

INPLASY PROTOCOL

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The Relationship Between Exercise and FGF21 in Adults–Meta Analysis and system review

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Review question / Objective: Fibroblast growth factor 21(FGF21) is a crucial factor on human's health, especially who has overweight, or metabolic disorder. Exercise is an important pattern of health in whole life. The aim of this study was quantify circulating FGF21 changes after chronic/long time exercise. The PubMed, web of Science, Cochrane Library and CNKI databases were searched up to February 2022 for studies published in English and Chinese journals. Studies that evaluated the effects of long time exercise on FGF-21 concentrations after 48 h in adult were included. Fixed effects models were used for analyses, with data reported as standardized mean difference(SMD) and 95% confidence intervals(95%CI) were calculated to determine the pooled effect size of different exercise patterns on FGF21, and the risk of heterogeneity was evaluated. A total of 15 groups data form 10 studies involving 700 participants were identified. Overall, the pooled effect size was -38.54 (95%CI=-91.84,-17.68) comparing exercise to sedentary. Moreover, intervention duration, exercise modality, and duration did not significantly modify the effect of exercise on FGF21.It is concluded that compared with sedentary or slight activities, exercise has obviously effect on FGF21 in adults.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 17 September 2022 and was last updated on 17 September 2022 (registration number INPLASY202290080).

INTRODUCTION

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Condition being studied: Fibroblast growth factor 21(FGF-21) is a subgroup member of FGF superfamily that is proved in the regulation of energy homeostasis, glucose and lipid metabolism, and insulin sensitivity. It was regarded as a potential clinical medicine to improve the obesity and relevance diseases, even cure those. exercise is a health life style among people, like health or matabolism disorder, which is have one reason relavent with FGF21, However, there were studies find exercise can change the concentration of body, but some have different effects, we want to assess the exactly effect in FGF21 on human.

METHODS

Search strategy: According to the words of (FGF21) AND (exercise, training OR physical activity) searched up full text in The PubMed, Web of Science, Cochrane Library and CINK databases were searched up to Fevruary 2022 for English and Chinese language articles. The titles and abstracts were reviewed by two authors, Initially, studies that were clearly not relevant and repetition were removed before analysis all titles and abstracts using pre-protocol inclusion and exclusion

criteria. Then, three authors independently reviewed the full text of potentially eligible papers, If the three reviewers could not reach a conclusive decision, the ambiguity was resolved by a discussion with a fourth reviewer.

Participant or population: The population include overweight, fat, type 2 diabetes, postmenopausal women, sedentary health or fat participants, and NAFLD, moreover, younger and older people among the people were included.

Intervention: The intervention is exercise, and include the type of resistance training, aerobic training, combined training, SIT and HIIT.

Comparator: The compare intervention between different exercises model and sedentary people or light activity.

Study designs to be included: The main study design is randomized controlled trail(RCT) in data analysis.

Eligibility criteria: The inclusion criteria for this article was as follows:(1) English and Chinese language peer-reviewed publication; (2) Human subject, regardless of age, gender, fitness level, and health status(normal weigh, overweight, obese, or diabetes); (3) Measurement of FGF21 in serum or plasma; (4) Comparison between post- and pre-exercise concentrations; (5) Randomized or non-randomized controlled trials; (6) Standardized exercise protocol(endurance, resistance, combined exercise, and interval exercise) with controlled intensity, timing, and duration. (7) FGF21 concentration measured both at baseline and after exercise. The exclusion criteria were as follows: (1) Conference proceedings, published abstracts, dissertations; (2) Animal studies; (3) Uncontrolled and cross-sectional studies; (4) Studies in language other than English and Chinese were excluded as well.

Information sources: Pubmed, Web of science , Cochrane Library and CINK.

Main outcome(s): After a chronic exercise intervention, the concentration of FGF21 were reduced in population significantly.

Quality assessment / Risk of bias analysis: Two reviewers independently assessed the risk of bias of studies that met the inclusion criteria. Using Review Manager 5.3 software (Cochrane Collaboration, UK), and ambiguous regarding the methodological quality were resolved by discussion. The quality assessment was performed according to the Cochrane criteria, including selection bias, performance bias, detection bias, attrition bias, reporting bias, and other potential biases, which were categorized into three grades: low risk, unclear risk and high risk.

Strategy of data synthesis: Statistical analysis was performed using Review Manager 5.3. (The Nordic Cochrane Centre, Copenhagen, Denmark) with means, standard deviations (SD), and sample size of extracted data were input to the statistic software. Extracted variables were converted to the same unit and mean differences (MDs) were compared between the intervention and control group (light physical activity or sedentary). Analyses were according to the concentration of FGF21 among the exercise and the subgroup of different model (e.g., aerobic vs. control; resistance vs. control; and combined exercise vs. control). All of the analyses, I² statistics were used to analyze heterogeneity between studies. A random effect model was used if I² >50% or fixed effect model.

Subgroup analysis: No subgroup analysis.

Sensitivity analysis: After the data analysis, and I² >50%, we use the one-by-one eliminate article method to assess the heterogeneity.

Country(ies) involved: China.

Keywords: Chronic exercise; Metabolism; FGF21; Health.

Contributions of each author:

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