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Health-related Outcomes and Safety of Qigong in Patients with Chronic Kidney Disease: A Systematic Review and Meta-analysis

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ADMINISTRATIVE INFORMATION

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Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols INPLASY) on 16 June 2025 and was last updated on 19 November 2026.

INTRODUCTION

Review question / Objective To determine the effects of traditional Qigong (e.g., Baduanjin, Tai Chi, Wuqinxi, Yijinjing) compared with no intervention, other exercises, conventional treatment, or mental health education on health-related outcomes in adults ≥18 years with chronic kidney disease (including hemodialysis or peritoneal dialysis patients) based on randomized controlled trials. Primary outcomes include:
– Mortality and hospitalization rates

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– Laboratory parameters (e.g., serum creatinine, eGFR, CRP)
– Quality of life (e.g., KDQoL-36/SF-36)
– Mental health status (e.g., HAMA/HAMD)
– Sleep quality (e.g., PSQI)
– Physical capacity (e.g., 6-minute walk test, handgrip strength)
Secondary analyses will explore heterogeneity by dialysis status, Qigong type, and intervention duration.

Condition being studied Chronic kidney disease (CKD) is a progressive condition characterized by impaired kidney function and is a major global cause of morbidity and mortality[1-3]. CKD is often associated with reduced physical capacity, which heightens cardiovascular risk and mortality[4-6]. Improving physical activity levels and identifying effective exercise interventions are key to delaying disease progression and improving outcomes in this population[4, 7, 8].
Qigong is a traditional Chinese exercise which contributes to both physical and psychological wellbeing including Tai Chi, Ba duan jin, Wu qin xi, etc[9]. These exercise involves full-body stretching movements, breathing training and psychological relaxation[9]. Numerous previous studies[10, 11] have investigated the potential therapeutic benefits of Qigong in patients with CKD. However, many of these studies are limited by small sample sizes, varying degree of quality and focusing on different health-related outcome, complicating the interpretation of the overview of effectiveness and safety of qigong in this population. To date, there has been a lack of systematic reviews and comprehensive assessments of Qigong for CKD patients. Moreover, it remains unclear whether different types of qigong exert varying effects on health-related outcome in this population.
Considering these gaps, we aim to conduct a systematic review and meta-analysis of RCTs to characterize what health-related outcomes and evaluated the efficacy and safety of Qigong in patient with CKD, providing evidence to inform their application in clinical practice.
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METHODS

Search strategy The Qigong search block is expanded to include: qigong, health qigong, Baduanjin (eight-section brocade), Tai Chi/Taiji/Taijiquan, Wuqinxi (five-animal exercise), Yijinjing, Liuzijue (six-character formula), daoyin, breath/respiratory guidance, traditional Chinese exercise, traditional Chinese medicine exercise therapy and Chinese health-preservation exercises, with corresponding Chinese terms (qigong, health qigong, Baduanjin, Tai Chi, Taijiquan, Wuqinxi, Yijinjing, Liuzijue, daoyin, breath/respiratory guidance, traditional health-preservation exercises). Complete, reproducible, database-specific strategies (controlled vocabulary plus free-text terms, Boolean/proximity operators, RCT filters, fields and platform) for all eight databases

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are provided in a supplementary file, with the exact date each database was searched.

Participant or population
All CKD stages are eligible, analyzed in three subgroups: (i) non-dialysis-dependent CKD; (ii) maintenance hemodialysis; and (iii) peritoneal dialysis.

Intervention Qigong-based interventions, including Baduanjin, Tai Chi, Wuqinxi, Yijinjing, Liuzijue, and Daoyin-based guided breathing exercises, provided that the practice integrates coordinated movement, breath regulation, and mental focus.

Comparator Eligible comparators are classified into three pre-specified categories: (a) usual/standard care without exercise intervention (passive control); (b) conventional treatment with additional health education or mental health support (attention control); or (c) non-Qigong exercise interventions (active exercise control, e.g., walking).

Study designs to be included Only randomized controlled trials are eligible. Quasi-randomized allocation (by admission/visit order, odd/even numbering, medical record number or nursing method) and non-randomized comparative studies are excluded. Multiple publications of the same trial are collated as a single study, using the report with the most complete data and longest follow-up, and duplicate publications are excluded. Master's/doctoral theses are eligible as grey literature.

Eligibility criteria 1. Reported at least one health-related outcome of interest, including sleep, quality of life, etc.
2. The following study designs or publication types will be excluded: review literature, meta-analysis, duplicate publication, summary of experiences, animal experiment research, single-arm studies, studies with incomplete outcome data, studies with patients with other diseases, and studies with unclear intervention protocols.

Information sources Electronic databases are searched from inception to 19 August 2026 (updated from the registered 'to June 2025'). The protocol was registered on 16 June 2025 when only preliminary scoping searches had been performed; all study selection, data extraction and analysis occur after registration. Searches are re-run immediately before submission, and the PRISMA 2020 diagram reports the exact search date and yield per database.

Main outcome(s) The main outcomes include all-cause mortality, hospitalization, cardiovascular events, health-related quality of life, fatigue, sleep quality, and physical function.

Additional outcome(s) The additional outcomes are explicitly defined as: (i) surrogate or intermediate outcomes, including blood pressure, left ventricular ejection fraction, New York Heart Association class, haemoglobin, albumin, C-reactive protein, serum creatinine, and estimated glomerular filtration rate; and (ii) exploratory outcomes, including traditional Chinese medicine syndrome scores and meridian assessment. All eligible outcomes are extracted. Outcomes are quantitatively pooled only when the prespecified criteria for pooling are met; otherwise, they are summarized narratively. Safety outcomes are extracted separately.

Data management Two reviewers independently extract the data from the included studies. A standardized data extraction form is used to collect the following details: (i) study characteristics (authors, year of publication, population); (ii) characteristics of the study population (total sample size, mean age, sex); (iii) intervention details (type, sample size, frequency, and duration); (iv) definitions of outcome assessments; (v) outcome measurements: mean ± standard deviation (SD) for continuous variables (e.g., PSQI, HAMA, HAMD); the number of events and the total number of participants in each group to calculate risk ratios (RR) with 95% confidence intervals for mortality, hospitalization, and adverse reactions. All extracted data undergo cross-verification between reviewers to mitigate transcription errors, and disagreements are resolved through discussion or consultation with a third reviewer.

Quality assessment / Risk of bias analysis Risk of bias in the included studies will be assessed using the revised Cochrane risk-of-bias tool for randomized trials (RoB 2.0). The domains assessed will include the randomization process, deviations from the intended interventions, missing outcome data, measurement of the outcome, selection of the reported result, and overall risk of bias. Disagreements between reviewers will be resolved by discussion, with a third reviewer consulted if consensus cannot be reached.
The certainty of evidence will be independently assessed by two reviewers for each meta-analyzed outcome using the GRADE approach. Evidence from randomized trials will start at high certainty and will be downgraded, where appropriate, for risk of bias, inconsistency, indirectness,

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imprecision, and publication or outcome-reporting bias. Certainty will be classified as high, moderate, low, or very low; disagreements will be resolved by consensus or consultation with G.S. The summary of findings table will present seven key outcomes spanning symptoms, physical function and clinical events. The complete evidence profile will report separate domain judgments for all meta-analyzed outcomes. Outcomes reported only narratively will not be assigned a certainty rating if outcome-specific effect estimates, precision, or risk-of-bias information is insufficient for a defensible GRADE judgment.

Strategy of data synthesis Eligibility for quantitative synthesis will be determined before analysis. We will meta-analyse an outcome only when at least three studies report the same construct using a sufficiently comparable instrument and direction of effect. Outcomes reported by fewer studies or measured with incompatible instruments will not be pooled across scales and will instead be summarized narratively. All meta-analyses will use the mean difference (MD) with 95% confidence intervals (CIs) for continuous outcomes, because the studies contributing to each pooled outcome use the same instrument and scale; the standardized mean difference will therefore not be required. Dichotomous outcomes will be summarized using Mantel–Haenszel risk ratios (RRs) with 95% CIs. Because the included trials differ in population, Qigong modality, dose and comparator, random-effects models will be used as the primary approach. Heterogeneity assessment will employ dual metrics: the I^2 statistic (categorized as low: 0–50%, moderate: 51–75%, high: >75%) and Cochran's Q test (significance threshold: $P < 0.10$). We will prespecify subgroup analyses to explore sources of heterogeneity and sensitivity analyses to evaluate the robustness of pooled findings. Potential small-study effects will be assessed only for meta-analyses including at least 10 studies, using visual inspection of funnel plots and Begg's rank correlation test. For outcomes with fewer than 10 studies, we will not conduct formal tests for small-study effects because of limited power. The incidence of adverse events (AEs) in the included RCTs will be calculated to conduct a safety analysis, and the difference in the incidence of AEs between the experimental and control groups in each study will be examined to see if there is any statistical significance. All synthesized results will be visualized using forest plots displaying study-specific and pooled effect estimates with 95% CIs. RevMan 5.4.1 will be used for statistical analysis. A two-tailed P value < 0.05 will be considered statistically significant.

Subgroup analysis Pre-specified subgroup analyses: (1) dialysis modality — hemodialysis / peritoneal dialysis / non-dialysis CKD; (2) Qigong type — Baduanjin / Wuqinxi / Tai Chi / Liuzijue; (3) intervention duration — short term (≤ 3 months) versus long term (> 3 months).

Sensitivity analysis We will conduct sensitivity analyses by iteratively excluding individual studies to assess the influence of individual studies on pooled estimates and heterogeneity.

Language No language restriction is applied at the search or screening stage: search strategies will be run without language filters, and any record that is not in English or Chinese will be translated and assessed against the same eligibility criteria.

Country(ies) involved China.

Keywords Qigong, Health-related Outcomes, Chronic Kidney Disease, Dialysis, Systematic review, Meta-analysis.

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