Clinical Trial Protocol
Iranian Registry of Clinical Trials

08 Nov 2026

Comparative Effects of Simulation-Based Education and Gamification on Nursing Students' Knowledge, Attitudes, and Performance in Applying the Emergency Severity Index (ESI), Fifth Edition

Protocol summary

Study aim

To compare the effects of simulation-based education and gamification versus usual education on nursing students' knowledge, attitudes, and performance in applying ESI-V5 at baseline, post-intervention, and one-month follow-up.

Design

A three-arm, parallel-group randomized educational trial involving 72 nursing students, with variable block randomization (sizes 3 and 6). Outcomes will be assessed at baseline, post-intervention, and one-month follow-up. The performance assessor will be blinded; participant and intervention-provider blinding is not feasible.

Settings and conduct

The study will involve 72 students at Ahvaz Jundishapur University of Medical Sciences, randomly allocated to three groups. Knowledge, attitudes, and performance will be assessed at three time points by a blinded performance assessor.

Participants/Inclusion and exclusion criteria

Participants will be undergraduate nursing students at Ahvaz Jundishapur University of Medical Sciences enrolled in the theoretical Emergency Nursing course; inclusion criteria: informed consent, no prior formal ESI-V5 triage training, and no participation in advanced triage courses outside the university curriculum; non-inclusion criteria: failure to meet the eligibility criteria or unwillingness to participate.

Intervention groups

Seventy-two nursing students will be allocated to three groups (n=24 each): simulation-based education (one 60-minute lecture and three 60-minute simulation sessions); gamification (one 60-minute lecture and three 60-minute scenario-based sessions with points and immediate feedback); and usual education (lectures and discussion). All groups will cover ESI-V5 content.

Main outcome variables

Primary outcomes are knowledge, attitude, and performance scores in ESI-V5 application, measured at baseline, post-intervention, and one-month follow-up across the three study groups.

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20120414009469N7**
Registration date: **2026-11-04, 1405/08/13**
Registration timing: **prospective**

Last update: **2026-11-04, 1405/08/13**
Update count: **0**

Registration date

2026-11-04, 1405/08/13

Registrant information

Name
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Recruitment status

Not yet recruiting

Funding source

Expected recruitment start date

2026-11-22, 1405/09/01

Expected recruitment end date

2027-05-21, 1406/02/31

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

Scientific title
Comparative Effects of Simulation-Based Education and Gamification on Nursing Students' Knowledge, Attitudes, and Performance in Applying the Emergency Severity Index (ESI), Fifth Edition

Public title
Comparative Effects of Simulation-Based Education and Gamification on Nursing Students' Knowledge, Attitudes, and Performance in Applying the Emergency Severity Index (ESI), Fifth Edition
Purpose
Education/Guidance
Inclusion/Exclusion criteria
Inclusion criteria:
Being an undergraduate nursing student currently enrolled in the theoretical Emergency Nursing course. Having no prior formal instruction in the Emergency Severity Index, Fifth Edition (ESI-V5), before enrollment in the study. Having no previous participation in formal advanced triage training courses or workshops outside the university curriculum. Providing informed consent to participate in the study and agreeing to cooperate throughout the research process.
Exclusion criteria:
Unwillingness to participate in the study and failure to provide informed consent.
Age
No age limit
Gender
Both

Phase
N/A
Groups that have been masked

- Outcome assessor

Sample size
Target sample size: **72**
More than 1 sample in each individual
Number of samples in each individual: **3**
Data will be collected from each participant at three time points: baseline (before the educational intervention), immediately after the intervention, and at a one-month follow-up. At each time point, nursing students' knowledge, attitudes, and performance in applying the Emergency Severity Index (ESI), Version 5, will be assessed.
Randomization (investigator's opinion)
Randomized
Randomization description
Individual randomization will be performed using a 1:1:1 allocation ratio. Permuted block randomization with variable block sizes of 3 and 6 will be used to maintain balance in the number of participants across the three study groups. Randomization will be conducted separately in each of the two academic semesters, with academic semester serving as the stratification factor. In each semester, following sample selection and confirmation of eligibility, participants will be randomly allocated to one of three groups: simulation-based education, gamification-based education, or the control group receiving usual education, with 12 participants assigned to each group per semester. The random allocation sequence will be generated using random-number generation software by an individual independent of intervention delivery and outcome assessment. To ensure allocation concealment and prevent prediction of subsequent group assignments, the allocation sequence will not be accessible to the researcher delivering the interventions until each participant enters the allocation process. Following confirmation of eligibility, obtaining informed consent, and assignment of a study identification code, each participant will be allocated according to the predetermined randomization sequence.
Blinding (investigator's opinion)
Single blinded
Blinding description
Due to the nature of the educational interventions, blinding of participants and the researcher delivering the interventions is not feasible, as participants will be aware of the type of education they receive and the researcher will be responsible for delivering the intervention assigned to each group. However, to reduce assessment bias, participant performance will be evaluated by an independent assessor who is not involved in delivering the educational interventions and is unaware of participants' group assignments. Each participant will be assigned a study identification code, and information regarding group allocation will not be made available to the assessor. Performance assessment forms will be completed using study identification codes only, without indicating the educational group. The assessor will also remain unaware of participants' previous assessment results to the extent possible. Therefore, blinding will be implemented at the outcome assessor level to reduce the risk of bias in performance assessment.
Placebo
Not used
Assignment
Parallel
Other design features
This study is a three-arm randomized educational trial with a parallel-group design, comparing simulation-based education and gamification-based education with usual education. Outcomes will be assessed at baseline, immediately after the intervention, and one month after the intervention to evaluate the retention of educational effects. To reduce assessment bias, participant performance will be evaluated by an independent assessor who is blinded to group allocation. To minimize potential contamination between groups, educational sessions will be conducted at separate times.

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee
Ethics Committee of Ahvaz Jundishapur University of Medical Sciences

Street address
Ahvaz Jundishapur University of Medical Sciences, Vice-Chancellery for Research, Ethics Committee.

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Postal code
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Approval date
2026-10-31, 1405/08/09

Ethics committee reference number
IR.AJUMS.REC.1405.364

Health conditions studied

1

Description of health condition studied
Hospital Triage Education Using the Emergency Severity Index, Fifth Edition (ESI-V5), in Nursing Students

ICD-10 code

ICD-10 code description

Primary outcomes

1

Description
Nursing students' knowledge score in applying the Emergency Severity Index, Fifth Edition hospital triage system.

Timepoint
Before the educational intervention, immediately after completion of the educational sessions, and one month after completion of the intervention.

Method of measurement
Researcher-developed 30-item multiple-choice knowledge questionnaire on applying the Emergency Severity Index, Fifth Edition hospital triage system.

2

Description
Nursing students' attitude score toward applying the Emergency Severity Index, Fifth Edition hospital triage system.

Timepoint
Before the educational intervention, immediately after completion of the educational sessions, and one month after completion of the intervention.

Method of measurement
Researcher-developed 16-item Likert-scale attitude questionnaire on applying the Emergency Severity Index, Fifth Edition hospital triage system.

3

Description
Nursing students' performance score in applying the Emergency Severity Index, Fifth Edition hospital triage system.

Timepoint
Before the educational intervention, immediately after completion of the educational sessions, and one month after completion of the intervention.

Method of measurement
Objective Structured Clinical Examination comprising five scenario-based stations, with a performance assessment checklist to evaluate students' triage-level assignments using the Emergency Severity Index, Fifth Edition hospital triage system.

Secondary outcomes

empty

Intervention groups

1

Description
Intervention group 1: Students will first receive a 60-minute educational session on the Emergency Severity Index, Fifth Edition hospital triage system. They will then participate in three weekly 60-minute simulation-based training sessions. A total of 12 clinical scenarios, four per session, will be implemented using standardized patients or simulation equipment. Patient information will be provided progressively, and students will be required to assign an appropriate triage level and justify their decisions within 2–3 minutes. Each scenario will be followed by structured feedback and debriefing.

Category
Behavior

2

Description
Control group: Students will receive usual theoretical Emergency Nursing education through lectures and discussion. The educational content related to the Emergency Severity Index, Fifth Edition hospital triage system, will be delivered according to the usual curriculum. After completion of the study, the intervention educational materials will be made available to this group.

Category
Behavior

3

Description
Intervention group 2: Students will first receive a 60-minute educational session on the Emergency Severity Index, Fifth Edition hospital triage system. They will then participate in three 60-minute interactive gamification-

based sessions using PowerPoint and clinical scenarios. A 15-minute orientation will be provided at the beginning. Students will work in teams of 3–4, with assigned roles such as scenario analysis, vital-sign assessment, final triage-level assignment, and timekeeping. Scenarios of varying difficulty will be presented, with points awarded and immediate feedback provided based on students' responses and triage decisions.

Category
Behavior

Recruitment centers

1

Recruitment center

Name of recruitment center
School of Nursing and Midwifery, Ahvaz Jundishapur University of Medical Sciences

Full name of responsible person
Mohammad Adineh

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Sponsors / Funding sources

1

Sponsor

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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
Ahvaz 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
Ahvaz University of Medical Sciences

Full name of responsible person
Loghman Momeni

Position
دانشجوی کارشناسی ارشد پرستاری داخلی‌ـجراحی، دانشگاه علوم پزشکی جندی‌شاپور اهواز

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Bachelor

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Nursery

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Person responsible for scientific inquiries

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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
Due to participant confidentiality and research data protection requirements, individual participant data will not be shared.

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
Not applicable

Data Dictionary
Not applicable

Title and more details about the data/document
The final study protocol, statistical analysis plan, and informed consent form, with identifying information removed, will be made available upon request to the principal investigator after study completion, subject to applicable requirements.

When the data will become available and for how long
Access to the documents will begin six months after publication of the main study results and remain available for three years.

To whom data/document is available
Academic and scientific researchers may submit a justified request to access the documents.

Under which criteria data/document could be used
The documents may be used for research and educational purposes only. Requests will be reviewed, and access will be subject to research ethics and confidentiality requirements.

From where data/document is obtainable
Requests may be directed to the principal investigator at Ahvaz Jundishapur University of Medical Sciences.

What processes are involved for a request to access data/document
Requests should specify the research objectives, requested documents, and intended use. They will be reviewed for scientific merit, ethical compliance, and confidentiality, and applicants will be notified of the decision.

Comments
Document sharing will comply with research ethics principles, university regulations, and intellectual property rights. No individual participant data will be made publicly available, even after de-identification. Access to the documents will be provided only after review and approval of the request.