Competency based Training & Evaluation of Final Year MBBS Students on Neonatal Resuscitation

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Abstract

Introduction: Currently the final year students are taught neonatal resuscitation in the form of conventional lectures which fails to develop & assess their skill to actually provide effective basic newborn resuscitation care at the time of birth.

Aim & Objectives: Competency based training of MBBS final year students to provide basic resuscitation to a newborn at the time of birth & their evaluation.

Methodology: Prospective Interventional study was done at Muzaffarnagar Medical College, Muzaffarnagar on 100 final year students (four groups of 25 students each). An interactive lecture of one hour duration of all 100 students & a two hour tutorial of each batch of 25 students with hands-on demonstration on manikin was held. A pre-test, a day before lecture & tutorial and post-tests, first a day and second 3 months after training in the form of validated MCQ written test and OSCE were taken for assessment. Feedback of students and faculties was taken on a five point Likert scale.

Result & Conclusion: 80 students scored > 75% marks in MCQ post-test1 (Mean score ± SD 76.51 ± 10.38, p value <0.001) and 94 students scored > 75% marks in OSCE post-test1 (Mean score ± SD 91.30 ± 13.40, p value <0.001) as compared to only 48 and 16 students in MCQ (Mean score ± SD 51.51 ± 11.33) & OSCE (Mean score ± SD 65.28 ± 9.18) pre-test respectively, thus proving that competency based newborn resuscitation training was very effective to develop necessary knowledge and skill of final year MBBS students. Retention of knowledge and skill was also evident from the scores of second post-test taken after 3 months. 74 students scored > 75% marks in MCQ post-test2 (Mean score ± SD 67.06± 8.61, p value <0.001) and 90 students scored > 75% marks in OSCE post-test2 (Mean score ± SD 83.45 ± 8.94, p value <0.001). Students' appreciated interactive environment, resources shared and knowledge, communication & facilitation skill of trainers while faculties' feedback was well perceived regarding training material and students' attention & body language.

Keywords: *Neonatal Resuscitation, Birth Asphyxia, Competency based training*

Introduction

UNICEF published its first-ever report on the newborn mortality rate, on Tuesday, 20th February 2018. According to the report, every year 26 lakh babies die worldwide within 28 days of birth, which is an average of 7,000 deaths every day. Of these, 6.4 lakh neonatal deaths occur in India. At neonatal mortality rate of 25.4 deaths per 1,000 live births (12th worst among the 52 lower-middle-income countries), India is quite far from meeting the commitment to lowering the neonatal mortality rates to 12/1000 live births[1].

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Birth asphyxia accounts for approximately 19 % of total newborn deaths in India. Around 10% of newborns require basic resuscitation, including stimulation at birth and about 1% need assisted ventilation with bag and mask, to initiate breathing[2,3]. These deaths can be prevented by improving antenatal care, especially by providing skilled resuscitation at delivery. Resuscitation efforts at birth are designed to help the newborn to make the respiratory and circulatory transition that must be accomplished immediately after birth, which result in lung expansion and elevation of PaO_2.

Hence, all skilled birth attendants (who are defined as doctors, midwives and other health professional trainees to manage normal pregnancies and childbirth, to identify and manage complications in women and newborn, and make needed referrals) should have the capacity to resuscitate newborn babies, whether deliveries take place in health facilities or at home. For resuscitation to be successful, it requires good understanding by the health-care personnel working in labour, maternity and newborn unit to have adequate skills for prompt neonatal resuscitation. Adequate knowledge and awareness about neonatal resuscitation plays a major role in early diagnosis, appropriate management and, accordingly, reduction of adverse consequences.

At present, final year students are taught neonatal resuscitation in the form of conventional lectures which impart them the knowledge regarding birth asphyxia and neonatal resuscitation but it fails to develop & evaluate their skill to actually provide effective basic newborn resuscitation care at the time of birth.

An objective structured clinical examination (OSCE) is a modern type of examination often used in health sciences. It is designed to test the clinical knowledge, skill performance and competence in skills such as communication, clinical examination, medical procedures / prescription[4,12].

An objective structured clinical examination (OSCE) is very useful tool to evaluate the Neonatal Resuscitation skills and knowledge of health care professionals (faculties, residents, interns and nursing staff of labour room & OT) dealing with child birth. It is a hands-on, real-world approach to learning that keeps examinees engaged, allows them to understand the key factors that derive the medical decision making process, and challenges the health care professionals to be innovative and reveals their errors in case handling and provides an open space for improved decision-making, based on evidence based practice for real-world responsibilities[4,12].

Aims and Objective

1. To carry out training of final year students for basic neonatal resuscitation and routine newborn care.

2. To assess neonatal resuscitation knowledge and skills of final year students.

3. To take feedback of students and faculty regarding the competency based training & evaluation method.

Material and Methods

Place: Muzaffarnagar Medical College, Muzaffarnagar

Study Design: Prospective Interventional study

Target Subjects: 100 final year students, divided into four groups of 25 students each

Methodology: This Prospective Interventional study was started in November 2018 after taking Institutional Ethics Committee approval & written informed consent from the students. A meeting of curriculum development committee of the institute, along with all the faculties of the department of Paediatrics, was held in the month of November 2018 to develop a competency based teaching module on Neonatal Resuscitation for Final MBBS Students with the help of NNF teaching aids, AIIMS Neonatology protocols and Navjaat Shishu Suraksha Karyakram, Ministry of H & FW, Govt. of India. This module had interactive lecture and tutorial including group discussion, role play and hand on demonstration on manikins to help them to acquire necessary knowledge and skill regarding effective basic newborn resuscitation care. A MCQ based written test and OSCE stations were also developed for evaluation of their knowledge and skill regarding effective basic newborn resuscitation care.

An interactive lecture of one hour duration of all 100 students was taken by faculty and a two hour tutorial of each batch of 25 students with hands-on demonstration on manikin was taken by the senior resident doctors in

the first week of December 2018. The senior resident doctors were given module prepared by faculties of department for uniform teaching of final year students.

A pre-test, a day before lecture & tutorial and two post-tests, first a day after training and second 3 months after training in the form of validated MCQ written test and OSCE were taken for assessment. A 2 hour tutorial of each batch with hands-on demonstration on manikin was held by the senior residents on same day. Post-test assessments with pre-validated 20 MCQ written test and OSCE were done on next day and after 3 months. Feedback of students and faculties was taken on a five point Likert scale regarding the newly introduced training & evaluation methods.

Observation and Results

Table 1: Pre and Post MCQ test performance to students

	PreTest	**Posttest 1**	**Posttest 2**
No. of students Passed (Score >75%)	48	80	74
Mean Score ± SD	51.51 ± 11.3	76.50 ± 10.38	67.06 ± 8.61
P value- pretest vs. posttest	< 0.001	< 0.001	< 0.001

Table 1: Describes MCQ pre and post test marks, in pre test 48 out of 100 students scored 48 >75% marks, while in post test 1, 80 out of 100 students scored >75% marks scored and in post test 2 74 out of 100 score >75% marks

Table 2: Pre and post OSCE test performance to students

	Pre Test	Post Test 1	Post Test 2
No. of students Passed (Score >75%)	16	94	90
Mean Score ± SD	65.28 ± 9.18	91.30 ± 13.40	83.45 ± 8.94
P value- Pretest vs Posttest	< 0.001	< 0.001	< 0.001

Table 2: Describes pre and post test OSCE marks, in pre test 16 out of 100 scored >75% marks, while in post test 1, 94 out of 100 students scored >75% marks scored and in post test 2, 90 out of 100 score >75% marks

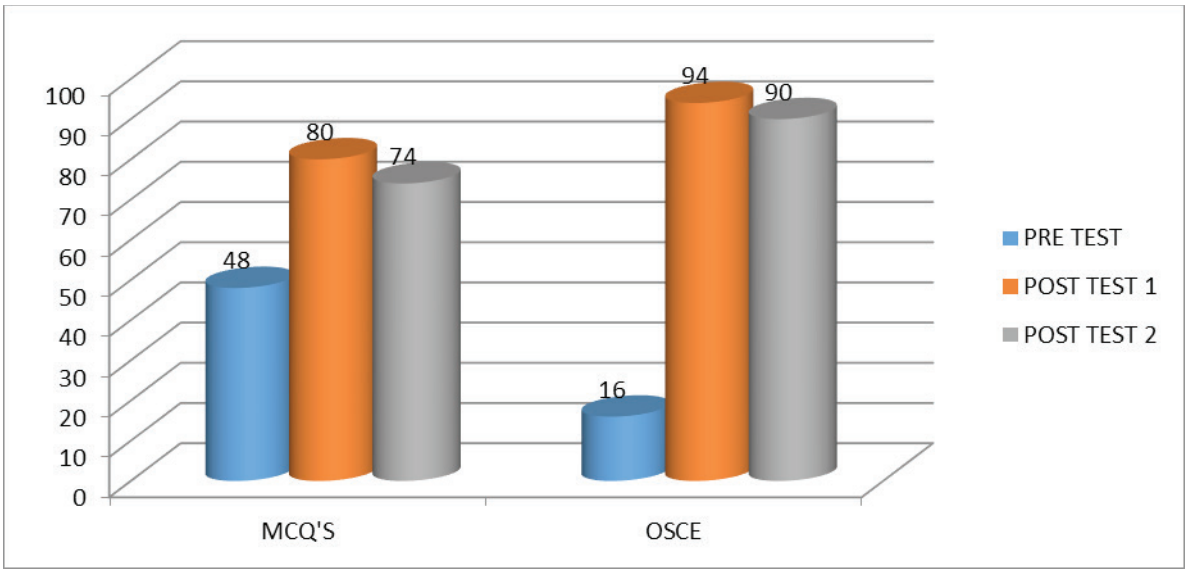

Figure 1: Vertical cylindrical diagram of percentage of students passed

Shows number of students scored >75 % marks in pre test, post test 1 and post test 2 on basis of MCQ's and OSCE

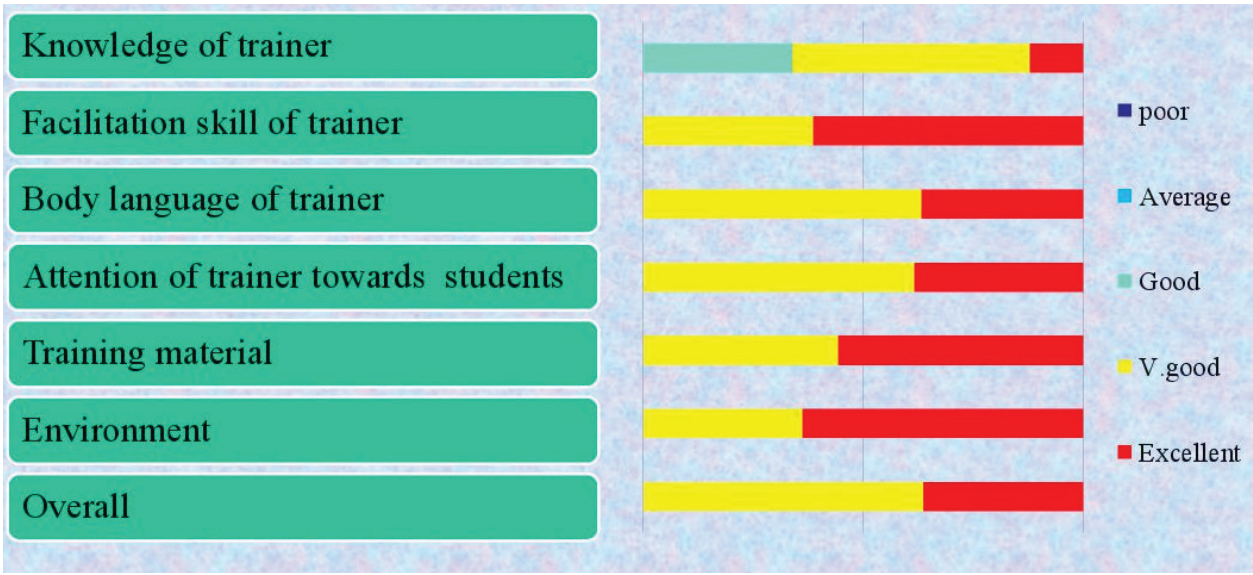

Figure 2: Students feedback on 5 Point Likert Scale

Students gave feedback in questionnaire form, rating given as poor, average, good, v,good, excellent.

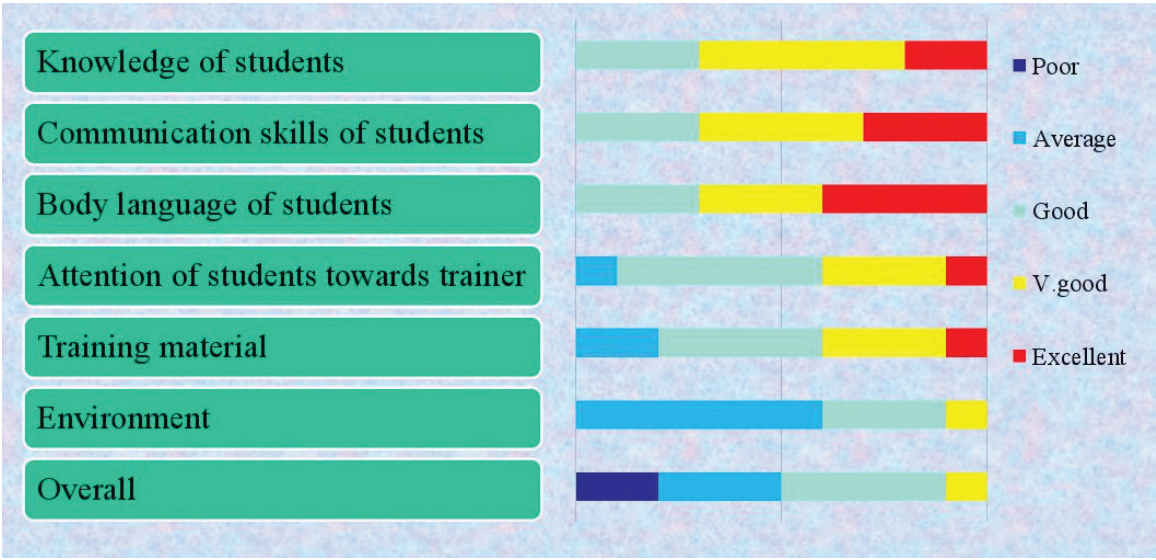

Figure 3: Faculty feedback on 5 Point Likert Scale

Faculty gave feedback in questionnaire form, rating given as poor, average, good, v.good, excellent

Discussion

Genesis: In the mid 1970s, neonatal intensive care units (NICUs) had become common in and as a result, the National Institutes of Health (NIH) funded five projects to provide fundamental neonatal care education to hospitals with level 1 perinatal services. Dr. Ron Bloom and, Cathy developed the Neonatal Education Program (NEP), a 6-module series focused on neonatal resuscitation. These modules formed the basis of the future Neonatal Resuscitation Program®. Members chair of the American Academy of Pediatrics (AAP) Section on Perinatal Pediatrics, advocated for the development of a neonatal resuscitation core curriculum. They met with representatives from the AHA to explore a course structure. Both organizations expressed a joint commitment to develop a training program aimed at teaching the principles of neonatal resuscitation with the goal of having a trained provider at every delivery. In 1987, the AAP Section launched the Neonatal Resuscitation Program (NRP) program in New Orleans in November 1987. Within a year, NRP had reached 48 states and Canada with 184 National Faculty and 876 trained Hospital-based Instructors. The program continued to expand, both in the US and internationally. NRP continues to meet the learning needs of instructors and providers through award winning state of the art interactive education in 130 countries.[13,14]

First International Course on NRP in India was conducted in 1989. National Neonatology Forum (NNF) created a national faculty of 150 pediatricians and nurses for NRP, who trained 12,000 healthcare professionals in various parts of India over the following 2 years in advanced course of NRP. But there was no follow up or monitoring and no system of certification or training was in place which is an essential component of good NRP program. Since then, the NRP has been taught sporadically in India. However for a country of the size of India with 27 million deliveries per year the programs need to be up scaled substantially. To have a skilled birth attendants trained for every delivery, more than 0.25 million health professionals needed to be trained in NRP including physicians, pediatricians, obstetricians, anesthetics, nurses, midwives and other categories. It is also essential that such skilled professionals are available in a short period of time to meet the requirement of MDG4 goal and NRP. This would require massive organizational support. Isolated training efforts have had little impact on influencing neonatal training efforts, largely due to size of country.[15]

However there was no such training program as a part of MBBS curriculum and final year MBBS students were taught neonatal resuscitation only as didactic lectures with little or no Hands on training on manikins. Our aim was to train final year IMG to provide basic

neonatal care at the time of delivery.

The development of OSCE for the evaluation of neonatal resuscitation skills and the assessment of students' knowledge, experience and competence in performing neonatal resuscitation was described by Javad Malekzadeh, Fatemeh Erfanian & Talaat Khadivzadeh in 2015. In their study, regarding knowledge about neonatal resuscitation, students obtained almost half of the total score in MCQ pretest while in terms of students' neonatal resuscitation skills, the findings were dissatisfactory as 84.6% of students had poor skills in neonatal resuscitation, and students obtained less than 50% of the total score in OSCE pretest, which indicated lack of knowledge in cardiopulmonary resuscitation.[4]

Similarly in our study, we observed that students performed well in MCQ's based pretest as compared to OSCE based pretest due to their existing theoretical knowledge only with no practical skill. Almost half of the students (48 out of 100) passed in MCQ pretest (Mean score ± SD 51.51 ± 11.33) while only 16 students were successful in OSCE pretest (Mean score ± SD 65.28 ± 9.18). But in post test OSCE score was better than MCQ' based test as out of total 100 students, 94 students scored > 75% marks in OSCE post-test1 (Mean score ± SD 91.30 ± 13.40, p value <0.001) as compared to 80 students scored > 75% marks in MCQ post-test1 (Mean score ± SD 76.51 ± 10.38, p value <0.001).

Retention of knowledge and skill was also evident from the scores of second post-test taken after 3 months. 74 students scored > 75% marks in MCQ post-test2 (Mean score ± SD 67.06± 8.61, p value <0.001) and 90 students scored > 75% marks in OSCE posttest2 (Mean score ± SD 83.45 ± 8.94, p value <0.001).

This shows that real-world approach to learning have better impact in decision making while handling the patient.

Result

In our study, students performed well in MCQ's based pretest as compared to OSCE based pretest due to theoretical knowledge. But in post test OSCE score is better than MCQ' based test, this shows that real-world approach to learning have better impact in decision making while handling the patient. During feedback on five point Likert scale, students appreciated interactive environment, resources shared and knowledge, communication & facilitation skill of trainers while faculties' feedback was well perceived regarding training material and students' attention & body language.

Conclusion

Competency based training of Indian medical graduate (IMG) will make them competent to provide basic resuscitation to a newborn at the time of birth leading to reduction in Neonatal mortality to Sustained Development Goal (12/1000 live birth).

Limitations: Small sample size of only 100 students and only one time intervention limits this study. Repeated teaching is also required.

Conflict of Interest: None

Source of Funding: Self

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