

Qiliqiangxin Capsule in Patients with Chronic Heart Failure Complicated by Coronary Artery Disease: A Systematic Review and Meta-Analysis of Randomized Trials

Kaijuan Wang ^{1, #}, Jinhao Xu ^{1, #}, Xiangying Zheng ^{1, #}, Fengshuo Chang ², Jingen Li ^{1, *}

¹ Department of Cardiovascular Medicine, Dongzhimen Hospital, Beijing University of Chinese Medicine, Beijing 100700, China

² Department of Geriatrics, Xiyuan Hospital, China Academy of Chinese Medical Science, Beijing 100091, China

These authors are co-first authors of the article.

*** Correspondence:**

Jingen Li

lijingen198908@126.com

Received: 17 June 2026/ Accepted: 30 August 2026/ Published online: 30 September 2026

Abstract

To explore the clinical value and potential risk of Qiliqiangxin Capsule, we designed a systematic review and meta-analysis on randomized controlled trials (RCTs), targeting patients diagnosed with both chronic heart failure and coronary artery disease. Our search included eight commonly used databases, focusing on studies that assessed the effectiveness of Qiliqiangxin Capsule and guideline-directed medical therapy for patients whose condition was chronic heart failure complicated by coronary artery disease. We conducted the meta-analysis employing the meta and metafor packages running under R 4.5.3, whereas the risk of bias was assessed using the Cochrane Risk of Bias 2 (RoB 2) tool. After systematic screening procedure, we included 17 studies, involving 2000 eligible patients. The results showed that Qiliqiangxin Capsule combination treatment reduced the occurrences of the primary outcome [RR=0.38, 95%CI (0.23, 0.63)], left ventricular ejection fraction (LVEF) [MD=5.39, 95%CI (4.62, 6.16)], left ventricular end-diastolic diameter (LVEDD) [MD=-4.86, 95% CI(-6.20, -3.51)], N-terminal B-type natriuretic peptide precursor (NT-proBNP) levels [SMD = -0.82, 95% CI (-0.97, -0.67)], the 6-minute walk test distance (6MWD) [MD=39.05, 95%CI(19.90, 58.20)], and the clinical efficacy [RR = 1.20, 95% CI (1.14, 1.25)] were also significantly improved. As for the safety evaluation, the incidence of adverse events was not found to differ meaningfully [RR = 0.95, 95% CI (0.60, 1.50)]. The combination of Qiliqiangxin Capsule and guideline-directed medical therapy can safely and effectively improve the heart failure rehospitalization and all-cause mortality in patients with chronic heart failure complicated by coronary artery disease, improve cardiac performance, increase physical capacity. However, further large sample trials are required to confirm the results.

Keywords: Qiliqiangxin Capsule; Chronic Heart Failure; Coronary Artery Disease; Meta-Analysis

1. Introduction

Heart failure (HF) (McDonagh et al., 2021) is widely recognized as a complex, end-stage cardiovascular syndrome. Recent epidemiological data indicates approximately 60 million people worldwide live with HF, with a rapidly increasing prevalence driven by population aging and improved survival following acute cardiovascular events (Bozkurt et al., 2025). Among the diverse etiologies of HF, coronary artery disease (CAD) ranks as the most frequent cause, being responsible for over half of all HF cases in many regions (Chinese Society of Cardiology et al., 2024). The coexistence of HF and CAD creates a synergistic pathophysiological burden, significantly exacerbating clinical symptoms and increasing a greater all-cause mortality risk than either condition alone (Yan et al., 2020).

In modern clinical management, the pharmacological approach to chronic heart failure (CHF) is anchored in guideline-directed medical therapy (GDMT), often referred to as the foundational quadruple therapy (McDonagh et al., 2023), while concomitant CAD is primarily managed with antiplatelet agents and lipid-lowering medications (McDonagh et al., 2021). Although these conventional therapies have demonstrated substantial efficacy in reducing mortality and improving cardiac function parameters, they exhibit notable limitations. Significant numbers of patients still have residual risks, recurrent hospitalizations, and inadequate improvements in long-term quality of life (Fiuzat et al., 2020).

Traditional Chinese Medicine (TCM) has garnered growing recognition for its unique, multi-target therapeutic profile in the management of cardiovascular diseases. Qiliqiangxin capsule, a well-established TCM formulation and formulated with 11 medicinal botanicals, has been included in national HF guidelines in China and has demonstrated promising cardioprotective effects, including reducing myocardial fibrosis and modulating neurohormonal activation (Cheang et al., 2024).

In the last decade, a large number of small-sample randomized controlled studies (RCTs) have been carried out, aimed to assessing the therapeutic benefits and safety of Qiliqiangxin capsule for CHF complicated by CAD. Preliminary evidence suggested that Qiliqiangxin Capsule, when added to conventional pharmacotherapy, may improve LVEF, reduced NT-proBNP levels, enhance physical capacity (e.g., 6-minute walk distance), and potentially lower rehospitalization rates. Notably, the recent landmark QUEST trial (Qiliqiangxin in Heart Failure: Assessment of Reduction in Mortality) provided robust evidence that Qiliqiangxin Capsule significantly reduced the composite risk of cardiovascular death and HF hospitalization in patients with reduced ejection fraction (Cheang et al., 2024). Despite these encouraging findings, comprehensive and rigorous systematic evaluations specifically targeting the subpopulation of CHF patients with concomitant CAD remain scarce. To address this critical lack of evidence, we performed a meta-analysis of trials examining Qiliqiangxin Capsule in patients with CHF complicated by CAD, comprehensively and systematically evaluating its efficacy and safety.

2. Materials and Methods

We designed and executed this systematic review under Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement (Page et al., 2021). Prospective registration in PROSPERO (ID number: 420251236471) and the completed PRISMA checklist is available in the Supplementary Materials (Table S1).

2.1. Eligibility Criteria

Studies were deemed eligible for inclusion if they satisfied all of the following conditions: (i) Adult patients with definite CHF and coexisting CAD, and whose HF symptom severity ranged from New York Heart Association (NYHA) class II to IV, irrespective of on age, sex, geographic region, or disease duration. (ii) Qiliqiangxin Capsule (4 capsules [1.2 g] per dose, three times daily) administered in combination with standard treatment for at least 12 weeks. (iii) Standard treatment alone or with placebo. Standard treatment included lipid-lowering therapy, vasodilators, antiplatelet agents, angiotensin-converting enzyme inhibitors (ACEI)/angiotensin receptor blockers (ARB)/angiotensin receptor-neprilysin inhibitors (ARNI), beta-blockers, mineralocorticoid receptor antagonists (MRA), and sodium-glucose cotransporter-2 inhibitors (SGLT2i). (iv) Reporting outcomes of interest. The primary outcome was the composite of HF rehospitalization or all-cause mortality. Secondary outcomes included left ventricular ejection fraction (LVEF), left ventricular end-diastolic dimension (LVEDD), N-terminal pro-B-type natriuretic peptide (NT-proBNP), 6-minute walk test distance (6MWD), clinical response rate (defined as improvement in NYHA functional class by ≥ 2 levels or achievement of class I as effective; no change or deterioration in NYHA functional class as ineffective), (Haijing and Zhigang, 2022) and the incidence of adverse events. (v) RCTs were eligible, irrespective of language (Chinese or English). Studies meeting the following criteria have been excluded: (i) obviously erroneous information, duplicate publication; (ii) lack of recognized diagnostic criteria and established guidelines, rendering definitive diagnosis of CHF or CAD uncertain; (iii) concomitant use of other traditional Chinese medicine preparations in addition to the specified proprietary Chinese medicine during the treatment period; or (iv) .treatment duration <12 weeks.

2.2. Search Strategy

An extensive search was carried out in China (CNKI, VIP, Wanfang, and SinoMed) and English (PubMed, Web of Science, Embase, and Cochrane Library) databases, for all records published up to November 30, 2025. The search terms included heart failure, coronary disease, qiliqiangxin, and RCT. Table S2 contains a full account of the search strategies.

2.3. Literature Selection and Data Extraction

Reference management was facilitated by EndNote 21, and duplicate citations were excluded before screening. Two reviewers (W.K.J., X.J.H.) independently conducted a three-phase screening and data extraction process: (i) preliminary screening the title and abstract to eliminate duplicates and studies irrelevant to the research topic; (ii) full-text review of candidate studies using eligibility criteria; and (iii) standardized data extraction with independent cross-verification between reviewers. The extracted data elements included the first author's name, year, baseline patient characteristics

(sample size, sex distribution, mean age), intervention and comparison details, outcomes and randomization method. Disagreements were resolved by discussion or third-reviewer adjudication.

2.4. Risk of Bias Assessment

Methodological quality was evaluated in the Cochrane RoB 2 tool (Sterne et al., 2019). Each domain was rated as low risk, some concerns, or high risk. Disagreements were resolved by discussion or third-reviewer adjudication.

2.5. Statistical Analysis

Meta-analyses were performed using R software (version 4.5.3). Given the anticipated clinical and methodological heterogeneity, random-effects models with 95% confidence intervals estimated using the Hartung–Knapp–Sidik–Jonkman method were employed for all pooled estimates. Treatment effects on dichotomous outcomes were expressed as relative risk (RR). Mean difference (MD) and standardized mean difference (SMD) for continuous outcomes. Two-sided $P < 0.05$ was significant. Heterogeneity was quantified using Cochran's Q and I^2 (τ^2 for variance), with $I^2 > 50\%$ and $Q P < 0.10$ defining significance. Subgroup analyses found heterogeneity sources. Sensitivity used leave-one-out and fixed-effect replacement. Publication bias was evaluated via funnel plots and Egger's test. A two-sided $p < 0.05$ on Egger's test, in conjunction with significant funnel plot asymmetry, was considered indicative of potential publication bias. Trim-and-fill was applied when bias was detected (Duval and Tweedie, 2000).

3. Results

3.1. Literature Search and Study Selection

The search output 615 records, 304 duplicates were removed. The remaining 311 were screened by title and abstract, with 205 excluded as irrelevant. Full-text review of 106 articles against eligibility criteria yielded 17 included studies. Figure 1 provides the PRISMA 2020 flow chart.

3.2. Characteristics of Included Studies

Seventeen RCTs with 2000 participants were included, equally divided between Qiliqiangxin Capsule ($n = 1,000$) and standard therapy ($n = 1,000$) (Boying et al., 2022; Changqing et al., 2021; Danmei and Zhengjian, 2017; Hua, 2017; Jiang, 2019; Jiaqi et al., 2025; Jinhua, 2019; Jinyu et al., 2020; Meijuan et al., 2024; Ronglai, 2020; Shige et al., 2024; Shisheng et al., 2020; Wang and Zhang, 2024; Xiling, 2020; Xinhua et al., 2014; Yaoqi et al., 2020; Yuxian et al., 2021). The trials enrolled a minimum of 60 and a maximum of 236 participants, and treatment duration varied between 12 weeks and 6 months. Of the 17 studies, only one study employed placebo control (Changqing et al., 2021). All eligible studies reported comparable baseline characteristics between groups. Table 1 contains the baseline characteristics of the included studies.

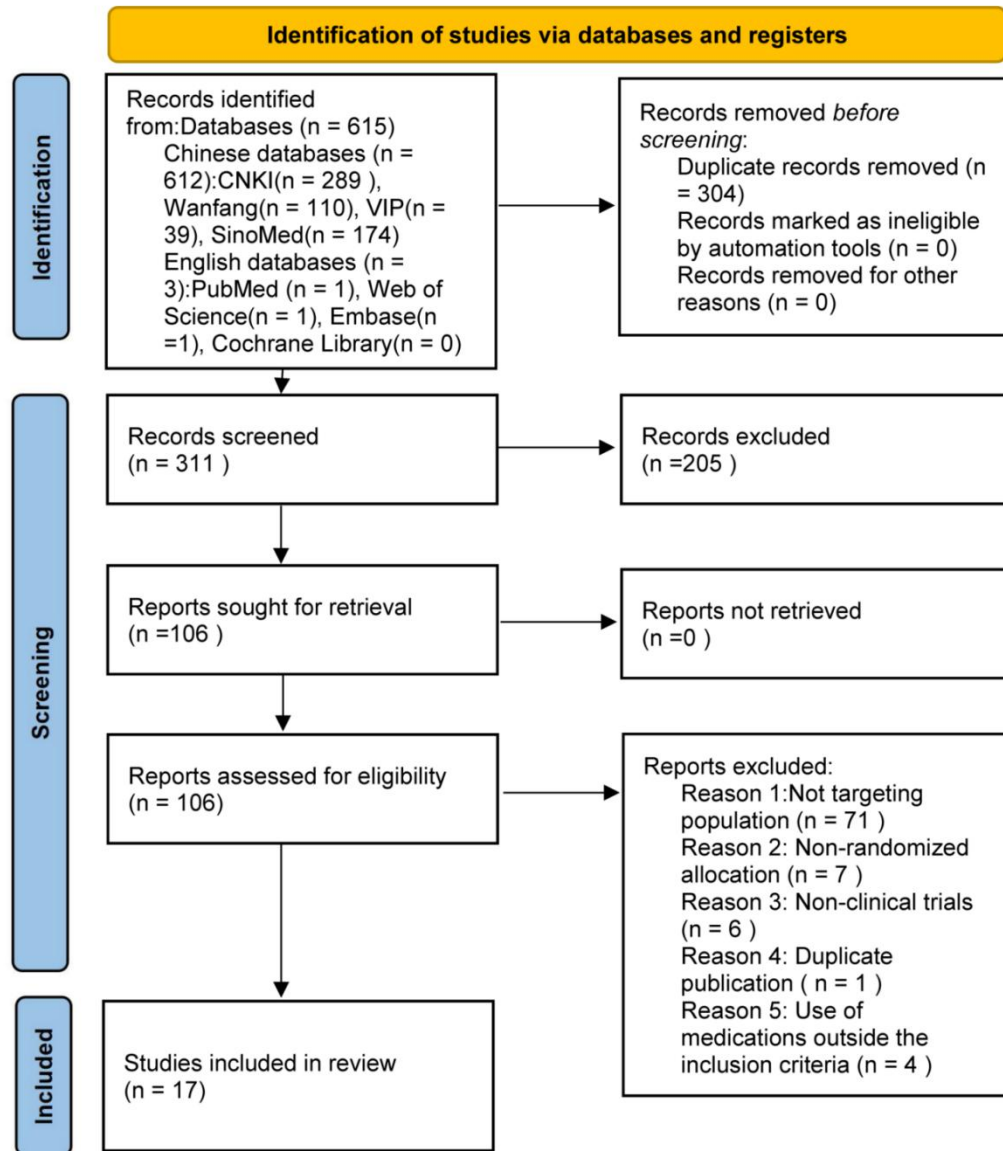


Figure1. PRISMA 2020 flow diagram of the study selection process

Table 1. Baseline characteristics of included studies

Study	Sample	Male/Female (n)		Mean Age(years)		Randomization Method
	T/C	T	C	T	C	
Chen XH 2014	30/30	17/13	16/14	63 ± 10	62 ± 11	Random allocation
Yao DM 2017	43/43	26/17	23/20	65.84 ± 9.51	65.24 ± 9.06	Random allocation
Wang H 2017	63/62	40/23	42/20	63.1 ± 10.3	62.4 ± 10.2	Random allocation
Yu J 2019	41/41	22/19	23/18	69.56 ± 3.85	70.54 ± 3.83	Random number table
Guo JH 2019	51/51	29/22	30/21	61.84 ± 5.03	61.13 ± 5.22	Random number table
Chen YQ 2020	51/51	33/18	31/20	63.16 ± 11.57	62.85 ± 11.73	Random number table
Song JY 2020	83/84	45/38	48/36	63.12 ± 7.41	62.25 ± 7.65	Simple randomization

Guo SS 2020	34/34	21/13	20/14	72.19 ± 4.53	71.84 ± 4.35	Random number table
Yang RL 2020	39/39	15/24	16/23	64.1 ± 12.2	63.6 ± 11.2	Random allocation
Zhao XL 2020	85/85	45/40	43/42	72.6 ± 2.3	73.5 ± 2.8	Random allocation
Chen YX 2021	116/116	63/53	61/55	58.35 ± 6.62	57.26 ± 7.05	Random number table
Xia CQ 2021	47/47	36/11	34/13	69.03 ± 6.84	68.12 ± 6.91	Random number table
Qin BY 2022	43/43	23/20	25/18	64.61 ± 4.68	64.58 ± 4.69	Randomized envelope
Li SG 2024	40/40	21/19	24/16	63.83 ± 6.14	62.97 ± 5.68	Random allocation
Qi MJ 2024	37/37	31/6	28/9	60.46 ± 8.45	61.65 ± 9.99	Random number table
Wang LJ 2024	79/79	38/41	39/40	59.48 ± 9.77	59.42 ± 9.72	Simple randomization
Huo JQ 2025	118/118	74/44	77/41	63.88 ± 7.69	63.57 ± 7.17	Simple randomization

Note: T, treatment group (Qiliqiangxin Capsule); C, control group; QLQX, Qiliqiangxin Capsule. ① Primary composite outcome (heart failure rehospitalization or all-cause mortality); ② LVEF; ③ LVEDD; ④ NT-proBNP; ⑤ 6MWD; ⑥ clinical response rate; ⑦ incidence of adverse events.

Table 1. Baseline characteristics of included studies (cont.)

Study	Intervention		Treatment duration	Outcome
	T	C		
Chen XH 2014	Standard therapy + QLQX	Standard therapy	6 months	①②③④
Yao DM 2017	Standard therapy + QLQX	Standard therapy	3 months	④
Wang H 2017	Standard therapy + QLQX	Standard therapy	6 months	②③④⑥
Yu J 2019	Standard therapy (bisoprolol fumarate) + QLQX	Standard therapy (bisoprolol fumarate)	3 months	②③⑦
Guo JH 2019	Standard therapy (trimetazidine) + QLQX	Standard therapy (trimetazidine)	3 months	②③⑤⑥
Chen YQ 2020	Standard therapy + QLQX	Standard therapy	6 months	②③④⑤⑥
Song JY 2020	Standard therapy (milrinone) + QLQX	Standard therapy (milrinone)	3 months	②③④⑤⑥
Guo SS 2020	Standard therapy (trimetazidine) + QLQX	Standard therapy (trimetazidine)	12 weeks	⑥
Yang RL 2020	Standard therapy + QLQX	Standard therapy	3 months	①②③⑥
Zhao XL 2020	Standard therapy (trimetazidine) + QLQX	Standard therapy (trimetazidine)	3 months	⑥

Chen YX 2021	Standard therapy + QLQX	Standard therapy	3 months	②③⑥
Xia CQ 2021	Standard therapy + QLQX	Standard therapy + placebo	12 weeks	②③④⑤ ⑥⑦
Qin BY 2022	Standard therapy (trimetazidine) + QLQX	Standard therapy (trimetazidine)	12 weeks	②③④⑤ ⑦
Li SG 2024	Standard therapy (sacubitril/valsartan) + QLQX	Standard therapy (sacubitril/valsartan)	3 months	②⑥⑦
Qi MJ 2024	Standard therapy (dapagliflozin) + QLQX	Standard therapy (dapagliflozin)	3 months	⑥
Wang LJ 2024	Standard therapy (trimetazidine) + QLQX	Standard therapy (trimetazidine)	6 months	②③④⑤ ⑥⑦
Huo JQ 2025	Standard therapy (sacubitril/valsartan) + QLQX	Standard therapy (sacubitril/valsartan)	12 weeks	②③④⑤ ⑥

Note: T, treatment group (Qiliqiangxin Capsule); C, control group; QLQX, Qiliqiangxin Capsule. ① Primary composite outcome (heart failure rehospitalization or all-cause mortality); ② LVEF; ③ LVEDD; ④ NT-proBNP; ⑤ 6MWD; ⑥ clinical response rate; ⑦ incidence of adverse events.

3.3. Methodological Quality Assessment

Each of the 17 studies were published as journal articles (Boying et al., 2022; Changqing et al., 2021; Danmei and Zhengjian, 2017; Hua, 2017; Jiang, 2019; Jiaqi et al., 2025; Jinhua, 2019; Jinyu et al., 2020; Meijuan et al., 2024; Ronglai, 2020; Shige et al., 2024; Shisheng et al., 2020; Wang and Zhang, 2024; Xiling, 2020; Xinhua et al., 2014; Yaoqi et al., 2020; Yuxian et al., 2021). For the randomization process, three studies (Jiaqi et al., 2025; Jinyu et al., 2020; Wang and Zhang, 2024) employed simple randomization, one (Boying et al., 2022) used a sealed envelope method, seven studies (Changqing et al., 2021; Jiang, 2019; Jinhua, 2019; Meijuan et al., 2024; Shisheng et al., 2020; Yaoqi et al., 2020; Yuxian et al., 2021) utilized a random number table to generate the allocation sequence, and all of these trials were rated at low risk; six studies merely stated that randomization was performed without specifying the method and were judged as some concerns (Danmei and Zhengjian, 2017; Hua, 2017; Ronglai, 2020; Shige et al., 2024; Xiling, 2020; Xinhua et al., 2014). Baseline characteristics were generally comparable across all included studies. Regarding deviations from intended interventions, one placebo-controlled trial was assessed as low risk (Changqing et al., 2021); the other 16 trials (non-placebo, unblinded) were high risk. For missing outcome data, no patient attrition or data loss occurred in any study, and they were classified as low risk. For measurement of the outcome, two studies (Ronglai, 2020; Xinhua et al., 2014) incorporated subjective endpoints without explicit assessor blinding and were classified as some concerns; the remaining studies employed objective outcome measurement criteria and were judged as low risk. For selection of the reported result, none of the reports referred to a prespecified protocol, and all were rated as some concerns. Figures S1 and S2 present the detailed outcomes of the bias assessment results.

3.4. Meta-Analysis Results

3.4.1. Primary Outcome

Two studies (Ronglai, 2020; Xinhua et al., 2014) reported the primary composite endpoint (HF rehospitalization or all-cause death), with 138 patients included (69 allocated to the Qiliqiangxin capsule arm and 69 to the control group). The pooled risk ratio was 0.38 (95% CI: 0.23–0.63), suggesting a significantly meaningful reduction in the Qiliqiangxin capsule arm (Figure 2). Heterogeneity was absent ($I^2 = 0.0\%$, $p = 0.4418$). Sensitivity analysis using a fixed-effect model showed that the effect estimates remained consistent in direction.

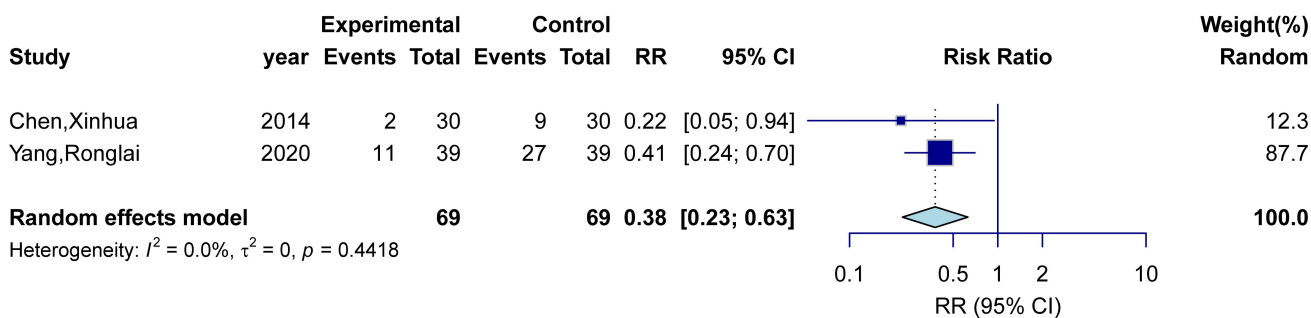


Figure 2. Forest Plot of the Primary outcome

3.4.2. LVEF

A total of 13 studies (Boying et al., 2022; Changqing et al., 2021; Hua, 2017; Jiang, 2019; Jiaqi et al., 2025; Jinhua, 2019; Jinyu et al., 2020; Ronglai, 2020; Shige et al., 2024; Wang and Zhang, 2024; Xinhua et al., 2014; Yaoqi et al., 2020; Yuxian et al., 2021) reported LVEF, comprising 1602 patients (801 allocated to the Qiliqiangxin capsule arm and 801 to the control arm). The pooled mean difference was 5.82 (95% CI: 4.68–6.96), indicating that Qiliqiangxin capsule significantly improved LVEF compared with control. Notable heterogeneity was observed across the studies, with an I^2 of 68.1% and p of 0.0002 (Figure 3A). A subgroup analysis was conducted by duration of treatment (≤ 3 months versus > 3 months) to investigate the possible sources of heterogeneity (Figure S3). In the short-duration subgroup (≤ 3 months), heterogeneity remained substantial ($I^2 = 77.4\%$, $p < 0.0001$). In the long-duration subgroup (> 3 months), heterogeneity was absent ($I^2 = 0.0\%$, $\tau^2 = 0$, $p = 0.62$). Treatment duration alone does not fully explain the observed between-study variability. Leave-one-out sensitivity analysis showed that effect estimates remained directionally consistent across all iterations; however, the removal of one study (Ronglai, 2020) markedly reduced heterogeneity ($I^2 = 36.2\%$, $p = 0.1008$), yielding an adjusted pooled estimate of MD = 5.39 (95% CI: 4.62, 6.16,) (Figure S4). Detailed inspection revealed that this study enrolled a population with a male-to-female ratio < 1 , whereas all other studies reported ratios ≥ 1 , suggesting that differential sex distribution may have contributed to clinical heterogeneity. Attributable to the fact that women demonstrate higher stroke volume at identical end-diastolic volume (Arata et al., 2023), with consequent sex-based differences in ejection fraction. The funnel plot showed potentially asymmetric; however, Egger's test was not statistically significant ($t = 0.97$, $P = 0.3538$), suggesting absence of small-study effects (Figure S5).

3.4.3. NT-proBNP

A total of 9 studies (Boying et al., 2022; Changqing et al., 2021; Danmei and Zhengjian, 2017; Hua, 2017; Jiaqi et al., 2025; Jinyu et al., 2020; Wang and Zhang, 2024; Xinhua et al., 2014; Yaoqi et al., 2020) reported NT-proBNP, comprising 1114 patients (557 allocated to the Qiliqiangxin capsule group and 557 to the control group). Due to unit heterogeneity, SMD was used. A pooled analysis provided a SMD of -1.48 (95% CI: -2.40 to -0.55), indicating that Qiliqiangxin capsule significantly reduced NT-proBNP levels compared with control. Heterogeneity was considerable ($I^2 = 95.9\%$, $p < 0.0001$) (Figure 3B). Subgroup analyses were conducted by duration of treatment (≤ 3 months versus > 3 months) to investigate possible sources of heterogeneity (Figure S6). In the short-duration subgroup (≤ 3 months), heterogeneity remained considerable ($I^2 = 91.6\%$, $p < 0.00001$), and in the long-duration subgroup (> 3 months), heterogeneity remained considerable ($I^2 = 97.9\%$, $p = 0.37$), indicating that the duration of treatment does not represent a source of heterogeneity. Sensitivity analyses demonstrated directional consistency of effect estimates. Detailed inspection identified one study (Changqing et al., 2021) that substantially contributed to heterogeneity; this trial employed western conventional therapy plus placebo in the control group, whereas all other studies used blank control, representing a methodological design difference that may have introduced heterogeneity. Furthermore, one study (Wang and Zhang, 2024) used trimetazidine in both arms, potentially introducing clinical heterogeneity. Removal of these studies yielded a SMD of -0.82 (95% CI: -0.97 to -0.67), and heterogeneity was reduced ($I^2 = 9.4\%$, $P = 0.3570$) (Figure S7).

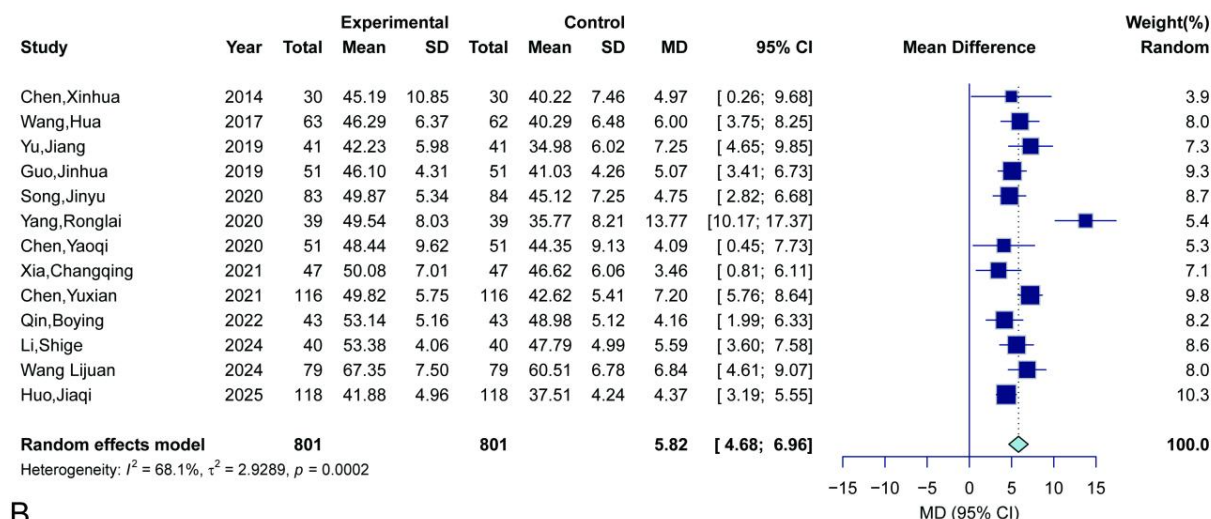
3.4.4. 6MWD

A total of 7 studies (Boying et al., 2022; Changqing et al., 2021; Jiaqi et al., 2025; Jinhua, 2019; Jinyu et al., 2020; Wang and Zhang, 2024; Yaoqi et al., 2020) reported 6MWD, comprising 945 patients (472 allocated to the Qiliqiangxin capsule arm and 473 to the control arm). The pooled MD was 39.05 meters (95% CI: 19.90 to 58.20), indicating that Qiliqiangxin capsule significantly improved 6MWD compared with control. Notable heterogeneity was observed across the studies, with an I^2 of 87.7% ($p < 0.0001$) (Figure 3C). In order to investigate the potential sources, we performed subgroup analyses that were stratified by NYHA class (II vs. III–IV) and duration of treatment. These findings (Figure S8,9) suggest that neither treatment duration nor baseline heart failure severity accounts for the observed clinical diversity. Variations in baseline patient age and disease duration across studies may represent potential sources of clinical heterogeneity. Leave-one-out approach and alternative statistical models demonstrated consistent directionality of effect estimates.

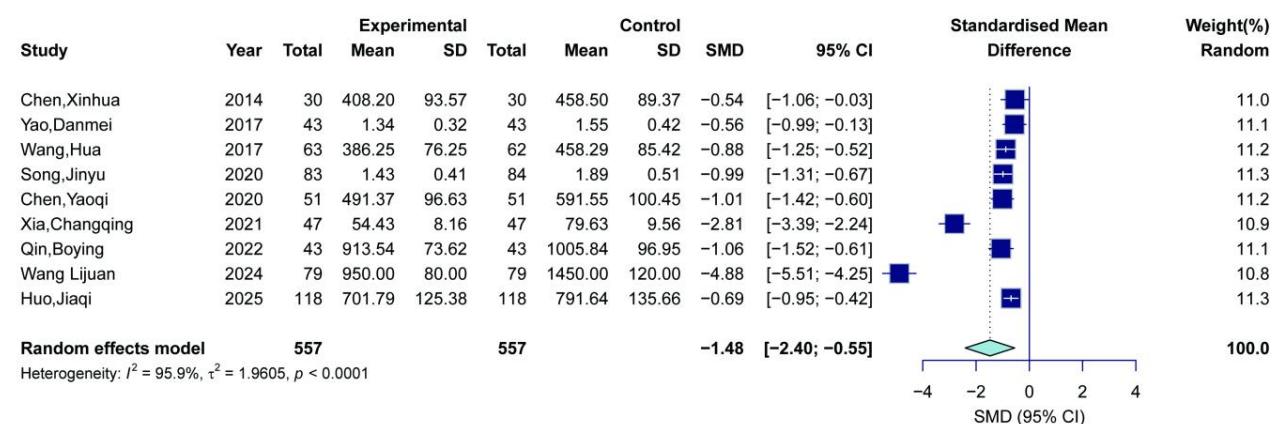
3.4.5. LVEDD

A total of 12 studies (Boying et al., 2022; Changqing et al., 2021; Hua, 2017; Jiang, 2019; Jiaqi et al., 2025; Jinhua, 2019; Jinyu et al., 2020; Ronglai, 2020; Wang and Zhang, 2024; Xinhua et al., 2014; Yaoqi et al., 2020; Yuxian et al., 2021) reported LVEDD, comprising 1522 patients (761 allocated to the Qiliqiangxin capsule arm and 761 to the control arm). The pooled MD was -4.93 (95% CI: -6.09 to -3.76) indicating that Qiliqiangxin capsule significantly reduced LVEDD compared with control. Heterogeneity was considerable ($I^2 = 80.5\%$, $p < 0.0001$) (Figure 4A). To investigate potential sources, we performed a subgroup analysis stratified by treatment duration (≤ 3 months versus > 3 months) (Figure S10).

A



B



C

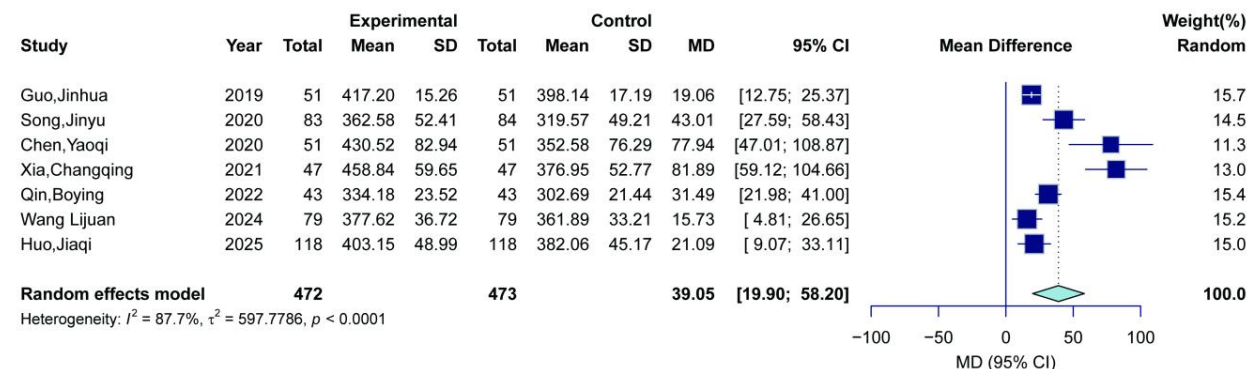


Figure 3. Forest Plot of LVEF , NT-pro BNP and 6MWD

In the short-duration subgroup (≤ 3 months), heterogeneity was negligible ($I^2 = 0\%$, $p = 0.438$). In the long-duration subgroup (> 3 months), heterogeneity remained substantial ($I^2 = 70.4\%$, $p = 0.018$). Treatment duration alone does not fully explain the observed between-study variability. Sensitivity analyses demonstrated directional consistency of effect estimates. Detailed inspection of the long-duration subgroup identified one study (Yaoqi et al., 2020) enrolled a population in which 61 (59.8%) of 102 with CHF and CAD patients who had received percutaneous coronary intervention (PCI). This high prevalence of prior revascularization may have contributed to the observed clinical heterogeneity. Furthermore, the concomitant use of trimetazidine in both the experimental and control groups of one study (Wang and Zhang, 2024) may introduce clinical heterogeneity. Removal of these studies

yielded a MD of -4.86 (95% CI: -6.20 to -3.51), and heterogeneity was reduced (Figure S11). The funnel plot appeared potentially asymmetric; however, Egger's test was not statistically significant ($t = -0.60$, $p = 0.5598$), suggesting absence of small-study effects (Figure S12).

3.4.6. Clinical Response Rate

Thirteen studies (Changqing et al., 2021; Hua, 2017; Jiaqi et al., 2025; Jinhua, 2019; Jinyu et al., 2020; Meijuan et al., 2024; Ronglai, 2020; Shige et al., 2024; Shisheng et al., 2020; Wang and Zhang, 2024; Xiling, 2020; Yaoqi et al., 2020; Yuxian et al., 2021) reported clinical response rate, comprising a total of 1686 patients (843 allocated to the experimental arm and 843 to the control arm). The pooled risk ratio was 1.20 (95% CI: 1.14, 1.25) showed that the clinical response rate was significantly improved, with low between-study heterogeneity ($I^2 = 0\%$, $p = 0.5022$ for heterogeneity) (Figure 4B). Sensitivity analyses demonstrated directional consistency of effect estimates.

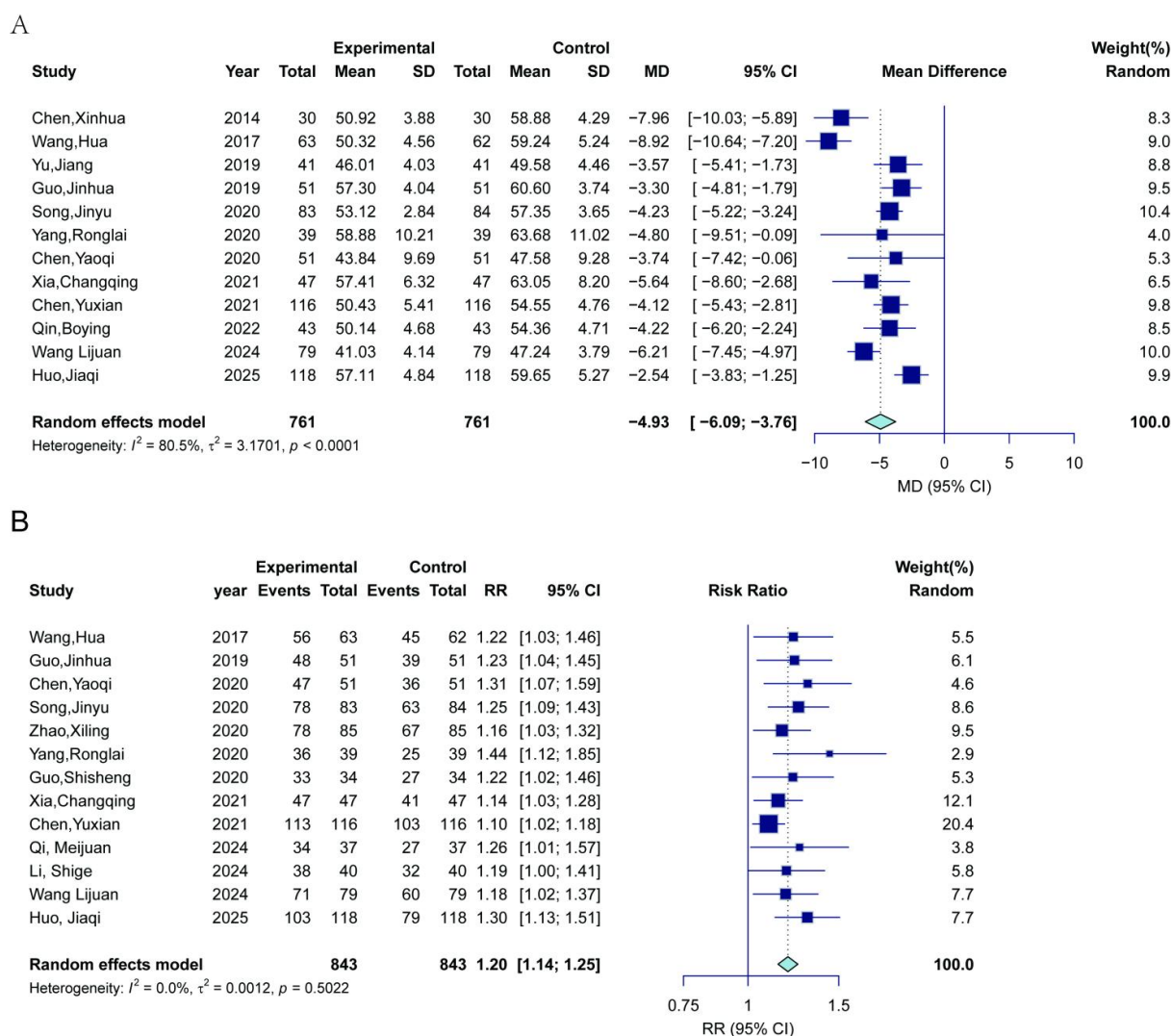


Figure 4. Forest Plot of LVEDD and Clinical Response Rate

3.5. Adverse Events

Eight studies (Boying et al., 2022; Changqing et al., 2021; Jiang, 2019; Jinhua, 2019; Jinyu et al., 2020; Shige et al., 2024; Wang and Zhang, 2024; Xiling, 2020) reported adverse events, of which three (Jinhua, 2019; Jinyu et al., 2020; Xiling, 2020) indicated no notable adverse events in either

group, and five (Boying et al., 2022; Changqing et al., 2021; Jiang, 2019; Shige et al., 2024; Wang and Zhang, 2024) provided detailed reports of specific adverse events. The control group reported 38 adverse events, the most common being headache and dizziness (n=10) and gastrointestinal dysfunction (n=9). In the experimental group, 34 adverse events were documented, among which dizziness and headache (n=9) and gastrointestinal discomfort (n=6) were the most common. Detailed information on adverse events is provided in Table S3. The pooled risk ratio was 0.95 (95% CI: 0.60 - 1.50), with between-study heterogeneity ($I^2=13.6\%$, $p=0.3275$ for heterogeneity) (Figure 5), showing that adverse event rates did not differ significantly between groups. Sensitivity analyses employing a fixed-effect model and a leave-one-out approach demonstrated consistent directionality of effect estimates.

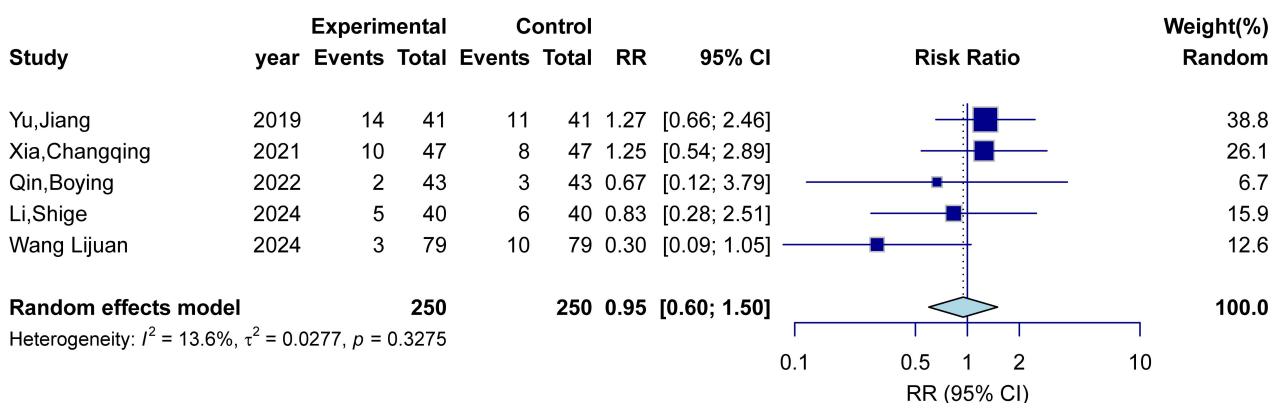


Figure 5. Forest Plot of Adverse Events

4. Discussion

The present meta-analysis for the first time found that Qiliqiangxin capsules combined with GDMT significantly reduced the composite outcome of HF rehospitalization or all-cause mortality in CHF patients complicated by CAD. In addition, Qiliqiangxin capsules also favorably modified markers of cardiac remodeling and ventricular function. These benefits were observed alongside a favorable safety profile, with no significant increase in adverse events. Collectively, these findings support the therapeutic relevance of Qiliqiangxin capsules in CHF with CAD, and highlight the need for further high-quality trials to refine patient selection and optimize integration with contemporary cardiovascular therapeutics.

CHF and CAD are characterized by a complex bidirectional interplay, wherein both conditions are tightly linked through shared pathophysiological mechanisms including myocardial ischemic injury, ventricular remodeling, neurohormonal activation, inflammatory response, oxidative stress, microcirculatory dysfunction, and metabolic remodeling.

CAD represents the most common etiology of heart failure. Atherosclerotic coronary stenosis or occlusion induces sustained myocardial hypoxia, precipitating myocardial infarction (MI). Necrotic myocardium is subsequently replaced by fibrotic scar tissue, causing pathological structure and function cardiac changes and ventricular remodeling (Jiang et al., 2023), thereby exacerbating heart failure. Heart failure induces hemodynamic derangement, reducing coronary perfusion pressure. Concurrently, sympathetic nervous system (SNS) activation increases oxygen demand, the supply–

demand mismatch exacerbates myocardial ischemia (Heusch, 2022). Simultaneously, myocardial injury triggers pathological overactivation of the renin-angiotensin-aldosterone system (RAAS) and the SNS (Jia et al., 2018), resulting in myocardial fibrosis, cytotoxic injury, and progressive ventricular remodeling that drives further deterioration of heart failure. This aberrant RAAS and SNS activation also increases myocardial oxygen consumption, promotes vasoconstriction, intensifies myocardial ischemia, and fosters a prothrombotic milieu. Furthermore, myocardial ischemia and hypoxia induce mitochondrial metabolic remodeling (Zhou and Tian, 2018), engendering oxidative stress, activating downstream signaling pathways, and triggering cytokine release, leading to cardiomyocyte apoptosis or necrosis and heart failure. Concurrently, oxidative activation and inflammatory response impair endothelial integrity, promoting plaque instability and aggravating vascular stenosis (Libby, 2002). Additionally, CAD induces coronary microcirculatory dysfunction (Vrints et al., 2024), precipitating sustained subclinical myocardial ischemia and culminating in heart failure with preserved or reduced ejection fraction (HFpEF/HFrEF). Insufficient myocardial perfusion exacerbates myocardial ischemia, stenosis, and plaque instability. Thus, CHF and CAD constitute a vicious cycle of mutually reinforcing pathologies, wherein each condition serves as both cause and consequence, significantly increasing the risks of recurrent hospitalization and all-cause mortality (Yan et al., 2020). Thus a novel strategy targeting this patient population is needed.

Qiliqiangxin capsules, a standardized commercial formulation comprising 11 herbal ingredients, has demonstrated multiple cardioprotective effects across diverse experimental and clinical settings. Mass spectrometry analysis has identified up to 173 potentially active compounds in Qiliqiangxin capsules, including astragaloside IV, tanshinone IIA, ginsenosides (Rb1, Rg1, and Re), periplocymarin, and alisol A (Packer, 2023). Astragaloside IV attenuates cardiomyocyte apoptosis (Jia et al., 2014) and enhances glucose uptake (Zhu et al., 2016); ginsenosides inhibit the pressure-overload heart failure (Yang et al., 2018), and reduce oxidative stress and proinflammatory signaling (Qin et al., 2019); tanshinone IIA ameliorates myocardial ischemia–reperfusion injury (Li et al., 2016). These experimental findings converge with the conceptual framework proposed by Packer, who posited that Qiliqiangxin capsules probably directly bind to RXR α , augmenting glucose and fatty acid oxidation, promoting mitochondrial health and mitophagy, and attenuating proinflammatory and profibrotic signaling. Collectively, these mechanisms may be the basis for the efficacy of Qiliqiangxin capsules in CHF complicated by CAD.

This study designated the composite hard outcome was identified as the primary outcome of HF rehospitalization or all-cause mortality, focusing on the interventional effect of Qiliqiangxin Capsule in CHF complicated by CAD. Compared with similar studies predominantly employing clinical response rate, heart failure biomarkers, and cardiac function-related indicators (Yahui et al., 2020; Yan et al., 2021), this approach more directly reflects patient survival status and confers stronger clinical guidance significance. Among them, LVEF, LVEDD, and NT-proBNP are indicative of cardiac function, whereas 6MWD and clinical response rate demonstrate patient exercise tolerance and quality of life. Furthermore, this study identified and elucidated sources of heterogeneity through subgroup analyses and leave-one-out sensitivity analyses. Additionally, publication bias for LVEF and LVEDD was evaluated by means of the funnel plot and Egger's linear regression test.

However, there are some limitations to this research. First, we found that the RCTs that we screened were all Chinese, which may compromise the generalizability of our results globally. Second, the primary outcome was reported in only two studies (Ronglai, 2020; Xinhua et al., 2014) compromising statistical credibility; furthermore, as the primary outcome encompassed merely two studies, Egger's linear regression test was underpowered and was therefore not performed for this outcome. Third, the methodological quality of the included RCTs was modest; several studies lacked explicit randomization protocols and blinding design, with only one RCT employing placebo control while the remainder utilized blank control. The risk of bias assessment yielded predominantly "high risk" judgments; this limitation may inflate the risk of bias. Fourth, for the 6MWD indicator, neither subgroup analyses stratified by treatment duration or heart failure severity classification nor leave-one-out approaches materially attenuated heterogeneity; this persistent heterogeneity may be attributable to multifactorial influences including patient age, sex, and disease duration. In response to these limitations, future large-scale, multicenter, high-quality RCTs conducted across multiple countries are warranted to confirm the superiority of these findings. Moreover, the therapeutic efficacy of Qiliqiangxin Capsule specifically regarding heart failure rehospitalization and all-cause mortality needs to be further validated by additional large-scale RCTs. With respect to study design, rigorous implementation of randomization protocols and blinding procedures should be emphasized to further corroborate these results.

5. Conclusion

Qiliqiangxin Capsule combined with guideline-directed medical therapy in patients with CHF complicated by CAD demonstrated superior efficacy compared with guideline-directed medical therapy alone in reducing the composite endpoint of HF rehospitalization or all-cause mortality, improving left ventricular ejection fraction, decreasing left ventricular end-diastolic dimension, reducing NT-proBNP levels, increasing 6-minute walk distance, and enhancing clinical response rate, without concomitant increase in adverse risk. Future large-scale, multicenter, randomized, double-blind, placebo-controlled clinical trials are needed to further confirm the reliability of these findings.

Author Contributions:

Conceptualization, Kaijuan Wang, Jingen Li, Jinhao Xu and Xiangying Zheng; methodology, Kaijuan Wang, Jingen Li, Jinhao Xu and Xiangying Zheng; software, Kaijuan Wang, Jingen Li, Jinhao Xu and Xiangying Zheng; validation, Kaijuan Wang, Jingen Li, Jinhao Xu and Xiangying Zheng; formal analysis, Kaijuan Wang, Jingen Li, Jinhao Xu and Xiangying Zheng; investigation, Kaijuan Wang, Jingen Li, Jinhao Xu and Xiangying Zheng; resources, Kaijuan Wang, Jingen Li, Jinhao Xu and Xiangying Zheng; data curation, Kaijuan Wang, Jingen Li, Jinhao Xu and Xiangying Zheng; writing—original draft preparation, Kaijuan Wang, Jingen Li, Jinhao Xu and Xiangying Zheng; writing—review and editing, Kaijuan Wang, Jingen Li, Jinhao Xu and Xiangying Zheng; visualization, Kaijuan Wang, Jingen Li, Jinhao Xu, Xiangying Zheng and Fengshuo Chang; supervision, Kaijuan Wang, Jingen Li, Jinhao Xu and Xiangying Zheng; project administration,

Kaijuan Wang, Jingen Li, Jinhao Xu and Xiangying Zheng; funding acquisition, Jingen Li. All authors have read and agreed to the published version of the manuscript.

Funding:

This research was funded by the Sponsored by Beijing Nova Program, grant number 20240484736; Beijing University of Chinese Medicine affiliated Dongzhimen Hospital's Youth Backbone Talent Program, grant number DZMG-QNGG007; Clinical Research and Achievement Commercialization Capacity Improvement Pilot Project of Beijing University of Chinese Medicine, Dongzhimen Hospital grant number DZMG-JBZX-25001; Capital's Funds for Health, grant number 2026-4-4196.

Institutional Review Board Statement:

Not applicable

Informed Consent Statement:

Not applicable

Data Availability Statement:

The original data presented in the study are openly available in CNKI, Wanfang, VIP, Sinomed, Pubmed, Web of Science and Embase.

Acknowledgments:

The authors thank the researchers of the included primary studies for their valuable contributions.

Conflict of Interest:

The authors declare no conflict of interest.

References

- Arata, A., Ricci, F., Khanji, M. Y., et al. (2023). Sex Differences in Heart Failure: What Do We Know? *J Cardiovasc Dev Dis*, 10(7), 277.
- Boying, Q., Yinglan, Y., and Ying, T. (2022). Effects of Qiliqiangxin Capsule and Trimetazidine on Serum NT pro BNP Level and Cardiac Function in Patients with Coronary Heart Disease and Heart Failure. *Capit Food Med*, 29(21).
- Bozkurt, B., Ahmad, T., Alexander, K., et al. (2025). HF STATS 2024: Heart Failure Epidemiology and Outcomes Statistics An Updated 2024 Report from the Heart Failure Society of America. *J Card Fail*, 31(1), 66-116.
- Changqing, X., Fang, W., Na, Z., et al. (2021). Curative Efficacy of Qili Qiangxin Capsules in Treatment of Heart Failure of Elderly Patients with Coronary Heart Disease. *World Chin Med*, 16(18), 2751-2756.
- Cheang, I., Yao, W., Zhou, Y., et al. (2024). The traditional Chinese medicine Qiliqiangxin in heart failure with reduced ejection fraction: a randomized, double-blind, placebo-controlled trial. *Nat Med*, 30(8), 2295-2302.

- Chinese Society of Cardiology, Chinese Medical Association, Chinese College of Cardiovascular Physician, C. H. F. a. O. C. M. D. A., and Cardiology, E. B. O. C. J. O. (2024). Chinese guidelines for the diagnosis and treatment of heart failure 2024. *Chin J Cardiol* 52(03), 235-275.
- Danmei, Y., and Zhengjian, L. (2017). Application value of Qili Qiangxin capsule in the treatment of coronary heart disease combined with chronic heart failure. *Clin Res Pract*, 2(12), 33-34.
- Duval, S., and Tweedie, R. (2000). Trim and fill: A simple funnel-plot-based method of testing and adjusting for publication bias in meta-analysis. *Biometrics*, 56(2), 455-463.
- Fiuzat, M., Ezekowitz, J., Alemayehu, W., et al. (2020). Assessment of Limitations to Optimization of Guideline-Directed Medical Therapy in Heart Failure From the GUIDE-IT Trial: A Secondary Analysis of a Randomized Clinical Trial. *JAMA Cardiol*, 5(7), 757-764.
- Haijing, G., and Zhigang, Z. (2022). Pharmacoeconomic evaluation of Qili qiangxin capsule in the treatment of chronic heart failure. *China Pharm*, 33(02), 209-216.
- Heusch, G. (2022). Coronary blood flow in heart failure: cause, consequence and bystander. *Basic Res Cardiol*, 117(1), 1.
- Hua, W. (2017). Effect of Qiliqiangxin capsule on Serum Adiponectin Levels and Heart Function in Patients with Coronary Heart Disease and Heart Failure. *Mod J Integr Tradit Chin West Med*, 26(22), 2450-2452.
- Jia, G., Aroor, A. R., Hill, M. A., and Sowers, J. R. (2018). Role of Renin-Angiotensin-Aldosterone System Activation in Promoting Cardiovascular Fibrosis and Stiffness. *Hypertension*, 72(3), 537-548.
- Jia, Y., Zuo, D., Li, Z., et al. (2014). Astragaloside IV inhibits doxorubicin-induced cardiomyocyte apoptosis mediated by mitochondrial apoptotic pathway via activating the PI3K/Akt pathway. *Chem Pharm Bull (Tokyo)*, 62(1), 45-53.
- Jiang, H., Fang, T., and Cheng, Z. (2023). Mechanism of heart failure after myocardial infarction. *J Int Med Res*, 51(10), 3000605231202573.
- Jiang, Y. (2019). Investigation of the Effects of QiliQiangxin Capsule Combined with Bisoprolol on Vascular Endothelial Function and Cardiac Performance in Patients with Coronary Heart Disease and Heart Failure. *Med J Chin People's Health*, 31(14), 100-102.
- Jiaqi, H., Houze, T., Yaling, Z., and Shifeng, X. (2025). Clinical observation of Qiliqiangxin capsule on patients with chronic heart failure complicated with coronary heart disease. *Chin Arch Tradit Chin Med*, 1-11.
- Jinhua, G. (2019). Clinical observation of Qiliqiangxin capsule Combined with Trimetazidine on patients with Heart Failure of Coronary Heart Disease. *Mod Diagn Treat*, 30(01), 36-37.
- Jinyu, S., Xin, D., Jihong, S., and Yongzhi, W. (2020). Effects of Qili Qiangxin Capsule Combined with Milrinone on Arterial Hemodynamics and Heart Function in Patients with Myocardial Infarction Complicated with Heart Failure. *Shaanxi J Tradit Chin Med*, 41(04), 493-495.
- Li, Q., Shen, L., Wang, Z., et al. (2016). Tanshinone IIA protects against myocardial ischemia reperfusion injury by activating the PI3K/Akt/mTOR signaling pathway. *Biomed Pharmacother*, 84, 106-114.
- Libby, P. (2002). Inflammation in atherosclerosis. *Nature*, 420(6917), 868-874.

- Mcdonagh, T. A., Metra, M., Adamo, M., et al. (2021). 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. *Eur Heart J*, 42(36), 3599-3726.
- Mcdonagh, T. A., Metra, M., Adamo, M., et al. (2023). 2023 Focused Update of the 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. *Eur Heart J*, 44(37), 3627-3639.
- Meijuan, Qi., Han, Z., Fenfen, Z., et al. (2024). Efficacy of Qili Qiangxin capsule combined with dapagliflozin in treatment of newly developing heart failure after acute myocardial infarction. *Chin J Drug Appl & Monit*, 21(05), 661-664.
- Packer, M. (2023). Qiliqiangxin: A multifaceted holistic treatment for heart failure or a pharmacological probe for the identification of cardioprotective mechanisms? *Eur J Heart Fail*, 25(12), 2130-2143.
- Page, M. J., Mckenzie, J. E., Bossuyt, P. M., et al. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *Bmj*, 372, n71.
- Qin, Q., Lin, N., Huang, H., et al. (2019). Ginsenoside Rg1 ameliorates cardiac oxidative stress and inflammation in streptozotocin-induced diabetic rats. *Diabetes Metab Syndr Obes*, 12, 1091-1103.
- Ronglai, Y. (2020). Effect of Qili Qiangxin Capsule on Serum APN , cTnI and Prognosis in Patients with Heart Failure of Coronary Heart Disease. *Guangming J Chin Med*, 35(17), 2711-2713.
- Shige, L., Xiaodan, Z., and Zhangzheng, Y. (2024). Clinical Efficacy of Sacubitril Valsartan Combined with Qili Qiangxin Capsule in the Treatment of Coronary Heart Disease with Heart Failure. *Shenzhen J Integr Tradit Chin West Med*, 34(20), 33-36.
- Shisheng, G., Donghua, L., and Jiwei, Z. (2020). Application of Trimetazidine Combined with Qili Qiangxin Capsule in Treatment of Heart Failure of Elderly Patients with Coronary Heart Disease. *Cardiovasc Dis Electron J Integr Tradit Chin West Med*, 8(17), 52-53.
- Sterne, J. a. C., Savović, J., Page, M. J., et al. (2019). RoB 2: a revised tool for assessing risk of bias in randomised trials. *Bmj*, 366, 14898.
- Vrints, C., Andreotti, F., Koskinas, K. C., et al. (2024). 2024 ESC Guidelines for the management of chronic coronary syndromes. *Eur Heart J*, 45(36), 3415-3537.
- Wang, L., and Zhang, Q. (2024). Effectiveness of Qiliqiangxin Combined with Trimetazidine Hydrochloride Tablets in Treating Coronary Heart Disease with Concurrent Heart Failure: A Comparative Study. *Curr Top Nutraceutical Res*, 22(2), 446-451.
- Xiling, Z. (2020). Effect of Qiliqiangxin capsule Combined with Trimetazidine on Plasma Brain Natriuretic Peptide and Vascular Endothelial Function in Elderly Patients with Coronary Heart Disease and Heart Failure. *Mod J Integr Tradit Chin West Med*, 29(01), 77-80.
- Xinhua, C., Qi, Sun., Liang, Li., et al. (2014). Effect of Qiliqiangxin capsules on neurohumoral factors , left ventricular remodeling and heart function in the patients with ischemic heart disease with heart failure. *Mod J Integr Tradit Chin West Med*, 23(25), 2760-2763.
- Yahui, C., Junpeng, X., Haiyue, Z., et al. (2020). Systematic Evaluation of Efficacy and Safety Qili Qiangxin Capsules in the Treatment of Acute Myocardial Infarction Complicated with Heart Failure. *Eval Anal Drug-Use Hosp China*, 20(06), 698-703.

- Yan, Y., Xiaofang, H., Xiaoyun, L., et al. (2021). Systematic Review on Qili Qiangxin Capsules Combined with Conventional Western Therapy in Treatment of Coronary Heart Disease with Chronic Heart Failure. *Chin J Inf TCM*, 28(02), 39-45.
- Yan, Z., Ting, M., Yaping, B., et al. (2020). Clinical features and prognosis of patients with different types of heart failure in relation to coronary artery disease. *Natl Med J China*, 100(15), 1142-1147.
- Yang, T., Miao, Y., Zhang, T., et al. (2018). Ginsenoside Rb1 inhibits autophagy through regulation of Rho/ROCK and PI3K/mTOR pathways in a pressure-overload heart failure rat model. *J Pharm Pharmacol*, 70(6), 830-838.
- Yaoqi, C., Jinxing, M., Yanxin, L., et al. (2020). Effect of Qiliqiangxin capsule on heart function, renal function and prognosis in patients with old myocardial infarction and heart failure *Chin J Diffic and Compl Cas*, 19(08), 785-790.
- Yuxian, C., Shujun, Y., and Juping, D. (2021). Clinical Study on Qili Qiangxin Capsules Combined with Routine Western Medicine for Ischemic Cardiomyopathy Complicated with Heart Failure. *J New Chin Med*, 53(15), 40-43.
- Zhou, B., and Tian, R. (2018). Mitochondrial dysfunction in pathophysiology of heart failure. *J Clin Invest*, 128(9), 3716-3726.
- Zhu, R., Zheng, J., Chen, L., et al. (2016). Astragaloside IV facilitates glucose transport in C2C12 myotubes through the IRS1/AKT pathway and suppresses the palmitate-induced activation of the IKK/I κ B α pathway. *Int J Mol Med*, 37(6), 1697-1705.

Supplementary Materials

Table S1. PRISMA_2020_checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Title
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Abstract
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Introduction
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Introduction
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Section 2.1
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Section 2.2 Search Strategy
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Table S2.
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Section 2.3
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Section 2.3
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Section 2.1.(iv) Outcome
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Table 1.
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used,	Section 2.4

Section and Topic	Item #	Checklist item	Location where item is reported
		how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Section 2.5
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Section 2.5
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Section 2.5
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Section 3.4
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Section 2.5
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	Section 2.5
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Section 2.5
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Section 2.5
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Section 3.3
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Figure 1.
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Figure 1.
Study characteristics	17	Cite each included study and present its characteristics.	Table 1.
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Figures 2 and 3.
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Section 3.4
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Section 3.4

Section and Topic	Item #	Checklist item	Location where item is reported
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Section 3.4
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	Section 3.4
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Section 3.4
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Section 3.4
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Section 4
	23b	Discuss any limitations of the evidence included in the review.	Section 4
	23c	Discuss any limitations of the review processes used.	Section 4
	23d	Discuss implications of the results for practice, policy, and future research.	Section 4
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Section 2
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Section 2
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	Section 2
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Funding
Competing interests	26	Declare any competing interests of review authors.	Conflict of Interest
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	

Table S2. Search Strategy

Database	Search terms
CNKI	(篇文摘: 心衰 + 心力衰竭 + 心功能不全) AND (冠心病 + 冠状动脉粥样硬化性心脏病 + 缺血性心肌病 + 心肌梗死) AND (篇文摘: 芪苈强心 + 芪苈强心胶囊) AND (篇文摘: 随机 + 对照 + 临床 + RCT) (Title/Keywords/Abstract: "heart failure" + "cardiac failure" + "cardiac insufficiency") AND ("coronary heart disease" + "coronary atherosclerotic heart disease" + "ischemic cardiomyopathy" + "myocardial infarction") AND (Title/Keywords/Abstract: "Qiliqiangxin" + "Qiliqiangxin Capsule") AND (Title/Keywords/Abstract: "randomized" + "controlled" + "clinical" + "RCT")
WanFang	题名或关键词:(心衰 OR 心力衰竭 OR 心功能不全) and 题名或关键词:(冠心病 OR 冠状动脉粥样硬化性心脏病 OR 缺血性心肌病 OR 心肌梗死) and 题名或关键词:(芪苈强心) and 题名或关键词:(随机 OR 对照 OR 临床 OR RCT) Title or Keywords: ("heart failure" OR "cardiac failure" OR "cardiac insufficiency") AND Title or Keywords: ("coronary heart disease" OR "coronary atherosclerotic heart disease" OR "ischemic cardiomyopathy" OR "myocardial infarction") AND Title or Keywords: ("Qiliqiangxin") AND Title or Keywords: ("randomized" OR "controlled" OR "clinical" OR "RCT")
VIP	(((((题名或关键词=心衰 OR 题名或关键词=心力衰竭) OR 题名或关键词=心功能不全) AND (((题名或关键词=冠心病 OR 题名或关键词=冠状动脉粥样硬化性心脏病) OR 题名或关键词=缺血性心肌病) OR 题名或关键词=心肌梗死)) AND 题名或关键词=芪苈强心) AND (((题名或关键词=随机 OR 题名或关键词=对照) OR 题名或关键词=临床) OR 题名或关键词=RCT)) (((((Title or Keywords = "heart failure" OR Title or Keywords = "cardiac failure") OR Title or Keywords = "cardiac insufficiency") AND (((Title or Keywords = "coronary heart disease" OR Title or Keywords = "coronary atherosclerotic heart disease") OR Title or Keywords = "ischemic cardiomyopathy") OR Title or Keywords = "myocardial infarction")) AND Title or Keywords = "Qiliqiangxin") AND (((Title or Keywords = "randomized" OR Title or Keywords = "controlled") OR Title or Keywords = "clinical") OR Title or Keywords = "RCT"))
Sinomed	("心衰"[摘要] OR "心力衰竭"[摘要] OR "心功能不全"[摘要]) AND ("冠心病"[摘要] OR "冠状动脉粥样硬化性心脏病"[摘要] OR "缺血性心肌病"[摘要] OR "心肌梗死"[摘要]) AND "芪苈强心"[摘要] AND ("随机"[摘要] OR "对照"[摘要] OR "临床"[摘要] OR "RCT"[摘要]) ("heart failure"[Abstract] OR "cardiac failure"[Abstract] OR "cardiac insufficiency"[Abstract]) AND ("coronary heart disease"[Abstract] OR "coronary atherosclerotic heart disease"[Abstract] OR "ischemic cardiomyopathy"[Abstract] OR "myocardial infarction"[Abstract]) AND "Qiliqiangxin"[Abstract] AND ("randomized"[Abstract] OR "controlled"[Abstract] OR "clinical"[Abstract] OR "RCT"[Abstract])
Pubmed	((((((((((("Heart Failure"[Mesh]) OR (Cardiac Failure[Title/Abstract])) OR (Heart Decompensation[Title/Abstract])) OR (Decompensation, Heart[Title/Abstract])) OR (Congestive Heart Failure[Title/Abstract])) OR (Heart Failure, Congestive[Title/Abstract])) OR (Heart Failure, Right-Sided[Title/Abstract])) OR (Right-Sided Heart Failure[Title/Abstract])) OR (Heart Failure, Left-Sided[Title/Abstract])) OR (Left-Sided Heart Failure[Title/Abstract])) OR (Myocardial Failure[Title/Abstract])) OR (HF[Title/Abstract])) AND (((("Coronary Disease"[Mesh]) OR (((((((Coronary Diseases[Title/Abstract]) OR (Disease, Coronary[Title/Abstract])) OR (Diseases, Coronary[Title/Abstract])) OR (Coronary Heart Disease[Title/Abstract])) OR (Coronary Heart Diseases[Title/Abstract])) OR (Disease, Coronary Heart[Title/Abstract])) OR

	(Diseases, Coronary Heart[Title/Abstract])) OR (Heart Disease, Coronary[Title/Abstract])) OR (Heart Diseases, Coronary[Title/Abstract])) OR ("Myocardial Infarction"[Mesh]) OR (((((((((((Infarction, Myocardial[Title/Abstract]) OR (Infarctions, Myocardial[Title/Abstract])) OR (Myocardial Infarctions[Title/Abstract])) OR (Heart Attack[Title/Abstract])) OR (Heart Attacks[Title/Abstract])) OR (Myocardial Infarct[Title/Abstract])) OR (Infarct, Myocardial[Title/Abstract])) OR (Infarcts, Myocardial[Title/Abstract])) OR (Myocardial Infarcts[Title/Abstract])) OR (Cardiovascular Stroke[Title/Abstract])) OR (Cardiovascular Strokes[Title/Abstract])) OR (Stroke, Cardiovascular[Title/Abstract])) OR (Strokes, Cardiovascular[Title/Abstract])))) AND (((("qiliqiangxin" [Supplementary Concept]) OR (QLQX[Title/Abstract])) OR (qiliqiangxin[Title/Abstract])) OR (qili qiangxin[Title/Abstract])) AND (((("Randomized Controlled Trial" [Publication Type]) OR (randomized clinical trial[Title/Abstract])) OR (random[Title/Abstract])) OR (RCT[Title/Abstract]))))
WOS	#1.TS=(Heart Failure OR Cardiac Failure OR Heart Decompensation OR Decompensation, Heart OR Congestive Heart Failure OR Heart Failure, Congestive OR Heart Failure, Right-Sided OR Right-Sided Heart Failure OR Heart Failure, Left-Sided OR Left-Sided Heart Failure OR Myocardial Failure OR HF) #2.TS=(Coronary Disease OR Disease, Coronary OR Diseases, Coronary OR Coronary Heart Disease OR Coronary Heart Diseases OR Disease, Coronary Heart OR Diseases, Coronary Heart OR Heart Disease, Coronary OR Heart Diseases, Coronary OR Myocardial Infarction OR Infarction, Myocardial OR Infarctions, Myocardial OR Myocardial Infarctions OR Heart Attack OR Heart Attacks OR Myocardial Infarct OR Infarct, Myocardial OR Infarcts, Myocardial OR Myocardial Infarcts OR Cardiovascular Stroke OR Cardiovascular Strokes OR Stroke, Cardiovascular OR Strokes, Cardiovascular) #3.((TS=(qiliqiangxin)) OR TS=(QLQX)) OR TS=(qili qiangxin) #4.(((TS=(randomized controlled trial)) OR TS=(randomized clinical trial)) OR TS=(random)) OR TS=(RCT) #1 AND #2 AND #3 AND #4
Embase	#1 'heart failure'/exp OR 'heart failure':ti,ab,kw OR 'backward failure, heart':ti,ab,kw OR 'cardiac backward failure':ti,ab,kw OR 'cardiac decompensation':ti,ab,kw OR 'cardiac failure':ti,ab,kw OR 'cardiac incompetence':ti,ab,kw OR 'cardiac insufficiency':ti,ab,kw OR 'cardiac stand still':ti,ab,kw OR 'cardial decompensation':ti,ab,kw OR 'cardial insufficiency':ti,ab,kw OR 'chronic heart failure':ti,ab,kw OR 'chronic heart insufficiency':ti,ab,kw OR 'decompensatio cordis':ti,ab,kw OR 'decompensation, heart':ti,ab,kw OR 'heart backward failure':ti,ab,kw OR 'heart decompensation':ti,ab,kw OR 'heart incompetence':ti,ab,kw OR 'heart insufficiency':ti,ab,kw OR 'insufficiencia cordis':ti,ab,kw OR 'myocardial failure':ti,ab,kw OR 'myocardial insufficiency':ti,ab,kw #2 'ischemic heart disease'/exp OR 'coronary artery insufficiency':ti,ab,kw OR 'coronary insufficiency':ti,ab,kw OR 'heart disease, ischaemic':ti,ab,kw OR 'heart disease, ischemic':ti,ab,kw OR 'ischaemia heart disease':ti,ab,kw OR 'ischaemic cardiac disease':ti,ab,kw OR 'ischaemic cardiac disease':ti,ab,kw OR 'ischaemic cardiopathy':ti,ab,kw OR 'ischaemic heart disease':ti,ab,kw OR 'ischaemic heart disease':ti,ab,kw OR 'ischaemic heart disease':ti,ab,kw OR 'ischemic cardiac disease':ti,ab,kw OR 'ischemic cardiopathy':ti,ab,kw #3 'qiliqiangxin'/exp OR 'qiliqiangxin capsule'/exp #4 'randomized controlled trial'/exp OR 'randomized controlled trial':ti,ab,kw OR 'controlled trial, randomized':ti,ab,kw OR 'randomised controlled study':ti,ab,kw OR 'randomised controlled trial':ti,ab,kw OR 'randomized controlled study':ti,ab,kw OR 'trial, randomized controlled':ti,ab,kw #5 #1 AND #2 AND #3 AND #4

Table S3. Detailed adverse events reported in five studies

Adverse Event	Control Group (n)	Experimental Group (n)
Sleep disorders / Somnolence	3	3
Headache and dizziness / Dizziness and headache	10	9
Chest distress with abnormal heartbeat / palpitations	4	5
Lower extremity edema	1	2
Gastrointestinal dysfunction / discomfort	9	6
Constipation	3	1
Rash	2	0
Hypotension	2	4
Mild anemia	1	2
Elevated serum creatinine	2	1
Elevated serum potassium	1	1
Total	38	34

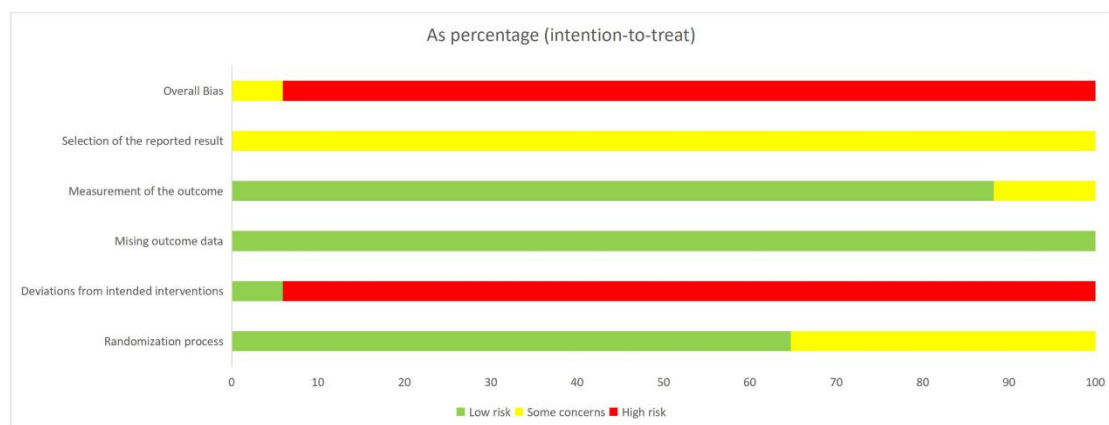


Figure S1. Risk of Bias Assessment

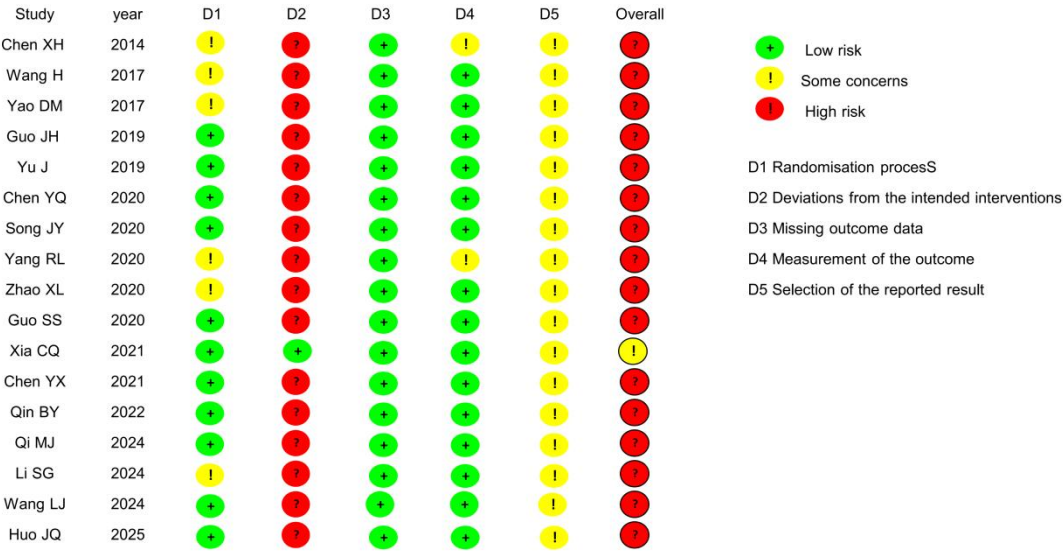


Figure S2. Quality assessment of the included trials

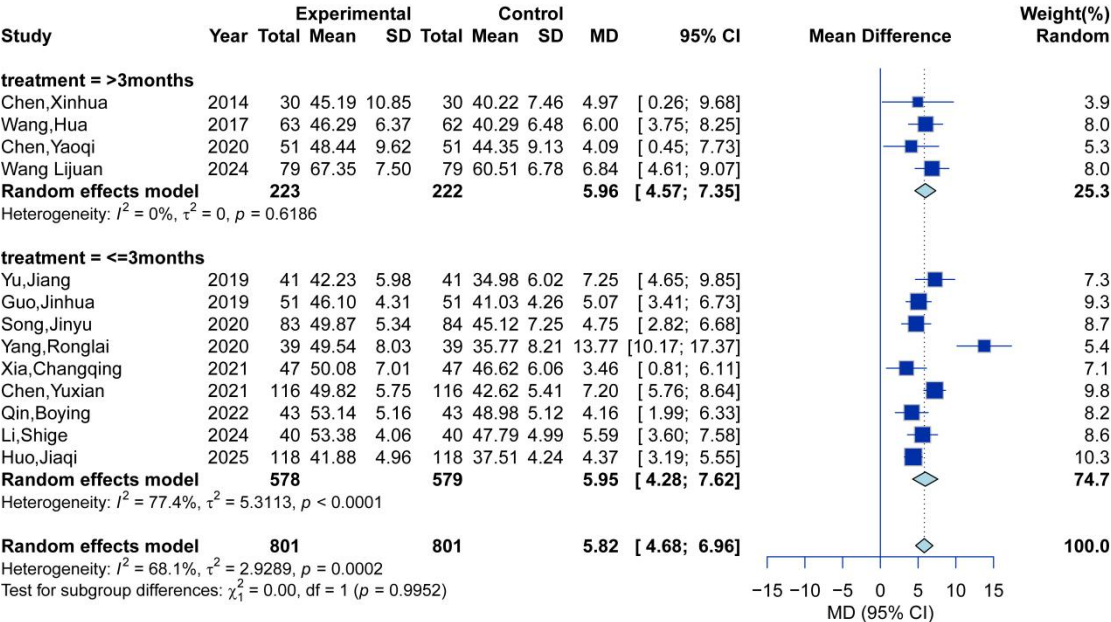


Figure S3. Forest Plot of LVEF Subgroup Analysis

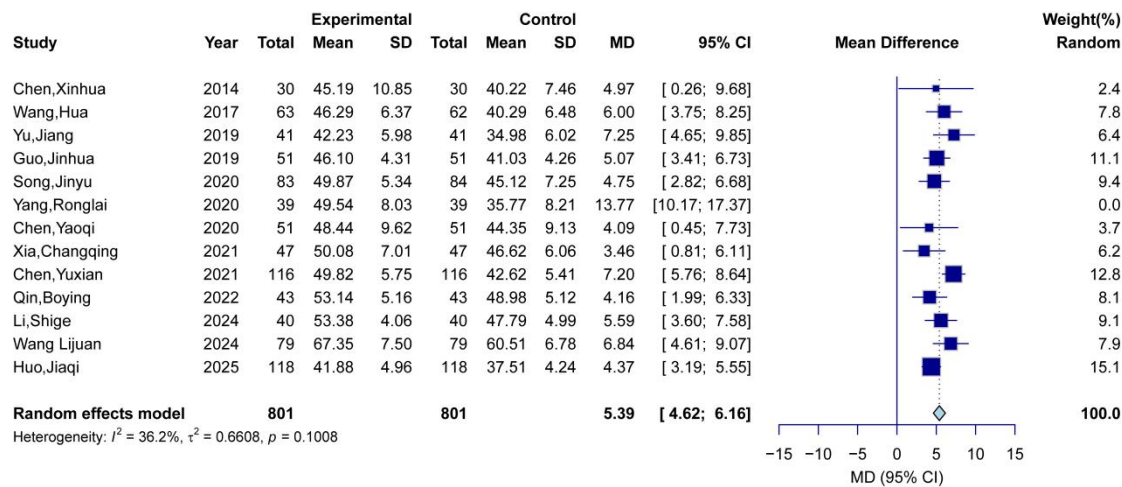


Figure S4. Forest Plot of LVEF Sensitivity Analysis

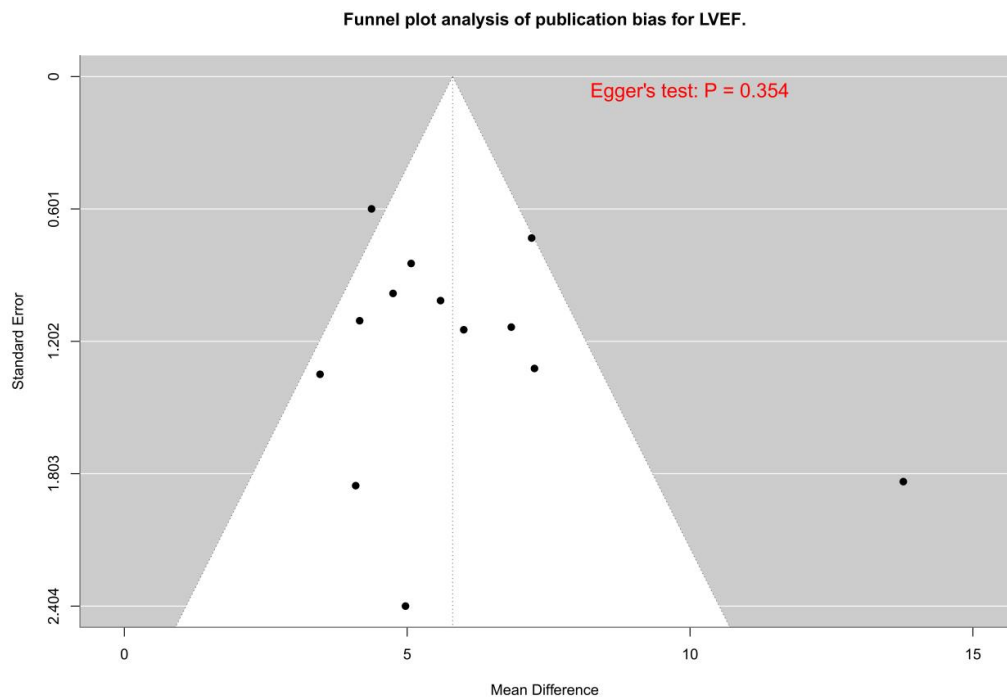


Figure S5. Funnel plot analysis of publication bias for LVEF

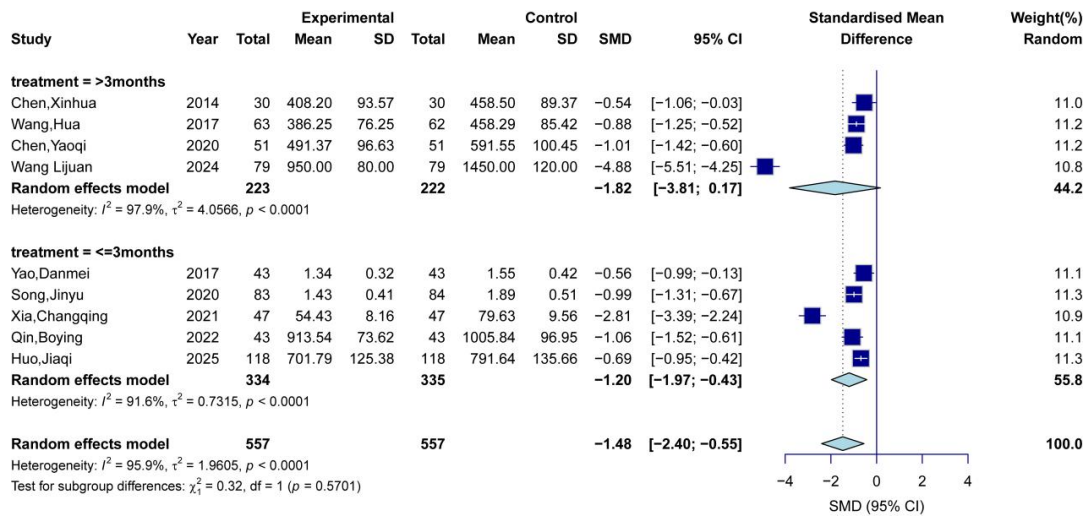


Figure S6. Forest Plot of NT-proBNP Subgroup Analysis

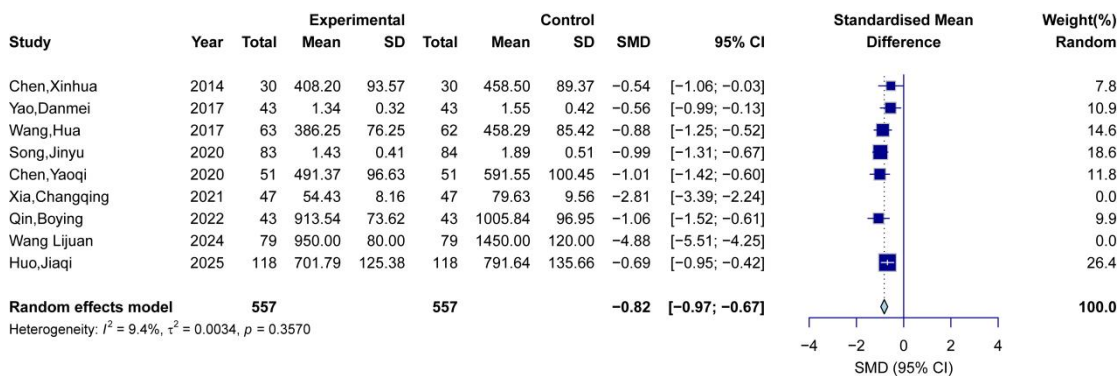


Figure S7. Forest Plot of NT-proBNP Sensitivity Analysis

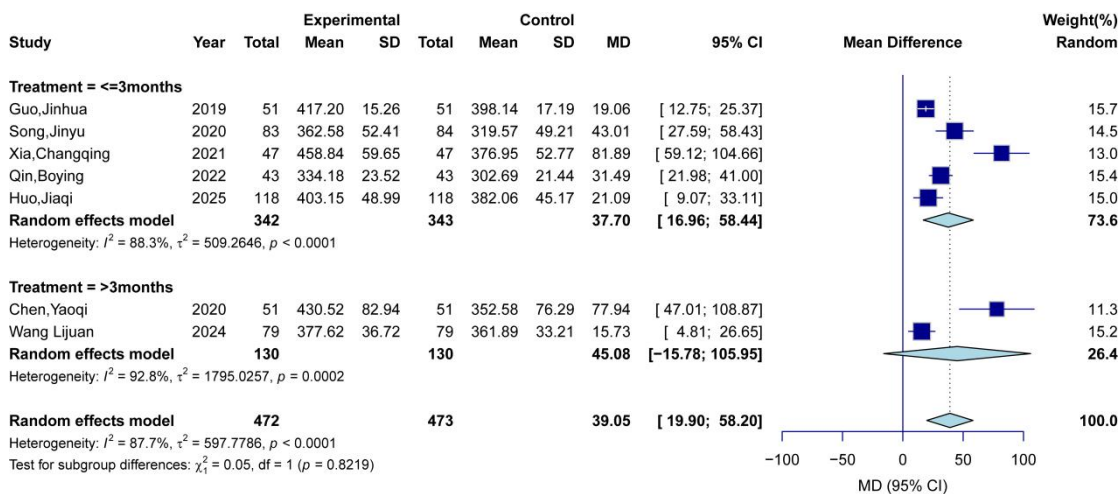


Figure S8. Forest Plot of 6MWD Subgroup Analysis of Treatment

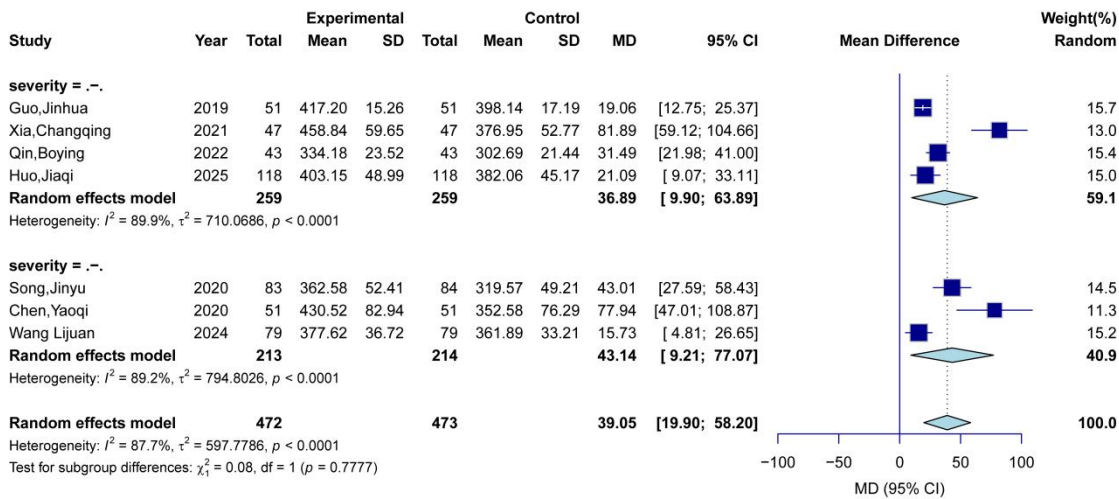


Figure S9. Forest Plot of 6MWD Subgroup Analysis of Class

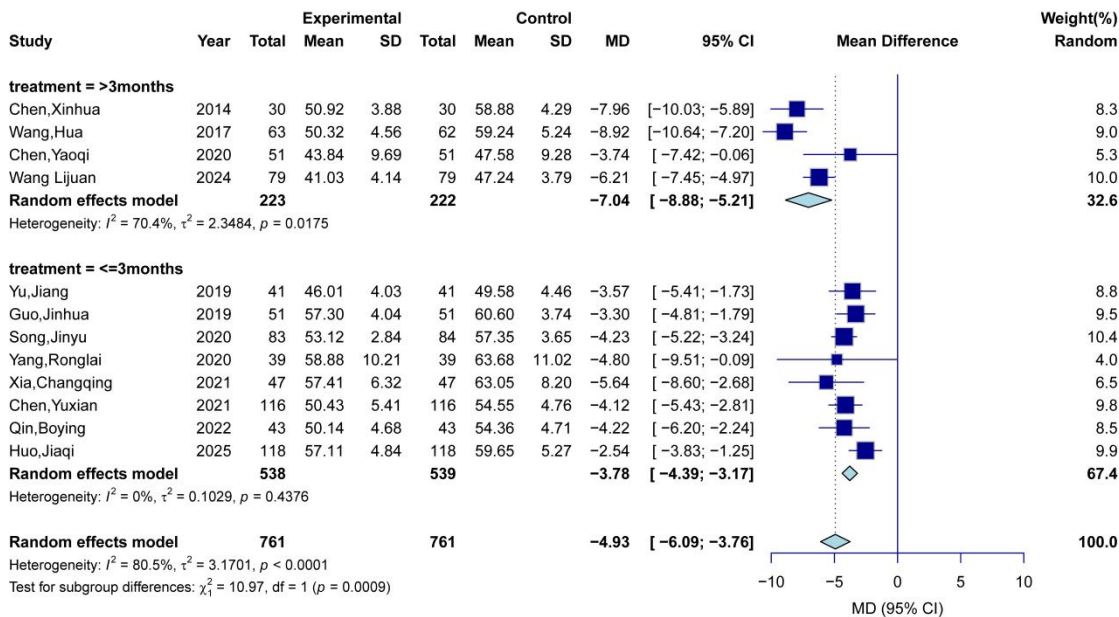


Figure S10. Forest Plot of LVEDD Subgroup Analysis

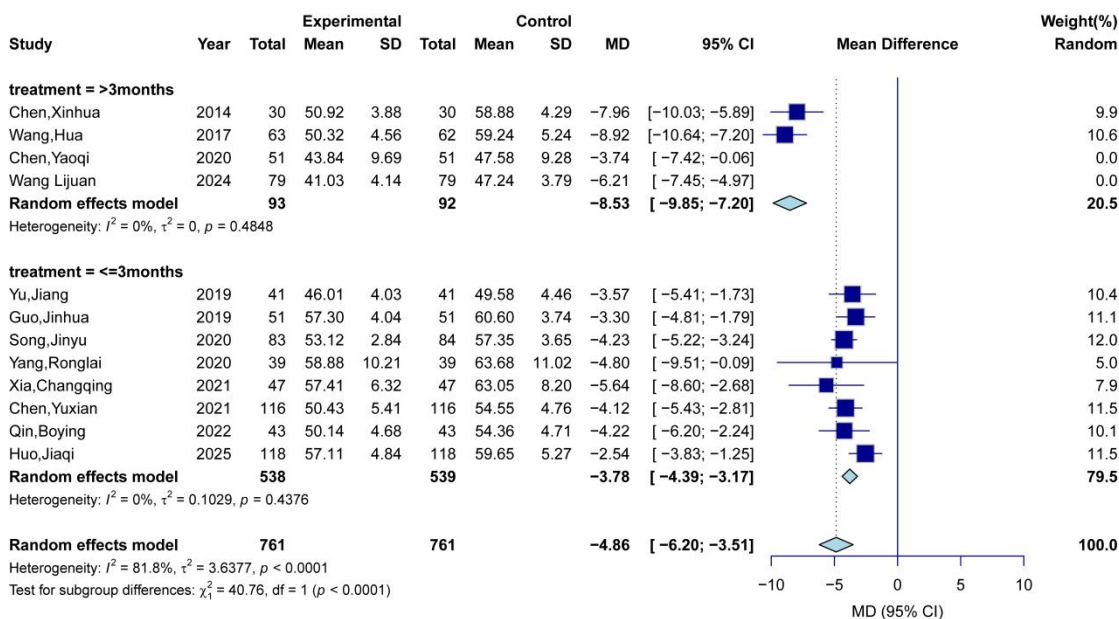


Figure S11. Forest Plot of LVEDD Sensitivity Analysis

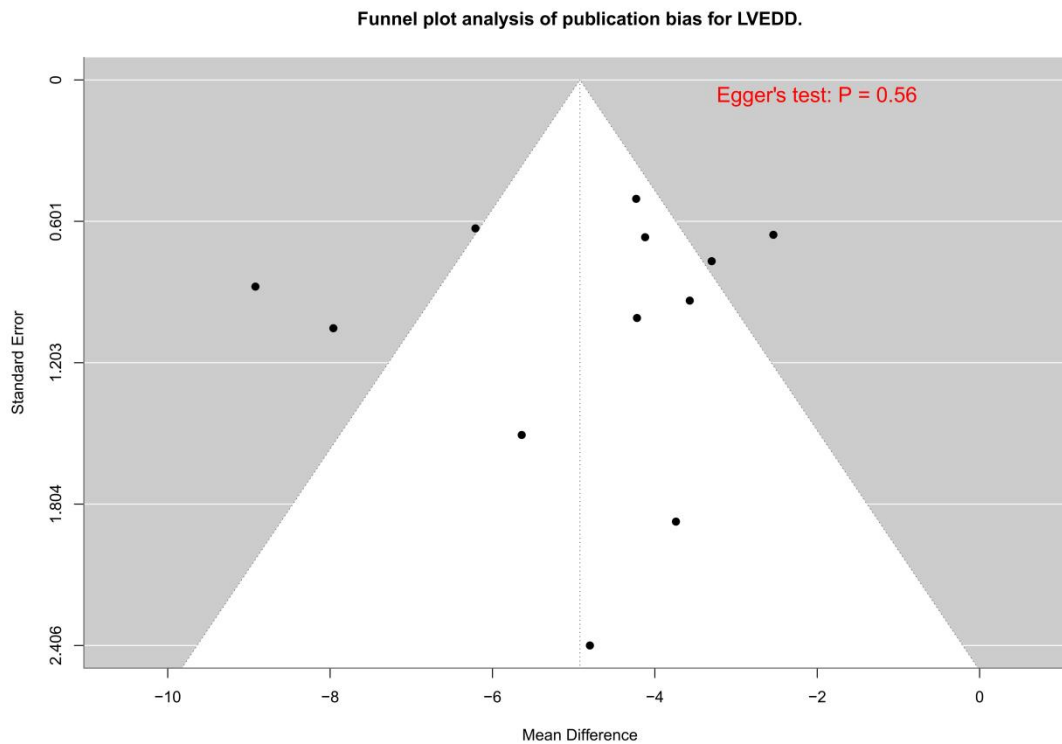


Figure S12. Funnel plot analysis of publication bias for LVEDD

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