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Promoting Mental and Physical Health of Vietnamese Immigrants Through a Cultural Movement Intervention

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Abstract

Objectives: Older Vietnamese adults are among the most underserved groups in the United States, despite being at high risk for stress and other negative experiences (e.g., access to same-language practitioners, transportation barriers, lack of health care). Minimal progress has been made in decreasing treatment barriers for this underserved population. One promising approach involves using indigenous, culturally based interventions to enhance psychological and physical well-being. Such interventions may reduce utilization and quality of care disparities because they emphasize a more holistic approach to health, thereby limiting the shame and face loss often experienced due to the stigma associated with mental illness. The present study examined the efficacy of lishi, a traditional East Asian movement form of exercise, in promoting mental and physical health outcomes for older Vietnamese immigrant adults.

Method: Seventy-one older Vietnamese adults participated in this randomized waitlist control study. Participants were between 60 and 75 years old. Multivariate analysis of covariance was used to determine posttest outcomes differences between the intervention and control groups.

Results: Intervention group participants experienced significantly higher levels of self-efficacy and physical energy, less bodily pains, and better body balance at posttest compared to the control group.

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Cindy Y. Huang played a lead role in data curation, formal analysis, methodology, project administration, writing–original draft, and writing–review and editing and a supporting role in conceptualization. Nolan W. Zane played a lead role in conceptualization, funding acquisition and supervision and an equal role in methodology and writing–review and editing. Lynette Hunter played a lead role in supervision, a supporting role in conceptualization and writing-review and editing and an equal role in methodology. Lay Vang played a supporting role in data curation. Ester Carolina Apesoa-Varano played a supporting role in funding acquisition, investigation, methodology, supervision and writing–review and editing. Jill Joseph played a lead role in funding acquisition, a supporting role in writing–review and editing and an equal role in conceptualization, investigation and supervision.

Conclusions: Lishi may be an effective culturally valid intervention for older Vietnamese adults and demonstrated promise at engaging this hard-to-reach population in treatment and services.

Keywords

Vietnamese Americans; older adults; cultural intervention; community-based participatory research; mental and physical health

There are persistent mental health (MH) and physical health disparities for Asian Americans (AAs), the most rapidly growing population in the United States (Karel et al., 2012; Lopez et al., 2017). These disparities include lack of access to MH and physical health care and higher rates of unaddressed MH and health problems, often due to the unequal distribution of social and economic resources for AA populations in the United States (Carter-Pokras & Baquet, 2002). Vietnamese Americans are among the largest Asian subgroups in the United States; yet, they are more likely to experience MH and physical health disparities even compared to their AA counterparts. As an example, Vietnamese Americans have higher levels of cardiovascular diseases, hypertension, and were at increased risk of contracting COVID-19 during the pandemic (Wang et al., 2020). Age and immigration status compound these disparities—a large percentage of Vietnamese Americans are older (aged 65 years and up) and immigrants (Budiman & Ruiz, 2021). In particular, the Vietnamese American population has a higher refugee population compared to other Asian subgroups (e.g., Chinese, Korean, Filipino; Wang et al., 2020). These factors further exacerbate the MH and physical health disparities experienced by this high-risk underserved population.

Older AA adults are at higher risk for experiencing stress and negative mental and physical health outcomes due to factors such as limited access to health care, financial instability, and language barriers. Older AA have higher rates of poverty and lower rates of Medicare and health insurance coverage compared to all U.S. older adults (U.S. Department of Health and Human Services [USDHHS], 2014); these factors interfere with their ability to access MH services. Unfortunately, depression among older AA adults is linked to higher mortality compared to other racial/ethnic groups (Takeshita et al., 2002). Older AA adults also reported worse overall health compared to their non-Hispanic White peers (USDHHS, 2014). Furthermore, MH service use is notably low among AA older adults—an estimated 28% of older AA adults with diagnosable MH problems used services, compared to 54% in the general population (Le Meyer et al., 2009). For Vietnamese older adults, these MH disparities are even more pronounced. Vietnamese older adults are even more likely to live in poverty compared to their AA peers, and 52% of Vietnamese Americans reported no to limited English-language fluency (Budiman, 2021); these factors further impede their access to care. The majority of Vietnamese older adults are also refugees with high levels of trauma exposure resulting from the Vietnam War, which has been linked with increased depressive symptoms and chronic health problems (e.g., hypertension, heart disease) in this population (Korinek & Teerawichitchainan, 2014). In fact, a study found that Vietnamese Americans who have been in the United States for more than 20 years (i.e., represented by the first waves of war refugees) had higher levels of depression than more recent Vietnamese immigrants (P. Leung et al., 2010). Despite these clear needs, most Vietnamese Americans are hesitant about seeking MH care (Steel et al., 2005), and very few studies have sought

to improve treatment engagement (i.e., how individuals initiate, participate, and stay in treatments) for this population (Aggarwal et al., 2016; Interian et al., 2013).

Cultural (e.g., stigma, face loss) and contextual (e.g., language, health care access, transportation) factors remain the major reasons for MH and health disparities for Vietnamese older adults, particularly for those who emigrated to the United States (Yoo et al., 2014). For example, stigma around mental illness persists in Vietnamese culture, which includes beliefs that mental illness is a punishment for wrongdoing or spiritual forces, and that MH symptoms are a result of an imbalance between body and spirit (P. Leung et al., 2010; Luu et al., 2009). Relatedly, Vietnamese Americans have reported high use rates of traditional Eastern services to treat MH symptoms, including natural doctors (58%), herbalists (82%), and spiritual healers (51%; Phan, 2000). Additional studies with AAs have found that they were less likely to self-disclose (i.e., talk about personal issues) compared to other racial/ethnic groups (Zane & Ku, 2014). They were also more likely to prefer a provider of the same ethnicity compared to Whites (Jimenez et al., 2013). Researchers have called for the need to expand culturally sensitive MH services for Vietnamese Americans, especially ones that incorporate the mental health belief system for this community (Luu et al., 2009). As such, a culturally sensitive intervention will need to consider aspects of Eastern values and practices in order to be engage Vietnamese older adults in MH services.

Informed by the ecological validity model (EVM; Bernal, & Sáez-Santiago, 2006; Bernal et al., 1995), the present study tested the effectiveness of lishi, a cultural movement intervention informed by a traditional East Asian movement form of exercise, with a sample of Vietnamese older adults. The EVM serves as a framework for guiding the development of culturally sensitive interventions. The EVM proposes eight dimensions that "culturally center" an intervention: language, persons, metaphors, content, concepts, goals, methods, and context (Bernal et al., 1995). Essentially, culturally centering an intervention would include (a) delivering an intervention in the native *language* of the target population; (b) having individuals (i.e., *persons*) who are familiar with the culture implementing the intervention; (c) incorporating *metaphors*, such as symbols or concepts, that are familiar and shared by individuals of the same cultural group; (d) ensuring all *content* of the intervention processes include unique aspects of the cultural group; (e) describing *concepts* of the intervention in culturally congruent ways; (f) aligning *goals* so that the targeted intervention outcomes are consistent with cultural group's values, customs, and expectations; (g) having *methods*, or intervention procedures, that are congruent with the cultural group's norms and customs; and (h) embracing *context*, such that the intervention addressed the broader social, economic, political, and cultural processes of a particular group. While lishi has been used as a form of exercise, this was the first study to examine its potential impact on MH and physical health.

Emerging research suggests that cultural movement interventions (defined as movement exercises rooted in traditional Asian cultures) may be one way of addressing the MH and health disparities experienced by Vietnamese older adults because they focus on physical health and may be perceived as spiritual and nonstigmatizing. These interventions, which include lishi, tai chi, and qigong, incorporate body movements and breathing that are associated with health benefits (Abbott & Lavretsky, 2013). Additionally, studies in Asia

suggest that cultural movement interventions can improve MH (e.g., stress, depressive symptoms; Tsang et al., 2006) as well as physical health (e.g., mobility, blood pressure; Chen et al., 2008) for older adults. In a sample of elderly Vietnamese adults, a tai chi intervention improved balance, sleep quality, and cognitive performance (Nguyen & Kruse, 2012). Across Asian, similar findings have been documented—Hong Kong older adults who participated in qigong exercise for 16 weeks had significantly fewer symptoms of depression, better self-efficacy, and more positive moods compared to the control group (Tsang et al., 2006). Taiwanese older adults in a tai chi exercise program demonstrated significant improvements in physical fitness (i.e., resting blood pressure, lung capacity, flexibility) after 6 months (Chen et al., 2008). Existing studies have clearly documented the MH benefits of physical activity (Penedo & Dahn, 2005)—findings suggest that older adults experienced elevated moods following physical activity and reductions in feelings of confusion, anger, and tension (McLafferty et al., 2004). In addition, physical activity has been found to positively influence self-efficacy and self-esteem levels for older adults (McAuley et al., 2006; Park & Kim, 2011; Son & Lee, 2006). Self-esteem and self-efficacy are critical aspects of psychological well-being for the older—studies have found that higher levels of self-esteem and self-efficacy are associated with better quality of life (D. S. Leung, & Liu, 2011; McAuley et al., 2006; Son & Lee, 2006). Lower levels of self-efficacy were associated with worse overall health (i.e., frailty), less stamina and power, and decreases in memory (Doba et al., 2016).

The need for interventions that simultaneously promote MH and physical health (e.g., fall risk) is particularly critical for Vietnamese older adults. Vietnamese, as well as other AA individuals, often perceive MH symptoms in somatic ways such (e.g., stomach pain or head pain; Huang & Zane, 2016; P. Leung et al., 2010; Zane & Huang, 2016). Thus, the connection between mental and physical health is often intertwined for AA immigrants. And yet research on cultural movement interventions in the United States has largely ignored their potential impact on MH. Most U.S. studies focused primarily on improving the fall risk of the older. Falling poses a threat to physical well-being as falling is associated with an increase in chronic disease mortality rates, loss of independence, and costly long-term care (Fuller, 2000; Sattin, 1992). Interventions using tai chi and yoga in the United States have specifically measured the effectiveness of these programs on fall risk. Li et al. (2003) found that older adults who participated in a weekly tai chi intervention for 3 months significantly improved their balance over time. Older adults who participated in 8 weeks of tai chi had higher balance scores compared to participants who had 8 weeks of yoga or no exercise (Hakim et al., 2010). These samples, however, were not racially/ethnically diverse. One study included a majority (greater than 90%) of White participants (Li et al., 2003), and the other study neglected to report the racial/ethnic information of their participants (Hakim et al., 2010). Since cultural movement interventions have traditional roots in East Asian cultures, it is essential to understand if they impact U.S. Vietnamese older adults in similar ways as older adults in Vietnam (i.e., Nguyen & Kruse, 2012).

While findings from cultural movement interventions are promising, more is needed to fully understand how Vietnamese older adults residing in the United States would engage in this type of intervention and/or experience similar outcomes. Thus, the present study examined lishi, a cultural movement intervention well-aligned with the EVM's dimensions

of a culturally centered intervention and determined its potential for increasing treatment engagement among a sample of Vietnamese older adults. This study also examined the effects of lishi on the MH and physical health outcomes. The following hypotheses were tested: (a) lishi will be effective at engaging Vietnamese older adults in the intervention; (b) lishi will result in better MH outcomes (e.g., depressive symptoms, stress, self-esteem, self-efficacy) compared to the no-treatment control group; (c) lishi will achieve better physical health outcomes compared to the control group; and (d) participants who attend more lishi sessions will experience better mental and physical health outcomes.

Method

Study Design

The study utilized a randomized, waitlist control group design to examine the effects of lishi. The interdisciplinary research team comprised experts in psychology, nursing, dance, and staff from an immigrant-serving community-based agency. Participants were recruited over 2 years (i.e., Cohorts 1 and 2) and randomly assigned to the intervention or waitlist control group (see Figure 1, for more information about participant enrollment). Each cohort included an intervention group and a waitlist control group. The intervention received lishi immediately; the waitlist control group received lishi immediately following the conclusion of the intervention group. Participants were informed that there were two start dates for the study and therefore blinded to their group membership.

Data were collected using a paper-based, self-report survey. All participants completed the survey weekly and received compensation for their time following each assessment. For the purposes of this study, only data collected at baseline (i.e., prior to the start of lishi sessions for the intervention group) and following the last session of lishi (i.e., posttest) were utilized. The institutional review board at the University of California, Davis, approved the research protocol.

Participants

Participants were recruited from a community-based social services agency that provides services to AA immigrants in a metropolitan area in Northern California. This agency provided social services such as employment/vocational support, housing, and/or English classes; they did not provide MH services. Participants were eligible to participate in the study if they: (a) were between 60 and 75 years old, and (b) passed the Exercise/Physical Activity Assessment and Screening for You (EASY; Resnick et al., 2008), a six-question assessment tool for older adults (additional information below). An a priori power analysis was conducted using G*Power to determine the minimum sample size required to test the study hypotheses. Results indicated the required sample size to achieve 80% power for detecting a medium effect, at a significance criterion of $\alpha = .05$, was 30 participants per group. This was consistent with a recent meta-analysis of culturally adapted interventions, which found the overall effect size of such interventions to be $d = .67$ (Hall et al., 2016). Thus, the obtained sample of 71 participants was more than adequate to test the study hypotheses. The 71 participants self-identified as Vietnamese and spoke Vietnamese as their primary language. The average age of participants was 66.6 years old ($SD = 5.17$), and

the majority of them were female (n = 37; 51.4%). Most of the participants had a high school degree (n = 40; 58%) and were not currently employed (n = 66; 91.7%). Additional participant characteristics are provided in Table 1. Thirty-eight participants were assigned to the intervention group and 34 participants to the waitlist control group; participants did not differ on demographic characteristics, baseline levels of study variables, or by cohort (Table 2).

Procedure

Screening—Potential participants attended an informational session (provided in Vietnamese) describing the length and purpose of the study. Individuals who were interested in participating following the information session were consented to in their preferred language (i.e., Vietnamese) by members of the research team. Participants were randomly assigned to the intervention or waitlist control group.

Nurse practitioners, physician assistants, and their trainees from the local medical school campus administered the EASY to each of the participants to assess for their ability to safely participate in the movement-based intervention. The EASY is composed of six questions that assessed for pain/tightness in chest, experiences of dizziness/lightheadedness, high blood pressure, pain/stiffness in body, and the use of assistive devices (e.g., walkers) to stand or walk. Assessments were conducted with assistance of Vietnamese-speaking translators from the research team and lasted 5–10 min per person. Individuals who were unable to stand on their own without support, who experienced dizziness/lightheadedness while standing, or had high blood pressure and not taking medications were excluded from participation. This was done to ensure the participants did not have preexisting physical health challenges that may preclude them from engaging in all of lishi's physical activity. All participants who passed the EASY were able to move forward with the study and provided baseline data following their assessment. A total of 73 participants were screened using the EASY; one person was screened out based on the EASY criteria; another individual, who self-identified as Chinese and therefore did not meet study eligibility, was also removed from the study analyses. Thus, the total number of eligible participants for this study was 71.

Intervention Group—The intervention was held at the local Vietnamese community center, which was where the participants lived and were easily accessible through public transportation. The intervention included a 1-hr class, once a week for 8 consecutive weeks. The sessions were implemented by a doctoral-level graduate student who was also a trained practitioner of lishi, and directly supervised by a coprincipal investigator, who was a lishi master and created the intervention protocol. Supervision occurred weekly for the duration of the intervention.

Waitlist Control Group—Waitlist control group participants completed the self-report surveys during the same period as the intervention group; as such, they had weekly contact with the research team but did not have any contact with the interventionist during this time. The data collection occurred in an office located at the social service agency that served as this study's community partner. The waitlist control group received 8 weeks of lishi

following the conclusion of the intervention group's sessions. During this time, outcome data were not assessed.

Intervention

Lishi is a traditional East Asian movement exercise that includes slow, soft poses and whole-body movements. Lishi focuses on maintaining movement even through apparent stillness, connecting breathing techniques with body movements, and promoting the integration of health and body awareness (Bolles & Hunter, 2012); these movements promote breathing, balance, coordination, and alignment, and are similar to the movements found in tai chi and qigong (Abbott & Lavretsky, 2013). Lishi is particularly well-aligned with the EVM domains for a culturally centered intervention. One example of this is lishi's movements/stances, which are named after animals and objects that are commonly found in traditional East Asian cultures, particularly ones with a tradition of farming like Vietnam. This is consistent with the EVM domain of incorporating metaphors familiar with the intervention's intended cultural group (Bernal et al., 1995). To illustrate, the Bee stance (see Figure 2) is a position when both feet are touching with toes pointing forward and arms relaxed at the sides. The bear stance (Figure 1) is a position where feet are shoulder length apart with toes pointing forward and arms related at the sides.

The lishi intervention was developed by one of the principal investigators who is a lishi master practitioner and trainer with over 30 years of experience. Each session followed this format: 10 min of warm-up, 40 min of lishi, and 5 min of cool-down. Warm-up exercises started with the head (e.g., head turns to each side), down to the feet (e.g., ankle circles), and ended with lishi-specific breathing exercises. The 40 min of lishi exercises included individual movements focused on tension and release, combined with pressured breathing into the abdomen, rib cage, and upper chest, and partner (two-person) exercises that required participants to collaborate on the coordination of breathing, balance, and alignment. Each session built on the previous week by reviewing movements and adding in new movements. The cool-down activities focused on lower abdominal breathing. Specific questions about the intervention protocol may be directed to the first author.

Measures

Participants completed measures that assessed for their current state of MH well-being and physical health status. Measures were selected due to their preestablished validity with AA populations and/or older adults. A behavioral measure of balance was also administered to assess for fall risk. All measures were translated and back-translated into Vietnamese by native Vietnamese speakers of the research team, then proofread by a native Vietnamese speaker of the social service agency.

Disruption of Functioning—Disruptions in daily functioning due to pain were assessed using the Pain Disability Index (PDI; Tait et al., 1987). The PDI assesses pain-related disability and disruptions in daily living activities resulting from bodily pain. The categories assessed are family/home responsibilities (e.g., chores performed, running errands), recreation (e.g., hobbies, sports), social activity (e.g., parties, dining out, social functions), occupation (i.e., activities directly related to one's job), sexual behavior (e.g., frequency and

quality of sex life), self-care (e.g., taking a shower, driving, getting dressed), and life-support activity (eating, sleeping, breathing). Participants reported their level of agreement on a scale of 0 (*no disability*) to 10 (*total disability*); higher scores indicated more disruptions due to pain. An overall score was calculated based on an average across the seven items. Psychometrics of the PDI found it to be internally consistent with an α coefficient of .87, with item-total correlations ranging from .56 to .85 (Tait et al., 1987). While the PDI has not been specifically validated with AA, it has been established with older racial/ethnic minority adults (e.g., African Americans) and is a commonly used measure for assessing pain among older adults (Chibnall, & Tait, 2005; Chibnall et al., 2005; Green et al., 2003). In this study, the PDI reliability coefficients were high at baseline and posttest (αs = .91 and .88, respectively).

Anxiety and Depression—Anxiety and depression were assessed using the Hopkins Symptom Checklist–25 (HSCL-25; Parloff et al., 1954). Participants reported their agreement to 25 questions on anxiety and depressive symptoms. The scale ranged from 1 (*not at all*) to 4 (*extremely*), with higher scores indicating more distress. In addition to a total distress score, the HSCL-25 also yields anxiety symptoms subscale and a depression symptoms subscale. The HSCL-25 has been validated with many diverse populations, including Southeast Asian refugees (Mollica et al., 2006). In this sample, the subscales were used in the analyses. The anxiety symptoms subscale (αs = .93 and .94) and depression symptoms subscale (αs = .92 and .93) were reliable.

Self-Esteem—The Rosenberg Self-Esteem Scale (Rosenberg, 1965) was used to assess for participants' ratings of global self-worth. The measure has 10 items, and participants rate their level of agreement with each item on a 4-point Likert scale, with higher scores indicating higher self-esteem. Examples of questions included "I feel that I have a number of good qualities" and "I feel I do not have much to be proud of." The measure has been widely used and has been empirically validated (Gray-Little et al., 1997; Robins et al., 2001), including with AA samples (Mullen et al., 2013; Thai et al., 2017) and in Asian countries (e.g., China; Cheng & Hamid, 1995). Baseline and posttest scores were reliable, α = .63 and .68, respectively, but were lower than the reliability coefficients of other measures in this study. These alphas have been shown to demonstrate adequate reliability by previous research (Taber, 2018); however, the self-esteem results in this study were examined with caution.

Self-Efficacy—The 10-item General Self-Efficacy Scale (GSE; Schwarzer & Jerusalem, 1995) was used to assess participants' levels of self-efficacy, an individual's belief that one's actions can produce successful outcomes. Items included "I can always manage to solve difficult problems if I try hard enough" and "When I am confronted with a problem, I can usually find several solutions." Participants indicated their agreement with each of the ten statements on a scale of 1 (*not at all true*) to 4 (*exactly true*); higher scores indicated higher self-efficacy. The GSE has been used in many countries and translated into many languages. The GSE yielded internal consistencies between α = .75 and .90 across studies (Jerusalem & Schwarzer, 1986, 1992; Jerusalem & Schwarzer, 1989). It has been found to be reliable across studies with Cronbach's alphas ranging between .76 and .90 (Luszczynska et al.,

2005). A Chinese version of the GSE has shown a satisfactory internal consistency α of 0.86 (Zhang & Schwarzer, 1995), which has been replicated with an older Chinese population (Wu et al., 2004).

In this study, the GSE was also reliable at baseline and posttest (αs = .93 and .89, respectively).

Stress—Participants reported on their level of perceived stress using the Perceived Stress Scale (PSS; Cohen et al., 1983). The PSS has 10 items, and participants responded to items on a 5-point Likert scale, with higher scores indicating more stress. Items included “In the last month, how often have you felt nervous and stressed?” and “In the last month, how often have you found that you could not cope with all the things that you had to do?” The PSS has been validated with diverse samples, including with AA adults in the United States and in Asian countries (e.g., China, Japan, Thailand; Lee, 2012). This measure was also highly correlated with similar measures and has a test-retest reliability of .85 (Cohen et al., 1983). In this study, the PSS was reliable at baseline and posttest (αs = .79 and .73).

Physical Health—The 36-Item Health Survey (SF-36; Ware & Sherbourne, 1992) was used to assess for healthy functioning in eight domains: (a) physical functioning, (b) social functioning, (c) limitation in activities (e.g., job duties) due to physical health, (d) bodily pain, (e) general mental health, (f) limitation in activities due to emotional health, (g) energy level, and (h) general perceptions of health. Items include, The SF-36 subscales are scored to reflect a 0–100 range, with higher scores indicating better functioning and health. The SF-36 has been found to be reliable and valid for various cultural groups, including older Vietnamese Americans (Ngo-Metzger et al., 2008). This study utilized the physical functioning, energy level, bodily pain, and limitations due to physical health subscales. Examples of questions on physical functioning include “Does your health limit you in bending, kneeling, or stooping?” and “During the past 4 weeks, how much did pain interfere with your normal work (including both outside the home and housework)?” The remaining subscales were excluded based on their similarity with previously measured constructs in the study (e.g., HSCL-25 for depressive symptoms). The reliabilities of the scales in this study were as follows: (a) physical functioning (α = .90 for baseline and .93 for posttest), (b) energy level (α = .77 for baseline and .75 for posttest), (c) bodily pain (α = .93 for baseline and .91 for posttest), and (d) limitations due to physical problems (α = .84 for baseline and .92 for posttest).

Balance—The Balance Screening Tool (BST; Mackintosh et al., 2006) was used to determine participants’ risk for falling. The BST consisted of six items that included simple and quick functional standing tests. Participants were instructed to (a) stand with their feet together with their eyes open for 30 s, (b) stand with feet together with eyes closed for 30 s, (c) stand on their left leg for 5 s without needing support), (d) the same on their right leg, (e) turn 180° in under five steps, and (f) take five tandem steps (i.e., heel to toe) consecutively and without support. For each task, the test administrators indicated “Yes” if an individual was able to complete it or “No” of they were not. Two or more “No” answers indicated the individual had a significant risk for falling. Though the BST has yet to be validated with Asian samples, it has high concurrent validity with other empirically validated tools of fall

risk among older adults (Mackintosh et al., 2006). The BST was added to the packet of measures following the completion of the intervention for Cohort 1. Meetings between the principal investigators and physiology researchers determined that balance was an essential component of lishi and a component of older adult health; as such, the BST was only collected with half of the intervention sample group. The reliability at baseline was .94 and .91 at posttest.

Intervention Engagement and Dosage—Engagement in this study was determined by attrition and retention from baseline to posttest. Behavioral therapy research indicates a minimum of 70% retention from baseline to posttest for the outcomes of a study to be considered (Lyles et al., 2007). Dosage was measured by the number of lishi sessions participants attended, and therefore this information was only available for the intervention group. The more sessions attended, the higher the dosage.

Data Analysis

To test the effectiveness of lishi as an intervention, multivariate analysis of covariance (MANCOVA) tests were conducted to determine between-group differences (i.e., intervention vs. waitlist control group) in MH and health outcomes at posttest. Researchers have determined that MANCOVA tests are the most effective method of detecting differences between groups when examining posttreatment change scores in clinical research because it treats the baseline (e.g., pretest) levels of each outcome variable as a covariate, thereby controlling for its effects on the posttest scores (O'Connell et al., 2017; Senn, 2006; Wan, 2019). If the multivariate analyses revealed significant effects, univariate analyses of covariance (ANCOVA) were used to interpret the findings. ANCOVA analyses were conducted for the main effects of intervention status (intervention vs. control group) and participant sex (female vs. male). The Sex × Intervention interaction was also investigated. Effects of cohort (Cohort 1 vs. Cohort 2) and the Cohort × Intervention interaction were also examined. This multivariate adaptation of Fisher's protected t test protects against Type I error rates and keeps both F and t tests relatively powerful (Cohen et al., 2013). ANCOVA tests were also conducted to explore the effects of lishi on balance. Cohen's d (for comparisons of groups over 20 individuals) and Hedge's d (for comparisons of groups less than 20 individuals) were used to determine the magnitude of these effects, with d = .20 indicating small, d = .50 medium, and d = .80 large effects, respectively (Gignac & Szodorai, 2016).

Another way of examining effectiveness is to examine if individuals who received the intervention will benefit from attending more sessions (i.e., dosage). Simultaneous regression analyses were performed to a within-groups examination of the effects of dosage on physical and mental health outcomes for intervention group participants. All analyses were conducted using SPSS Version 26.

Baseline levels for all measures were included in the analyses as control variables in addition to participant sex. Missing data were minimal. The use of listwise deletion has been found to decrease statistical power and increase standard error (Peng et al., 2006);

as such, data imputation using mean replacement in the SPSS software was employed to account for missing data.

Results

Engagement

Overall attrition (combined intervention and control groups) was 11.4% from baseline to posttest; thus, the overall retention rate of the study is 88.6%, which exceeded the minimum cutoff of 70% as indicated in previous behavioral intervention research (Lyles et al., 2007). For the intervention groups, overall attrition was 3.0%. For the control group, overall attrition was 19.9%. The groups also did not differ significantly across baseline outcomes, and individuals who dropped out at baseline did not statistically differ from those who remained in the study on any of the outcome measures (ps > .05).

Mental Health and Physical Health Outcomes

Multivariate tests showed significant differences in MH and physical outcomes between the intervention and control groups, $F(10, 56) = 2.21$, $p = .03$, Wilk's $\lambda = .72$, partial $\eta^2 = .28$, and yielding small-to-medium effect sizes. Specifically, the univariate results indicated that intervention participants ($M = 3.19$, $SD = 0.46$) were significantly higher on self-efficacy at posttest compared to control group participants ($M = 2.96$, $SD = 0.50$), $F(1, 65) = 6.31$, $p = .02$, partial $\eta^2 = .09$, $d = .49$. Intervention participants also had more energy, $M = 62.89$, $SD = 17.69$; $F(1, 65) = 7.29$, $p = .01$, partial $\eta^2 = .10$, $d = .44$, and experienced less bodily pain, $M = 64.95$, $SD = 25.89$; $F(1, 65) = 5.28$, $p = .04$, partial $\eta^2 = .07$, $d = 36$, compared to the control participants at posttest ($M = 53.33$, $SD = 19.75$ and $M = 53.11$, $SD = 25.02$, respectively). Results also revealed a significant intervention effect on balance, $F(1, 18) = 6.62$, $p = .02$, partial $\eta^2 = .27$, $d = .58$, with intervention participants having better balance (i.e., lower risk for falling) at posttest compared to control participants ($M = .13$, $SD = 84$ vs. $M = .80$, $SD = .035$). The remaining outcomes (i.e., self-esteem, anxiety, disruption of functioning, stress, and physical health) were not significantly different across the groups at posttest ($p > .05$).

No significant differences were found between men and women, $F(10, 56) = 1.58$, $p = .14$, Wilk's $\lambda = .78$, partial $\eta^2 = .22$. The Sex × Intervention, $F(10, 56) = 1.45$, $p = .18$, Wilk's $\lambda = .79$, partial $\eta^2 = .21$, and Cohort × Intervention interactions were not significant ($p > .05$).

Dosage

The dosage effects of Lishi were explored for the participants in the intervention group, controlling for the effects of baseline levels of physical and psychological functioning and sex. Dosage effects were not associated with any MH or health outcomes in the study ($p > .05$).

Discussion

This study examined the effectiveness of a cultural movement intervention to promote treatment engagement, MH, and physical health outcomes in Vietnamese older adults.

Findings suggest that lishi has some mental and physical health-promoting effects and may be a culturally salient way of engaging Vietnamese older adults in treatment.

Engagement

Treatment engagement suggested the intervention group was more engaged (i.e., attended more sessions) than the control group. One possible explanation is that the participants "bought-in" to the intervention—they may have found lishi to be culturally salient, which in turn increased their engagement in the sessions. This is consistent with research suggesting culturally adapted interventions are more effective than unadapted interventions for minority populations (Hall et al., 2016). Treatment engagement may also have been influenced by the participants' perception of lishi as a physical health intervention. The pervasive stigma of MH is one main barrier to MH treatment for Vietnamese and AA individuals (Aggarwal et al., 2016; P. Leung et al., 2010). A physical intervention may eliminate the face concerns associated with seeking and participating in a MH treatment. Face is an individual' s set of claims about his/her social character and sense of self, which are also tied to one's social roles in their community (Zane & Yeh, 2002). Losing face threatens an individual's sense of self and standing in a particular community and impacts one' s social character. Studies have found that individuals with higher face concern (i.e., afraid to lose face) are less likely to disclose personal information such as feelings, values, and private habits (Zane & Ku, 2014). Face concern may be even more salient for Vietnamese older adults, who may be less acculturated to mainstream U.S. values. Vietnamese older adults are also be more likely to perceive MH symptoms as somatic difficulties (e.g., difficulty sleeping, headaches, stomach pains, fatigue; Luu et al., 2009). Thus, providing an intervention that has the outward appearance of physical exercise, with indirect MH impact, is one strategy to combat MH stigma for this underserved population.

Mental Health and Physical Health

The findings also suggested the list had positive effects on psychological outcomes. Specifically, intervention participants experiencing greater self-efficacy at posttest compared to the control group. Existing research suggests that self-efficacy is associated with a broad and stable sense of personal competence (Schwarzer & Jerusalem, 1995) and with feelings of self-worth and personal power. In older adults, declines in MH are related to diminishing feelings of usefulness and worth (Apesoa-Varano, Barker, & Hinton, 2015; Apesoa-Varano, Barker, Unutzer, et al., 2015), and improvements in self-efficacy may be helpful in improving the overall health of these adults. Previous research has shown a strong association between higher self-efficacy and better health for older adults (Grembowski et al., 1993). These findings demonstrate promise for lishi to improve mental health through improved self-efficacy among Vietnamese older adults.

Findings also supported positive associations with physical health outcomes. Participants who received lishi had more energy and less overall pain in their bodies compared to those in the control group. Participants who received lishi also demonstrated significantly better balance compared to the control group. These findings align with the outcomes found in existing movement-based intervention studies, which show they are effective at reducing fall risk for older adults. The risk of falling poses a threat to physical well-being, as falling is

associated with an increase in chronic disease mortality rates, loss of independence, and costly long-term care (Fuller, 2000; Sattin, 1992). Li et al. (2003) found that older adults who participated in a tai chi intervention significantly improved their balance over time. In another study, older adults who participated in tai chi scored significantly better on balance measures compared to participants who had yoga and no exercise (Hakim et al., 2010). However, these samples were not racially or ethnically diverse. Thus, the findings from this study demonstrate the potential impact of lishi on promoting healthy outcomes for Vietnamese older adults.

For the individuals in the intervention group, dosage (i.e., number of sessions attended) was not associated with any posttest outcomes. This is contrary to existing studies, which have suggested more sessions of movement-based interventions (e.g., qigong, tai chi) are associated with improvements in positive mood and self-efficacy for older adults across Asia (Abbott & Lavretsky, 2013; Tsang et al., 2006). The mechanisms for how these movement-based interventions impact MH symptoms have not been studied; however, it can be surmised that regular attendance in a weekly intervention may promote social interactions and reduce social isolation. Previous studies have found social isolation to be a major issue for AA households overall, often contributing to depression rates for older AA who are more likely to be refugees or immigrants in the United States (Hossen, 2012). While dosage effects on MH or physical health were not found in this study, it should be noted that the association between lishi sessions attended and posttest depression symptoms was positive and significant; these effects disappeared once baseline depression symptoms are included in the model. Thus, it is possible that more lishi, like tai chi and qiqong, may also decrease social isolation if the intervention had more sessions. The underlying mechanisms of lishi and other movement-based interventions on MH and physical health outcomes warrant further investigation.

Limitations and Future Directions

The study has several limitations. The sample was composed of mostly Vietnamese individuals, limiting the generalizability of findings. The samples were also healthy older adults who were able to move and engage in the intervention as intended. These participants were also self-selected. It is unclear if the intervention would achieve similar outcomes with older participants experiencing more severe physical limitations and/or who were mandated to participate in the study (e.g., if they were required to participate for health reasons). More research is needed to determine if lishi can benefit Vietnamese older adults with serious mental illness or physical illnesses and to determine if adaptations can be made to promote health outcomes for older individuals with limited mobility. Furthermore, the waitlist control design of this study may have introduced an “attention” factor that was not formally assessed—that is, the amount of attention paid to the intervention group was greater than the attention paid to the waitlist control group. While the research team maintained contact at the same frequency for both groups, the length of time spent differed due to the intervention. One way to address these limitations may be to use an active, or alternative treatment, control group in future examinations of lishi—this would allow for the ability to determine whether lishi or the social aspect of participating in the intervention, yielded significant treatment effects.

Another limitation was the low reliability of the balance measure at posttest—the BST assessed participants on their ability to accomplish various balance tasks on a dichotomous scale (i.e., yes, no). The vast majority of intervention group participants demonstrated improvements in balance from baseline to posttest, resulting in “yes” responses to each task accomplished, which reflected scores of zero on the BST items. Future studies may need to consider other measures of balance that are not measured dichotomously or include various indices of balance in order to mitigate this issue with the BST. The reliability of the BST may also have been impacted by the small sample size, as the BST was only collected with Cohort 2 participants. Thus, the findings should be interpreted with caution, and with the understanding that more studies are needed to replicate the findings. It is also important to mention that this sample of participants had relatively low levels of MH distress. The present study did not examine participants’ MH change over time but rather the differences in MH outcomes in an intervention versus control group; future studies may be able to gain valuable information about the impact of lishi over a longer period of time (e.g., 3 months, 6 months, 1-year follow-up). Last, the present study did not evaluate potential mediating cultural variables such as acculturation level or MH stigma. Given the cultural nature of the lishi intervention, these questions will provide more information in understanding why the intervention was effective and allow researchers to better adapt and develop interventions in the future to engage immigrant communities.

Implications

The findings from this study have significant implications for disparities research as well as the prevention of MH and health problems in the aging immigrant population. First, the study demonstrated that a movement intervention can be used to promote treatment engagement in an underserved population. Engaging in treatment and services is one path toward reducing the disparities currently observed in MH and health outcomes for Vietnamese older adults. The results suggested that the credibility was high for this type of intervention and worked well to engage this population, a historically difficult population to engage in multiple types of services. The movement-based approach may be an effective non-stigmatizing method of promoting positive outcomes for individuals who are concerned about being in a MH treatment. The findings also suggest that lishi may be an effective intervention for improving MH and physical health outcomes, particularly self-efficacy and balance. These promising findings indicate a potential for lishi to be disseminated more broadly in community organizations with healthy older adults. Future studies can focus on determining how to implement lishi more broadly across community-based organization, which may further determine the viability of lishi as a MH and health-promoting intervention for cultural and ethnic minority groups.

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Public Significance Statement

Vietnamese older adults are among the most vulnerable for developing mental and physical health problems and can benefit from interdisciplinary, community-based research to facilitate novel approaches to treatment engagement. The use of lishi, a cultural movement intervention, effectively promoted mental and physical health outcomes among Vietnamese older adults. Findings from this study support the need for more culturally based interventions, particularly for hard-to-engage populations such as Southeast Asian immigrants

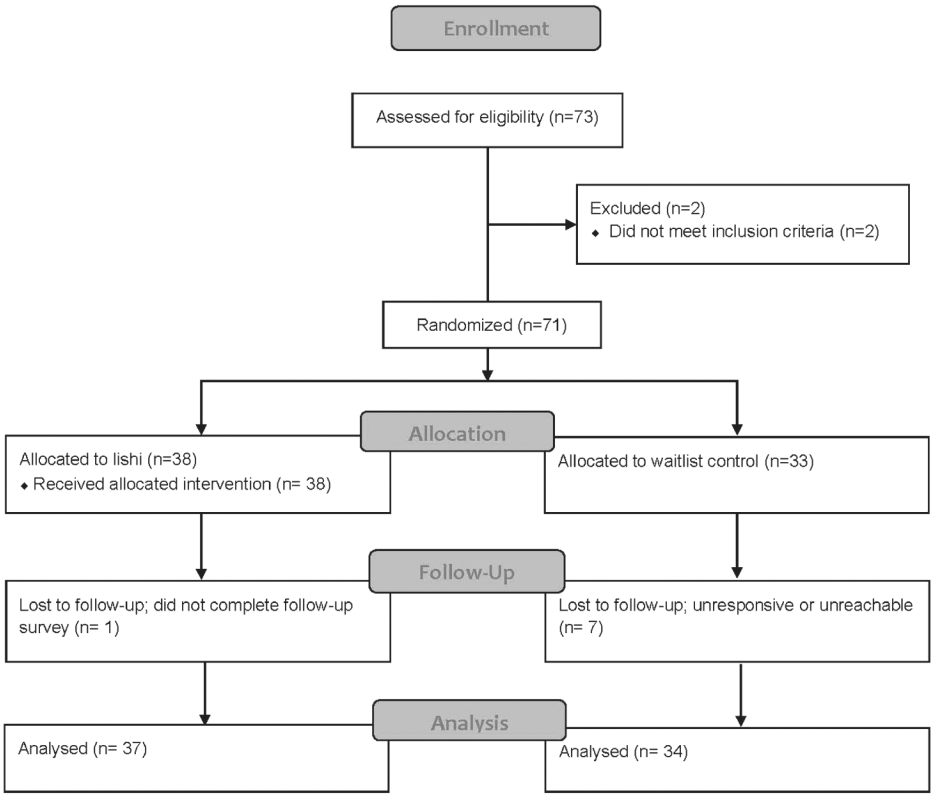

Figure 1.
Participant Enrollment Flowchart

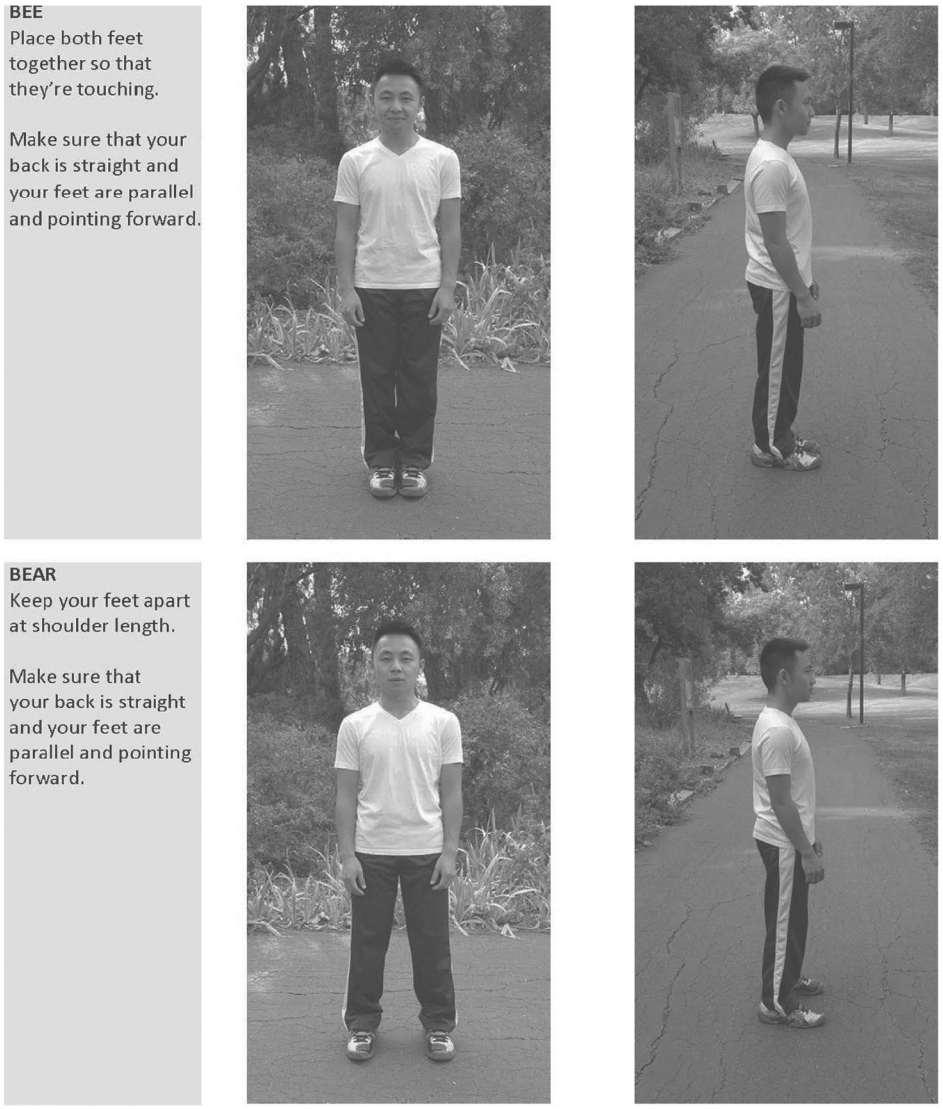

Figure 2.
Examples of Lishi Stances
Note. Photo of Lay Vang by Cindy Huang.

Table 1

Participant Characteristics

Characteristic	*n*	%
Treatment condition		
Intervention	37	52.8
Control	33	47.2
Gender		
Female	37	51.4
Male	35	48.6
Ethnicity		
Vietnamese	72	100.0
Marital status		
Single	4	5.6
Married	42	58.3
Separate or divorced	15	20.9
Widowed	5	6.9
Other	6	1.4
Missing	5	6.9
Employment status		
Not employed	66	91.7
Employed	6	8.3
Education		
Less than high school degree	19	27.5
High school degree	40	58.0
Community college/some college	8	11.6
Bachelor’s degree	2	2.9
Missing	3	4.2
Religious affiliation		
Buddhist	36	51.4
Catholic	27	38.6
Protestant	4	5.7
Other	3	4.3
Missing	2	2.8
Age	M = 66.62 years (SD = 5.17)	

Table 2

Intervention Effects of Lishi on Physical and Mental Health Outcomes

Dependent variable	*df*	*df* error	*F*	Group condition	Means (*SD*)	*P* value	95% confidence interval	
							Lower bound	Upper bound
Depression	1	65	2.72	Intervention	1.72 (0.52)	.12	1.19	1.76
				Control	1.86 (0.58)	.12	1.44	1.95
Anxiety	1	65	1.27	Intervention	1.73 (0.53)	.36	1.23	1.81
				Control	1.78 (0.55)	.36	1.42	1.92
Stress	1	65	1.04	Intervention	17.71 (4.05)	.43	14.43	19.91
				Control	18.52 (5.99)	.43	16.07	20.85
Disruption in functioning	1	65	0.86	Intervention	3.13 (1.84)	.44	1.81	3.61
				Control	3.32 (1.46)	.44	2.31	3.89
Self-efficacy *	1	65	5.93	Intervention	3.19 (0.46)	.02	3.12	3.61
				Control	2.96 (0.50)	.02	2.87	3.30
Self-esteem	1	65	0.56	Intervention	17.41 (3.10)	.56	17.76	20.76
				Control	17.64 (3.27)	.56	17.53	20.17
Physical functioning	1	65	0.03	Intervention	47.24 (24.50)	.89	47.30	70.08
				Control	50.69 (21.21)	.89	49.70	69.59
Vitality (energy) *	1	65	7.67	Intervention	62.89 (17.69)	.01	62.70	82.08
				Control	53.33 (19.75)	.01	51.65	68.55
Bodily pain *	1	65	4.81	Intervention	64.95 (25.89)	.04	55.62	82.89
				Control	53.11 (25.02)	.04	43.55	67.37
Role limitations due to physical problems	1	65	2.83	Intervention	55.26 (44.33)	.11	53.37	94.40
				Control	46.21 (37.04)	.11	40.04	75.57
Balance[a], *	1	18	6.62	Intervention	0.13 (0.84)	.02	−0.33	1.27
				Control	0.80 (0.35)	.02	0.23	1.11

[a]Higher scores indicate higher risk for falling.

*$p < .05$.