

The Effect of Exercise on Drug Craving in Methamphetamine Addicts: a Systematic Evaluation and Meta-Analysis

INPLASY2024120076

doi: 10.37766/inplasy2024.12.0076

Received: 18 December 2024

Published: 18 December 2024

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ADMINISTRATIVE INFORMATION

Support - Collaborative Governance of Multiple Subjects in the Community to Promote the Social Rehabilitation of Adult Drug Users in the Context of Body-Medicine Integration.(grant number::22BTY064).

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - We declare that we have no financial and personal relationships with other people or organizations that can inappropriately influence our work.All authors disclosed no relevant relationships.No conflict of interest.

INPLASY registration number: INPLASY2024120076

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 18 December 2024 and was last updated on 18 December 2024.

INTRODUCTION

Review question / Objective Existing studies have focused on the effects of a single form of exercise on addictive substances and lack comprehensive comparative analyses of the effects of different forms of exercise, intensity, and duration of intervention on methamphetamine addiction withdrawal. Based on this, this inquiry paper will use meta-analysis to collate the latest literature on physical activity and MUD drug craving. It will explore the improvement effect of exercise on drug craving in methamphetamine quitters under different dose effects and its mechanism to carry out, hoping to provide theoretical guidance for exercise to promote physical and mental rehabilitation of MUD and its drug abstinence.

Rationale Methamphetamine (MA), a central amphetamine-type stimulant, is relatively low-cost and highly addictive, making it the most heavily used synthetic illicit stimulant globally.The 2019 United Nations World Drug Report states that 35 million people globally have a substance abuse problem, with only 1 in 7 receiving treatment, and that of the 531,000 new drug abusers 73.2% abused methamphetamine-type substances. In addition, the 2015-2019 U.S. cross-sectional study showed an increase in methamphetamine use and a rising trend in overdose deaths due to MUDs and psychostimulants.

Condition being studied Methamphetamine (MA), a central amphetamine-type stimulant, is relatively low-cost and highly addictive, making it the most heavily used synthetic illicit stimulant globally.The 2019 United Nations World Drug Report states that

35 million people globally have a substance abuse problem, with only 1 in 7 receiving treatment, and that of the 531,000 new drug abusers 73.2% abused methamphetamine-type substances. In addition, the 2015-2019 U.S. cross-sectional study showed an increase in methamphetamine use and a rising trend in overdose deaths due to MUDs and psychostimulants. Compared with psychological and pharmacological treatments, exercise promotes patients' recovery mainly by improving the physiological, psychological and spiritual functions of the individual. Numerous studies have also confirmed the close relationship between exercise and MA withdrawal, and the degree of drug craving in patients shows a significant decrease after exercise intervention in MA withdrawal. Based on this, this exploratory paper will use meta-analysis to collate the latest literature on physical activity and MUD drug craving. It will explore the ameliorative effect of exercise under different dose effects on drug craving of methamphetamine quitters and its mechanism of action, hoping to provide theoretical guidance for exercise to promote physical and mental rehabilitation of MUD and its drug withdrawal.

METHODS

Search strategy 1.1 Literature search strategy

The two researchers used PubMed, Web of Science, China Knowledge Network (CNKI), and Wikipedia databases to search for the following Chinese subject terms based on the PICOS principle: methamphetamine, people with methamphetamine use disorders, addiction, drug cravings, drug dependence, physical activity, and exercise interventions, etc. The search was also carried out by adopting a 'subject + free word' search. The period of searching literature was from 1st January 2000 to 1st January 2025.

Participant or population 1) the subjects were people with methamphetamine use disorders.

Intervention The experimental group had a rigorous exercise prescription design, with the intervention being various types of physical activity, including various types of play activities, sports activities, exercise activities, and physical fitness activities, etc., whereas the control group could be daily activities or no intervention; the exercise prescription design followed the American College of Sports Medicine (ACSM) standards; the experimental study design was based on the PICOS principles and model; and 5) the experimental study design was based on the ACSM standards.

Comparator Control group can be daily activities or no intervention.

Study designs to be included The inclusion criteria for the literature were: 1) the study subjects were people with methamphetamine use disorder; 2) the experimental group had a rigorous exercise prescription design, and the intervention was various types of physical activities, including various types of play activities, sports activities, exercise activities, and physical fitness activities, etc., while the control group could be daily activities or no intervention; 3) the exercise prescription design followed the standards of the American College of Sports Medicine (ACSM).

Eligibility criteria The screening, inclusion, and exclusion criteria for the literature were developed based on the PICOS principles and model.

Literature inclusion criteria were: 1) the study population was people with methamphetamine use disorders; 2) the experimental group had a rigorous exercise prescription design, with the intervention being various types of physical activity, including various types of play activities, sports activities, exercise activities, and physical fitness activities, etc., whereas the control group could be daily activities or no intervention; 3) the exercise prescription design followed the standards of the American College of Sports Medicine (ACSM) 4) The experimental study design needs to be a randomised controlled (RCT) experimental study. 5) The evaluation indicators mainly include drug craving and drug dependence in people with methamphetamine use disorders.

Literature exclusion criteria were: 1) non-English or non-Chinese literature; 2) non-experimental studies and studies with no pre- and post-tests for the control group; 3) literature unrelated to exercise prescription, MUD, MA craving, and MA dependence; and 4) reviews, dissertations, conference papers, qualitative studies, and literature with unavailable research data.

Information sources The two researchers used databases such as PubMed, Web of Science, China Knowledge Network (CNKI) and Wikipedia.

Main outcome(s) Evaluation indicators include, among other things, drug craving and drug dependence in people with methamphetamine use disorders.

Quality assessment / Risk of bias analysis The quality of the included studies was assessed using the Cochrane Risk of Bias Assessment tool for systematic evaluation.

Strategy of data synthesis Review Manager 5.4 software was used to analyse the outcome indicators of the eight included papers. The results of this study were all continuous variables and the outcome indicators were tested using different tools such as VNS and DSQ, the higher the value the stronger the level of drug craving. Therefore, standardised mean difference (SMD) was used to calculate the effect size, with 95% confidence interval, $P \leq 0.05$ was considered statistically significant.

Subgroup analysis 2.2.1 Subgroup analyses of the effect of exercise on drug craving among methamphetamine addicts of different genders

2.2.2 Subgroup analysis of the effect of different types of exercise on drug craving among methamphetamine addicts.

Sensitivity analysis Sensitivity analysis was conducted on the 11 included papers, taking the route of excluding single papers one by one, changing the analysis method, and then re-examining the size and change of the effect size, and the results now show that the exclusion of single studies did not affect the outcome indicators too much, indicating that the results of the Meta-analysis of this study have a certain degree of credibility.

Country(ies) involved China.

Keywords Exercise; methamphetamine; people with methamphetamine use disorders; drug cravings.

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