

Bedside Infant Mannikins for Teaching Newborn Examination to Medical Undergraduates

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ABSTRACT

Objective: To study whether using infant mannikins 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 mannikins 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 mannikins at the bedside during clinical posting improves the performance of undergraduate students in newborn examination.

Keywords: Medical Education, Teaching methods and simulation.

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 mannikin. This study was undertaken to determine if the use of mannikins during clinics could improve the teaching of newborn examination to undergraduate medical students.

METHODS

This was a prospective, observational study conducted on 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 mannikin at the bedside under supervision (with correction if necessary) before examining babies themselves in small groups under supervision. Group 2 were 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 the same for both groups. Neonatal resuscitation mannikins (ResusciAnne by Laedra) 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 mannikin 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 mannikin 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 mannikin to improve the skills of undergraduate medical students in examining newborns. In our study the students showed significantly better OSCE scores when mannikin 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. in [5]. Nurses and paramedics still use simple, non-computerized task-trainer mannikins for teaching nursing procedures and breast feeding [6]. Bath, *et al.* 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 [7].

In our country 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 of evidence on the use of mannikins in undergraduate medical education, especially at the bedside for on examination skill.

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

WHAT THIS STUDY ADDS?

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

Contributors: SSM: conceived the study, supervised and participated in training, conducted the OSCE and wrote the paper; DJ: helped in training and conduct of the OSCE and also in editing the draft of the paper; MC: helped in conduct of the OSCEs and the questionnaire, and in editing the paper. All authors approved the final manuscript.

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REFERENCES

1. Srivastava RN, Mittal SK, Paul VK, Ramji S. for Indian Academy of Pediatrics. IAP Guidelines for Graduate Medical Education in Pediatrics. *Indian Pediatr.* 2001; 38:605-18.
2. Supe A, Burdick WP. Challenges and issues in medical education in India. *Acad Med.* 2006;81:1076-80.
3. Okuda Y, Bryson EO, Demaria S, Jacobson L, Quinines J, Shen B, *et al.* The utility of simulation in medical education: what is the evidence? *Mt Sinai J Med.* 2009; 76:330-43.
4. Halamek LP, Kaegi DM, Gaba DM, Sowb YA, Smith BC, Smith BE, *et al.* Time for a new paradigm in pediatric medical education: teaching neonatal resuscitation in a simulated delivery room environment. *Pediatrics.* 2000;106:E45.
5. Weinberg ER, Auerbach MA, Shah NB. The use of simulation in pediatric training and assessment. *Curr Opin Pediatr.* 2009;21:282-7.
6. Aebersold M, Tschannen D. Simulation in nursing practice: the impact on patient care. *Online J Issues Nurs.* 2013;31;18:6.
7. Bath LE, Cunningham S, McIntosh N. Medical students' attitudes to caring for a young infant-can parenting a doll influence these beliefs? *Arch Dis Child.* 2000; 83:521-3.

8. Kalaniti K, Compbell DM. Simulation-based medical education-time for a pedagogical shift. *Indian Pediatr.* 2015;52:41-5.
9. Minimum Standard Requirements for Medical Colleges. Available from: URL: <http://www.mciindia.org>. Accessed June 15, 2016.

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

<i>Helped me in examining for</i>	<i>Agree (%)</i>	<i>Not sure (%)</i>	<i>Disagree (%)</i>
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

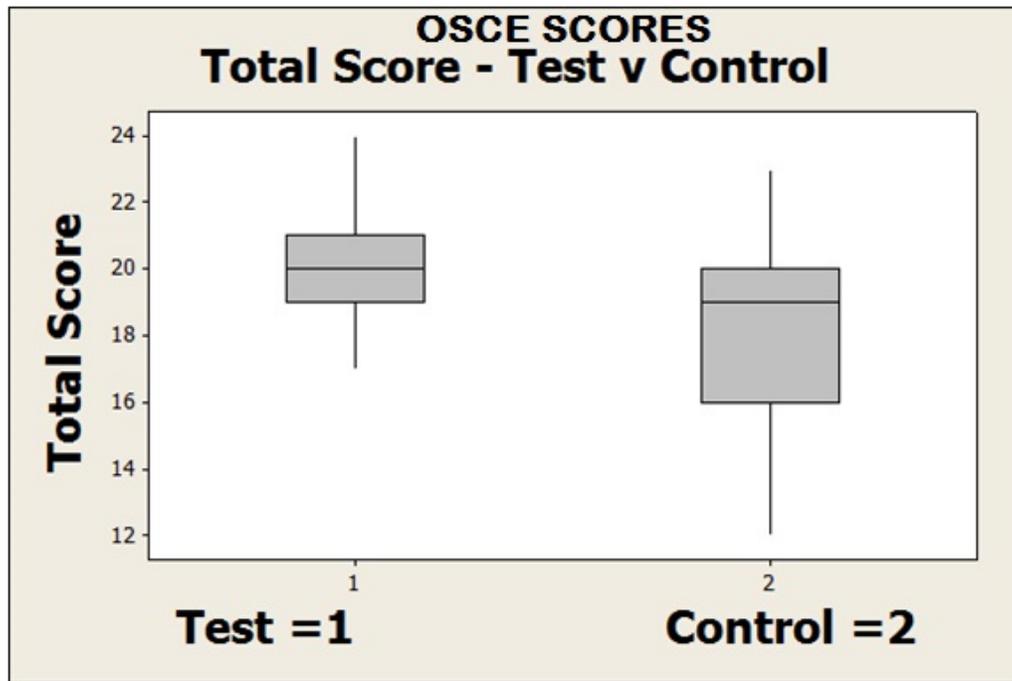


Fig. 1 Box-plot chart showing difference in OSCE scores between group taught with a mannikin (Test group) versus group taught by traditional method (Control Group).