EFFECTIVENESS OF EDUCATIONAL INTERVENTION ON NEONATAL RESUSCITATION AMONG NURSING PERSONNEL

Nanthini Subbiah*, Jyoti Sarin**, Jeeva.S** and Geetanjali**

ABSTRACT

Birth of a child is a special moment of joy for the parents and along with it comes a lot of expectations. However, the first few moments after birth are full of anxiety and rapid physiological adjustments. Most babies go through the transition successfully as a matter of routine; however 10 per cent of babies who do not start breathing immediately and spontaneously result in birth asphyxia and need assistance to initiate breathing. Opportunity lost to provide needed assistance at this time would be a crucial impediment for saving these babies. Timely initiation of neonatal resuscitation has the potential of altering the outcome of intra-partum events. The present Pre-experimental study was conducted at the Trained Nursing Association of India in 2011 among 71 nurses working at nursery and allied units of District and Sub-district hospitals across the country. It assessed the effectiveness of educational intervention in terms of knowledge and skill of nurses on Neonatal Resuscitation. Purposive sampling technique was adopted to select the samples. Tools used for data collection were Structured Knowledge questionnaire and simulated situations with observational checklist. The study findings reflect the need for education to enhance the knowledge and skill of nurses to identify birth asphyxia and its potential complications leading to neonatal mortality during the first few hours after birth. As Practical skills appear to decline faster than theoretical knowledge regular in-service instruction is required every year.

Key words: Educational intervention, Neonatal resuscitation, Nursing personnel, Birth asphyxia.

*Reader, National Institute of Health and Family Welfare, New Delhi,
**Research Team Members, MM College of Nursing, Ambala, Haryana.
INTRODUCTION

When the baby is born, many crucial things happen, enabling the transition to extra uterine life. Changes take place in the lungs to allow breathing and changes in the heart and circulatory system switch off circulation through the placenta and redirect it through the lungs. In some newborns, the changes do not occur smoothly and those babies do not start breathing immediately and spontaneously resulting in birth asphyxia and need assistance to initiate breathing. Birth asphyxia is one of the leading causes contributing to neonatal mortality.¹

The Neonatal mortality rate is used as an indicator of country’s social, educational and health care standard.² Out of 130 million infants born each year worldwide, 4 million die in the first 28 days of life. In India, out of 26 million babies born annually, 1.2 million die during the first four weeks, constituting 30 per cent of global neonatal deaths.³ Three-quarters of neonatal deaths occur in the first week, and more than one-quarter occur in the first 24 hours. About 20-25 per cent of neonatal deaths occur as a result of birth asphyxia.⁴⁵ It is estimated that each year over a million of children who survive birth asphyxia develop problems such as cerebral palsy, learning difficulty and other disabilities. The main reason for birth asphyxia and other associated problems is poor management during and immediately after child birth. The incidence of birth asphyxia is reported to be higher in developing countries than in the developed.

Neonatal resuscitation has the potential of altering the outcome of intra-partum and post-partum events. However, due to lack of skilled health professionals, appropriate timely action is not taken in many health settings to prevent the incidence.⁶ Lack of competency of health professionals is one of the impediments for saving the asphyxiated babies. Nurses being crucial health care providers available in the unit round the clock at all levels of health care delivery system can contribute significantly in promotion of newborn’s health if they have adequate knowledge and skill in provision of newborn care. Thus improving their knowledge and making them competent in provision of resuscitation can help to identify and manage the asphyxiated baby in time and ensure intact survival of newborn baby.⁵⁷

The present study assesses the effectiveness of an educational intervention on Neonatal resuscitation in terms of knowledge and practice of nurses working in Neonatal and Allied units of secondary and tertiary hospitals across the country. The information for this paper has been derived from literature review, policy/programme documents, national level data, state information system, personal experiences of authors.
METHODOLOGY

This pre-experimental study was conducted at the Trained Nurses Association of India (TNAI) New Delhi in 2011 as part of their national workshop on Newborn Care for five days duration. The rationale for selecting this site was availability of the subjects and feasibility of conducting the study. To participate in this study 71 nurses working at nursery, labour room, postnatal ward of secondary and tertiary hospitals across the country were selected as samples by using purposive sampling technique. The inclusive criteria for their selection was that they should be working in newborn and allied health units such as labour room and postnatal ward where newborns are treated and cared for. The study design adopted was one group pre-test – post-test. Tools used for data collection were structured knowledge questionnaire and observational checklist. The Knowledge questionnaire consisted of two Parts. Part-I comprised of demographic variables such as age, gender, educational status, area of work, years of experience in newborn units, knowledge about neonatal resuscitation, any experience of resuscitating a newborn and details regarding formal training or education regarding NRP. Part II consisted of 49 objective type items pertaining to neonatal resuscitation such as initial steps, bag and mask, chest compression, endotracheal intubation, medications, care of pre-term babies and special considerations. Each correct response was awarded one score and incorrect response a score of zero was given. Observational checklist consisted of 33 expected steps pertaining to neonatal resuscitation such as pre-performance steps, initial steps, routine care, positive pressure ventilation, chest compression and medication. For each correct step one score was awarded and for incorrect step a score of zero was given. Maximum marks were 49 on knowledge questionnaire and 33 on observational checklist. An answer key was prepared to facilitate the correct response. The tools used were validated before administration. The reliability of the structured knowledge questionnaire was established by using Kuder Richardson -20 formula. The reliability coefficient was found to be 0.88. The reliability of the observational checklist was established by using inter rater reliability. The reliability co-efficient was found to be 85 per cent between two observers.

Data Collection Procedure

On day one baseline data with regard to knowledge and practice of nurses with regard to neonatal resuscitation was obtained. On day two, knowledge regarding neonatal resuscitation for management of asphyxiated baby was imparted through lecture-cum-discussion and demonstrations followed by hands on training by using mannequin. The guideline/module developed by National Neonatology Forum, India on Neonatal Resuscitation was used. On the third and fourth day,
the proceedings of the workshop dealing with other areas of the newborn care proceeded. At the end of the workshop (Day 5) the post test was conducted following the similar sequence followed during the pre-test. The data collected was analyzed using descriptive and inferential statistics.

**Ethical Clearance**

Before conducting the study, prior approval for conducting the study was obtained from the executive committee of the TNAI. Formal approval was obtained from the coordinator of the workshop. The study samples were explained about the procedure of the study and their consent was obtained. The right of withdrawal and denial from participation was explained to them. Written consent was obtained from the nurses who expressed their willingness to participate in the study.

**FINDINGS**

**FIGURE 1**

**DISTRIBUTION OF SAMPLES BASED ON DESIGNATION**

All participants (71) were working in newborn and allied health units. The sample consisted of staff nurses (36.67%), sister in-charges (33.33%), assistant nursing superintendents (13.33%), public health nurses (6.67%) and nursing superintendents (10.0%).

1. Knowledge of Nurses on Neonatal Resuscitation

**TABLE 1**

**PRE-TEST AND POST-TEST KNOWLEDGE SCORE OF NURSES**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Test</th>
<th>Mean</th>
<th>Median</th>
<th>Range</th>
<th>S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Pre-Test</td>
<td>19.11</td>
<td>18.7</td>
<td>5.5-29</td>
<td>5.53</td>
</tr>
<tr>
<td></td>
<td>Post-Test</td>
<td>30.71</td>
<td>31.7</td>
<td>11-37.5</td>
<td>6.74</td>
</tr>
</tbody>
</table>
Data presented in Table 1 indicate that the mean post-test knowledge score (30.71) was higher than the mean pre-test knowledge score (19.11). The post test knowledge scores were more homogeneous (SD 6.74) as compared to the pre test knowledge score (SD 5.53).

### TABLE 2
**AREA WISE PRETEST AND POSTTEST KNOWLEDGE SCORE**

<table>
<thead>
<tr>
<th>Knowledge areas</th>
<th>Max. Score</th>
<th>Pre-test</th>
<th>Post-test</th>
<th>Gain Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean Score and Mean % Score</td>
<td>Mean Score and Mean % Score</td>
<td></td>
</tr>
<tr>
<td>Initial steps</td>
<td>12</td>
<td>5.27 (43.9)</td>
<td>9.22 (76.8)</td>
<td>3.95</td>
</tr>
<tr>
<td>Bag and mask, chest compression and ET intubation</td>
<td>25</td>
<td>9.55 (38.2)</td>
<td>16.15 (64.62)</td>
<td>6.6</td>
</tr>
<tr>
<td>Medications and care of pre-term babies and special considerations</td>
<td>12</td>
<td>3.70 (30.83)</td>
<td>4.75 (39.65)</td>
<td>1.05</td>
</tr>
</tbody>
</table>

In pre-test, nurses had less knowledge score (3.70) in the area of medications, care of pre-term babies and special considerations and highest score (9.55) in the area of bag and mask ventilation, chest compression and ET intubation. The area with the lowest mean percentage score indicates the highest deficit area. In the post-test, their mean percentage score in all the areas was higher, indicating that the educational intervention was effective in enhancing their knowledge on neonatal resuscitation.

### TABLE 3
**COMPARISON OF OVERALL PRETEST AND POSTTEST KNOWLEDGE SCORE**

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Mean</th>
<th>MD</th>
<th>SDD</th>
<th>‘t’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Test</td>
<td>19.11</td>
<td>11.6</td>
<td>0.21</td>
<td>23.5*</td>
</tr>
<tr>
<td>Post-Test</td>
<td>30.71</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

df (70)=1.67; * significant (p<0.05)

Table 3 shows the knowledge score of nurses before and after the administration of educational intervention. On an average they had 19.11 knowledge score before
administration of an educational intervention and 30.71 after administration of an educational intervention. It means that they improved from 19.11 to 30.71 on the knowledge score.

In other way it can be interpreted that in pre-test they were able to answer only 19 questions on neonatal resuscitation but in post-test they were able to answer 30 questions. It means after having educational intervention they were able to answer 11 questions additionally. This difference is statistically significant (23.5) at 0.05 level of significance.

2. Skill/Practice of Nurses on Neonatal Resuscitation

<table>
<thead>
<tr>
<th>Domain</th>
<th>Test</th>
<th>Mean</th>
<th>Median</th>
<th>Range</th>
<th>S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skill/Practice</td>
<td>Pre-Test</td>
<td>12.8</td>
<td>13</td>
<td>05-18</td>
<td>2.03</td>
</tr>
<tr>
<td></td>
<td>Post-Test</td>
<td>20.6</td>
<td>19.8</td>
<td>12-29</td>
<td>6.05</td>
</tr>
</tbody>
</table>

Data presented in Table 4 shows that the mean post-test practice score (20.6) was higher than the mean pre-test practice score (12.8). The post-test practice scores were more homogeneous (SD 6.05) as compared to the pre-test practice score (SD 2.03).

<table>
<thead>
<tr>
<th>Practice areas</th>
<th>Maximum Score</th>
<th>Pre Test</th>
<th>Post Test</th>
<th>Mean % Gain Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre Performance Steps</td>
<td>2</td>
<td>32.34%</td>
<td>65%</td>
<td>32.66%</td>
</tr>
<tr>
<td>Initial steps</td>
<td>4</td>
<td>36.5%</td>
<td>77.5%</td>
<td>41%</td>
</tr>
<tr>
<td>Routine Care</td>
<td>14</td>
<td>43.56%</td>
<td>86.45%</td>
<td>42.89%</td>
</tr>
<tr>
<td>Positive pressure ventilation</td>
<td>6</td>
<td>40.56%</td>
<td>86.66%</td>
<td>46.1</td>
</tr>
<tr>
<td>chest compression</td>
<td>6</td>
<td>49.56%</td>
<td>92.5%</td>
<td>42.94%</td>
</tr>
<tr>
<td>Medications</td>
<td>1</td>
<td>50.12%</td>
<td>100%</td>
<td>49.88%</td>
</tr>
</tbody>
</table>

Maximum Score =33
The data in Table 5 indicates that the percentage of practice in each aspects of neonatal resuscitation among nurses before and after administration of an educational intervention. In pre-test lowest mean percentage score was in the area of pre performance steps (32.66%) followed by initial steps (41%) routine care (42.89%), chest compression (42.94%), positive pressure ventilation (46.1%) and medications (49.88%). In post-test, in all aspects of neonatal resuscitation practice nurses improved their practice after administration of educational intervention.

<table>
<thead>
<tr>
<th>Practice</th>
<th>Mean</th>
<th>MD</th>
<th>SDD</th>
<th>‘t’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Test</td>
<td>12.8</td>
<td>7.8</td>
<td>2.03</td>
<td>17.53*</td>
</tr>
<tr>
<td>Post-Test</td>
<td>20.6</td>
<td>6.05</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

df(70)=1.67; * significant (p<0.05)

Table 6 shows the practice score of nurses before and after administration of an educational intervention. On an average they had 12.8 practice score before administration of educational intervention and 20.6 after administration of educational intervention. It means that they improved from 12.8 to 20.6 on the practice score.

In other way it can be interpreted that in pretest they were able to practice only 12 steps of neonatal resuscitation but in posttest they were able to perform 20 steps. After having educational intervention they were able to perform 8 steps additionally. This difference is statistically significant (17.53) at 0.05 level of significance.

DISCUSSION

Adequate knowledge and skill of health professionals is essential for improving the neonatal outcome. Training programmes is the key strategy in promotion of health care services. The findings of the present study suggest the need for implementation of comprehensive training programme on NRP to improve the practices of immediate newborn care in labour room. Regular training of nurses may possibly have positive effect in reducing undesirable health events especially in resource constrained settings. The findings of study is in line with the study conducted by Nakakeeto et.al to determine effectiveness of training nursing personnel and its effect on the outcome of neonate delivered.8
The present result is consistent with Bann CM, Carlo WA, Chomba E and Patel D et al. who conducted a study to assess the educational impact of neonatal resuscitation program concludes that the neonatal resuscitation education has the potential to substantially improve knowledge, skill and self-efficacy of staff nurses on neonatal resuscitation.9,10

1. Assessment of Knowledge of Nurses Before and After Administration of Education

While comparing the nurses’ knowledge on neonatal resuscitation before and after administration of an educational intervention it was observed that in all aspects of neonatal resuscitation nurses had improved their knowledge after administration of an educational intervention. In pre-test the nursing personnel had knowledge deficit in the areas of medications and care of preterm babies and special considerations, followed by Initial steps and bag and mask ventilation and ET intubation which is similar to the study conducted by Ogulesi T et al. reported that the knowledge of the nurses regarding neonatal resuscitation was poor.11

After the administration of educational intervention the knowledge in all the areas had significantly increased. These findings are consistent with the study conducted by Waldemar A. Carlo et al (2009) on educational impact of neonatal resuscitation. They found that after training, written scores (knowledge evaluation) improved from 57% ± 14% to 80% ± 12% (mean ± SD; P < .0001).

2. Assessment of Skill/Practice of Nurses Before and After Administration of Education

Before administration of an educational intervention their overall practice score on an average was 45.58 per cent in neonatal resuscitation with the deficit in the area of pre performance steps. The findings are consistent with the study conducted by Shanta Chandrasekaran (2010) on Awareness of basic life support among medical, dental, nursing students and doctors. Their study findings revealed that out of 1,054 responders, none of them had complete knowledge of BLS.13

After administration of an educational intervention their overall practice score on an average was 85.45 per cent in neonatal resuscitation. The maximum mean percentage score was in the area medication (100%) The findings are consistent with the study conducted by Laurel Bookman et al (2010) on Educational impact of a hospital-based neonatal resuscitation programme in Ghana Resuscitation.14 In all aspects of neonatal resuscitation, the nursing personnel had improved
their practice after administration of an educational intervention. The maximum mean percentage gain was in the area medication (49.88%) and the lowest mean percentage gain was in the area of pre performance steps (32.66%). The findings are consistent with the study conducted by Opiyo N et al. (2008) on “Effect of Newborn Resuscitation Training on Health Worker Practices in Pumwani Hospital, Kenya”. They found that the trained providers demonstrated a higher proportion of adequate initial resuscitation steps compared to the control group (trained 66% vs control 27%; risk ratio 2.45, [95% CI 1.75–3.42], p<0.001, adjusted for clustering).\textsuperscript{15}

CONCLUSION

Health professionals involved in direct care of newborns should be equipped with adequate knowledge and skill in neonatal resuscitation. Neonatal resuscitation should be an integral part of continuing education for all personnel involved in newborn and obstetrical care because it improves both tested knowledge and performance. As practical skills appear to decline faster than theoretical knowledge, regular in-service instruction is required at least every year.

REFERENCES


