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Effectiveness of internal Qigong on quality of life, depressive symptoms and self-efficacy among community-dwelling older adults with chronic disease: A systematic review and meta-analysis

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ABSTRACT

Background: With increasingly aged populations worldwide, the quality of life and psychosocial wellbeing of older adults, especially those with chronic disease, become of increasing importance. There are multiple studies on the use of internal Qigong, a popular mind-body exercise commonly practiced by older adults. However, the effectiveness of internal Qigong on quality of life, depressive symptoms, and self-efficacy on older adults remains unclear.

Objectives: To review updated evidence to determine the effectiveness of internal Qigong interventions on quality of life, depressive symptoms, and self-efficacy among community-dwelling older adults with chronic disease.

Method: Six databases (PubMed, CENTRAL, CINAHL, Embase, Scopus, CNKI) were systematically searched for studies from January 2008 to December 2018 in English and Chinese. Relevant randomised controlled trials (RCTs) were screened and assessed for risk of bias by two independent reviewers. A meta-analysis on study outcomes of quality of life, depressive symptoms and self-efficacy using the RevMan 5.3 software was performed.

Results: The search retrieved 3439 records. After screening, a total of 13 RCTs with 1340 participants were included in this review. Meta-analysis revealed a significant effect favouring internal Qigong on the quality of life (combined MD = 3.72; 95% CI: 2.27–5.18; $p = 0.0001$) compared to controls. No significant effects were found for depressive symptoms and self-efficacy. Low heterogeneity among the studies was found for quality of life, whereas high heterogeneity was shown for depressive symptoms and self-efficacy.

Conclusion: Internal Qigong appears to have potential benefits on overall quality of life among community-dwelling older adults with chronic disease. The findings of this study suggest potential use of internal Qigong as an adjunct activity for chronic disease management. Future research may enhance the rigour of trials and explore theoretical underpinnings behind Qigong.

What is already known about the topic?

- Originating from China, Qigong is a popular meditative exercise consisting of coordinated movements and regulated breathing exercise.
- Growing evidence suggests that Qigong has various physical and psychological benefits making it a potentially viable form of complementary and alternative medicine.

What this paper adds

- The internal Qigong appears to have potential benefits on overall quality of life among community-dwelling older adults with chronic disease.
- The practice of internal Qigong can be considered as an adjunct activity in chronic disease management or as a supplementary exercise in rehabilitation programs for older adults with chronic disease.

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1. Background

Globally, the population is rapidly ageing. According to the World Population Prospects: 2017 revision, the population aged 60 and above is the fastest growing and is expected to increase by 200% from 962 million in 2017 to 2.1 billion in 2050 at the current rate (United Nations, Department of Economic and Social Affairs, Population Division, 2017). A recent report found that Asia Pacific is the most rapidly ageing region globally with an estimated 200 million people turning 65 years and above between 2015 and 2030 (Hedrich et al., 2016). As there is no universal definition, this review adopts the World Health Organization's (WHO) definition of older adults as aged 50 years and above (World Health Organization WHO, 2016). This definition was created with consideration of factors contributing to disparities in life spans across various countries, making it applicable to most countries (World Health Organization WHO, 2016).

Generally, population ageing is a result of increasing longevity and declining fertility (Yenilmez, 2014). With longer life expectancies comes greater risk of disability (Mahesh et al., 2016). A study found that older adults were more likely to experience lower psychological wellbeing and that depressive symptoms were more common with age after 55 years old (Westerhof and Keyes, 2009). Lack of appropriate psychosocial interventions can lead to disability, impaired quality of life and poorer prognosis (Conner et al., 2010).

Despite advances in healthcare, ageing still comes with increasing vulnerability to chronic disease. Chronic disease is a complex condition with prolonged effects associated with progressive functional disability (Bernell and Howard, 2016). As people get older, health deteriorates, and disease susceptibility increases (Raeside and Khan, 2008). In developed countries, three in four older adults live with multiple chronic conditions (Hajat and Stein, 2018). Chronic conditions have considerable impact on the quality of life among older adults (Grady, 2011), and often contribute to financial, social and psychological burden in older adults (Chiaranai et al., 2018; He et al., 2018).

Population ageing results in consequences for communities worldwide, including but not limited to shrinking workforces, rising healthcare expenditure and stress on healthcare and social service sectors to provide long-term care for the aged (Harper, 2014; Yenilmez, 2014; Zhao et al., 2018). The challenge of managing health in ageing societies is further complicated by the burden of chronic disease in older adults (He et al., 2018; Zhao et al., 2018). In light of this, there exists a need to explore community-viable interventions to promote quality of life and psychosocial health of older adults with chronic disease in our communities. Self-efficacy refers to an individual's belief in his/her ability to carry out behaviours needed to achieve desired outcomes successfully (Bandura, 1986). There is evidence that self-efficacy is significantly correlated to exercise benefits in older people and is a key factor mediating the relationship between physical activity and quality of life in older adults (White et al., 2012).

Originating from China, Qigong is a popular meditative exercise consisting of coordinated movements and regulated breathing among older adults (Chan et al., 2012a,b, 2017). Qigong is the cultivation of energy where "*qi*" refers to the body's life energy, and "*gong*" refers to mastery of the "*qi*" (Horowitz, 2009). In traditional Chinese medicine, stagnant "*qi*" causes poor health and Qigong helps to restore health by promoting the flow of "*qi*" (Yeung et al., 2018).

Qigong encompasses the concept of wholeness and brings self-healing potential into the treatment process (Yeung et al., 2018). This includes the treatment of chronic disease both physical and psychological through self-regulation of the mind and body over sustained practice (Liu, 2013). Many Eastern and Western countries have recognised Qigong for its potential on positive physical and mental health outcomes (Yin and Dishman, 2014), with applicability in various chronic disease (Ding et al., 2014; Hartley et al., 2015; Liu et al., 2016; Wang et al., 2014; Xiong et al., 2015). It was also found to reduce depressive symptoms in adults with chronic conditions (Ng and Tsang, 2009). Given that psychological factors can influence physical disease, psychophysiological interventions like Qigong may supplement chronic disease management (Purdy, 2013).

Qigong can exist as internal or external Qigong. Internal Qigong is self-directed and achieved through self-controlled movement and breathing, whereas external Qigong involves therapist's hand movements, acupressure on specific points of the client, and other mind healing techniques to direct the therapist's own "*qi*" into the client (Chan et al., 2012a,b). Different Qigong forms have different meditative movements (Yeung et al., 2018). Performing the meditative movements helps to concentrate and circulate "*qi*" in the body, improving health (Ross, 2009). Internal Qigong is easy to learn and does not require equipment (Lee et al., 2009). Given its light intensity and meditative nature (Wang et al., 2012), internal Qigong is a suitable exercise for older adults (Kuan et al., 2012; Ng and Tsang, 2009).

Growing evidence suggests that Qigong has various physical and psychological benefits making it a potentially viable form of complementary and alternative medicine (Jahnke et al., 2010). However, existing reviews on Qigong for older adults are limited and do not provide firm conclusions on its effectiveness on quality of life, depression, and self-efficacy for older adults (Ng and Tsang, 2009; Oh et al., 2013; Haidich, 2010; Wang et al., 2015). Hence, the objective of this systematic review was to meta-analyse updated available evidence to determine the effectiveness of internal Qigong on quality of life, depressive symptoms and self-efficacy in community-dwelling older adults with chronic disease.

2. Methods

The study followed the recommendations of the Cochrane Handbook (Higgins and Green, 2011) and is reported in accordance with the Preferred Reporting Items for Systematic Review and Meta-analyses (PRISMA) statement (Liberati et al., 2009).

2.1. Eligibility criteria

We included randomized controlled trials (RCTs) published from January 2008 to December 2018, which met the following inclusion criteria. (1) Studies conducted on participants who are community-dwelling, aged 50 years and above, and suffering from one or more chronic disease. (2) Studies evaluated the internal Qigong interventions that were facilitated individually and/or in groups, guided by Qigong professional/non-professional, or in person and/or using audio-visual material. (3) Studies compared internal Qigong with standard care, waitlist control, no intervention, newspaper reading, health education, routine activity or walking. (4) Studies reported on at least one of the outcomes of quality of life, depressive symptoms, and self-efficacy using validated measurement tools. Given that Qigong is of Chinese origin (Ng and Tsang, 2009), studies published in English and Chinese were included to broaden the representativeness of evidence and prevent bias.

We excluded studies that utilised exercise intervention programmes with or without Qigong as a component, mixed interventions (e.g. Qigong and acupuncture), *qi*-based therapies, Taichi and Taichi Qigong. The conference proceedings, abstracts-only, book chapter reviews, letters, discussions and editorials were also excluded.

2.2. Information sources

PubMed, Cochrane Central Register of Controlled Trials (CENTRAL), Cumulative Index of Nursing and Allied Health Literature (CINAHL), Excerpta Medica database (Embase), Scopus, and China National Knowledge Infrastructure (CNKI) were selected for their extensive biomedical literature and systematically searched. The CNKI database was searched to ensure a more robust review because Qigong is primarily rooted in Chinese culture so many articles are published only in Chinese databases.

To ensure a thorough search, sources of grey literature were searched. We searched the Clinical Trials Registry (www.ClinicalTrials.gov) and Qigong and Energy Medicine Database (www.qigonginstitute.org) for relevant ongoing unpublished trials. A manual search of the bibliographies and reference lists of shortlisted articles and relevant reviews was also performed. Study authors were contacted in the event of missing information required to perform a meta-analysis.

2.3. Search strategy

Keywords and index terms related to Qigong (intervention), and older adults (population) were used to enhance the accuracy of the search strategy and retrieve relevant results (Butler et al., 2016). Boolean operators were utilised to combine different concepts where the Boolean operator "OR" was used to combine keywords and index terms of a concept (e.g. "old" and "aged" belonging to the concept of "older adult") and the Boolean operator "AND" was used to combine the two different concepts of "older adult" and "Qigong". The final compiled list of keywords and index terms used, and the detailed search strategy used for the databases listed above are presented in Appendix 1.

2.4. Study selection

Search results were downloaded from the respective databases and imported into the EndNote X8 Software. After removing duplicate articles, the titles and abstracts of studies were manually assessed by two independent authors (VG and YJ) for their relevancy to this review. Studies were then organised according to those that meet, potentially meet or do not meet the eligibility criteria. The full-texts of all relevant and potentially relevant trials were retrieved and each of the two authors independently processed and analysed the articles to determine if they were to be included in the review. A third author (WW) was consulted for disagreements when a consensus was not established after discussion.

2.5. Data collection process and data extraction

A modified data collection form adapted from the Cochrane data extraction form published in the Cochrane Handbook for Systematic Reviews of Interventions (Higgins and Green, 2011) was used to guide extraction and collation of data from the individual trials. Data extraction was carried out independently by two reviewers (VG and YJ), to minimise bias and prevent errors (Liberati et al., 2009). A third author (WW) was consulted to resolve discrepancies. Study authors were contacted via email (with a maximum of three attempts) in the event of missing information. To reduce extraction error and ensure relevancy of data items included, the data extraction form was piloted by testing it on two included studies (Higgins and Green, 2011). Improvements were made to the data extraction form after piloting to tailor it better to the needs of this review.

2.6. Quality assessment

The Cochrane 'Risk of Bias' assessment tool as denoted in the Cochrane Handbook of Systematic Reviews of Interventions (Higgins and Green, 2011) was used to assess bias. The following domains were assessed; random sequence generation (selection bias), allocation concealment (selection bias), blinding of participants and personnel (performance bias), blinding of outcome assessment (detection bias), incomplete outcome data (attrition bias), and selective reporting (reporting bias).

Two reviewers (VG and YJ) independently assessed each study and made evidence-based judgements on the attempts of study authors to minimise bias in their trials. Any disagreements were discussed and resolved by a third author (WW). Each study was methodically judged in all domains and placed into a category – low, high or unclear risk of bias.

2.7. Data synthesis

RevMan 5.3 software was used to synthesize data as recommended by the Cochrane Handbook of Systematic Reviews of Interventions (Higgins and Green, 2011). Continuous data were analyzed using the inverse variance (IV) approach by combining the mean difference (MD) of individual studies when the outcome was reported using the same measurement scale, or the standardised mean difference (SMD) of individual studies, when the outcome was reported using different measurement scales. The SMD in the meta-analysis, also known as the Cohen's *d*, was used to evaluate the magnitude of effect size ($d < 0.2$, very small effect size, $0.2 \leq d < 0.5$, small effect size, $0.5 \leq d < 0.8$, moderate effect size; $d \geq 0.8$, large effect size) (Higgins and Green, 2011).

Heterogeneity was evaluated through computation of the I^2 statistic and chi-squared test, with consideration for effect magnitude and direction. A chi-squared test with p-value <0.10 (significance level of 0.1) indicates that a study is heterogenous (Higgins and Green, 2011). The I^2 statistic was used to assess the extent of heterogeneity (I^2 = 0%–30%, low; I^2 = 30%–60%, moderate; I^2 = 50%–90%, substantial, I^2 = 75%–100%, considerable). If heterogeneity was not significant (p-value >0.10 and $I^2 < 30\%$), the fixed-effects model was adopted. If heterogeneity was significant (p-value <0.10 and $I^2 \geq 30\%$), a random-effects model was used (Higgins and Green, 2011).

3. Results

3.1. Search process

The systematic search yielded 3439 records: Pubmed (n = 65), Embase (n = 471), CINAHL (n = 32), Cochrane (n = 183), Scopus (n = 184), and CNKI (n = 2504). 40 additional records were identified from other sources of grey literature and reference lists. 408 duplicates were removed, leaving 3031 records left for screening. 2121 records based on title and 644 records based on abstract were excluded after screening against the eligibility criteria.

The full-text of the remaining 266 records were retrieved, independently screened by two reviewers (VG and YJ), and 253 articles were excluded for the reasons as listed in Fig. 1. Finally, 13 studies were eligible for inclusion in this review. The PRISMA Flowchart (Fig. 1) illustrates the search process.

3.2. Description of included studies

All studies were individualised RCTs; nine were two-arm RCTs (An et al., 2008; Chen et al., 2016; Gao, 2016; Liu et al., 2014; Ng et al., 2011; Tsang et al., 2013a,b; Xiao and Zhuang, 2015; Zhou,

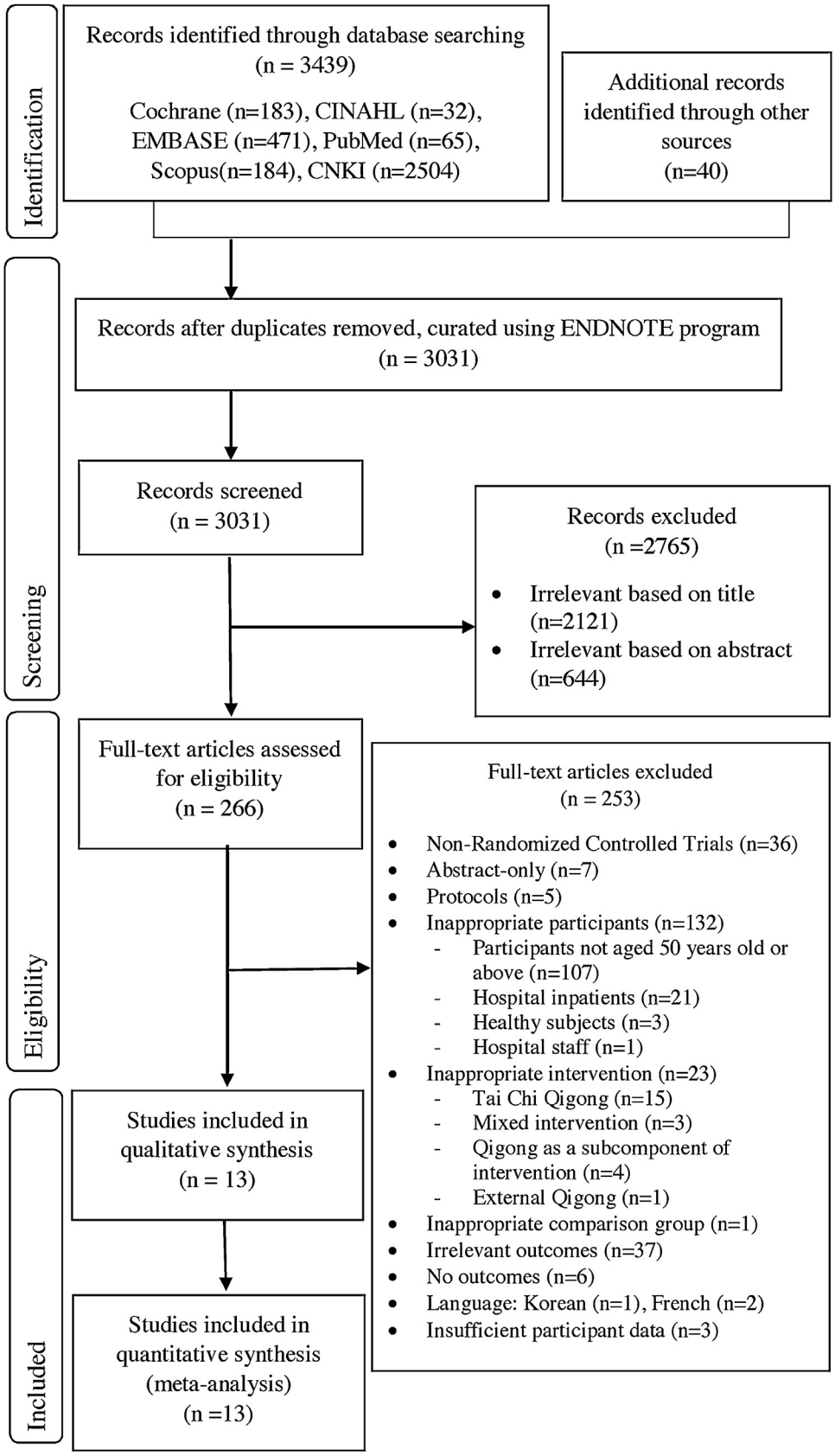

Fig. 1. PRISMA Flow Diagram.

2014) and four were three-arm RCTs (Teut et al., 2016; von Trott et al., 2009; Wei and Wu, 2014; Zhang et al., 2016). Studies were conducted in China (n = 8, 61.5%) (An et al., 2008; Chen et al., 2016; Gao, 2016; Liu et al., 2014; Wei and Wu, 2014; Xiao and Zhuang, 2015; Zhang et al., 2016; Zhou, 2014), Hong Kong (n = 3, 23.1%) (Ng et al., 2011; Tsang et al., 2013a,b), and Germany (n = 2, 15.4%) (Teut et al., 2016; von Trott et al., 2009). The details of characteristics of included studies can be found in Appendix 2.

3.3. Description of participants

The total sample size was 1340 participants, with individual samples varying from 25 (Zhou, 2014) to 200 participants (Gao, 2016). All studies specified the recruitment setting of participants. Participants recruited in Ng et al. (2011) and Xiao and Zhuang (2015) had no hospital admissions in the month prior to their respective studies so they were considered community-dwelling and included in this review.

All participants were above 50 years old, with mean ages ranging from 63.9 ± 7.6 (Wei and Wu, 2014) to 83.33 ± 6.30 (Tsang et al., 2013b) years in the Qigong group and 62.35 ± 9.27 (Zhang et al., 2016) to 84.85 ± 6.03 years (Tsang et al., 2013a) in the control group. Zhou (2014) did not report mean age of participants included in their study. Participants had musculoskeletal disorders (n = 3, 23.1%) (An et al., 2008; Teut et al., 2016; von Trott et al., 2009), chronic respiratory diseases (n = 3, 23.1%) (Ng et al., 2011; Xiao and Zhuang, 2015; Zhang et al., 2016), diabetes (n = 2, 15.4%) (Wei and Wu, 2014; Zhou, 2014), and other miscellaneous chronic diseases (n = 5, 38.5%) (Chen et al., 2016; Gao, 2016; Liu et al., 2014; Tsang et al., 2013a,b).

3.4. Description of the interventions and comparators

Studies conducted various forms of internal Qigong; Baduanjin (n = 7, 53.8%) (An et al., 2008; Ng et al., 2011; Tsang et al., 2013b; Liu et al., 2014; Chen et al., 2016; Wei and Wu, 2014; Zhou, 2014), Yijinjing (n = 1, 7.7%) (Zhang et al., 2016), Dantian (n = 2, 15.4%) (Teut et al., 2016; von Trott et al., 2009), Liuzijue (n = 1, 7.7%) (Xiao and Zhuang, 2015), Yan Chai Yi Jin ten-section brocade (n = 1, 7.7%) (Tsang et al., 2013a). Participants in the intervention group of one study participated in either Liuzijue, Yijinjing, Baduanjin, or Wuqinxi (Gao, 2016). The duration of Qigong interventions ranged from 8 weeks (An et al., 2008) to 6 months (Ng et al., 2011; Xiao and Zhuang, 2015; Zhang et al., 2016), with sessions varying from 30 min (An et al., 2008; Chen et al., 2016) to 90 min (Teut et al., 2016).

All studies specified the Qigong provider and format of practice. Qigong groups in four studies were supplemented with audio-visual materials (An et al., 2008; Ng et al., 2011; Xiao and Zhuang, 2015; Zhang et al., 2016). Five studies conducted follow-up assessments (An et al., 2008; Teut et al., 2016; Tsang et al., 2013a,b; von Trott et al., 2009). None of the studies described a theoretical basis for their intervention. The details characteristics of the internal Qigong interventions were summarized in Appendix 3.

The Qigong group was compared with: no intervention (n = 3, 23.1%) (An et al., 2008; Gao, 2016; Wei and Wu, 2014), wait-list control (n = 2, 15.4%) (Teut et al., 2016; von Trott et al., 2009), health education (n = 1, 7.7%) (Zhou, 2014), routine activity (n = 1, 7.7%) (Zhang et al., 2016), standard care (n = 2, 15.4%) (Ng et al., 2011; Xiao and Zhuang, 2015), newspaper reading (n = 2, 15.4%) (Tsang et al., 2013a,b), and walking (n = 3, 23.1%) (Chen et al., 2016; Liu et al., 2014; Wei and Wu, 2014).

3.5. Risk of bias

Fig. 2 presents the risk of bias summary of the included studies. Four studies detailed their random sequence generation process

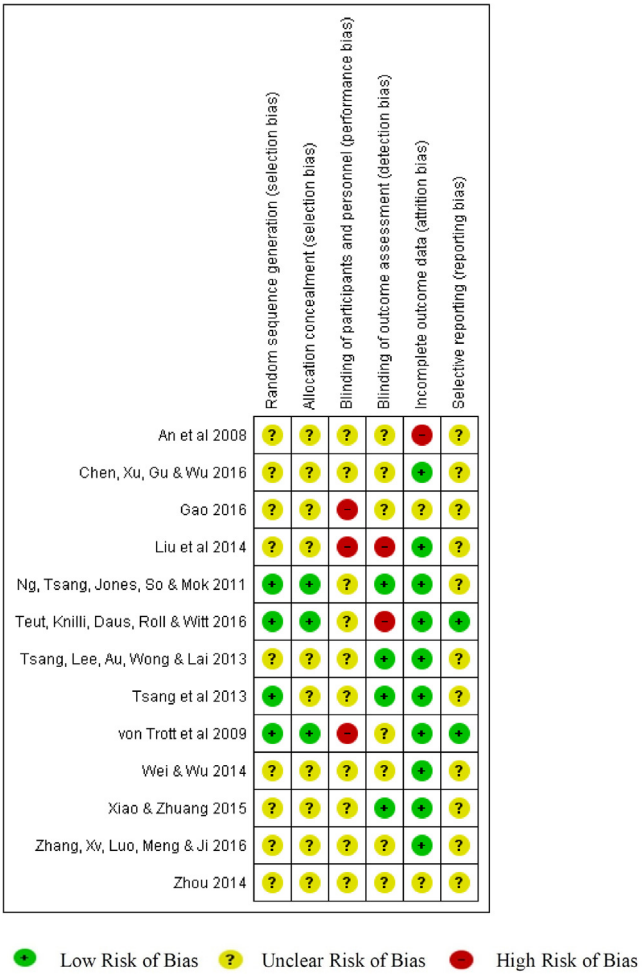

Fig. 2. Risk of bias summary.

(Ng et al., 2011; Teut et al., 2016; Tsang et al., 2013b; von Trott et al., 2009) and only three studies proceeded to describe allocation concealment measures (Ng et al., 2011; Teut et al., 2016; von Trott et al., 2009). Due to the nature of the internal Qigong intervention, it was difficult or impossible to blind participants, resulting in all studies obtaining either an unclear or high risk of performance bias. Six studies reported on blinding of outcome assessors, of which four undertook appropriate measures (Ng et al., 2011; Tsang et al., 2013a,b; Xiao and Zhuang, 2015) while two did not (Liu et al., 2014; Teut et al., 2016). Majority of the studies (n = 10) had a low risk of attrition bias (Chen et al., 2016; Liu et al., 2014; Ng et al., 2011; Teut et al., 2016; Tsang et al., 2013a,b; von Trott et al., 2009; Wei and Wu, 2014; Xiao and Zhuang, 2015; Zhang et al., 2016) and only one study had a high risk of attrition bias (An et al., 2008). Two studies were rated low risk of selective reporting bias (Teut et al., 2016; von Trott et al., 2009).

3.6. Effectiveness of internal Qigong on overall quality of life

Seven studies measured the quality of life using SF-36 but reported on different combinations of domains (An et al., 2008; Liu et al., 2014; Ng et al., 2011; Teut et al., 2016; von Trott et al., 2009; Wei and Wu, 2014; Xiao and Zhuang, 2015). We performed the meta-analysis on overall quality of life. Six studies involving 240 participants in the internal Qigong group and 247 participants in the control group were meta-analysed for overall quality of life (Fig. 3). The pooled results showed statistically significant effect favouring Qigong (combined MD = 3.72; 95% CI 2.27–5.18;

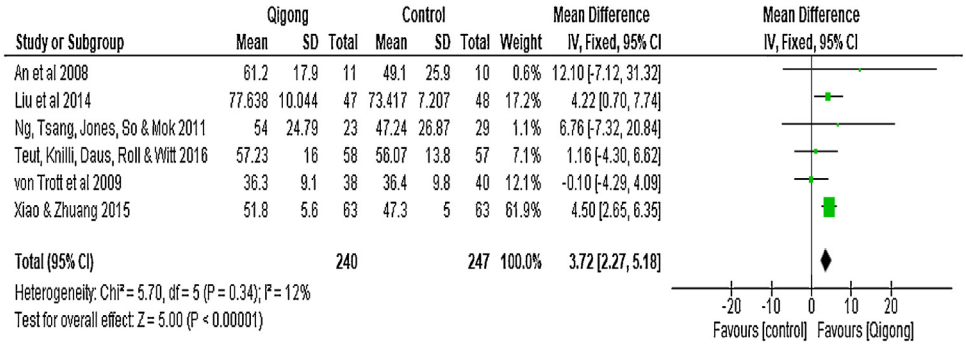

Fig. 3. Forest plot: effectiveness of internal Qigong on overall quality of life.

$p < 0.0001$) with no statistically significant heterogeneity between studies ($I^2 = 12\%$; $p = 0.34$).

3.7. Effectiveness of internal Qigong on depressive symptoms

Six studies involving 340 participants in the Qigong group and 218 participants in the control group were meta-analysed for depressive symptoms (Gao, 2016; Teut et al., 2016; Tsang et al., 2013a,b; von Trott et al., 2009; Zhou, 2014) (Fig. 4). The result revealed that the combined intervention effect was not statistically significant in reducing depressive symptoms ($d = -0.27$; 95% CI −0.58 to 0.03; $p = 0.08$). In addition, significant and substantial heterogeneity was found among the combined studies ($I^2 = 61\%$; $p = 0.02$).

Due to the substantial heterogeneity in the pooled meta-analysis, a further narrative synthesis for internal Qigong on depressive symptoms showed that four studies reported mean differences favouring Qigong (Gao, 2016; Tsang et al., 2013a,b; Zhou, 2014) and two studies favoured the control (Teut et al., 2016; von Trott et al., 2009). Gao (2016), Tsang et al. (2013b) and Zhou (2014) reported significant reduction of depressive symptoms in the Qigong group compared to the control. Teut et al. (2016) and von Trott et al. (2009) found no significant differences in depressive symptoms scores between Qigong intervention and the control group post-intervention. Tsang et al. (2013a) found no significant across time effects in reduction of depressive symptoms.

3.8. Effectiveness of internal Qigong on self-efficacy

Three studies involving 120 and 119 participants in the Qigong and control group respectively were meta-analysed for self-efficacy (Teut et al., 2016; Tsang et al., 2013b; Zhang et al., 2016) (Fig. 5). A random-effects model and inverse-variance approach was used, revealing results that were not statistically significant ($d = 0.57$; 95% CI −0.32 to 1.47; $p = 0.21$) with significantly considerable heterogeneity ($I^2 = 90\%$; $p < 0.00001$).

A further narrative synthesis for internal Qigong on self-efficacy indicated that two studies reported mean differences favouring Qigong (Tsang et al., 2013b; Zhang et al., 2016). Teut et al. (2016) found no significant improvement in self-efficacy between the Qigong and control group. Conversely, Tsang et al. (2013b) and Zhang et al. (2016) reported a significant improvement in self-efficacy in the Qigong group post-intervention.

4. Discussion

This review aimed to examine the effectiveness of internal Qigong on the quality of life, depressive symptoms, and self-efficacy among community-dwelling older adults aged 50 and above with chronic diseases. 13 RCTs were retrieved through the systematic search and screening process. The studies were conducted in community settings and involved 1340 participants. The duration of interventions ranged from 8 weeks to 6 months with varying forms of internal Qigong.

Six studies which measured overall quality of life using the SF-36 tool were meta-analysed revealing a positive effect favouring internal Qigong (An et al., 2008; Liu et al., 2014; Ng et al., 2011; Teut et al., 2016; von Trott et al., 2009; Xiao and Zhuang, 2015). The result is consistent with a recent review on Baduanjin Qigong for adults which also reported significant improvements in quality of life favouring Qigong (Zou et al., 2017). However, Zou et al.'s review demonstrated significant heterogeneity possibly due to the variety of instruments used (Zou et al., 2017). Chronic disease compromises quality of life by slowly life control and ability to participate in meaningful activities and pursue desired outcomes (Megari, 2013). All participants in this review suffered from chronic disease which meant they might have experienced a lack of control in their lives. A plausible reason for the current finding is that participants completing the Qigong intervention regained a sense of personal

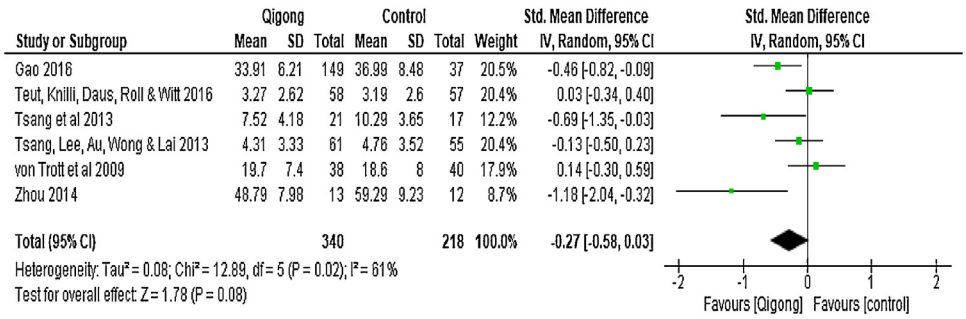

Fig. 4. Forest plot: Effectiveness of internal Qigong on depressive symptoms.

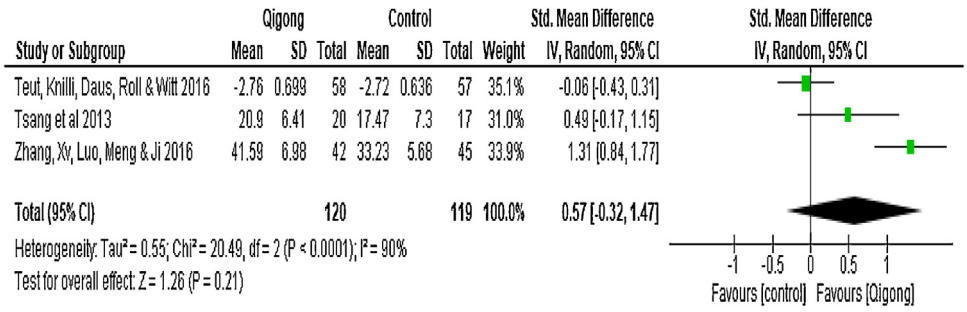

Fig. 5. Forest plot: Effectiveness of internal Qigong on self-efficacy.

control, an important determinant of quality of life for older adults (Levasseur et al., 2009), increasing their confidence in disease management and resulting in improved general quality of life.

The meta-analysis of six studies showed a small effect size in reducing depressive symptoms which was not statistically significant and possessed substantial heterogeneity (Gao, 2016; Teut et al., 2016; Tsang et al., 2013a,b; von Trott et al., 2009; Zhou, 2014). This inconclusive result corresponds with the findings of a similar systematic review investigating the effects of Qigong on depression (Oh et al., 2013). Other similar reviews found that depressive symptoms were reduced in studies comparing Qigong to passive controls but at a statistically significant level (Jahnke et al., 2010; Ng and Tsang, 2009; Wang et al., 2013). A possible reason for the discrepancy in significance of findings might be due to the differences in studies included in the review, which results in different variabilities between studies meta-analysed, affecting statistical significance (Brignardello-Petersen et al., 2013). The reviews reported by Jahnke et al. (2010) and Ng and Tsang (2009) only included studies published in English, one of which produced a narrative synthesis (Jahnke et al., 2010) and the meta-analysis by the other only involved two articles (Ng and Tsang, 2009). Wang et al. (2013) included trials with adults aged 18 and above, while our review restricted participants to aged 50 and above. This review suggests that the effectiveness of internal Qigong on depressive symptoms for community-dwelling older adults with chronic disease is inconclusive. Further high-quality studies are needed to develop conclusive evidence and reconcile differences on the effects of internal Qigong in the reduction of depressive symptoms in older adults.

Furthermore, three studies were meta-analysed for self-efficacy and the results revealed a non-statistically significant moderate effect size favouring Qigong with considerable heterogeneity (Teut et al., 2016; Tsang et al., 2013b; Zhang et al., 2016). All three studies utilised different tools to measure self-efficacy which might have contributed to the high heterogeneity. The result is supported by a systematic review on the health benefits of Taichi and Qigong on adults, which found that Qigong participants demonstrated enhanced self-efficacy compared to inactive controls (Jahnke et al., 2010). Self-efficacy is a person's belief in his/her ability to execute a behaviour successfully and is a core construct of social cognitive theory (Bandura, 1986). Qigong being a light intensity, learner-friendly and non-competitive mind-body activity (Wang et al., 2012; Zhang et al., 2016), might have increased participants' self-belief through the ease of completing the exercise despite their chronic diseases. All three studies contained a group component in the Qigong intervention. This may have also been an external factor in influencing participants' expectations of themselves when observing the behaviour of others in the group. According to the social cognitive theory, when one individual successfully performs the behaviour (Qigong), others observing are likely to model the success as well (Bandura, 1986). In this manner, more participants are likely to demonstrate success in performing Qigong and possibly greater self-efficacy. However, in view of the considerable heterogeneity and small number of studies meta-analysed, caution should be exercised in generalising the results.

5. Limitations

Most studies included in this review failed to provide sufficient details of measures undertaken to prevent bias, weakening the quality of studies included. In addition, trials of complementary therapies published outside mainstream journals may be systematically biased. Moreover, the lack of consistency in the interventions makes comparison across overall activity levels of Qigong difficult. Finally, there was a notable absence of theoretical basis on which studies included based their interventions on. Theories are important for the development of effective interventions for health behaviour change (Lippke and Ziegelmann, 2008).

6. Implications for practice and research

Internal Qigong is a safe, cost-effective, mind-body exercise that is easy to learn and does not require any special equipment (Lee et al., 2009; Xiao and Zhuang, 2015). This review indicates that the practice of internal Qigong can be considered as an adjunct activity in chronic disease management or as a supplementary exercise in rehabilitation programs for older adults. Physical activity is useful as a supplementary therapy for chronic diseases, especially mental illness, as it is not linked with the stigma associated with mental health issues (Blake et al., 2009). Nevertheless, healthcare professionals should make differential judgements based on the older adults' condition and diagnosis before recommending Qigong. Future RCTs should provide more rigorous research processes, particularly measures undertaken to minimise bias so that more accurate quality appraisals and estimates of intervention effects can be achieved.

7. Conclusion

Qigong is a meditative exercise based on the concept of mindfulness (Chan et al., 2017). It aims to strengthen the mind and body through low impact movements and concentration of the mind (Wang et al., 2012). The meta-analysis of the overall quality of life reveals a positive effect favouring Qigong with low heterogeneity among the studies. However, small effects but non-significant improvements were found for depressive symptoms and self-efficacy with high heterogeneity. Lack of consistency between interventions or the use of different psychosocial tools might have contributed to the considerable heterogeneity.

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Ethical approval

The systematic review was not subject to ethical review.

Declaration of Competing Interest

No conflict of interest has been declared by the authors.

Appendix A. Supplementary data

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