

## Bedside Infant Manikins for Teaching Newborn Examination to Medical Undergraduates

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**Objective:** To study whether using infant manikins during clinical posting could help in teaching newborn examination to undergraduate medical students. **Methods:** 111 final MBBS students were taught newborn examination either by the new method which included practice on infant manikins at the bedside before examining babies (Group 1) or by the traditional method which involved directly examining babies (Group 2). They were tested the next day by validated OSCE stations on important aspects of the newborn examination. Marking was done as 0 (completely incorrect), 1 (partially correct) or 2 (completely correct). Student feedback was also taken. **Results:** Scores were higher, with lesser variance, in Group 1. Student feedback was positive, favoring the new method. **Conclusion:** Use of infant manikins at the bedside during clinical posting improves the performance of undergraduate students in newborn examination.

**Keywords:** Competency-based medical education, Simulation, Skill-teaching.

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Teaching large numbers of undergraduates how to examine newborn babies in the limited time available is a challenging, though mandatory, requirement of the undergraduate syllabus. However, many fresh medical graduates remain diffident in actually examining patients, specially newborns [2]. Traditional bedside demonstration of the newborn examination by a faculty followed by supervision of students while they examine babies themselves is tedious, and it is not always possible to ensure that every student actually achieves the requisite skills. We attempted to improve the traditional teaching method of newborn examination by using an infant manikin. This study was undertaken to determine if the use of manikin during clinics could improve the teaching of newborn examination to undergraduate medical students.

### METHODS

This was a prospective, observational study conducted with final year MBBS students during their Pediatric rotation. After taking the Institutional Ethics Committee clearance and informed consent of the students, batches of students were designated as Group 1 or Test Group (these students were exposed to the new method of teaching) and Group 2 or Control Group (these students were subjected to the traditional method of teaching) by draw of lots.

From a pilot study, it was calculated that a sample size

of 90 would be required to detect a 30% improvement in OSCE scores in newborn examination in the Test group with an alpha error of 5% and power of 80%. A convenience sample of 111 was taken to include all medical students coming for their Pediatric posting in the final year. 53 students were assigned to the test group (2 batches) and 58 students to the control group (2 batches) by draw of lots.

Group 1 was taught the newborn examination by the new method wherein a faculty member first demonstrated signs on the baby following which every student practiced on an infant manikin at the bedside under supervision (with correction if necessary) before examining babies themselves, in small groups, under supervision. Group 2 was taught by the traditional method wherein students observed faculty demonstrating signs on the baby and they then performed the examination on babies themselves, in groups, under supervision. Time allotted for the teaching sessions was similar for both groups. Neonatal resuscitation manikins (ResusciAnne by Laedral) were used for the study.

Students were tested by validated OSCE stations the day after the teaching session. Assessment was done on important aspects of the newborn examination requiring some maneuverability of the baby. Station A consisted of aspects of the general examination (Feeling the anterior fontanel, looking for jaundice on palms and soles, checking for ear recoil, breast nodule and sole creases) and

Station B consisted of some aspects of the neurological examination (assessing muscle tone by scarf sign, arm recoil, heel to ear and popliteal angle and eliciting the neonatal reflexes namely palmar and plantar grasp reflexes and Moro's reflex). Adequate numbers of healthy neonates were available at each OSCE station to ensure that no baby was examined by more than four students, to avoid fatigue of the neonates. Consent of the mothers was taken for the examination of the neonates. Complete asepsis and other relevant precautions were observed during the conduct of the OSCE. Marking was done by trained faculty on a nominal scale of 0 (completely incorrect), 1 (partially correct) or 2 (completely correct). What constituted 0, 1 and 2 was pre-determined and the scoring guide or checklist was kept with the trained examiner during the session. Each station was for 5 minutes. No student could see how others were doing during the examination as the stations were in adjacent but different rooms.

Scores were compared between groups using Mood's Median Test and variability in scores was compared by Levene Test. After the study was over, students (Test group) were asked to give a feedback on a Likert-scale on a validated questionnaire. After the end of the study, Control group students were also given an opportunity to practice on the infant manikins before the final examination.

## RESULTS

OSCE scores were statistically better in Group 1 (Test) as compared to Group 2 (Control), both in the general examination and neurological examination stations. In addition, the variance in the scores was significantly less in Group 1 (**Fig. 1**). In the student feedback, majority felt that practice on the manikin had helped them in

performing specific aspects of the newborn examination at the OSCE stations (**Table I**).

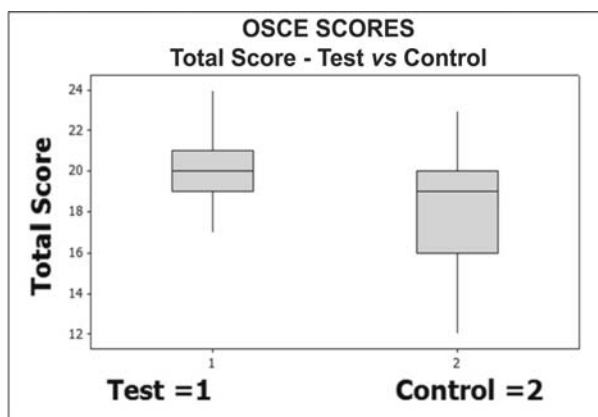
## DISCUSSION

This observational study looked at using a simple manikin to improve the skills of undergraduate medical students in examining newborns. In our study the students showed significantly better OSCE scores when manikins were used during teaching, in addition to the majority agreeing to the benefit of the training.

The main limitation of our study was that only one assessment was done, and that too the day after the training session. Hence the long-term effects of this change in training methodology cannot be commented upon. Moreover, we did not look at the mother's response to this method of teaching. Medical educators realize how anxious mothers get when young medical students handle their babies and this method of teaching could actually alleviate this anxiety.

Although there is ample evidence that simulation in training in critical care procedures is effective [5], its use for teaching clinical skills in neonatology has been infrequently addressed. Nurses and paramedics still use simple, non-computerized task-trainer manikins for teaching nursing procedures and breast feeding [6]. Bath, *et al.* [7] made an attempt to improve baby 'handling skills' of medical students with mechanized dolls. Most students felt that it helped them understand better the caretaking issues related to real babies.

There is a felt need to embrace simulation in pediatric teaching [8]. 'Skills laboratory' is now a mandatory requirement in medical colleges as per the latest MCI guidelines [9]. We feel that this study will add to the body



**FIG. 1** Box-plot chart showing difference in OSCE scores between group taught with a manikin (Test group) versus group taught by traditional method (Control Group).

**TABLE I** FEEDBACK OF MEDICAL UNDERGRADUATES REGARDING PRACTICE IN A MANIKIN (N=53)

Helped me in examining for	Agree (%)	Not sure (%)	Disagree (%)
Ear recoil	63	6	31
Breast nodule	67	8	25
Plantar creases	65	3	32
Palmar reflex	58	10	32
Plantar reflex	62	5	30
Moro's reflex	54	5	26
Tone of the baby	71	5	24
Anterior fontanel	60	18	22
Jaundice	67	11	22
Overall	63	10	27

**WHAT THIS STUDY ADDS?**

- Additional practice on manikin at the bedside during clinical posting improves students' performance in examination of the newborn.

of evidence on the use of manikins in undergraduate medical education, especially at the bedside for on examination skill.

Our study suggests that the using infant manikins at the bedside can improve skills of undergraduates in examining newborn babies. This method may be adopted in medical colleges during pediatric clinical postings.

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