Qigong programme among community-dwelling older adults at risk of depression: A randomised controlled study

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Abstract: The objective of this study was to evaluate the effects of Qigong programme on depression of older adults with mild-moderate depression. The experimental study was conducted at the Public Health Service Centre (PHS) in two randomised districts of Bangkok, Thailand from October to December 2017. This parallel, randomised controlled trial compared the Qigong programme with the usual singing and praying activities among older adults at mild-to-moderate risk of depression. The Qigong programme was based on mind-body exercises incorporate mindful breathing. The intervention group underwent a 3 sessions/week 12-week course of Qigong exercises while the control group participated in singing and praying with the same duration and frequency. The outcome measure was the change in the TGDS from baseline to 12 weeks. Data analysis was conducted using STATA. The outcome data are available for all randomized subjects, all analyses were conducted as intention-to-treat. The Qigong programme was highly significant (−9.88 score points; 95% CI −11.62 to −8.13; p < 0.001) than the control group in reducing depression scores at 12 weeks. Depression score decreased (10.39 score points; 95% CI −11.77 to −9.02; p < 0.001) only in the Qigong group. These findings support the Qigong programme was effective in reducing depression score both in...
mild and moderate depression community-dwelling older adults. The Qigong programme appears to confer greater improvements than the usual program.

**Subjects:** Exercise Therapy; Aging; Aging and Health; Mental Health

**Keywords:** qigong; depression; older adult

1. Introduction

Population ageing is a new global demographic trend. In the past century, ultramodern innovations and technological advances in medical sciences have improved monitoring during childbirth, labour, delivery processes, treatment techniques, drugs, and medical devices. Human lifespan is increasing, with declining mortality rates in all age levels leading to accelerated increase in world population (Kanasi, Ayilavarapu, & Jones, 2016; Lutz, Sanderson, & Scherbov, 2008). Most older adults have multiple medical conditions as a natural result of deteriorating mental and physiological capacities. Thus, increase in ageing of the global population and the commensurate rise in ageing-related non-communicable diseases have become social economic burdens that necessitate change in healthcare policy direction. An appropriate healthcare system must be identification and implemented to prepare Thai older adults for a world with an ageing society and, thereby, improve the productiveness and well-being of their longevity.

Epidemiological population ageing studies report that depression is commonly experienced by older adults. As a global disease burden, depression is ranked third among disorders and will gain top spot by 2030 (Mathers & Loncar, 2006). In Thailand, prevalence of depression for older adults living in Bangkok was reported at 12.78% (Thongtang et al., 2002), with 8.23% having depressive symptomatology (male 5.43%, female 9.63%) (Geriatric Depression Scale [GDS], 2002). Underdiagnosed and undertreated depression was reported at almost one-third in the United States of America (USA) for older adults (VanItallie, 2005). Depression in older adults should be identified early, together with an assessment of depression risk. However, research concerning mild-to-moderate depression in older community-dwelling adults is lacking. An outreach preventive programme whereby treatment is actively offered to risk groups in the community can be used to reduce depression risk factors and maximise health benefits for the elderly (Hindi, Dew, Albert, Lotrich, & Reynolds, 2011).

Many previous studies have demonstrated reductions in depressive symptoms through participating in exercise (Blumenthal, Smith, & Hoffman, 2012; Craft & Perna, 2004; Schuch et al., 2016). Qigong, an ancient mind-body healing technique that originated in China, involves sequences of ongoing movements with variation in mental focus, coordination, breathing, relaxation, and meditation training (Larkey, Jahnke, Etnier, & Gonzalez, 2009). Qigong is often used for health purposes and has also been ratified as safe for a wide variety of users including older adults with chronic health conditions such as psychological well-being, cognitive function (Marks, 2017), balance, neuromuscular conditions (Haak & Scott, 2008) and coronary artery disease (Hung, Yeh, & Chen, 2016). Few adverse events have been reported in the literature (Birdee, Wayne, Davis, Phillips, & Yeh, 2009; Chen & Yeung, 2002) with evidence-based channels improving health-related quality of life for older adults through feasible social intervention (Chan, Yu, & Choi, 2017). Randomised controlled trials suggested that Qigong is effective in decreasing depressive symptoms, stress, anxiety, and mood disturbances. The therapy is readily available at little cost to a substantial proportion of the population but prevention studies appraising the Qigong technique are limited (Abbott & Lavretsky, 2013; Liu et al., 2015; Zeng, Luo, Xie, Huang, & Cheng, 2014).

Here, the potential effects of Qigong exercise were assessed to combat depression in Thai older adults and increase their productiveness and well-being.
2. Materials and methods

2.1. Study design and ethics approval
The experimental study was conducted at the Public Health Service Centre (PHS) in two randomly assigned districts of Bangkok, Thailand from October to December 2017. This parallel, randomised controlled trial compared the Qigong programme with the usual singing and praying activities among older adults at mild-to-moderate risk of depression. The study was approved by the Institutional Review Board, IRB No. 381/59 of the Faculty of Medicine, Chulalongkorn University. Procedures followed the tenets of the Declaration of Helsinki and the collected information was recorded as Thai clinical trial registration database No. TCTR20180627004.

2.2. Inclusion/exclusion criteria
Inclusion criteria were healthy volunteers aged 60 to 90 years who scored between 13 and 24 on the Thai Geriatric Depression Scale (TGDS), had no suicide risk evaluated by Mini International Neuropsychiatric Interview Part C (M.I.N.I.-Suicidality) and no cognitive impairment as determined by the Thai Mental State Examination (TMSE). Subjects were recruited and randomly assigned by district to the intervention and control groups. The intervention group underwent a 12-week course of Qigong exercises while the control group participated in singing and praying with the same duration and frequency. The study population consisted of older adults with no personal case history or presence of major depressive disorders including bipolar affective disorders, schizophrenia, cognitive impairment, and severe illnesses (cardiac, hepatic or renal failure, cancer or other systemic diseases). Volunteers who were currently taking antidepressants were excluded. All volunteers had not practiced Qigong or similar exercises such as Tai-Chi for at least 6 months before the study.

2.3. Recruitment and randomisation procedures
Randomisation was performed by a statistician using a simple randomisation method. The two districts were randomly assigned to either the Qigong group or the control group. Participants were recruited through announcements at both districts that were randomised as Bangna District = PHS No. 8 and Khlong Toei District = PHS No. 41. This randomised controlled trial with the allocation process in different areas avoided the risk of communication between participants.

2.4. Intervention
Experts with more than 30 years of experience in the Qigong programme were utilised in this study alongside the research team. Qigong focuses on accurate body movements with rhythmic breathing and meditation. Each Qigong class lasted 60 min and consisted of a warm-up (15 min), posture and breathing (10 min), main Qigong treatment (25 min), and a cool-down period of 10 min. The warm-up and cool-down exercise times were emphasised to focus on stabilisation of autonomic nervous system activity.

After recruitment to the Qigong group, the participants attended Qigong classes with instruction provided by two experts 3 times a week for 12 weeks (DiLorenzo et al., 1999) at the assigned Public Health Service Centre (No. 41). The control group undertook normal activities such as praying and singing for the same period and frequency at the assigned Public Health Service Centre (No. 8) under the supervision of research assistants. After the research period was completed, participants in both groups were given a DVD and booklet about the Qigong programme and advised to perform Qigong treatment at home at least three times a week.

2.5. Assessment
The primary outcome was recorded as a change in TGDS before and after the Qigong programme. Participants were asked to complete a TGDS inquiry form as a brief 30-item questionnaire and respond by answering “yes” or “no” to how they felt during the 12-week course of treatment in relation to their health and medical condition. Mild to moderate cognitively impaired older adults (GDS, 2002) were assessed at baseline and at 12 weeks.
2.6. Sample size and data analysis
Sample size estimation, based on detecting progression using the Geriatric Depression Scale (GDS), was calculated by assuming the effect size was the change in GDS as 1.23 (20% of 6.15 GDS mean in the control group) (Tsang, Fung, Chan, Lee, & Chan, 2006), with an alpha error of 5% and statistical power of 80% and set at 23 per group. To allow for a 10% drop out ratio, sample size was adjusted to 26 in each group with a total of 52 participants. Change in TGDS at the end of the 12-week treatment period was the primary endpoint. Primary comparison was determined between the participants assigned to the Qigong group versus the control group.

TGDS data were analysed using the principle of intent-to-treat (ITT). Group differences in baseline characteristics were tested using the unpaired t-test for continuous outcome. The independent t-test was used to compare differences between the Qigong and control groups with the paired t-test employed to compare differences before and after treatment within each group. When the assumption of normality was violated, the Wilcoxon rank-sum test and the Wilcoxon signed-rank test were used. Statistical analysis was performed using STATA and level of significance was established at p less than 0.05.

3. Results

3.1. Demographic data
A total of 274 participants were screened for eligibility with 66 included in the trial; 47 participants withdrew consent, 4 moved to other provinces, 1 moved abroad, and 156 did not satisfy the inclusion criteria. The 66 eligible participants were recruited and randomly assigned by district to the Qigong group (n = 33) or the control group (n = 33). Data for all participants were analysed. During the study, participants in both the Qigong group and control group recorded no dropouts. The subjects were recruited between June 15 and 24 September 2017 and the trial ended on 22 December 2017 (Figure 1).

3.2. Baseline characteristics of participants
From June 2017 to September 2017, 274 people were screened for eligibility; 66 qualified and underwent randomisation as 33 subjects in each group and attended more than 80% of the 36 sessions which defined the complete programme. Table 1 shows baseline characteristics of the study population. The groups were well identified between participants in the two groups with regard to baseline characteristics of age, sex, income, marital status, educational level, self-reported health status, diabetes, hypertension, dyslipidemia treatment, and knee pain.

All 66 participants completed their allocated arms and provided complete data on the outcome measured at 12 weeks. The baseline recorded no significant differences in demographic variables or main outcomes between the Qigong and control groups. Out of the 66 participants, over 80% attended 29 or more sessions. Attendance did not differ significantly between the groups (p = 0.87).

3.3. Outcomes
Outcomes at 12 weeks for mean (±SD) within each group and differences among groups are shown in Table 2. Participants in the Qigong group achieved significantly better outcomes than those in the control group. The Qigong group recorded better TGDS scores than the control group after the 36-session programme, with between-group difference of 9.88 points (95% confidence interval [CI], −11.62 to −8.13; P < 0.001).

From baseline to 12 weeks, participants in the Qigong group showed mean decrease of 10.39 points (95% CI, −11.77 to −9.02; P < 0.001), while participants in the control group recorded mean decrease of 0.52 points but with no significant change in TGDS (Table 2).
Results of the mild subgroup (TGDS 13–18) and moderate subgroup (TGDS 19–24) demonstrated no significant difference between both groups. Results in Table 3 show that the Qigong programme was effective in both subgroups. Scores for groups with mild risk and moderate risk decreased by 10.13 points (95% CI, −12.43 to −7.82; P < 0.001) and 9.17 points (95% CI, −11.93 to −6.41; P < 0.001) respectively.

4. Discussion
We found that a programme of triweekly Qigong for 12 weeks, as compared with the normal praying-singing programme, was effective in improving TGDS in older adults with mild-to-moderate risk in major depressive disorders. Our findings and improvements in the outcome were consistent with research conducted in Hong Kong, involving 82 elderly persons diagnosed with depression or apparent features of depression, which also demonstrated a significant difference between the Qigong intervention programme and control group (Tsang et al., 2006). Results also showed that after 12 weeks of training, depressed participants who followed the aerobic exercise programme demonstrated significant improvement in anxiety, depression, and
self-concept than those in the control group. However, most prior studies measured depression among sick research subjects suffering from other medical conditions that might mask results of the community-dwelling group.

Table 1. Demographic and clinical characteristics of the study participants at baseline. (N = 66)

| Characteristics                        | Qigong group (n = 33) | Control group (n = 33) |
|----------------------------------------|-----------------------|------------------------|
| Gender (males/females)                 | 9/24                  | 9/24                   |
| Age (years) Mean (SD)                  | 69 (6.3) (61-87)      | 71 (6.9) (60-82)       |
| Range (Min-Max)                        |                       |                        |
| Income Median (Q1, Q3)                 | 3,000 (1,000, 5,000)  | 2,700 (700, 5,000)     |
| Marital status: Single/married/divorce |                       |                        |
| Educational level: Illiteracy/Educated |                       |                        |
| Self-reported health status: Poor/Fair/Good or Excellent |                       |                        |
| Diabetes (%)                           | 14 (42.4)             | 20 (60.6)              |
| Hypertension (%)                       | 14 (42.4)             | 18 (54.5)              |
| Dyslipidemia (%)                       | 17 (51.5)             | 11 (33.3)              |
| Knee pain (%)                          | 5 (15.2)              | 2 (6.1)                |

Table 2. Differences in changed scores at baseline and 12 weeks within group and between groups

|                          | Mean (SD) | Diff within group (95%CI) (12 weeks—Baseline) a | Diff in changed scores between group (95%CI)b |
|--------------------------|-----------|-------------------------------------------------|---------------------------------------------|
| Control (n = 33)         |           |                                                 |                                             |
| Baseline                 | 17.39 (3.50) | −0.51 (−1.64, 0.61)                                 | −9.88 (−11.62, −8.13) **                   |
| 12 weeks                 | 16.88 (3.44) |                                                |                                             |
| Treatment (n = 33)       |           |                                                 |                                             |
| Baseline                 | 17.97 (2.84) | −10.39 (−11.77, −9.02)                             | −2.01 (−3.40, −0.62) **                   |
| 12 weeks                 | 7.58 (3.85)  |                                                 |                                             |

*ausing paired- t-test for baseline and 12 weeks.

*busing unpaired t-test for different in change scores between control and treatment.

**P < 0.001.

Table 3. Change of TGDS scores from baseline between control and treatment groups for moderate and mild group

| TGDS subgroups                        | Group    | n  | Mean (SD) | Diff between group (95%CI) |
|---------------------------------------|----------|----|-----------|---------------------------|
| Moderate (TGDS DiLorenzo et al., 1999; Johansson & Hassmen, 2008; Kessler et al., 2005; Liu et al., 2015; Tsang et al., 2006; Zeng et al., 2014) | Control  | 12 | 1.83 (9.40) | −9.17 (−11.93, −6.41) ** |
|                                       | Treatment| 15 | 11.00 (3.50) |                           |
| Mild (TGDS Abbott & Lavretsky, 2013; Bidee et al., 2009; Chan, et al., 2017; Chen & Yeung, 2002; Haak & Scott, 2008; Hung et al., 2016) | Control  | 21 | −0.24 (2.86) | −10.13 (−12.43, −7.82) ** |
|                                       | Treatment| 18 | 9.89 (4.20)  |                           |

**P < 0.001.
This study formed part of a programme of studies to test the efficacy of Qigong in the most precise and viable way as a randomised controlled trial. Subjects were in the risk group for major depressive disorder (MDD) identified by TGDS as untreated MDD patients. All participants were recruited from the community and not from a hospital or secondary or tertiary referral centre. Our study recorded no loss in follow-up and no antidepressant medication was prescribed during the study period; thus, concurrent medications did not confound our results.

The Qigong programme focuses on all aspect of exercise as warm-up, posture and breathing, main Qigong treatment and a cool-down period in a group setting that contributes to both physical and psychological well-being. Our results were consistent with prior studies on acute psychological responses to Qigong exercise that found decreased state of anxiety, optimism, positive mood states and improved perceived happiness (Johansson & Hassmen, 2008). Findings suggested that the Qigong programme was effective in decreasing depression scores in both subgroups.

However, our study results were not compatible with a review conducted by Kessler et al. They reported that scores of depression were higher by age (over 75) and gender (female) (Kessler et al., 2005). The process of ageing causes decline in both physical and psychological health functions and experiencing multiple sensory losses, social isolation, and other deteriorative elements are root causes of late-life depression. The thorough randomisation in our study helped to ameliorate variances initiated by age and gender factors.

Our study has some limitations. First, for behaviour-based intervention, participants were aware of their group assignments. This awareness may have contributed to biases results since people interested in participating may have had prior positive perspectives on the benefits of Qigong. Second, we did not include a non-exercise control group, so the overall improvement observed in the Qigong programme could not be evaluated. However, results of this trial indicated that the Qigong programme was more effective than praying and singing in preventing the development of MDD symptoms. Lastly, participants in the intervention group might have practiced at home during the study periods and may have concealed fundamental changes influenced by training interventions.

Future studies should focus on dose-response of subjects receiving Qigong intervention at different durations, intensities, and frequencies. A three-arm design involving Qigong intervention versus various kinds of exercise or different Qigong programmes versus usual care or waitlist groups could shed more light on the effect of these variables. A cost-benefit analysis could also suggest feasible health preventive policy solutions.

In conclusion, Qigong appears to be a compelling choice as preventive intervention for older adults with mild to moderate depression with low cost, small space requirements, safety, and practicability. Positive results of our study promote new evidence-based Qigong programmes as an alternative intervention to improve public health among older adults with late-life depression risk living in real community settings.

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