INPLASY PROTOCOL

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Corresponding author:
Shi Pu

18580642512@163.com

Author Affiliation:
Department of Nephrology, the Second Affiliated Hospital of Army Medical University.

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None declared.

Effect of different exercise methods for patients with chronic kidney disease: a Bayesian network meta-analysis

Pu, S[1]; Shi, Y[2]; Peng, HM[3]; Huang, X; Li, Y[4]; Zhang, YY[4].

Review question / Objective: **To evaluate and rank the effects of aerobic exercise, resistance exercise and aerobic combined with resistance exercise on delaying the progression of renal function, controlling blood pressure, improving cardiopulmonary endurance and walking ability by network Meta-analysis, so as to provide evidence-based basis for the construction of a precise exercise treatment system for patients with chronic kidney disease.**
Study designs to be included: **Clinical randomized controlled trials (RCTS) of the effects of different exercise modes on adult patients with CKD reported specific descriptions of the type, frequency, intensity, and amount of exercise, and exercise duration was not less than 8 weeks. The search period was from January 2000 to March 2023, with or without blinding, and the language was limited to English or Chinese.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 28 May 2023 and was last updated on 28 May 2023 (registration number INPLASY202350103).

INTRODUCTION

Review question / Objective: **To evaluate and rank the effects of aerobic exercise, resistance exercise and aerobic combined with resistance exercise on delaying the progression of renal function, controlling blood pressure, improving cardiopulmonary endurance and walking ability by network Meta-analysis, so as to provide evidence-based basis for the construction of a precise exercise treatment system for patients with chronic kidney disease.**

Rationale: At present, there is no clear evidence-based exercise guidelines for CKD, but existing studies have confirmed that regular and structured exercise is safe, effective, and feasible for CKD patients. It can reduce cardiometabolic risk factors, nutritional indicators, muscle strength and volume, and quality of life, delay and prevent the progression of kidney disease, and improve the health status of kidney transplant patients. Exercise management has become a great challenge in the prevention and treatment of CKD. According to the "expert consensus on exercise rehabilitation for Adults with Chronic Kidney Disease in China (2019)", an individualized exercise program should be formulated according to the physiological function assessment, basic activity, and their own rehabilitation goals. However, there is no restriction on a specific exercise mode, only the recommended types of exercise for patients with CKD include low to moderate intensity exercise such as aerobic exercise, resistance exercise, and combined exercise, 3-5 times a week for at least 30 minutes each time. Second, there is no consensus on which type of exercise patients benefit the most.

Condition being studied: Chronic kidney disease (CKD) is a disorder of kidney structure and (or) function caused by various reasons. Due to its high prevalence, poor prognosis and high medical costs, CKD has become one of the main causes of death in the world. With the decline of renal function, the physical function of patients is seriously impaired, the quality of life is decreased, and the exercise ability is gradually lost, which is closely related to the accelerated deterioration of renal function and all-cause mortality. At present, there is no clear evidence-based exercise guidelines for CKD, but existing studies have confirmed that regular and structured exercise is safe, effective, and feasible for CKD patients. It can reduce cardiometabolic risk factors, nutritional indicators, muscle strength and volume, and quality of life, delay and prevent the progression of kidney disease, and improve the health status of kidney transplant patients. How to manage exercise has become a great challenge in the prevention and treatment of CKD.

METHODS

Search strategy: Cochrane Library, PubMed, EMBASE, International Clinical Trial Registry Platform (ICTRP), China National Knowledge Infrastructure (CNKI), Wanfang Database and China Biology Medicine Disc (CBM) were searched from January 2000 to March 2023. The English search term is “chronic kidney disease/end stage renal disease”,“exercise/trainng/rehabilitation/physical activit/walk/aerobic exercise/resistance exercise/strength exercise/”,“the progression of renal disease”、“six-minute walk test/six-minute walk distance/walk ability”、“blood pressure/cardiovascular”.

Participant or population: ① Age ≥18 years old; ② Confirmed diagnosis of chronic kidney disease stage 1-5 [GFR<90mL/(min-1.73 m2)].

Intervention: Aerobic, Resistance, and Combined Exercise (Combined Aerobic and resistance Exercise).

Comparator: The patients were treated with conventional nursing measures, placebo or blank control.

Study designs to be included: Clinical randomized controlled trials (RCTS) of the effects of different exercise modes on adult patients with CKD reported specific descriptions of the type, frequency, intensity, and amount of exercise, and exercise duration was not less than 8 weeks. The search period was from January 2000 to March 2023, with or without blinding, and the language was limited to English or Chinese.

Eligibility criteria: Exclusion criteria: ① Non-rcts; ② Conference report; ③ obvious design defects or incomplete data; ⑤ unable to access the full text; ⑥

Inconsistent diagnosis, efficacy, and outcome indicators.

Information sources: Literature screening was performed by first reading the title, and after excluding obviously irrelevant literature, further reading the abstract and full text was performed to determine inclusion. Original study authors were contacted by mail or telephone if necessary to obtain information that was not identified but was important to the study.

Main outcome(s): Outcome measures: ① glomerular filtration rate (GFR) ② six-minute walk distance (6MWT); ③ systolic blood pressure (SBP); ④ Peak oxygen uptake (VO2peak).

Data management: The content of data extraction mainly included: ① the basic information of the included studies, including research title, first author, publication time, etc. ② Baseline characteristics of the subjects, including gender, mean and standard deviation of age; ③ the specific details of intervention measures and follow-up time; ④ Key elements of risk of bias assessment; ⑤ Outcome indicators.

Quality assessment / Risk of bias analysis: The methodological quality was assessed and graded by two researchers according to the RCT quality evaluation criteria recommended by the Cochrane Handbook for Systematic Reviews of Interventions version 5.1.0. The items included 7 items: generation of random sequence, allocation concealment, blinding of participants and researchers, blinding of outcome assessors, completeness of outcome indicators, selective reporting and other biases. The items were rated as "high risk", "low risk" and "unclear".

Strategy of data synthesis: R software combined with gemtc package was used for data analysis, and Stata16.0 software was used to draw the network evidence relationship diagram. Because the outcome measures were continuous variables, mean square deviation (MD) and 95% confidence interval (95%CI) were used as indicators of effect size, and the degree of heterogeneity was determined. Bayesian random effects model was used to compare the direct and indirect evidence of the included studies. For each specific parameter, the posterior distribution was calculated by placing a relatively appropriate Markov chain in the prior distribution. The convergence degree of the model was diagnosed by calculating the potential scale reduction factor (PSRF), and the PSRF value tended to 1 indicated that the model convergence was satisfactory. The consistency between direct comparison and indirect comparison was tested by node cut method, when P< A value of 0.05 was considered as significant inconsistency. In addition, the surface under the cumulative ranking concept map (SUCRA) was used to reflect the possibility of each intervention being the best intervention, and the value ranged from 0 to 1[18]. Subgroup analysis was performed according to the duration of the intervention.

Subgroup analysis: Considering the effect of intervention time on the outcome indicators, the study defined the duration of intervention as 8≧T≦12 weeks, 12> Subgroup analysis was performed with T < 24 weeks and T≧24 weeks.

Sensitivity analysis: No sensitivity analyses were performed.

Language restriction: Chinese or English.

Country(ies) involved: China.

Keywords: Chronic kidney disease; Exercise; Bayesian theory; Network meta-analysis; Evidence-based nursing.

Contributions of each author:

Author 1 - Shi Pu - Author 1 drafted the manuscript.
Email: ps18375751505@163.com
Author 2 - Yu Shi - The author provided statistical expertise.

Email: 18580642512@163.com
Author 3 - Hongmei Peng - The author contributed to the development of the selection criteria, and the risk of bias assessment strategy.
Email: wabbmm1212@sina.com
Author 4 - Xia Huang - The author read, provided feedback and approved the final manuscript.
Email: 1054884102@qq.com
Author 5 - Yang Li.
Email: 283827686@qq.com
Author 6 - Youying Zhang - The author read, provided feedback and approved the final manuscript.
Email: zhangyouying1990@sina.com