

Effectiveness of Simulation-Based Training for Clinical Breast Examination in Undergraduate Medical Education: A Quasi-Experimental Study

Abstract ID 260105

Sana Zeeshan¹ · Nadeem Siddiqui² · Amber Sultan³ · **Ahsan Ahmad**⁴ · Syeda Maryam Kazmi⁵ ·
Abraham Danish Durrani⁴ · Safna Virji⁶ · Lubna Vohra¹

Section of Breast Surgery & Centre of Innovation in Medical Education, Aga Khan University, Karachi, Pakistan

Background

- CBE remains vital in LMICs where mammography access is limited.
- Cultural barriers and constrained patient exposure — particularly for male students — hinder CBE skill acquisition in Pakistan.
- Simulation-based training (SBT) offers standardized practice independent of patient availability.

Aim

- Compare OSCE-assessed CBE performance: standard breast-surgery rotation alone vs. rotation plus a one-hour SBT workshop.
- Explore learner perceptions of SBT via focus-group discussion.

Methods

- Quasi-experimental, mixed-methods study; Centre of Innovation in Medical Education, AKU (Jun–Nov 2024).
- 66 Year 5 students, 3 clerkship rotations; non-randomly assigned to control (1-week rotation alone) or intervention (rotation + 1-hour SBT workshop).
- All completed pre- and post-test OSCEs (7-point scale checklist).
- Primary outcome: post-test score; secondary: gain score (post – pre).
- ANCOVA and a linear mixed-effects model assessed baseline-adjusted and longitudinal change (R v4.4.2; $p < 0.05$).



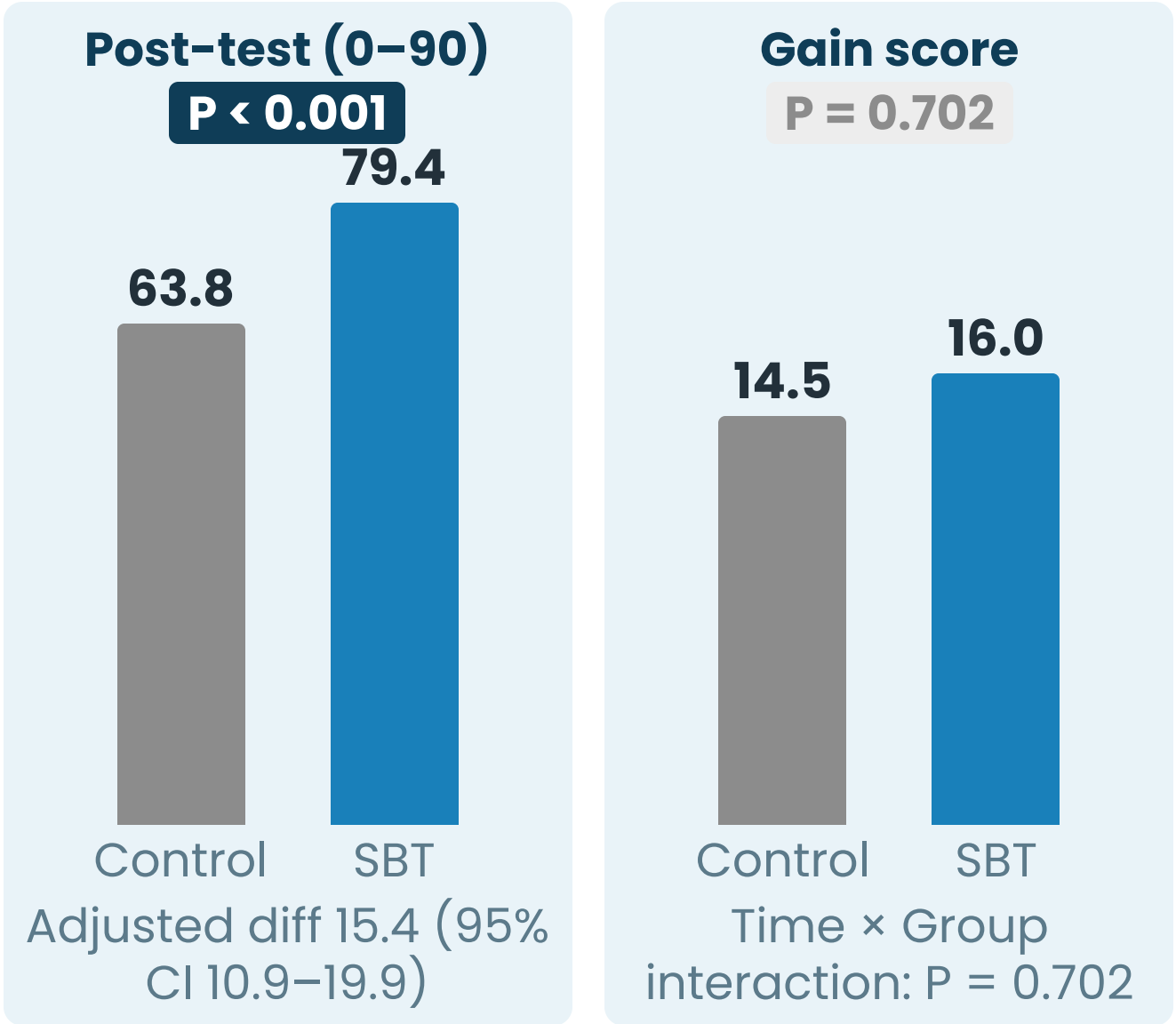
Silicone breast model used in the SBT workshop

N = 66 Year 5 students · 32 intervention · 34 control (32 per arm in complete-case post-test analysis) · median age 23.5 (IQR 23–24)

Results

Non-random allocation produced a **large baseline imbalance**: pre-test 63.4 ± 14.4 (intervention) vs 49.5 ± 12.7 (control); mean diff 13.94, $p < 0.001$.

Post-test score vs. gain score (post – pre):



Key nuance: higher SBT post-test scores mirror the baseline gap — gain scores and the Time × Group interaction were statistically equivalent, so this design cannot attribute greater improvement to SBT.

Exploratory subgroup: within the intervention group, males gained more than females (21.8 vs 10.2 points; $p = 0.054$).

Focus-group themes (intervention group):

Realistic, repeatable practice

Instructor feedback

Increased confidence

Less uncomfortable setting

Axillary/clavicular palpation was harder

Conclusion

- ✓ SBT was associated with **higher absolute post-test OSCE scores** and was perceived favorably by learners.
- ✓ Gain scores and the Time × Group interaction were **equivalent between groups** — baseline imbalance, not SBT, likely explains the post-test gap.
- ✓ Findings do not establish that SBT produces greater skill improvement than standard training; **larger randomized studies** with delayed assessment are needed.