

Comparison of LASOO and CE mask ventilation techniques for female nurses with different hand lengths

Submission date 12/08/2026	Recruitment status No longer recruiting	☐ Prospectively registered ☒ Protocol
Registration date 14/08/2026	Overall study status Ongoing	☐ Statistical analysis plan ☐ Results
Last Edited 13/08/2026	Condition category Other	☐ Individual participant data ☒ Record updated in last year

Plain English summary of protocol

Background and study aims

Bag-valve-mask ventilation is an important emergency resuscitation skill used to help patients breathe. Different techniques can be used to hold the mask during ventilation, but it is unclear whether hand size affects how well these techniques work.

This study aims to compare two bag-valve-mask ventilation techniques, known as the LASOO technique and the conventional CE technique, among female nurses with different hand lengths. The researchers will assess ventilation effectiveness, hand fatigue and operating performance to determine which technique works best for nurses with different hand sizes.

Who can participate?

Female licensed nurses aged 18 to 50 years who are willing to take part and provide written informed consent.

What does the study involve?

Participants will receive two hours of standardised training in bag-valve-mask ventilation and must pass a theory test before taking part in the assessment.

Participants will be randomly assigned to use either the conventional CE mask fixation technique or the LASOO mask fixation technique.

After training, participants will perform 10 consecutive ventilations using both their dominant and non-dominant hands on a simulation manikin.

Researchers will assess the volume of air delivered during ventilation, the correctness of the ventilation technique and the perceived hand fatigue after the procedure.

Two independent assessors will evaluate performance during the assessments.

What are the possible benefits and risks of participating?

Participants may improve their bag-valve-mask ventilation skills and contribute to research that could improve emergency airway management training for nurses.

The risks associated with participation are expected to be minimal and mainly relate to temporary hand fatigue during the ventilation exercises.

Where is the study run from?

Shanxi Bethune Hospital, Taiyuan, China.

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

January 2026 to December 2026.

Who is funding the study?

Investigator initiated and funded.

Who is the main contact?

Mrs Wen Li, liwen@sxbqeh.com.cn

Contact information

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Additional identifiers**Study information****Scientific Title**

A prospective 2×2 factorial randomised controlled trial comparing ventilation performance between LASOO and CE bag-valve-mask fixation techniques among Chinese female nurses stratified by hand length

Study objectives

- 1.To compare ventilation efficacy between LASOO and CE BVM fixation techniques in Chinese female nurses with hand length <170mm and ≥170mm, and test the interaction effect of hand length × ventilation technique.
- 2.To compare the proportion of participants achieving tidal volume 400–700mL across four subgroups (short hand+CE, short hand+LASOO, normal hand+CE, normal hand+LASOO).
- 3.To compare subjective hand fatigue (Borg CR-10 scale) among four subgroups.
- 4.To evaluate operability and teaching feasibility of LASOO technique for female nurses.
- 5.To provide evidence-based reference for differentiated emergency ventilation skill training.

Ethics approval required

Ethics approval required

Ethics approval(s)

Approved 06/11/2025, Medical Ethics Committee of Shanxi Bethune Hospital (No.99 Longcheng Avenue, Taiyuan, Shanxi Province, 030032, China; +8603518368465; sxbqeylyll@163.com), ref: YXLL-2025-077

Primary study design

Interventional

Allocation

Randomized controlled trial

Masking

Open (masking not used)

Control

Active

Assignment

Factorial

Purpose

Treatment, Skill training: Evaluate airway ventilation skill performance

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

Bag-valve-mask ventilation operation skill for emergency resuscitation

Interventions

Participants are stratified by hand size (small hand < 170 mm vs. non-small hand $\geq$ 170 mm) measured according to the Chinese national standard GB/T 16252-2023. A computer-generated random number sequence (Microsoft Excel RAND function) is used to allocate participants 1:1 to either the C-E technique or LASOO technique group, with a fixed block size of 4.

For allocation concealment, sequentially numbered, opaque, sealed envelopes are used. The allocation results (A = C-E technique, B = LASOO technique) are placed in envelopes labeled only with concealment numbers. Envelopes are opened sequentially after hand-length measurement and stratification by a research assistant not involved in subsequent procedures.

All participants receive unified 2-hour standardised training via modified Peyton four-step teaching method, with a closed-book theory test score ≥ 80 required before formal testing.

1. CE group: C-E mask fixation technique, forming a C shape with thumb-index finger to seal mask and E shape with middle-ring-little finger to lift mandible.
2. LASOO group: Five-step Lift-Apply-Slide-Oppose-Observe mask fixation technique, authorised and reviewed by original developer Dr Cliff Shelton.

Each participant completes 10 consecutive bag-valve-mask ventilations with the dominant and non-dominant hand on a Laerdal QCPR manikin. Two blinded independent assessors separately record operation correctness and tidal volume data.

Intervention Type

Behavioural

Primary outcome(s)

1. Mean tidal volume (mL) measured using automated recording by the Laerdal QCPR manikin and matched iPad App, averaged from 10 consecutive ventilations of dominant and non-dominant hand per participant, at an assessment immediately after standardised skill training
2. Technique correctness rate measured using Assessor A (technique supervisor) observes and records on a standardized checklist at the ventilation procedure

Key secondary outcome(s)

1. Perceived fatigue score measured using self-reporting by participants at assessments immediately after standardised skill training after completing 10 ventilations for each hand

Completion date

31/12/2026

Eligibility

Key inclusion criteria

1. Female licensed nurses including advanced study nurses
2. Voluntary participation and signed written informed consent

Healthy volunteers allowed

Yes

Age group

Adult

Lower age limit

18 Years

Upper age limit

50 Years

Sex

Female

Total final enrolment

0

Key exclusion criteria

1. Arthritis, tendinitis, hand fracture, nerve injury or other disorders impairing hand function
2. History of hand/wrist surgery or trauma sequela affecting hand movement
3. Congenital or acquired hand malformation
4. Neurological diseases impairing fine motor control (Parkinson's disease, multiple sclerosis etc.)
5. Hand tactile or pressure sensory disturbance
6. Hand length <150mm or >190mm

Date of first enrolment

07/01/2026

Date of final enrolment

12/08/2026

Locations

Countries of recruitment

China

Sponsor information

Organisation

Shanxi Academy of Medical Sciences

ROR

<https://ror.org/04tshhm50>

Funder(s)

Funder type

Funder Name

Investigator initiated and funded

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary

Not expected to be made available

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Other files			13/08/2026	No	No
Other files			13/08/2026	No	No
Protocol file			13/08/2026	No	No