Clinical Trial Protocol
Iranian Registry of Clinical Trials

07 Nov 2026

Comparison of the Efficacy of Artificial Intelligence in the Role of Teaching Assistant with Traditional Method in Teaching Electrocardiography Interpretation in the Physiology Laboratory of Medical Students: Assessment of Learning and Satisfaction

Protocol summary

Study aim

To compare the efficacy of artificial intelligence as a teaching assistant with the traditional method in teaching electrocardiography interpretation to medical students in the physiology laboratory on learning, satisfaction, and self-confidence.

Design

Quasi-experimental educational trial with control group, parallel groups, randomized, pretest and posttest, on 70 students (35 per group). Randomization using a random number table. Blinding was not performed.

Settings and conduct

The study is conducted in the physiology laboratory of the medical school at Iran University of Medical Sciences. After a shared theoretical course, participants are allocated to two parallel groups. The intervention group interacts with artificial intelligence, and the control group interacts with a physiology resident. Outcomes are measured using pretest, posttest, and a researcher-made questionnaire.

Participants/Inclusion and exclusion criteria

Medical students in the basic sciences stage who have the cardiac physiology and electrocardiography course; willingness to participate voluntarily and signing the informed consent form; access to the internet and a suitable device for the intervention group. Exclusion: history of previous participation in advanced courses on electrocardiography interpretation; unwillingness to continue cooperation.

Intervention groups

Intervention group: using an artificial intelligence chatbot based on a large language model (such as ChatGPT) as a teaching assistant to answer questions. Control group: asking questions from a physiology resident using the traditional method.

Main outcome variables

Learning of electrocardiography interpretation; satisfaction; self-confidence.

General information

Reason for update

Acronym

AITA-ECG

IRCT registration information

IRCT registration number: **IRCT20260919071102N1**

Registration date: **2026-09-19, 1405/06/28**

Registration timing: **prospective**

Last update: **2026-09-19, 1405/06/28**

Update count: **0**

Registration date

2026-09-19, 1405/06/28

Registrant information

Name

Ali mohammadkhanizadeh

Name of organization / entity

Country

Iran (Islamic Republic of)

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+98 21 8670 4546

Email address

ali_mohamadkhany@yahoo.com

Recruitment status

recruiting

Funding source

Expected recruitment start date

2026-10-23, 1405/08/01

Expected recruitment end date

2028-08-22, 1407/06/01

Actual recruitment start date
empty
Actual recruitment end date
empty
Trial completion date
empty

Scientific title
Comparison of the Efficacy of Artificial Intelligence in the Role of Teaching Assistant with Traditional Method in Teaching Electrocardiography Interpretation in the Physiology Laboratory of Medical Students: Assessment of Learning and Satisfaction

Public title
Purpose
Education/Guidance
Inclusion/Exclusion criteria
Inclusion criteria:
Medical students in the basic sciences (pre-clinical) stage who have have the cardiac physiology and electrocardiography course. Willingness to participate voluntarily in the study and signing the informed consent form. Access to the internet and a suitable device (mobile phone or laptop) for the intervention group.
Exclusion criteria:
History of previous participation in advanced courses or specialized workshops on electrocardiography interpretation Unwillingness to continue cooperation at any stage of the study.
Age
No age limit
Gender
Both

Phase
N/A
Groups that have been masked
No information
Sample size
Target sample size: **70**
Randomization (investigator's opinion)
Randomized
Randomization description
Eligible participants, after providing informed consent, are allocated completely randomly to either the intervention group (Artificial Intelligence) or the control group (traditional method) using a random number table or random number generation software. The sample size in each group is 35 participants.
Blinding (investigator's opinion)
Not blinded
Blinding description
Placebo
Not used
Assignment
Parallel
Other design features
The present study is a quasi-experimental educational trial with a pretest-posttest control group design. After completing a shared and standardized theoretical course on electrocardiography interpretation, participants are randomly allocated to two parallel groups (intervention and control). The intervention group uses an artificial intelligence chatbot based on a large language model (such as ChatGPT) as a teaching assistant to answer their questions, while the control group asks their questions from a physiology resident (traditional method). All conditions are identical for both groups except for the source of responses. The outcomes measured include learning (through a standardized pretest and posttest), satisfaction, and self-confidence (through a researcher-made questionnaire based on a Likert scale). Data will be analyzed using independent t-test, paired t-test, and analysis of covariance (ANCOVA).

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, Central Headquarters, Hemmat Highway, West, Between Sheikh Fazlollah and Shahid Chamran Intersections, Tehran, Iran
City
Tehran
Province
Tehran
Postal code
1449614535
Approval date
2026-02-21, 1404/12/02
Ethics committee reference number
IR.IUMS.FMD.REC.1404.722

Health conditions studied

1

Description of health condition studied
Electrocardiography Interpretation Education
ICD-10 code
ICD-10 code description

Primary outcomes

1

Description
Electrocardiography Interpretation Learning Score
Timepoint
Before the intervention (pretest) and immediately after the intervention (posttest)
Method of measurement
Researcher-made standardized test including theoretical and practical questions on electrocardiography

interpretation (score from 0 to 20)

Secondary outcomes

1

Description
Students' Satisfaction with the Teaching Method
Timepoint
Immediately after the intervention (after the posttest)
Method of measurement
Researcher-made satisfaction questionnaire based on a 5-point Likert scale

2

Description
Students' Satisfaction with the Teaching Method
Timepoint
Immediately after the intervention
Method of measurement
Researcher-made satisfaction questionnaire based on a five-point Likert scale

Intervention groups

1

Description
Intervention group:
Category
Other

Recruitment centers

1

Recruitment center
Name of recruitment center
Iran University of Medical Sciences, School of Medicine
Full name of responsible person
Ali MohammadKhanizadeh
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Sponsors / Funding sources

1

Sponsor
Name of organization / entity
Iran University of Medical Sciences
Full name of responsible person
Dr. majid safa
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Iran University of Medical Sciences, Central Headquarters, Hemmat Highway, West, Between Sheikh Fazlollah and Shahid Chamran Intersections, Tehran, Iran
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Web page address
https://research.iums.ac.ir
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
100
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
Ali MohammadKhanizadeh
Position
Assistant Professor of Physiology
Latest degree
Ph.D.
Other areas of specialty/work
Physiology
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Person responsible for updating data

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Sharing plan

Deidentified Individual Participant Data Set (IPD)
No - There is not a plan to make this available
Justification/reason for indecision/not sharing IPD
Individual participant data, including educational information and student scores, cannot be publicly shared due to confidentiality and ethical principles in educational research. Publishing such data could lead to indirect identification of students and contradicts the ethical commitments of this study.
Study Protocol
No - There is not a plan to make this available
Statistical Analysis Plan
Yes - There is a plan to make this available
Informed Consent Form
No - There is not a plan to make this available
Clinical Study Report
Not applicable
Analytic Code
No - There is not a plan to make this available
Data Dictionary
No - There is not a plan to make this available
Title and more details about the data/document
Study Protocol: Comparing the Efficacy of Artificial Intelligence as a Teaching Assistant with Traditional Method in Electrocardiography Interpretation Education for Medical Students
When the data will become available and for how long
Access will begin immediately after trial registration and will remain open indefinitely
To whom data/document is available
Researchers, academic institutions, and healthcare professionals.
Under which criteria data/document could be used
For academic and research purposes only. Users must cite the original study.
From where data/document is obtainable
Principal Investigator: Ali MohammadKhanizadeh; Email: ali_mohamadkhany@yahoo.com
What processes are involved for a request to access data/document
Interested parties should submit a formal request via email to the principal investigator. The request will be reviewed within two weeks.
Comments
The protocol will be available on the IRCT website upon registration.