ORIGINAL RESEARCH

Learning Neonatal Resuscitation Protocol by Simulation based teaching in MBBS Interns: A Qualitative analysis

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ABSTRACT
Background: Traditionally the Neonatal Resuscitation Protocol (NRP) is taught by lectures and Chart based methods. Revised curriculum using Competency based medical education (CBME) lists Neonatal resuscitation Protocol as a certifiable procedural skill in Pediatrics. The learning by listening alone has been shown to be short lasting as compared to when acquired by doing it. The qualitative analysis of the simulation-based teaching in learning neonatal resuscitation has been less described. **Aims and objectives:** To qualitatively analyze the experiences of the interns about learning neonatal resuscitation protocol by simulation-based teaching. **Methodology:** This study was a qualitative cross-sectional study done in MBBS interns of a government medical college in North India over a period of three years. The whole batch of interns was divided into groups. For the background knowledge, the interns were required to see the validated structured videos available on the IAP NRP website, and then complete the posttest to become eligible for offline simulation-based training. Trained instructors from Indian Academy of Pediatrics taught the students about the NRP on the simulator mannequins. The structured scenarios were given to the interns and they were asked to perform hands on as if they are attending delivery in real time. They also were evaluated in a structured manner by validated Performance Checklist. The feedback was taken after the training. Thematic analysis using the inductive approach was used to analyze this qualitative data. The written transcripts of the intern's responses were coded into different heading based upon the idea or the expression contained in the text. These codes were then classified into various themes on the basis of identification of similar patterns. The themes were then cross checked to see if all the data was included in the analysis. **Results:** A total of 362 students filled the proforma. The major themes which were generated in the qualitative analysis of the responses stated by the students included 'Better Learning', 'Novel', 'Focused Learning', 'Mimicked Real Scenario', 'Interactive', 'Skill Building', 'Motivating'. Almost all of students suggested that more discussion and training for NRP should be done during the MBBS final year and at the onset of internship. Almost all of the students liked the training and were feeling confident to handle such situation in real life after attending the training. They also felt similar training should be provided in more topics and other subjects. **Conclusion:** Simulation based teaching learning method in the hybrid was found to be acceptable, beneficial and motivational in the MBBS interns for learning neonatal resuscitation protocol.
Keywords: Neonatal Resuscitation Program, Interns, Simulation, IAP FGM, Hybrid Mode

INTRODUCTION

Neonatal Resuscitation Program (NRP) was developed by the American Academy of Pediatrics and the American Heart Association based on the latest scientific evidence, with the goal of having at least one trained provider present at each delivery (1). Neonatal Resuscitation Training is an integral part during the training of the undergraduate as well as post graduate students in the medical curriculum in India. Revised curriculum using Competency based medical education (CBME) lists Neonatal Resuscitation Protocol as a certifiable procedural skill in Pediatrics (2). Traditionally the NRP is taught by lectures and chart-based methods. The learning by passive listening alone has been shown to be short lasting as compared to when acquired by doing it (3).

NRP is a complex procedure and has many steps which must be followed in the intended manner to have a best outcome. There are high chances of committing medical errors and deviation from the protocol may have direct implications on neonatal mortality and morbidity. This is a skill which should

be learnt in spirit and ideally before actually going to the real scenario. Indian Academy of Pediatrics through its First Golden Minute project has taken up the teaching of the NRP skills in a hybrid manner to the health care professionals totally free of cost (explained later) (4). The basic NRP provider course focusses on training the health care providers up to the training of administering the Bag and Mask ventilation to the participants, a step which has been shown to have maximum impact in saving lives.

NRP has been shown to be effective in the medical students and residents using simulation-based teaching learning methods (5–7). Simulation is a learner-centered practice that helps develop and maintain knowledge, skills, and competencies and facilitates the acquisition of clinical skills in a safe environment through repeated practice, thereby improving patient safety and reducing medical costs (8,9). All the aspects of the student including the cognitive, procedural and affective domains along with the decision-making ability in adverse situations are improved by this technique (10).

Majority of the previous studies have focused on the pre post test pattern in testing the improvement in the subject understanding of the simulation-based techniques in NRP in the undergraduate students and residents (10–12). The qualitative analysis of the hybrid model of the simulation-based teaching in learning neonatal resuscitation has been less described. We aimed to qualitatively analyze the experiences of the MBBS interns about learning neonatal resuscitation protocol using hybrid model of simulation-based teaching.

METHODOLOGY

This Qualitative cross-sectional study was carried out in a tertiary level Government Medical College in North India over a period of three years. The study subjects included the MBBS interns posted in the institute. They were eligible for enrolment if they had completed the hybrid basic NRP Provider Course organized by the IAP in the college premises. The interns who did not give consent to be included in the study or who completed only a partial part of the course were excluded from the study.

Basic NRP Provider course is a free of cost training provided by the Indian Academy of Pediatrics under First Golden minute (IAPFGM) project to the health care professionals who are actively involved in managing the newborn at the time of delivery. Our center has been designated as an official center by IAP for doing NRP training workshops for the nurses, interns, doctors and paramedical staff involved in the resuscitation and these training are being conducted for last three years. The NRP under IAPFGM includes going through the online videos first followed by the hands-on session in the physical mode.

Each year, the whole batch of interns was divided into groups and trained batch-wise. For the background academic knowledge of the NRP, the interns were required to see the validated structured videos related to the topic on the IAP NRP website, and then complete the posttest to become eligible for offline simulation-based training. Trained instructors from Indian Academy of Pediatrics taught the students about the NRP on the simulator mannequins. The structured scenarios were given to the interns and they were asked to perform hands-on as if they are attending delivery in real time. During the onsite physical sessions each student was evaluated using a structured Performance Checklist. A provision for the re-evaluation was there for the participants who are not able to perform satisfactorily. Participants were declared pass only if all the essential steps included in the checklist were satisfactorily completed by them.

After the training feedback was taken in form of a questionnaire which contained open ended questions. Thematic analysis using the inductive approach was used to analyse the qualitative data. The written transcripts of the students' answers were coded into different heading based upon the idea or the expression contained in the text. These codes were then classified into various themes on the basis of identification of similar patterns. The themes were then cross checked to see if all the data was included in the analysis. The results were compiled in Microsoft excel. Descriptive statistics were used to analyse the results. The step-by-step overview of this training is shown in Figure 1.

RESULTS

During the three-year study period, out of 372 interns enrolled in the study, 362 were included in the study (n=10 participants were excluded as they did not attend the physical session). Almost all of the student were satisfied with the hybrid mode and found it very useful. They were appreciative about the course structure, material, and overall quality of the training sessions.

The major themes which were generated in the qualitative analysis of the responses stated by the students included 'Better Learning', 'Novel', 'Mimicking Real Scenario', 'Interactive', 'Skill Building', 'Motivating' and are depicted in Figure 2 and Table 1.
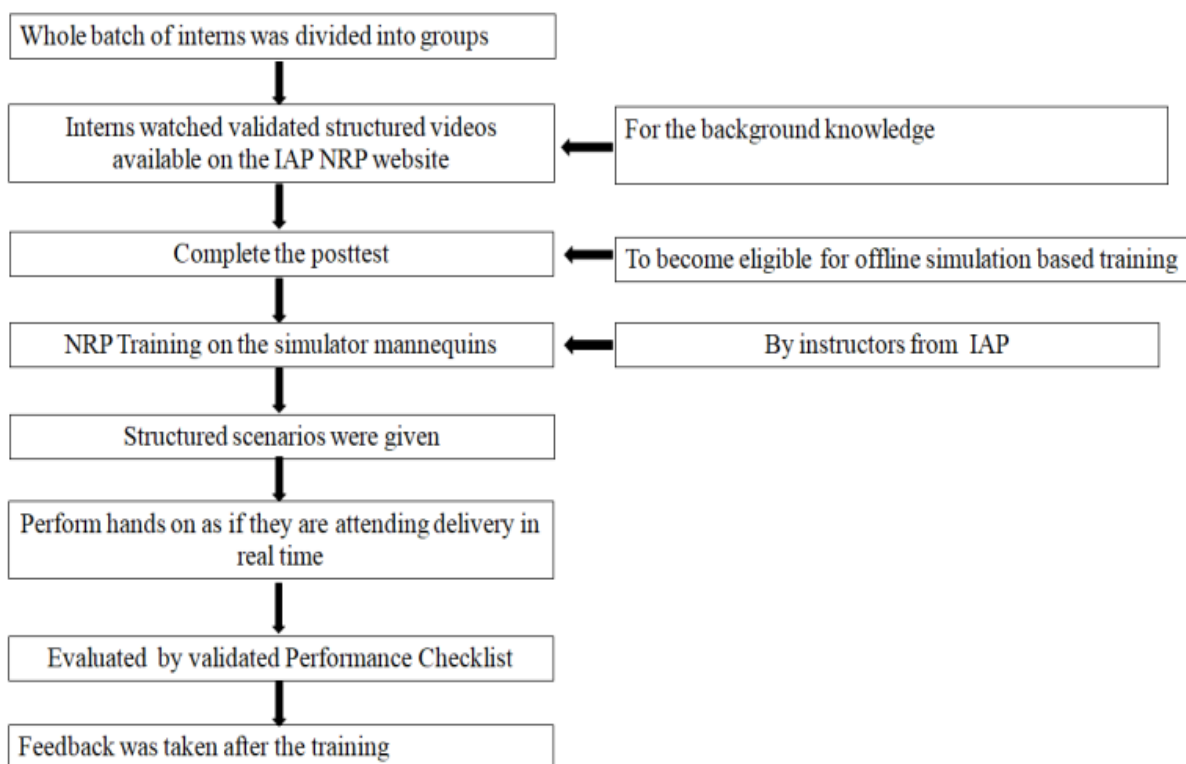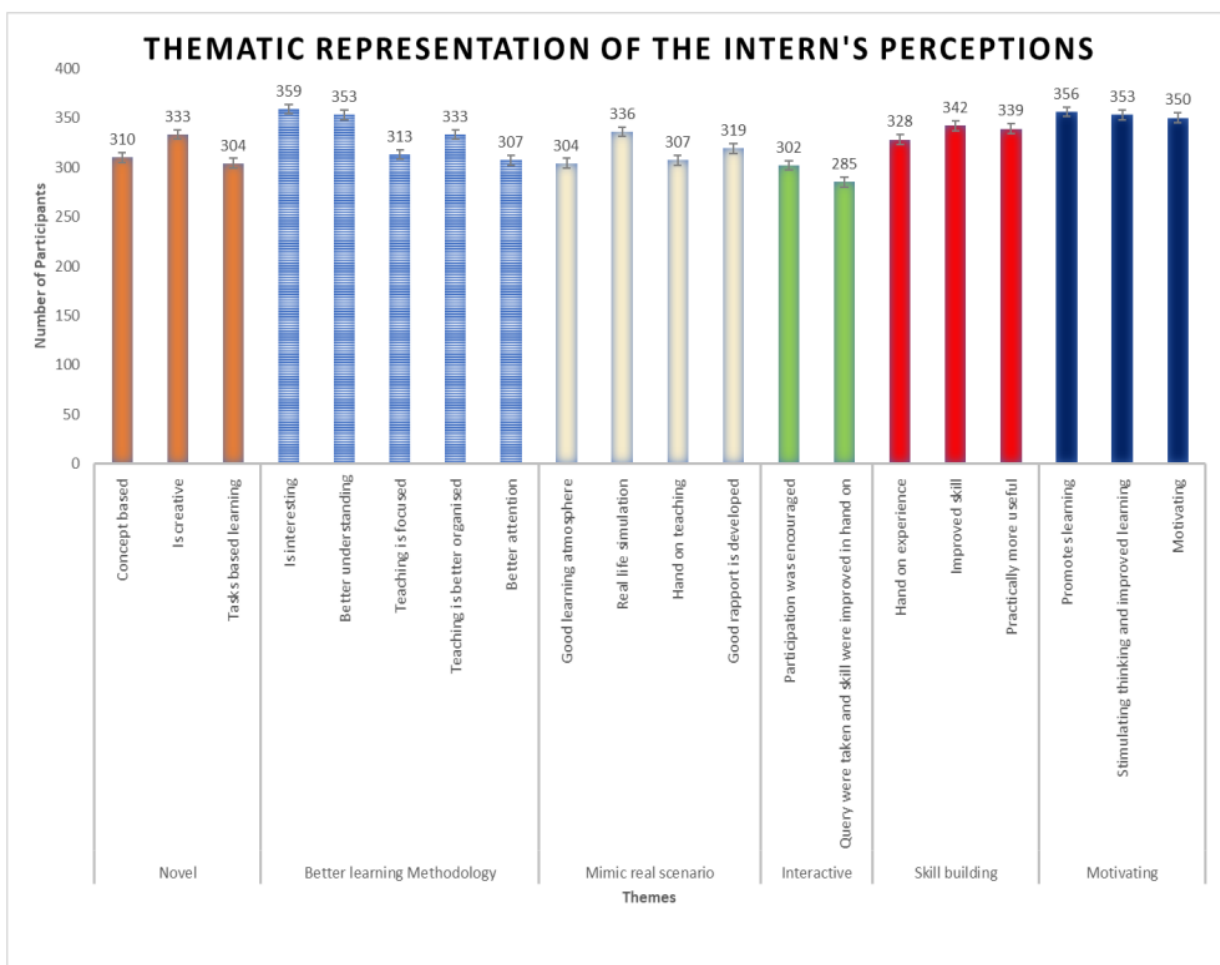
Figure 1: Flow Chart of the Process

Figure 2: Thematic Representation of the Intern's Perception about NRP

Table 1: Thematic Perceptions of MBBS Interns about Hybrid NRP

Broad Theme	Component	N(%)
Novel	Concept based	310(85.7%)
	Is creative	333(92%)
	Tasks based learning	304(84.1%)
Better learning Methodology	Is interesting	359(99.2%)
	Better understanding	353(97.6%)
	Teaching is focused	313(86.5%)
	Teaching is better organized	333(92%)
	Better attention	307(84.9%)
Mimic real scenario	Good learning atmosphere	304(84.1%)
	Real life simulation	336(92.8%)
	Hand on teaching	307(84.9%)
	Good rapport is developed	319(88.1%)
Interactive	Participation was encouraged	302(83.3%)
	Query were taken and skill were improved in hand on	285(78.6%)
Skill building	Hand on experience	328(90.5%)
	Improved skill	342(94.4%)
	Practically more useful	339(93.7%)
Motivating	Promotes learning	356(98.4%)
	Stimulates thinking and improved learning	353(97.6%)
	Motivating	350(96.8%)

SUGGESTIONS FROM THE INTERNS

Almost all of students suggested that more discussion and training for NRP should be done during the MBBS final year and at the onset of internship so that they are well prepared before the actual facing of the delivery. Almost all of the students liked the training and were feeling confident to handle such situation in real life after attending the training. They also felt similar training should be provided in more topics and other subjects.

The students were also of the opinion that civil hospital staff including obstetricians, doctors, and peripheral health care workers should be given separate training, giving them more time, and tests in the local language. Nurses, in addition should be taught a full equipment checklist for advanced NRP in addition to the basic course as they might have to prepare the stage for higher levels of resuscitation. They were happy with the ratio of participant to instructor which was 8:1 and felt it gave them adequate hands-on practice on all skill sessions. Some students felt that giving more time for the bag and mask station would go an extra step for preparing them for the hands-on workshop.

DISCUSSION

This is the one of the first few studies done after the introduction of the hybrid model of NRP training by IAP. This qualitative study of the perception of the MBBS interns did report that the hybrid method of learning NRP was highly useful in improving the understanding of the subject. In one study done on 28 interns during their NICU posting, if they received training of the Golden Minute module and hands-on simulation practice during and after 1 and 3 months of posting, had higher scores (18.8 vs 18.6 vs 14.4; P < .01) and shorter time to effective BMV (10.6 vs 20.4 vs 52.8 seconds; P < .05 for both comparisons) than those of controls (13).

It was shown in a study done in 34 Interns who received systematic training of high-fidelity mannequins, they exhibited more frequent teamwork behaviors and better workload management and completed the resuscitation more quickly than did control subjects and the impact on team behaviors persisted for at least 6 months (14).

Studies done earlier in undergraduate medical students have reported that simulation is one of the best methods to enhance the learning of the neonatal resuscitation. A study done in Korea reported that there was considerable improvement in the technical as well as non-technical skills in the understanding of the medical student's resuscitation skills (5). In another study done in students posted in anesthesia concluded that there was improvement of post-interventions knowledge and clinical skills of undergraduate anesthesia students for both aspects of evaluation and appropriate actions for neonatal resuscitation (15).

Even in previous studies, a high-fidelity resuscitation simulation training program improved learners' knowledge, self-confidence, teamwork, leadership, situation monitoring, mutual support, communication skills, and critical behaviors for neonatal resuscitation (5,16,17).

Study in pediatric residents in various studies have reported that Team-based simulation training in neonatal resuscitation improves the knowledge, skills, and performance of pediatric residents and has a positive effect on their self-confidence and leadership skills (12).

Simulation gives us the opportunities to learn in a safe environment. In today's scenario, where there is mushrooming of various medical colleges and number of the undergraduate students is very high, there might be dearth of the clinical material to provide adequate training. Therefore, the students need to be repeatedly exposed to simulation education experiences in order to have a sense of psychological stability and to competently deliver medical treatment in a clinical setting (11).

The positive points of our study are that this is a considerable sample size done over a period of three years. The limitation of this study is that we have analyzed one time perception in the interns, that too immediately after the training. It would be interesting to note that what they feel, how much they retain, and how do they carry it forward in the real-life scenario after some gap of the training. A longitudinal assessment done in a systematic manner to assess the retention in the skills acquired would be very useful to assess this aspect.

CONCLUSION

Simulation based teaching learning method in hybrid mode was found to be acceptable, beneficial and motivational in the MBBS interns for learning neonatal resuscitation protocol. Studies must be planned to devise ways to incorporate the benefits perceived to be translated in the real life and for longer duration.

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