. Liver disease is also common among Vietnamese men due to high alcohol consumption as Vietnam is one of the highest alcohol-consuming countries in the world [43]. Symptoms of liver disease (e.g., chronic fatigue, abdominal pain) could certainly predispose Vietnamese older adults to feeling weak and distressed. Among the ADLs examined, bathing and eating were the strongest correlates of depressive symptoms, and among IADLs, managing finances has the strongest effect (not shown in the table).

Previous studies have established a strong relationship between physical functional disability and depressive symptoms in community-dwelling older adults [5,6]. However, whether the relationships were with ADL or IADL functions varied. For example, among Asian Americans, Japanese, Korean, and Taiwanese older adults reported more depressive symptoms when they had high IADL difficulties [44–46] while Koreans in another study reported more depressive symptoms when their ADL disability was high [47]. A study of older Chinese Americans showed associations with both ADL and IADL disability and depressive symptoms [10]. Having limited control over their basic functioning would restrict Vietnamese older adults' daily activities. IADL functions, however, can be culturally and socioeconomically biased, especially among women who often rely on family members for assistance with instrumental activities.

Limitations of this study should be noted. First, we used a small convenience sample collected only within the greater Houston area, and our results may not be generalizable to older Vietnamese in other parts of the country. The number of some chronic conditions including liver disease was small. Future studies with larger and more representative samples might provide a better picture of the population's physical and emotional function. While most Vietnamese-origin older adults live with other family members and enjoy high levels of social support, healthcare professionals can help them to better access culturally and linguistically relevant services to help ameliorate their physical and emotional problems [48,49].

Author Contributions:. Conception & Design: CEM, JMG, KSM. Acquisition of data: CEM, KNN. Analysis & Interpretation of data: JMG, CEM, LDM, KSM. Drafting of manuscript: CEM, JMG. Critical review: CEM, OLM, KSM, JMG, LDM.

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Statement of Ethics: The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Institutional Review Board of the University of Houston (VACS 1: STUDY00000419, July 4, 2017, and VACS 2: STUDY00002733, December 18, 2020).

Informed Consent Statement: Written informed consent was obtained from all the participants prior to the survey.

Data Availability Statement: The data that support the findings of this study are available from the first author, CEM, upon reasonable request.

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Conflicts of Interest Statement: All authors have no competing interests to declare.

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