Clinical Trial Protocol
Iranian Registry of Clinical Trials

25 Jun 2026

Effects of upper and lower body resistance training on plasma levels of NADPH oxidase, CD25, TNF-α, NO, and blood pressure in hypertensive men

Protocol summary

Study aim

Investigate the effect of upper and lower body resistance training on plasma levels of NOX, CD25, TNF-α and NO, systolic, diastolic, and mean arterial blood pressure

Design

According to the call for information in this city (hospitals, pharmacies, and health centers), volunteers first register and then subjects selected purposefully based on inclusion criteria, and randomly divided into three groups of upper and lower body resistance training along with the control.

Settings and conduct

The subjects attended the briefing meeting and became acquainted with resistance training and one repetition maximum (1RM). They then took part in two separate sessions at the gym and 1RM of target muscle groups including upper body exercise (bench press, triceps extension, and lat pull down) and lower body exercise (leg press, leg extensions, and leg curl) was measured. To determine the 1RM of target muscle groups, 5 to 10 minutes of general warm-up were initially performed, including stretching and kinetic movements. Then, the subjects participated in the 1RM test of target muscle groups using bodybuilding machines.

Participants/Inclusion and exclusion criteria

The criteria for including the subjects were primary hypertension; absence of heart disease which prevented exercise; and absence of diabetes. Also, they had no history of performing regular exercise in the six months leading up to the study, and their systolic blood pressure ranged from 140-159 mm Hg and diastolic blood pressure lied within the range of 90-99 mm Hg .

Intervention groups

Three groups of upper body resistance training, lower body resistance training along with the control

Main outcome variables

NOX; CD25; TNF-α; NO; systolic, diastolic, and mean arterial blood pressure

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20181107041589N1**
Registration date: **2018-11-26, 1397/09/05**
Registration timing: **retrospective**

Last update: **2018-11-26, 1397/09/05**
Update count: **0**

Registration date

2018-11-26, 1397/09/05

Registrant information

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Marziyeh Saghebjoo
Name of organization / entity
University of Birjand
Country
Iran (Islamic Republic of)
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Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2017-06-10, 1396/03/20

Expected recruitment end date

2017-08-11, 1396/05/20

Actual recruitment start date

2017-06-10, 1396/03/20

Actual recruitment end date

2017-08-11, 1396/05/20

Trial completion date

2017-08-11, 1396/05/20

Scientific title

Effects of upper and lower body resistance training on plasma levels of NADPH oxidase, CD25, TNF-α, NO, and blood pressure in hypertensive men

Public title

Effects of upper and lower body resistance training on hypertension

Purpose

Treatment

Inclusion/Exclusion criteria

Inclusion criteria:

The criteria for including the subjects were primary hypertension, absence of heart disease which prevented exercise, and absence of diabetes. They had no history of performing regular exercise in the six months leading up to the study Their systolic blood pressure ranged from 140-159 mm Hg and diastolic blood pressure lied within the range of 90-99 mm Hg

Exclusion criteria:

Participation in exercise training programs other than the exercise training program of the present study

Age

From **40 years** old to **70 years** old

Gender

Male

Phase

N/A

Groups that have been masked

- Participant

Sample size

Target sample size: **40**

Actual sample size reached: **37**

Randomization (investigator's opinion)

Randomized

Randomization description

Samples randomization were done by table of random numbers.

Blinding (investigator's opinion)

Single blinded

Blinding description

The study participants were unaware of the difference in training between groups.

Placebo

Not used

Assignment

Factorial

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

Ethics committee of Birjand University of Medical Sciences

Street address

Pardis campus, University of Birjand, Avini Blvd

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Postal code

9717434765

Approval date

2017-05-22, 1396/03/01

Ethics committee reference number

IR.BUMS.REC.1396.56

Health conditions studied

1

Description of health condition studied

Hypertension

ICD-10 code

I10

ICD-10 code description

Essential (primary) hypertension

Primary outcomes

1

Description

Systolic blood pressure

Timepoint

Before and 4 weeks after exercise training

Method of measurement

Blood pressure meter

2

Description

Diastolic blood preesure

Timepoint

Before and 4 weeks after exercise training

Method of measurement

Blood pressure meter

3

Description

Mean arterial blood pressure

Timepoint

Before and 4 weeks after exercise training

Method of measurement

Formula

4

Description

NADPH oxidase

Timepoint
Before and 4 weeks after exercise training
Method of measurement
Research kit

5

Description
TNF-α
Timepoint
Before and 4 weeks after exercise training
Method of measurement
Research kit

6

Description
Nitric oxide
Timepoint
Before and 4 weeks after exercise training
Method of measurement
Research kit

7

Description
CD25
Timepoint
Before and 4 weeks after exercise training
Method of measurement
Research kit

Secondary outcomes

empty

Intervention groups

1

Description
Intervention group: Upper body resistance training: The resistance training program (bench press, triceps extension, and lat pull down) included four weeks (65-75% 1RM) and four sessions per week (60 minutes per session).
Category
Treatment - Other

2

Description
Intervention group: Lower body resistance training: The resistance training program (leg press, leg extensions, and leg curl) included four weeks (65-75% 1RM) and four sessions per week (60 minutes per session).
Category
Treatment - Other

3

Description
Control group: The control group did not receive any intervention and maintained a normal diet during the study.
Category
N/A

Recruitment centers

1

Recruitment center
Name of recruitment center
University of Birjand
Full name of responsible person
Marziyeh Saghebjoo
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Sponsors / Funding sources

1

Sponsor
Name of organization / entity
Deputy of Research and Technology, University of Birjand
Full name of responsible person
Dr Hamid Reza Najafi
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Grant name
Deputy of Research and Technology, University of Birjand
Grant code / Reference number
Is the source of funding the same sponsor organization/entity?
Yes
Title of funding source
Deputy of Research and Technology, University of

Birjand

Proportion provided by this source
10

Public or private sector
Public

Domestic or foreign origin
Domestic

Category of foreign source of funding
empty

Country of origin

Type of organization providing the funding
Academic

Person responsible for general inquiries

Contact

Name of organization / entity
University of Birjand

Full name of responsible person
Marziyeh Saghebjoo

Position
Associate professor

Latest degree
Ph.D.

Other areas of specialty/work
Exercise Physiology

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Sharing plan

Deidentified Individual Participant Data Set (IPD)
Undecided - It is not yet known if there will be a plan to make this available

Study Protocol
Yes - There is a plan to make this available

Statistical Analysis Plan
Not applicable

Informed Consent Form
Undecided - It is not yet known if there will be a plan to make this available

Clinical Study Report
Not applicable

Analytic Code
Not applicable

Data Dictionary
Not applicable

Title and more details about the data/document
The results of the study will be shared in the form of the printed article.

When the data will become available and for how long
Since 2019

To whom data/document is available
Public access to the results

Under which criteria data/document could be used
For use in controlling hypertension as a complementary

treatment method under the supervision of a physician and a exercise physiologist

From where data/document is obtainable

Send email to corresponding author

What processes are involved for a request to access data/document

Send email to corresponding author

Comments