Clinical Trial Protocol
Iranian Registry of Clinical Trials

17 Sep 2026

Association between exposure to Trihalomethanes (THMs) in chlorinated and ozone/chlorinated swimming pools and metabolome-wide

Protocol summary

Study aim
Association between exposure to Trihalomethanes (THMs) in chlorinated and ozone/chlorinated swimming pools and metabolome-wide in swimmers

Design
This study is a randomized, single blinded, parallel design clinical trial, with two intervention groups (Swimmers in chlorinated and Ozone/chlorinated swimming pools).

Settings and conduct
This study is at the filed of environmental risk factors and it will be conducted at swimming pools of Tehran city. After obtaining an informed written consent, volunteers are randomly divided into two groups of 29 (58 totally), in which the level of exposure of individuals with Trihalomethanes (THMs) in two types of swimming pools (1) chlorinated (intervention group) and (2) Ozone/chlorinated (control group) (In parallel) as well as the metabolome wide of individuals before and after swimming will be measured. Participants are asked to swim in the pool for 40 minutes. In this study, in order to assess the exposure of participants in each swimming pool, the THMs in indoor air of swimming pools and the THMs in the alveolar air of participants before and after swimming are measured. Also, the main outcome of this study, metabolome levels and changes, will be investigated through their blood samples. All investigators of study outcomes (blood and alveolar air), will be unaware of the allocations.

Participants/Inclusion and exclusion criteria
Inclusion criteria: Young subjects(18- 40 year) and Healthy. Exclusion criteria: Smokers, Alcoholic, and professional swimmers.

Intervention groups
intervention group1: Participants in the first group will be asked once to swim in chlorinated swimming pool for 40 minutes. intervention group 2: Participants in the second group will be asked once to to swim in ozone/chlorinated swimming pool for 40 minutes.

Main outcome variables
Levels of metabolome.

General information

Reason for update

Acronym

IRCT registration information
IRCT registration number: **IRCT20190515043594N1**
Registration date: **2019-10-28, 1398/08/06**
Registration timing: **registered_while_recruiting**

Last update: **2019-10-28, 1398/08/06**
Update count: **0**

Registration date
2019-10-28, 1398/08/06

Registrant information

Name
Ahmad jonidi jafari

Name of organization / entity

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Iran (Islamic Republic of)

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Recruitment status
Recruitment complete

Funding source

Expected recruitment start date
2019-09-06, 1398/06/15

Expected recruitment end date
2021-03-06, 1399/12/16

Actual recruitment start date
empty

Actual recruitment end date
empty

Trial completion date
empty

Scientific title
Association between exposure to Trihalomethanes (THMs) in chlorinated and ozone/chlorinated swimming pools and metabolome-wide

Public title
Investigation the health effects of exposure to Trihalomethanes (THMs) in swimming pools
Purpose
Basic scienece
Inclusion/Exclusion criteria
Inclusion criteria:
Young adults (18-40 years) Healthy
Exclusion criteria:
Smoker Alcoholic Professional swimmers
Age
From **18 years** old to **40 years** old
Gender
Both

Phase
3
Groups that have been masked

- Investigator
- Outcome assessor
- Data analyser

Sample size
Target sample size: **58**
Randomization (investigator's opinion)
Randomized
Randomization description
In order to random allocation of individuals in two groups, the permuted block randomization by using the web based software (www.sealedenvelope.com) will be applied. It should be noted that the length of blocks will be 4.
Blinding (investigator's opinion)
Single blinded
Blinding description
All investigators of study outcomes (blood and alveolar air), will be unaware of the allocations. Also, when the statistical model of the primary and secondary results is not complete, the randomization code will not be broken.
Placebo
Not used
Assignment
Parallel
Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee
Name of ethics committee
Ethics committee of Iran University of Medical Sciences
Street address
Iran University of Medical Sciences, Besides Milad Tower, Hemmat Highway.
City
Tehran
Province
Tehran
Postal code
1449614535
Approval date
2019-06-16, 1398/03/26
Ethics committee reference number
IR.IUMS.REC.1398.320

Health conditions studied

1

Description of health condition studied
The effects of chlorination and ozonation swimming pools (exposure to THMs) on metabolome profile levels
ICD-10 code
ICD-10 code description

Primary outcomes

1

Description
Metabolome profile levels. The metabolome represents the complete set of molecule/metabolites in a biological cell, tissue, organ or organism, which are the end products of cellular processes.
Timepoint
At this study, the biological samples (blood) of swimmers before and 15 minuets after swimming will be collected.
Method of measurement
High- Nuclear Magnetic Resonance spectroscopy (H-NMR).

Secondary outcomes

empty

Intervention groups

1

Description
Intervention group 1: Participants in the first group will be asked once to swim in chlorinated swimming pool for 40 minutes.
Category
Lifestyle

2

Description
Intervention group 2: Participants in the second group will be asked once to swim in Ozone/ chlorinated

swimming pool for 40 minutes.

Category

Lifestyle

Recruitment centers

1

Recruitment center

Name of recruitment center

Hejab Swimming Pool

Full name of responsible person

Ali Heidari

Street address

Hijab Street, Keshavarz Boulevard.

City

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2

Recruitment center

Name of recruitment center

Koosar Swimming Pool

Full name of responsible person

Mansour Faridi

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Sponsors / Funding sources

1

Sponsor

Name of organization / entity

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Full name of responsible person

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Grant name

Grant code / Reference number

Is the source of funding the same sponsor organization/entity?

Yes

Title of funding source

Iran University of Medical Sciences

Proportion provided by this source

45

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

2

Sponsor

Name of organization / entity

Iran National Science Foundation

Full name of responsible person

Dr. Iman Eftekhari

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No. 33, 5th Alley, North Karegar Avenue.

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Email

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Grant name

Grant code / Reference number

Is the source of funding the same sponsor organization/entity?

Yes

Title of funding source

Iran National Science Foundation

Proportion provided by this source

55

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
Iran University of Medical Sciences
Full name of responsible person
Ahmad Jonidi Jafari
Position
Professor
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Person responsible for updating data

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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
Undecided - It is not yet known if there will be a plan to make this available
Statistical Analysis Plan
Undecided - It is not yet known if there will be a plan to make this available
Informed Consent Form
Undecided - It is not yet known if there will be a plan to make this available
Clinical Study Report
Undecided - It is not yet known if there will be a plan to make this available
Analytic Code
Undecided - It is not yet known if there will be a plan to make this available
Data Dictionary
Undecided - It is not yet known if there will be a plan to make this available