Tai Chi Treatment for Depression in Chinese Americans
A Pilot Study

ABSTRACT

Objective: This study examined the feasibility, safety, and efficacy of using tai chi for treating major depressive disorder.

Design: Thirty-nine Chinese Americans with major depressive disorder were randomized into a 12-wk tai chi intervention or a waitlisted control group in a 2:1 ratio. The key outcome measurement was the 17-item Hamilton Rating Scale for Depression. Positive response was defined as a decrease of 50% or more on the 17-item Hamilton Rating Scale for Depression, and remission was defined as a score of 7 or lower on the 17-item Hamilton Rating Scale for Depression.

Results: Of the participants (n = 39), 77% were women, and mean (SD) age was 55 (10) years. There were 26 (67%) participants in the tai chi intervention group and 13 (33%) in the control group. Of the participants in the tai chi group, 73% completed the intervention; no adverse events were reported. We observed trends toward improvement in the tai chi intervention group, compared with the control group, in positive treatment-response rate (24% vs. 0%) and remission rate (19% vs. 0%), although the differences in our small sample did not reach statistical significance.

Conclusions: A randomized controlled trial of tai chi is feasible and safe in Chinese American patients with major depressive disorder. These promising pilot study results inform the design of a more definitive trial.

Key Words: Depression, Chinese, Tai Chi, Mind-Body Intervention, Randomized Clinical Trial
There are tremendous racial health disparities in the treatment of depression. Ethnic minorities face both practical and cultural barriers to mental health care. Asian Americans frequently lack the resources to seek help, suffer from language barriers, and hold strong stigma toward psychiatric illnesses, leading to underrecognition and undertreatment of mental illnesses, including depression. When depressed, less acculturated Chinese immigrants tend to seek help from primary care physicians, lay people, and alternative medical practices, and they rarely use mental health services. Our earlier study in an urban primary care setting in Boston showed that the prevalence of major depressive disorder (MDD) was 19.6% among underserved Chinese immigrants, and many of them hold stigma against mental health services. There is a pressing need for culturally sanctioned interventions for depressed Asian Americans, whose numbers have increased rapidly in the recent years.

PREVALENCE AND PROMISE OF MIND-BODY INTERVENTION

Tai chi is a mind-body exercise that originated in China and is growing in popularity in the West. Tai chi is based on slow intentional movements, often coordinated with breathing and imagery that aims to strengthen and relax the physical body and mind, enhance the natural flow of qi (or life energy), and improve health, personal development, and in some systems, self-defense. Preliminary research has shown tai chi’s beneficial effects on a range of psychologic well-being measures, including mood, anxiety, general stress management, self-esteem, cognition, and quality-of-life, in varied populations.

Wang et al. reviewed studies published in either Chinese or English on the effects of tai chi exercises and concluded that tai chi appeared to be associated with improvements in psychologic well-being, with reduction in stress, anxiety, and depression. However, most of the studies cited in these two recent review articles recruited healthy participants or individuals with primary medical conditions, including musculoskeletal pain and cardiovascular disease, and improvements in depression were secondary outcomes. To date, there are only two studies that examined the effects of tai chi specifically in patients with MDD. Tsang et al. reported a small randomized controlled trial of 14 older Chinese patients with depression, suggesting a beneficial impact of tai chi on five measures of depressive symptoms (i.e., the Center for Epidemiologic Studies–Depression Scale total score and subscale scores—somatic symptoms, negative affects, interpersonal relations, and well-being). Lavretsky studied depressed elderly patients who partially responded to antidepressant treatment and found that both tai chi and health education were effective treatments. Importantly, that same study showed that patients who received tai chi had better outcomes in resilience and health-related quality-of-life.

To our knowledge, this pilot study is the first randomized controlled trial to explore the feasibility, safety, and efficacy of a tai chi intervention in Chinese Americans diagnosed with MDD.

METHODS

Participants

Thirty-nine Chinese Americans were recruited from Boston’s Chinese community through advertisements and referral by primary care physicians and mental health clinicians at South Cove Community Health Center (South Cove; see Fig. 1 for the study flow diagram) between August 2008 and April 2010. South Cove is a federally funded community health center in Boston that serves predominantly Chinese Americans. In 2010, South Cove served

![Flowchart of study participants.](image)
more than 25,000 patients, and most of them (>92%) were Chinese immigrants. All participants were required to be fluent Chinese speakers both to ensure comprehension in the tai chi classes, which were conducted in Chinese (Cantonese and Mandarin), and to encourage social interaction and mutual support. The study was approved by the institutional review board of the Massachusetts General Hospital.

Inclusion criteria included the following: (1) self-identification as being of Chinese ethnicity and fluent in Mandarin and/or Cantonese; (2) 18–70 yrs of age; (3) Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, diagnosis of MDD; and (4) baseline score of 12 or higher on the 17-item Hamilton Rating Scale for Depression (HAM-D17). Exclusion criteria included the following: (1) primary psychiatric diagnosis other than MDD; (2) history of psychosis, mania, or severe cluster B personality disorder; (3) judged by the investigators to have unstable medical conditions; (4) having current active suicidal or self-injurious potential necessitating immediate treatment; and (5) regular practice of tai chi or other forms of mind-body intervention in the past 3 mos. Participants receiving treatment for depression, including antidepressants, conventional psychotherapy, or complementary treatments, such as St. John’s wort, S-adenosyl methionine, omega-3 fatty acids, and light therapy, were allowed to continue with their treatment and were advised not to change their existing treatments during the study.

**Participant Enrollment and Randomization**

Potential participants were prescreened over the telephone by our bilingual research staff using an institutional review board–approved protocol. They were then scheduled for a screen visit, where a bilingual investigator consented each participant and conducted interviews. A psychiatrist administered the Chinese bilingual version of the semistructured psychiatric interview to assess the diagnosis of MDD and the HAM-D17 to determine eligibility. Eligible participants were randomized using computer-generated numbers, with no restriction, that were put into sealed envelopes and opened sequentially. Subjects were randomized to the tai chi intervention group or the waitlisted control group in a 2:1 ratio. Because of the nature of the intervention, both the research personnel (except the outcomes assessors who remained blinded) and the participants were not blinded to the randomization status.

**Power Calculations**

Power calculations were performed using the hypothetical 35% response rate from the tai chi intervention and 17% from the waitlisted group based on an early clinical trial that used acupuncture. To have a power of 0.75 (\(P = 0.05\)), a sample size of 92 in each of the two groups will be required. This is a pilot study conducted to explore feasibility and possible signs of response to the intervention; it did not have adequate power to demonstrate statistical differences, if present, between the two groups.

**Intervention**

The tai chi intervention consisted of 1-hr group classes held twice weekly for 12 wks. The instructor had taught tai chi in a community setting for more than 20 yrs and had been a senior instructor for tai chi clubs in many universities in the Boston area. The instructor followed a standard protocol, which included 12 wks of training, and taught the first section of the traditional 108 movements Yang-style tai chi and a set of traditional warm-up exercises that involved arm swinging; gentle stretches of the neck, shoulders, spine, arms, and legs; and traditional breathing methods. These exercises focus on releasing tension in the body, incorporating mindfulness and imagery into movement, increasing awareness and efficiency of breathing, and promoting overall relaxation of body and mind. Participants in the intervention group were encouraged to practice at home at least three times per week and to record how much they practiced. Peer learning and discussion were encouraged to facilitate social interaction and mutual support, which are considered an important therapeutic element in tai chi. Classes were conducted in Chinese (Cantonese and Mandarin).

Participants in the waitlisted group were assessed at weeks 6 and 12 but received no other interventions during the waiting period.

**Outcome Assessments**

Outcome measures were assessed at baseline, week 6, and week 12 by research staff who were blinded to patients’ randomization status. At each assessment, participants in both groups were administered the HAM-D17, the Clinical Global Impressions–Severity (CGI-S) and Improvement (CGI-I), the Quality-of-Life Enjoyment and Satisfaction Questionnaire, Short-Form (Q-LES-Q-SF),
and the Multidimensional Scale of Perceived Social Support (MSPSS). Below are detailed descriptions of the instruments:

**HAM-D**\textsuperscript{17,20,21}: The HAM-D is a 17-item clinician-rated scale for depression. Questions focus on neurovegetative and other depressive symptoms experienced over the past 7 days. Scores on the HAM-D fall into the following ranges: 0–7 = normal; 8–13 = mild depression; 14–18 = moderate depression; 19–22 = severe depression; \geq 23 = very severe depression. The HAM-D is a widely studied instrument for depression, and its reliability and validity are high.\textsuperscript{22} The Chinese translated version of the HAM-D has been shown to have adequate reliability and validity in an earlier study.\textsuperscript{23}

**CGI-S and CGI-I**\textsuperscript{24}: These two clinician-rated scales assess the clinician's global impression of the patient. CGI-S (severity) measures the current condition of the patient, as judged by the clinician, on a scale of 1–7 (1 reflecting normal and 7 reflecting the most severely ill patients). The CGI-I (improvement) measures the degree of improvement, as judged by the clinician, since the start of treatment on a scale of 1–7 (1 being very much improved and 7 being very much worse).

**Q-LES-Q-SF**\textsuperscript{25}: The Q-LES-Q-SF is a self-report measure designed to assess the degree of enjoyment and satisfaction experienced by participants in various areas of daily functioning. The short form (the general activities subscale) has been shown to detect treatment effects in studies of mood and anxiety disorders.\textsuperscript{25,26} Each item is rated from 1 (very poor) to 5 (very good). Results are presented as the total score and as an average of the single overall assessment item, with higher scores representing better quality-of-life. The Chinese version of the Q-LES-Q-SF has been demonstrated to have good reliability and validity among Chinese patients with psychiatric disorders.\textsuperscript{27}

**MSPSS**\textsuperscript{28}: The MSPSS is a self-administered 12-item scale used to assess perceptions of social support from family members, friends, and significant others. Items are rated on a 7-point Likert Scale (1, very strongly disagree; 7, very strongly agree), with higher scores indicating greater level of perceived support. Confirmatory factor analysis has consistently reported a three-factor solution: family, friends, and significant others.\textsuperscript{29} The internal consistency of the Chinese version is good.\textsuperscript{30,31}

Beliefs and Expectations of Tai Chi is scored on a 4-point Likert scale (0: no; 1: maybe; 2: yes; 3: definitely) for the participants to report their opinions on how effective they consider tai chi as treatment of depression. This form is based on a similar scale that has been used in several other tai chi and acupuncture studies.\textsuperscript{32}

For feasibility and safety measures, at each class, participants were asked to fill in an attendance sheet, an adverse events log, and an adherence to tai chi practice log to report the frequency and duration of their tai chi practice in the past week.

**Data Analyses**

Participants in the two groups were compared with respect to their demographic characteristics, belief in the effectiveness of tai chi in treating depression, and severity of depression at the beginning of the study to explore potential confounders of treatment outcomes using nonparametric statistical tests (i.e., Fisher's exact probability test for categorical variables and Mann-Whitney test for continuous variables). Completers of the tai chi intervention were defined as having attended 15 (65%) or more of the training sessions. To examine the efficacy of tai chi in treating depression, intention-to-treat analyses were performed, requiring participants to have at least one postbaseline assessment. We did not impute missing data but used data obtained at week 6 if the week 12 assessment was not completed. The intervention and the control groups were compared in their response rates and remission rates using Fischer's exact probability test and in their final CGI-I scores and changes in CGI-S and HAM-D\textsubscript{17} scores compared with baseline using the two-sample Mann-Whitney test. Positive response to treatment was defined as a decrease of 50% or more in a patient's HAM-D\textsubscript{17} score, and remission was defined as having a score of 7 or lower on the HAM-D\textsubscript{17} at the last assessment. Statistical analyses were performed using SPSS software, version 17.

**RESULTS**

Thirty-nine Chinese Americans with MDD were enrolled in the study (77% women; mean [SD] age, 55 [10] yrs). Twenty-six (67%) were randomized to the tai chi intervention and 13 (33%) were randomized to the waitlisted control group. The two groups were similar with respect to age, sex, beliefs about and expectations of the tai chi intervention, and baseline scores on the HAM-D\textsubscript{17}, CGI-S, Q-LES-Q, and MSPSS scales. Compared with those in the control group, participants in
The participants in the tai chi intervention group were more likely to be married (68% vs. 39%; $P = 0.1$) and less likely to be employed (46% vs. 69%; $P = 0.31$) and to take antidepressants (24% vs. 46%; $P = 0.27$); however, none of these trends reached statistical significance. The baseline and demographic characteristics of participants in both groups are listed in Table 1.

Most participants had positive expectations that tai chi would help their depression ("not helpful," 0%; “maybe,” 39%; “yes,” 36%; and “definitely,” 21%). Nineteen (73%) participants in the tai chi intervention group completed the intervention, based on having attended 15 (65%) or more sessions. Two participants in the control group did not complete the week 6 or 12 assessments and were consequently excluded from data analysis. No adverse events due to the tai chi intervention were reported.

The tai chi intervention group, compared with the control group, had improved response rates (24% vs. 0%) and remission rates (19% vs. 0%), although the differences did not reach statistical significance ($P = 0.15$ and $P = 0.30$, respectively). A subgroup analysis using descriptive statistics was performed to compare the response and remission rates of completers ($n = 19$) and noncompleters ($n = 7$) of the tai chi group and the control group ($n = 11$). The response rates were 26%, 14% and 0%, respectively; the remission rates were 21%, 14%, and 0% (Fig. 2).

Comparing mean baseline and week 12 scores, there were no significant differences between the tai chi intervention group (including both completers and noncompleters) and the control group in the change in scores on the HAM-D$_{17}$ ($P = 0.82$), Q-LES-Q ($P = 0.46$), MSPSS-significant others ($P = 1.0$), MSPSS-family ($P = 0.20$), or MSPSS-friends ($P = 1.0$; Table 2). Similarly, participants in the tai chi group and the control group did not differ in the change in mean severity of depression at the week 12 assessment compared with baseline CGI-S scores, and the two groups had no significant differences in the CGI-I (global improvement in depression) at the week 12 assessment.

**DISCUSSION**

This pilot study provides preliminary information on the potential impact of a culturally sensitive tai chi intervention to treat MDD in underserved Chinese Americans, who historically underuse conventional treatment options. If the efficacy of tai chi in MDD can be shown, it has the potential to significantly impact a large proportion of underserved ethnic minorities with mental health issues. This study demonstrates the feasibility and safety of using tai chi as an intervention for Chinese Americans with MDD. We encountered little difficulty in recruiting for this randomized controlled study, and the Chinese community responded positively to the idea of using tai chi as an intervention for depression. At baseline evaluation, all participants had positive expectations of tai chi, and more than

<table>
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<tr>
<th>TABLE 1 Baseline characteristics of the study participants</th>
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<td>Characteristics</td>
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<tr>
<td>Age, yrs</td>
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<tr>
<td>Sex (male)</td>
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<tr>
<td>Marital Status (married)</td>
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<tr>
<td>Education, yrs</td>
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<tr>
<td>Employment status (employed)</td>
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<tr>
<td>Currently receiving antidepressants</td>
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<tr>
<td>Belief that tai chi is useful</td>
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<tr>
<td>HAM-D$_{17}$ (baseline)</td>
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<tr>
<td>CGI-S (baseline)</td>
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<tr>
<td>Q-LES-Q score</td>
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<tr>
<td>MSPSS-SO</td>
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<tr>
<td>MSPSS-FA</td>
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<tr>
<td>MSPSS-FR</td>
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*Based on Mann-Whitney U/Fisher's exact probability test.

Statistically significant if $P < 0.05$.

HAM-D$_{17}$ indicates 17-item Hamilton Rating Scale for Depression; CGI-S, Clinical Global Impressions—Severity; Q-LES-Q, Quality-of-Life Enjoyment and Satisfaction Questionnaire; MSPSS, Multidimensional Scale of Perceived Social Support; SO, significant others; FA, family; FR, friends.
half had strong beliefs that tai chi was helpful for depression. Of the participants in the tai chi group, 73% completed the intervention (≥65% attendance), demonstrating satisfactory compliance to treatment. Tai chi also appeared safe in this population, given that we observed no adverse events. This is consistent with findings of previous clinical trials in other populations.\textsuperscript{33,34} There were trends toward improved response and remission rates after the tai chi intervention, with some evidence of a dose effect: completers performed the best; controls, the worst; and noncompleters, in between (Fig. 2).

This study provides valuable information regarding intervention feasibility, outcome measurements, and effect size, which will facilitate the design of future studies on tai chi interventions for treating depression. It is worth pointing out that none of the participants in the control group achieved response or remission after the study period, suggesting that spontaneous response/remission was unlikely in this group of participants. The tai chi intervention (including both completers and noncompleters) led to small but meaningful response (24%) and remission (19%) rates. The relatively small proportion of patients who responded and remitted after treatment may explain the lack of significant improvement in the mean HAM-D\textsubscript{17}, CGI, Q-LES-Q, and MSPSS values. Power calculations using the observed effect sizes and variability indicated that a modestly sized randomized clinical trial of approximately 180 people (90 per group, based on a 20% difference remission rate, \( P = 0.05, \) power = 0.75) will be needed to more definitively assess the current primary outcomes.

We would like to acknowledge the following limitations of this study. First, this is a small randomized study with a waitlist control. Participants in the waitlisted group did not receive tai chi training or the attention and social support that accompanied the intervention. It is unclear whether patients’ improvement in the intervention group was a result of tai chi or social interaction from participating in the study. Future attention-controlled and mechanistic studies might further investigate the differential impact of tai chi and of social interaction. Another limitation is the issue of generalizability. Because

![Figure 2](image)

**Figure 2** Response and remission rates of completers \((n = 19)\), noncompleters \((n = 7)\), and controls \((n = 11)\). Positive response to the tai chi intervention was defined as a decrease of 50% or more on the HAM-D\textsubscript{17}, and remission was defined as a HAM-D\textsubscript{17} score of 7 or lower. HAM-D\textsubscript{17} indicates 17-item Hamilton Rating Scale for Depression.

<table>
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<th>TABLE 2</th>
<th>Comparison of treatment outcomes in the tai chi intervention and waitlisted control groups</th>
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<tr>
<td>Depression Treatment Outcomes (Compared with Baseline)</td>
<td>Tai Chi Intervention ((n = 25))</td>
</tr>
<tr>
<td>Response rate</td>
<td>% ((n)) Mean(SD)</td>
</tr>
<tr>
<td>Remission rate</td>
<td>24 ((6))</td>
</tr>
<tr>
<td>Change in CGI-S (larger scores reflect more improvement)</td>
<td>1.0 ((1.0))</td>
</tr>
<tr>
<td>Change in CGI (lower scores reflect more improvement)</td>
<td>3.0 ((1.2))</td>
</tr>
<tr>
<td>Change in HAM-D\textsubscript{17}</td>
<td>5.2 ((5.1))</td>
</tr>
<tr>
<td>Change in Q-LES-Q</td>
<td>0.4 ((0.1))</td>
</tr>
<tr>
<td>Change in MSPSS-SO</td>
<td>1.9 ((6.7))</td>
</tr>
<tr>
<td>Change in MSPSS-FA</td>
<td>1.4 ((6.1))</td>
</tr>
<tr>
<td>Change in MSPSS-FR</td>
<td>2.3 ((7.9))</td>
</tr>
</tbody>
</table>

\(^a\)Based on Mann-Whitney U/Fisher’s exact probability test.

\(^b\)Statistically significant if \( P < 0.05.\)

CGI-S Clinical Global Impressions–Severity; HAM-D\textsubscript{17}, 17-item Hamilton Rating Scale for Depression; Q-LES-Q, Quality-of-Life Enjoyment and Satisfaction Questionnaire; MSPSS, Multidimensional Scale of Perceived Social Support; SO, significant others; FA, family; FR, friends.
Patients in this study were predominantly recent Chinese immigrants, we cannot be sure whether these results would generalize to other populations. Further studies will be needed to examine whether tai chi is effective for treating depression in the mainstream population and in other ethnic minority groups.

CONCLUSIONS

A 12-wk tai chi intervention may be effective in improving symptoms and inducing remission in Chinese Americans with MDD. Future studies with larger sample sizes will be needed to provide more definitive outcomes.

REFERENCES


27. Tong M, Chiu, HM, Jian J: The reliability and validity of the Quality of Life Enjoyment and Satisfaction Questionnaire, Short Form, Q-LES-Q-SF, among Chinese patients with mental disorders. Chin Ment Health J 2010;24:680–4


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Erratum

In the article by Stineman et al, published in the February 2012 issue of the journal, Table 6 on page 135, there is a reversal of numbers in the last two rows of the second column. The number 7008 should be associated with “no” and the number 440 should be associated with “yes.” The corrected rows are as follows:

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<th>Perceived unmet home feature(s): P &lt; 0.0001</th>
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<tr>
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REFERENCE


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