

# Clinical Trial Protocol

## Iranian Registry of Clinical Trials

10 Jun 2026

### Comparing the Effects of Flipped Classroom and Traditional Lecture Method on Academic Performance and Classroom Environment Perception among Nursing Students: A Randomized Controlled Trial

#### Protocol summary

##### Study aim

Comparison of two methods: flipped classroom and lecture on academic performance and perception of nursing students

##### Design

This was a randomized controlled pre- and post-test trial with a control group.

##### Settings and conduct

All nursing students in the second semester of the Faculty of Nursing and Midwifery of Qom who had taken the Adult and Older Adult Nursing 1 course were included in the study if they were eligible to participate. They were assigned to the intervention and control groups using simple random assignment. This study was conducted in a single-blind manner, such that the researchers who collected and assessed the outcome were unaware of the type of intervention.

##### Participants/Inclusion and exclusion criteria

Inclusion criteria included taking the Adult and Older Adults Nursing 1 course for the first time; having access to devices such as mobile phones, computers, and the Internet for retrieving educational materials; and expressing willingness to participate in the study. The exclusion criteria included completion of training courses related to fluid and electrolytes, known learning disabilities, and participation in a similar study at the same time.

##### Intervention groups

"Intervention group:" Teaching in the intervention group was inverted as follows: students had to read the educational content related to the same session at home that was provided to them in advance and come to the classroom prepared for the next session. In the class, students were divided into groups of five to six and discussed the scenarios and questions designed by the teacher. The intervention was planned for 4 2-hour sessions, which were delivered over 4 consecutive

weeks. "Control group:" The instructor presented the educational content in the form of a lecture and via PowerPoint presentation.

##### Main outcome variables

academic performance, students' perceptions

#### General information

##### Reason for update

##### Acronym

##### IRCT registration information

IRCT registration number: **IRCT20240610062078N2**

Registration date: **2025-12-21, 1404/09/30**

Registration timing: **retrospective**

Last update: **2025-12-21, 1404/09/30**

Update count: **0**

##### Registration date

2025-12-21, 1404/09/30

##### Registrant information

##### Name

Mahboubeh Sadat Yousefi

##### Name of organization / entity

##### Country

Iran (Islamic Republic of)

##### Phone

+98 21 8865 5366

##### Email address

msyousefi@sbmu.ac.ir

##### Recruitment status

**Recruitment complete**

##### Funding source

##### Expected recruitment start date

2020-02-04, 1398/11/15

##### Expected recruitment end date

2020-03-10, 1398/12/20

**Actual recruitment start date**

2020-02-04, 1398/11/15

**Actual recruitment end date**

2020-03-10, 1398/12/20

**Trial completion date**

2020-04-03, 1399/01/15

**Scientific title**

Comparing the Effects of Flipped Classroom and Traditional Lecture Method on Academic Performance and Classroom Environment Perception among Nursing Students: A Randomized Controlled Trial

**Public title**

impact of flipped classroom on nursing students' learning and understanding

**Purpose**

Education/Guidance

**Inclusion/Exclusion criteria****Inclusion criteria:**

taking the Adult and Older Adults Nursing 1 course for the first time having access to devices such as mobile phones, computers, and the Internet for retrieving educational materials expressing willingness to participate in the study

**Exclusion criteria:**

completion of training courses related to fluid and electrolytes. known learning disabilities participation in a similar study at the same time

**Age**

No age limit

**Gender**

Both

**Phase**

N/A

**Groups that have been masked**

- Outcome assessor
- Data analyser

**Sample size**

Target sample size: **60**

Actual sample size reached: **58**

**Randomization (investigator's opinion)**

Randomized

**Randomization description**

The students were divided into two intervention and control groups using simple randomization. A Microsoft Excel random number generator with a 1:1 ratio was used to generate sequence numbers. The sequence numbers were then coded and placed in sealed opaque envelopes. The research assistant divided the students into intervention (29 people) or control (29 people) groups based on the sequence numbers in the envelope of their choice. The entire randomization process was carried out by a research assistant who was not involved in the intervention and data analysis.

**Blinding (investigator's opinion)**

Single blinded

**Blinding description**

This was a single-blind study. Because this study adopted educational interventions that made it difficult to blind the participants (students) and the researcher

(instructor) conducting the intervention, only the researchers responsible for data collection and analysis and for assessing the outcomes were blinded to group assignment. Thus, the researchers responsible for collecting and assessing outcomes had no access to the list of participants assigned to the intervention and control groups. The collected data were recorded and stored using random identifiers (such as unique numbers unrelated to grouping). These codes were created by the principal investigator, who had access to the decoding key. Blinded researchers collected data based on these codes and conducted outcome assessments (such as scoring tests or analyzing responses) without knowledge of the participant groupings.

**Placebo**

Not used

**Assignment**

Parallel

**Other design features****Secondary Ids**

empty

**Ethics committees****1****Ethics committee****Name of ethics committee**

Ethics Committee of Qom University of Medical Sciences

**Street address**

Shahid Lavasani (Saheli) St., Qom, I.R. Iran

**City**

Qom

**Province**

Ghous

**Postal code**

3716993456

**Approval date**

2018-07-03, 1397/04/12

**Ethics committee reference number**

IR.MUQ.REC.1397.056

**Health conditions studied****1****Description of health condition studied**

-

**ICD-10 code**

-

**ICD-10 code description**

-

**Primary outcomes****1****Description**

academic performance

### **Timepoint**

One week before the start of the intervention and after the end of the intervention

### **Method of measurement**

To assess academic performance (primary outcome), pre- and post-intervention test scores were used to measure the students' knowledge gains. The tests consisted of 20 multiple-choice questions (with four options each) on knowledge related to fluid and electrolyte topics. Each correct answer was worth 1 point, with scores ranging from 0 to 20; higher scores indicated better knowledge of fluids and electrolytes.

## **Secondary outcomes**

### **1**

#### **Description**

students' perceptions of the classroom environment (secondary outcome)

#### **Timepoint**

After the end of the intervention

#### **Method of measurement**

The College and University Classroom Environment Inventory (CUCEI) was used to assess students' perceptions of the classroom environment.

## **Intervention groups**

### **1**

#### **Description**

Intervention group: According to the lesson plan, the fluid and electrolytes topic was structured into four two-hour sessions delivered over four consecutive weeks. To deliver instruction using the flipped classroom approach, the instructor provided the students with all the content intended for a single session one week in advance. Students were required to review the educational materials at home or in a non-classroom setting and to arrive prepared at the subsequent session. The materials distributed included short topical videos and PowerPoint presentations (each 10-15 minutes long), along with a PDF of the lecture notes, all uploaded to the virtual educational group (Telegram). Each video and presentation concluded with a question or scenario to guide self-directed learning and evaluate students' grasp of key outcomes. Additionally, the instructor prepared questions and clinical scenarios tied to each session's core concepts prior to the class. In-Class Activities1. At the start of the class, the instructor spent 10-15 minutes addressing students' questions and clarifying misunderstandings about the educational content in order to resolve any misconceptions. 2. The instructor engaged individually with the students regarding the questions raised in the pre-class materials, which took approximately 15 minutes. 3. The students were divided into groups of five to six members to discuss the scenarios and questions prepared by the instructor. This involved the instructor presenting predesigned clinical scenarios using PowerPoint. Each group was given a few minutes to deliberate and collaborate internally in order

to formulate their responses. A representative of the group presented the answer in this scenario. Members of other groups could offer comments and ask questions. Finally, the instructor addressed any remaining issues and student queries. In this way, students practically applied their theoretical knowledge by analyzing and responding to clinical scenario questions.

#### **Category**

Other

### **2**

#### **Description**

Control group: The instructor delivered educational content via a lecture using PowerPoint slides. Students' questions were addressed at the end of the class.

#### **Category**

Other

## **Recruitment centers**

### **1**

#### **Recruitment center**

##### **Name of recruitment center**

School of Nursing and Midwifery

##### **Full name of responsible person**

Abbas Moghadam

##### **Street address**

Western 2nd Alley, Mo'alleh St., Qom, Iran

##### **City**

Qom

##### **Province**

Ghous

##### **Postal code**

3715835155

##### **Phone**

+98 25 3783 1370

##### **Email**

nmfac@muq.ac.ir

## **Sponsors / Funding sources**

### **1**

#### **Sponsor**

##### **Name of organization / entity**

Ghous University of Medical Sciences

##### **Full name of responsible person**

Dr Ali Ebraze

##### **Street address**

Fourth floor, Qom University of Medical Sciences, Shahid Lavasani St., Qom, Iran

##### **City**

Qom

##### **Province**

Ghous

##### **Postal code**

3716993456

##### **Phone**

+98 25 3107 1380

##### **Email**

ebraze1880@yahoo.com

**Grant name**

**Grant code / Reference number**

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

Yes

**Title of funding source**

Ghoum 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**

Ghoum University of Medical Sciences

**Full name of responsible person**

Mahboubeh Sadat Yousefi

**Position**

Instructor

**Latest degree**

Ph.D.

**Other areas of specialty/work**

Nursery

**Street address**

Western 2nd Alley, Mo'alleh St., Qom, Iran

**City**

Qom

**Province**

Ghoum

**Postal code**

3715835155

**Phone**

+98 25 3783 1370

**Email**

mahboubeh.yousefi@yahoo.com

## Person responsible for scientific inquiries

**Contact**

**Name of organization / entity**

Ghoum University of Medical Sciences

**Full name of responsible person**

Mahboubeh Sadat Yousefi

**Position**

Instructor

**Latest degree**

Ph.D.

**Other areas of specialty/work**

Nursery

**Street address**

Western 2nd Alley, Mo'alleh St., Qom, Iran

**City**

Qom

**Province**

Ghoum

**Postal code**

3715835155

**Phone**

+98 25 3783 1370

**Email**

mahboubeh.yousefi@yahoo.com

## Person responsible for updating data

**Contact**

**Name of organization / entity**

Ghoum University of Medical Sciences

**Full name of responsible person**

Mahboubeh Sadat Yousefi

**Position**

Instructor

**Latest degree**

Ph.D.

**Other areas of specialty/work**

Nursery

**Street address**

Western 2nd Alley, Mo'alleh St., Qom, Iran

**City**

Qom

**Province**

Ghoum

**Postal code**

3715835155

**Phone**

+98 25 3783 1370

**Email**

mahboubeh.yousefi@yahoo.com

## 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**

Not applicable

**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**

It can be shared after de-identifying individuals.

**When the data will become available and for how long**

Access begins one year after results are published.

**To whom data/document is available**

People working in academic and scientific institutions

**Under which criteria data/document could be used**

Subject to agreement with Qom University of Medical

Sciences

**From where data/document is obtainable**

Faculty of Nursing, Qom University of Medical Sciences,  
Ms. Mahboubeh Sadat Yousefi

**What processes are involved for a request to access**

**data/document**

Written and official request to the Vice President of  
Research, Faculty of Nursing

**Comments**