Clinical Trial Protocol
Iranian Registry of Clinical Trials

07 Nov 2026

Comparison of the Effectiveness of Virtual Case-Based Learning with Virtual Lectures on Knowledge Gain and Satisfaction in Virology Among Medical Students

Protocol summary

Study aim
To compare the effectiveness of virtual case based learning and virtual lecture based learning on knowledge gain and satisfaction among medical students in a virology course.

Design
Quasi experimental, crossover, randomized, single center educational study with 102 participants. Simple randomization using coin tossing.

Settings and conduct
Conducted at Babol University of Medical Sciences. Teaching and evaluations were delivered online via the Navid learning management system. The study was not blinded due to the educational nature of the intervention.

Participants/Inclusion and exclusion criteria
Inclusion criteria: Fourth semester medical students enrolled in the virology course; informed consent to participate. Exclusion criteria: Absence from any educational sessions; incomplete evaluation tests.

Intervention groups
Group A: Received virtual case based learning in the first phase and virtual lecture based learning in the second phase. Group B: Received virtual lecture based learning in the first phase and virtual case based learning in the second phase.

Main outcome variables
Knowledge score assessed by multiple choice questions; Student satisfaction evaluated by a structured questionnaire.

General information

Reason for update

Acronym

IRCT registration information
IRCT registration number: **IRCT20260926071201N1**
Registration date: **2026-10-14, 1405/07/22**
Registration timing: **retrospective**

Last update: **2026-10-14, 1405/07/22**
Update count: **0**

Registration date
2026-10-14, 1405/07/22

Registrant information
Name
Farzin Sadeghi
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
2022-10-01, 1401/07/09

Expected recruitment end date
2022-10-21, 1401/07/29

Actual recruitment start date
2022-10-01, 1401/07/09

Actual recruitment end date
2022-10-21, 1401/07/29

Trial completion date
2023-01-19, 1401/10/29

Scientific title
Comparison of the Effectiveness of Virtual Case-Based Learning with Virtual Lectures on Knowledge Gain and Satisfaction in Virology Among Medical Students

Public title
Comparing Case-Based Learning and Lecture-Based

Teaching for Medical Students in Virology

Purpose

Education/Guidance

Inclusion/Exclusion criteria

Inclusion criteria:

Undergraduate medical students enrolled in the fourth semester Official enrollment in the general medical virology course in the current semester Written informed consent to participate in the study

Exclusion criteria:

Prior history of failing or repeating the medical virology course Prior participation in formal case-based learning courses or workshops in virology Guest or transfer students who have previously completed this course at another university

Age

From **18 years** old to **35 years** old

Gender

Both

Phase

N/A

Groups that have been masked

No information

Sample size

Target sample size: **102**

Actual sample size reached: **102**

Randomization (investigator's opinion)

Randomized

Randomization description

Participants were randomly assigned to one of two sequences (CBL-Lecture or Lecture-CBL) using simple random allocation. The unit of randomization was the individual student. The random sequence was generated using a computer-based random number generator. Allocation concealment was maintained using sequentially numbered, opaque, sealed envelopes, which were opened only at the time of participant enrollment to ensure that neither the researchers nor the participants could predict the group assignment.

Blinding (investigator's opinion)

Not blinded

Blinding description

Placebo

Not used

Assignment

Crossover

Other design features

This study employed a two-period, two-sequence crossover design across eight educational topics in virology. Participants were randomly assigned to two equal groups (Group A and Group B). In the first phase, Group A received virtual case-based learning (CBL) for the first four topics, while Group B received virtual lectures on the same topics. In the second phase, the interventions were crossed over such that Group B received virtual CBL for the subsequent four topics, while Group A received virtual lectures on those topics. Knowledge retention was assessed via post-tests at the end of each session, and educational satisfaction was evaluated using a validated 20-item questionnaire.

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

Ethics Committee of Virtual University of Medical Sciences

Street address

No. 3, 1st Alley, Sarafraz St., Shahid Beheshti St., Tehran

City

Tehran

Province

Tehran

Postal code

1587656811

Approval date

2022-05-08, 1401/02/18

Ethics committee reference number

IR.VUMS.REC.1401.001

Health conditions studied

1

Description of health condition studied

Medical education / Virology education

ICD-10 code

ICD-10 code description

Primary outcomes

1

Description

Student knowledge score in medical virology

Timepoint

Immediately after each educational session across both study periods

Method of measurement

Multiple choice question knowledge assessment test

Secondary outcomes

1

Description

Student satisfaction with the teaching method

Timepoint

At the end of each teaching session in both study periods

Method of measurement

Self-administered satisfaction questionnaire using a five-point Likert scale

Intervention groups

1

Description
Intervention group: Virtual Case-Based Learning (VCBL). Multimedia clinical case vignettes with guided questions were provided via the Navid LMS one week prior to sessions. Synchronous 45-minute virtual sessions (4 sessions in total) were held on Adobe Connect. Students worked in small breakout groups of 4-5 individuals for 15 minutes to discuss clinical findings, laboratory workups, and differential diagnoses, followed by instructor-facilitated whole-class discussions, synthesis, and structured feedback.

Category
Behavior

2

Description
Control group: Virtual Lecture-Based Learning (LBL). Medical students received the same virology topics across 4 synchronous 45-minute virtual sessions delivered via Adobe Connect using conventional lecture delivery. Instructors presented structured didactic slides covering identical learning objectives, with interactive question-and-answer opportunities via microphone or text chat and key concept summaries at the conclusion of each session.

Category
Behavior

Recruitment centers

1

Recruitment center

Name of recruitment center
Smart University of Medical Sciences

Full name of responsible person
Dr. Rita Mojtahedzadeh

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No. 3, 1st Alley, Sarafraz St., Shahid Beheshti St., Tehran

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Sponsors / Funding sources

1

Sponsor

Name of organization / entity
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Grant name

Grant code / Reference number

Is the source of funding the same sponsor organization/entity?
No

Title of funding source
Smart 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
Department of Medical Education, Smart University of Medical Sciences

Full name of responsible person
Farzin Sadeghi

Position
Associate Professor

Latest degree
Ph.D.

Other areas of specialty/work
Medical Education

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Person responsible for scientific inquiries

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Name of organization / entity
Department of Medical Education, Smart University of Medical Sciences

Full name of responsible person
Rita Mojtahedzadeh

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Professor

Latest degree
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Other areas of specialty/work
E-Learning Planning

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Sharing plan

Deidentified Individual Participant Data Set (IPD)
Yes - There is a plan to make this available

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

Statistical Analysis Plan
Yes - There is a plan to make this available

Informed Consent Form
Yes - There is a plan to make this available

Clinical Study Report
Yes - There is a plan to make this available

Analytic Code
Yes - There is a plan to make this available

Data Dictionary
Yes - There is a plan to make this available

Title and more details about the data/document
Deidentified individual participant data (IPD) related to knowledge assessment scores and satisfaction surveys, study protocol, statistical analysis plan, informed consent form, clinical study report, analytic code (R scripts), and data dictionary.

When the data will become available and for how long
Data and documents will be available starting 6 months after the publication of the main study results and will remain available for 5 years.

To whom data/document is available
Available to researchers affiliated with academic or scientific institutions who provide a methodologically sound research proposal.

Under which criteria data/document could be used
Data may be used for meta-analysis or secondary research purposes. Requests must include a clear research proposal, study objectives, and the intended use of the data. The request will be reviewed by the principal investigator to ensure compliance with participant privacy and ethical standards.

From where data/document is obtainable
Interested researchers should contact the corresponding author via email at r_mojtahedzadeh@tums.ac.ir

What processes are involved for a request to access data/document
The applicant should submit a formal request via email, including their research proposal. The principal investigator will review the request for scientific validity and ethical adherence. The review process typically takes 2 to 4 weeks, and the applicant will be notified of the decision via email.

Comments
None