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### **Original Research Article**

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# The effectiveness of teaching on standardized neonatal resuscitation protocol in relation to knowledge and skills of nursing personnel in tertiary care hospital

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#### **ABSTRACT**

**Background:** Perinatal asphyxia is a major contributor to neonatal morbidity and mortality worldwide. Neonatal resuscitation is effective only when health professionals have sufficient knowledge and skills. We studied the change in the knowledge and skills of health professionals before and after training on standard protocol on neonatal resuscitation.

**Methods:** A Hospital based cross-sectional prospective study was conducted in tertiary care hospital of Lucknow. All nurses from delivery room and Neonatal intensive care unit were included. The mean scores of knowledge and skills were assessed before and after teaching neonatal resuscitation protocol. Results were analysed by using 'paired t' test and Chi-square to see the association.

**Results:** Fifty nursing personnel participated in the study. The overall mean scores of knowledge and skills of subjects were (11±4.18, 5.98±1.68) respectively. Whereas the mean scores of knowledge and skill after post-test were (27.28±1.45, 16.28±0.99). Effectiveness of teaching programme regarding standardized Neonatal Resuscitation Protocol in relation to skill was effective as the t value 37.27 and p value <0.0001 was highly significant and Effectiveness of teaching programme regarding standardized Neonatal Resuscitation Protocol in relation to knowledge was effective as the t value 27.27and p value <0.0001 was highly significant.

**Conclusions:** The knowledge and skill levels of nursing personal were substandard. There was significant difference in knowledge and skill scores after teaching. Continual teaching and training on neonatal resuscitation for nursing personal should be emphasized.

**Keywords:** Knowledge, Neonatal resuscitation protocol, Nursing personnel, Skill

#### INTRODUCTION

Birth is a physiological process that represents the start of life as a physically separate individual. It signifies a transitional phase that every new-born undergoes, thus leaving the highly protected intrauterine environment to independent existence.<sup>1,2</sup>

Successful transition from fetal to neonatal life comprises diverse physiological modifications. Before birth, the baby receives oxygen and removes carbon dioxide through the placenta, while after birth, lungs take over this function. The modulation from placenta to lungs for gas exchange begins when the umbilical cord iscut or tied off and the baby takes its first breath.<sup>3</sup> Approximately 5%

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to 10% of newly born population requires some degree of active resuscitation at birth (e.g. stimulation to breathe), of which approximately 1 to 10% require assisted ventilation. More than 5 million neonatal deaths occur worldwide each year. <sup>4,5</sup> It has been estimated that birth asphyxia accounts for 19% of deaths suggesting that the outcome might improve for more than 1 million infants per year through implementation of simple resuscitative techniques.

World Health Organization defined birth asphyxia as failure to initiate and sustain breathing at birth.6Every new-born should be considered at a high risk for birth asphyxia since most cases of asphyxia cannot be predicted.<sup>7</sup> Studies from Nigeria and Malawi found that the main cause for neonatal death was birth asphyxia, indicating that the skills of health professionals about neonatal resuscitation was very crucial for immediate neonatal outcome.<sup>8-10</sup>

Anticipation, adequate, and accurate evaluation and prompt initiatives for resuscitation are critical for successful neonatal resuscitation. In every delivery there should be a nurse who is capable of initiating resuscitation including administration of positive pressure ventilation and chest compression including endotracheal intubation and administration of medication.

Nursing personnel working in labor room and NICU may not be adequately competent to handle the asphyxiating babies. It also observed that they do not follow the steps of neonatal resuscitation properly. Crucial time gets wasted in collecting the equipment when needed to resuscitate the baby.

To root the concept of new-born resuscitation wide and far is currently a major challenge. Health workers attending births are often not proficient in resuscitation techniques, and equipment may not be available or it may not be in working order. Also, there is a tendency to overuse resuscitation procedures. Therefore, in addition to training of health workers, regular assessments of the quality of care that new-borns receive around birth, including appropriate use of resuscitation, are required. The generic tools to assess quality of care derived from these recommendations will be an important element in their implementation. <sup>11</sup>

We did this study to assess the knowledge of nursing personnel working in NICU and delivery room of selected tertiary care hospital regarding standardized neonatal resuscitation protocol and to assess the effectiveness of teaching on standardized neonatal resuscitation protocol in relation to knowledge and skill of nursing personnel working in NICU and delivery room

#### **METHODS**

A cross sectional study conducted on 50 nursing personnel working in NICU and delivery room of tertiary

care hospital, Lucknow. The structured knowledge questionnaire consisted of two Sections, section-I was divided in to two parts Part A part B, Part A comprised of items on socio-demographic profile i.e. age, gender, professional qualification, total years of experiences in delivery room and NICU, in service education on resuscitation, areas of clinical exposure. Part B consisted of 30 structured knowledge questions regarding standardized neonatal resuscitation protocol. Section-II consisted of 18 observation check list score of 1 was given for each correct response and 0 for each wrong response. Negative marking was not done.

#### Data collection and analysis

Data was presented in the form of tables and figures for better clarification. Paired t-test and Correlation were applied to analyse knowledge and skill of the nursing personnel and association between knowledge and skill.

#### RESULTS

Pre-test and post- test general question score of subject, regarding standardized neonatal resuscitation protocol the mean and SD of general question at the pre-test level with mean and SD (2.16±1.11) was compared to that post - test level with mean and SD (4.10±0.86) were found to be highly significant with t value 9.769 and p value <0.0001. Which is followed by Initial step score with t value 22.014 and p value<0.00001, Chest compression score with t value 15.98 and p value <0.0001, Endo-Trachial Intubation score with t value 28.094 and p value <0.0001 & medication score with t value 41.22 and p value <0.0001 were found to be significant. Positive pressure ventilation was not found to be significant association Table 1. Pre-test and post-test knowledge score of subject, regarding standardized neonatal resuscitation protocol shows the mean of knowledge at the pre-test level with mean and SD (11.12±4.18) was compared to that of post-test knowledge with mean and SD (27.28±1.45) were found to be significant with p<0.0001. The pre-test skill was compared to the post test skill test with mean and SD (5.98±1.68) and was compared to the post test skill with mean and SD (16.28±0.99) were found to be significant with p<0.0001. The first objective to assess the pre-test and post knowledge of the nursing personnel working in NICU and delivery room regarding standardized neonatal resuscitation protocol was achieved. The above finding are supported by Jose M Balijam, he conducted a study to see mall practice on neonatal resuscitation.

The training intervention significantly improved the performance of initial resuscitation steps, with 66% initial practices being adequate in the intervention group compared with 27% in the control group. In addition, there were significant reductions in the frequency of inappropriate and potentially harmful practices and improvements in overall resuscitation scores Table 2. The overall pre-test skill of the subjects, 29 (48%) had poor

skill, 22 (44%) had average knowledge and no one was in good score towards standardized neonatal resuscitation protocol. The overall post- test skill scores revealed that 50 (100%) good score on skill of standardized neonatal resuscitation protocol Table 3. The correlation between

the pre-test knowledge and skill as r=0.97 i.e. positive correlations between the knowledge and skill in the nursing personnel regarding neonatal resuscitation protocol Table 4.

Table 1: Distribution of the subjects with standardized neonatal resuscitation protocol.

Parameter	Pre-test		Post-test		- 4 volue	P-value
r ar ameter	Mean±SD	Mean Score (%)	Mean±SD	Mean score (%)	t-value	r-value
General question	2.16±1.11	0.43	4.10±0.86	0.82	9.76	0.0001
Initial step	1.64±0.33	0.33	4.80±0.39	0.96	22.01	0.0001
Positive pressure ventilation	$3.34\pm0.67$	0.67	4.92±0.37	98.40	0.30	0.763
Chest compression	2.24±0.45	0.45	4.50±0.74	0.90	15.88	0.0001
Endo-Trachial intubation	1.60±0.32	0.32	4.55±0.67	91.60	28.09	0.0001
Medication	1.42±0.28	0.28	4.66±0.48	0.93	41.22	0.0001

Table 2: Distribution of the subjects with knowledge and skills of standardized neonatal resuscitation protocol.

Parameter		Mean±Sd	p-value	
Vnowledge	Pre-test	11.12±4.18	0.0001	
Knowledge	Post-test	27.28±1.45		
Skill	Pre-test	5.98±1.68	0.001	
	Post-test	16.28±0.99	0.001	

Table 3: Distribution of the skill score of the subjects.

Skill score	Pre-test		Post-test	Post-test		
	Frequency	Percentage	Frequency	Percentage		
Good	0	0.00	50	100		
Average	22	42.00	0	0.00		
Poor	29	48.00	0	0.00		
	50	100.00	50	100		

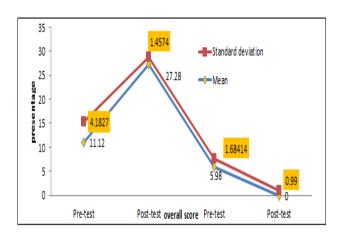


Figure 1: Association between overall pre-test and Post- test knowledge and skill mean score.

The effectiveness of teaching program regarding standardized Neonatal Resuscitation Protocol in relation

to knowledge was effective and the effectiveness of teaching program regarding standardized Neonatal Resuscitation Protocol in relation to skill as the t-test value of 25.27 was highly significant as value at P<0.0001 Table 5. The mean post-test skill score of nursing personnel in NICU and delivery room of selected urban hospital regarding neonatal resuscitation practice was significantly higher than the mean pre-test skill score.

Table 4: Association between knowledge and skill of standardized neonatal resuscitation protocol.

Area	Mean	SD	r- value	P-value	
Knowledge	11.12	4.18276346	0.978	0.004	
Skill	5.98	1.68414	0.976	0.004	

Table 5: Effectiveness of teaching on skill and knowledge regarding standardize neonatal resuscitation protocol.

Effectiveness of teaching on skill						
Skill test	Mean	SD	't'-test	P		
				value		
Pre-test	5.98	1.68414	37.27	0.0001		
Post- test	16.98	0.9905				
Effectiveness of teaching on knowledge						
Pre-test	11.2	0.27	25.27	0.0001		
Post- test	27.28	4.18				

#### **DISCUSSION**

The simplest method of testing effectiveness of training is to administer the same set of objectively structured questions before and after the session and to analyse the difference. This study showed that the overall knowledge and skills of nursing personal were insufficient. The overall mean knowledge and skill scores of nursing professionals were 11.12±4.18 and 5.98±1.68 respectively. This finding favours the study of Enweronu et al. This might be due to lack of exposure to an adequate number of real cardiopulmonary resuscitation cases, simulation-based training, lack regular updates in training, and certification process before graduation.

The mean knowledge score of nurses was poor (43.9%). This finding was in agreement with the same study of Enweronu et al.<sup>13</sup> The low level of performance could be due to limited exposure to real cardiopulmonary resuscitation cases during the undergraduate course, lack of exposure to clinical cases before leaving the university and updating their training.

Study of Taksande et al also favour our finding. <sup>14</sup> The finding was in sharp contrast to the study of Trevisanunuto D et al. This difference in the score might be due to the difference in the quality of the training given to the nursing professional and the clinical facilities available in the institute. Since our sample size was small. The mean skill score of nursing personal was poor (46%). This finding was not consistent with a study conducted in Afghanistan. <sup>16</sup>

This discrepancy might be due to the availability of simulation-based training, updating training, and certification process before graduation, which is not existed in our case. The finding was in sharp contrast to the study of Trevisanunuto D et al.<sup>15</sup> This difference in the score might be due to the difference in the quality of the training given to the nursing professional and the clinical facilities available in the institute. Our finding was similar to that in a study conducted in Western Nigeria (59.8%).<sup>17</sup>

Effectiveness of teaching program regarding standardized Neonatal Resuscitation Protocol in relation to skill, mean in pre-test was 5.98±1.68 compared to the post test skill test mean 16.28±0.99 increase. Our findings were consistent with the finding of Halder et al. They concluded that their training improved the knowledge of the participants and that repeat sessions were very helpful. In our study, knowledge was assessed after a single teaching event in a group consisting of nursing personnel with varying levels of experience and significant difference was found in the post workshop scores.

Effectiveness of teaching in term of enhancing knowledge and skill favours the finding of Singh M et al. 19 In their study pre and post test score difference showed significant increase in knowledge, more so in the group shown in the slides. The authors conclude that use of audio-visual aid increases the transfer of knowledge. In our study only regular teaching media was chosen, as compared to audio-visual presentation employed by them. From the finding it may be concluded that audiovisual aids, slide presentation and other media is very effective in enhancing knowledge and skill of health professionals. Despite this, almost every sub-group has shown significant improvement in the post test, thereby implying effective transfer of knowledge. This study shows the path towards improving the quality of resuscitation knowledge and skill by conducting continuous teaching programs, workshops and training sessions for a mixed group of medical personnel with assured benefits.

Limitations of this study were conducted on a single tertiary care centre. More studies in secondary and lesser equipped centres are needed to get a clearer picture.

#### **CONCLUSION**

We found that the knowledge and skill levels of nursing personal were substandard. There was significant positive difference in knowledge and skill score after teaching. We recommend emphasis on continual teaching and training through regular pre-scheduled programs in neonatal resuscitation for nursing personal.

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Institutional Ethics Committee

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