

Simulation-based airway management training procedures sustained improvements in knowledge, skills, and confidence among final-year medical students: a randomized waiting-list controlled trial

Submission date 06/09/2026	Recruitment status No longer recruiting	☐ Prospectively registered ☐ Protocol
Registration date 08/09/2026	Overall study status Completed	☐ Statistical analysis plan ☐ Results
Last Edited 08/09/2026	Condition category Other	☐ Individual participant data ☒ Record updated in last year

Plain English summary of protocol

Background and study aims

Airway management is an important clinical skill for newly graduating doctors. However, medical students may have limited opportunities to practise airway procedures in a safe and structured setting. This study aimed to determine whether a simulation-based airway management workshop could improve final-year medical students' knowledge, practical airway-management skills and confidence, and whether improvements in knowledge and practical skills were retained after 1 month.

Who can participate?

Final-year medical students enrolled in clinical rotations who had completed standard basic life support training during the preceding academic year and had not previously received formal simulation-based airway management training

What does the study involve?

Fifty students were randomly assigned in equal numbers to either an immediate intervention group or a waiting-list control group. The intervention consisted of a structured, high-fidelity simulation-based airway management workshop lasting about 3 hours. Training included bag-valve-mask ventilation, placement of oropharyngeal and nasopharyngeal airway adjuncts, laryngoscopy and video-assisted laryngoscopy, endotracheal intubation, and use of supraglottic airway devices. Participants also attended a structured reflection session. Knowledge, practical airway-management skills, and confidence were assessed before and after training, with knowledge and practical skills assessed again 1 month later. The waiting-list group completed additional assessments before receiving the same workshop.

What are the possible benefits and risks of participating?

Participants may benefit from additional structured practice in airway management and from

developing their knowledge, practical skills, and confidence in performing airway procedures. As the intervention involved mannequin-based simulation rather than procedures on patients, no significant physical risks were anticipated. Participants could potentially experience minor fatigue or stress associated with training and assessment.

Where is the study run from?

The study was conducted at Ajman University (United Arab Emirates) and its affiliated clinical training facilities.

When is the study starting and how long is it expected to run for?

November 2025 to January 2026

Who is funding the study?

Ajman University (United Arab Emirates)

Who is the main contact?

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Contact information

Type(s)

Public, Scientific, Principal investigator

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Additional identifiers

Study information

Scientific Title

Simulation-based airway management training procedures sustained improvements in knowledge, skills, and confidence among final-year medical students: a randomized waiting-list controlled trial

Study objectives

To evaluate whether a structured high-fidelity simulation-based airway management workshop improves final-year medical students' psychomotor airway-management performance, knowledge, and self-reported confidence, and whether improvements in knowledge and psychomotor performance are retained at 1 month. The study also used a randomized waiting-list design with repeated pretesting in the control group to assess whether observed improvements could be explained by repeated testing alone.

Ethics approval required

Ethics approval required

Ethics approval(s)

1. Approved 31/10/2025, Ajman University Research Ethics Committee (Ajman University, University Street, Al Jurf, Ajman, 346, United Arab Emirates; +971 (0)6 748 2222; g.andrade@ajman.ac.ae), ref: M-F-H-24-Sep-ii

2. Approved 22/08/2025, Institutional Review Board (IRB) of Gulf Medical University (Medical University, Al Jurf, Ajman, 4184, United Arab Emirates; +971 (0)6 7431333; deangmc@gmu.ac.ae), ref: IRB-COM-MHPE-STD-14-Aug-2025

Primary study design

Interventional

Allocation

Randomized controlled trial

Masking

Open (masking not used)

Control

Uncontrolled

Assignment

Parallel

Purpose

Medical education

Study type(s)**Health condition(s) or problem(s) studied**

Undergraduate medical education; acquisition and retention of airway management knowledge, psychomotor skills, and self-reported confidence through simulation-based training

Interventions

Participants were randomly allocated 1:1 to an immediate-intervention group or a waiting-list control group using a computer-generated random number sequence generated prior to the workshop. Due to logistical constraints related to clinical rotations, students were distributed into subgroups, and participants within each subgroup were randomly assigned to either the immediate intervention group or the waiting-list control group. The principal investigator generated the randomization sequence, enrolled participants, and assigned participants to groups. Formal allocation concealment was not implemented.

The intervention consisted of a structured high-fidelity, mannequin-based airway management workshop lasting approximately 3 hours and facilitated by experienced anesthesiologists and trauma physicians. Training included practical airway-management skills, followed the next day by a structured 2-hour reflection session in which participants reviewed their experiences, discussed common challenges, and worked through clinical case scenarios. The waiting-list

control group completed assessments on the same schedule but did not receive the workshop until after the initial comparison period. Assessments were conducted at baseline, immediately after training, and one month later; the waiting-list group also completed two additional pretests before receiving the intervention to assess retesting effects.

Intervention Type

Behavioural

Primary outcome(s)

1. Psychomotor airway management performance measured using a four-station airway-management skills checklist. Each station contained five criteria scored as 1 (performed correctly), 0.5 (partially correct), or 0 (incorrect/not performed). Performance was independently assessed by two trained assessors. Measured at baseline, immediately after the simulation-based training, and 1 month after training

Key secondary outcome(s)

1. Knowledge of airway management measured using a 10-item multiple-choice questionnaire, with each item scored as correct or incorrect and the total score expressed as a proportion from 0 to 1, at baseline, immediately after the simulation-based training, and 1 month after training

2. Self-reported confidence in airway management measured using a 5-point Likert scale at baseline and immediately after the simulation-based training

Completion date

30/01/2026

Eligibility

Key inclusion criteria

1. Final-year medical students enrolled in clinical rotations
2. Completed standard basic life support training during the preceding academic year
3. No prior formal simulation-based airway management training
4. Provided written informed consent

Healthy volunteers allowed

Yes

Age group

Adult

Lower age limit

21 Years

Upper age limit

24 Years

Sex

All

Total final enrolment

Key exclusion criteria

1. Prior advanced airway simulation exposure
2. Refusal/declining to provide informed consent

Date of first enrolment

15/11/2025

Date of final enrolment

15/01/2026

Locations**Countries of recruitment**

United Arab Emirates

Sponsor information**Organisation**

Ajman University

ROR

<https://ror.org/01j1rma10>

Funder(s)**Funder type****Funder Name**

Ajman University

Alternative Name(s)

, AU

Funding Body Type

Private sector organisation

Funding Body Subtype

Universities (academic only)

Location

United Arab Emirates

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary

Not expected to be made available