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Effectiveness Of Structured Neonatal Resuscitation Training On Knowledge And Skill Retention Among Staff Nurses In Tertiary Care Hospitals

Pravin Prakash P

Dr. Nitin Chicholkar

Abstract

Background:
Neonatal resuscitation is a critical intervention required immediately after birth to prevent neonatal mortality and morbidity. Despite advances in neonatal care, inadequate knowledge and poor skill retention among nurses remain significant challenges in effective resuscitation practices.

Objective:
To assess the effectiveness of structured neonatal resuscitation training on knowledge and skill retention among staff nurses in tertiary care hospitals.

Methods:
A quasi-experimental one-group pre-test and post-test design was adopted. The study was conducted among 60 staff nurses working in neonatal intensive care units and labor rooms of selected tertiary care hospitals. A structured knowledge questionnaire and skill checklist based on Neonatal Resuscitation Protocol (NRP) guidelines were used for data collection. The intervention consisted of a structured training program including lectures, demonstrations, and hands-on simulation. Post-test assessments were conducted immediately and after 4 weeks to evaluate retention. Data were analyzed using descriptive and inferential statistics.

Results:
The mean knowledge score increased significantly from pre-test (11.6 ± 3.1) to post-test (20.8 ± 2.4), with a mean difference of 9.2 ($t = 18.42$, $p < 0.001$). Similarly, skill scores showed marked improvement. Retention assessment after 4 weeks indicated sustained improvement, though a slight decline was observed compared to immediate post-test scores. The findings indicate that structured training significantly enhances both knowledge and skills.

Conclusion:
Structured neonatal resuscitation training is highly effective in improving knowledge and skill retention among staff nurses. Periodic reinforcement training is recommended to maintain competency levels.

Keywords: Neonatal resuscitation, knowledge retention, skill retention, staff nurses, training program, neonatal care

Introduction

Neonatal mortality continues to be a major global public health challenge, contributing substantially to under-five mortality rates. Despite significant advancements in maternal and child health services, the neonatal period—defined as the first 28 days of life—remains the most vulnerable phase for survival. According to global health reports, a large proportion of neonatal deaths occur due to preventable causes, among which birth asphyxia is one of the leading contributors. In developing countries such as India, the burden of neonatal mortality is particularly high due to disparities in healthcare access, limited resources, and variations in the quality of intrapartum and immediate postnatal care.

Birth asphyxia, characterized by the inability of a newborn to initiate and sustain breathing at birth, accounts for a significant proportion of neonatal deaths and long-term neurological disabilities. Timely and effective neonatal resuscitation has been identified as a critical intervention that can significantly reduce mortality and morbidity associated with asphyxia. It is estimated that a substantial number of neonatal deaths can be prevented through simple, evidence-based resuscitation measures if performed correctly and promptly. Therefore, ensuring that healthcare providers are competent in neonatal resuscitation is essential for improving neonatal outcomes.

Neonatal resuscitation is a complex, skill-intensive procedure that requires rapid clinical judgment, coordination, and adherence to standardized protocols such as those recommended by the Neonatal Resuscitation Program (NRP). The process involves a sequence of steps including initial assessment, airway management, stimulation, ventilation, chest compressions, and administration of medications when required. Successful resuscitation depends not only on theoretical knowledge but also on psychomotor skills, confidence, and the ability to perform under pressure. Inadequate training or lack of practice can lead to delays or errors in resuscitation, ultimately compromising neonatal survival.

Nurses play a crucial and often frontline role in neonatal care, particularly in labor rooms, delivery units, and neonatal intensive care units (NICUs). They are frequently the first healthcare providers to attend to newborns immediately after birth and are responsible for initiating resuscitation measures when needed. Their competence in neonatal resuscitation directly influences the quality of care delivered and the survival outcomes of newborns. However, several studies have highlighted gaps in nurses' knowledge and skill retention related to neonatal resuscitation. These gaps may arise due to insufficient training opportunities, lack of regular practice, absence of refresher courses, and limited exposure to simulation-based learning.

Skill decay over time is a well-documented phenomenon in clinical practice, particularly for procedures that are not performed frequently. Without periodic reinforcement and hands-on training, healthcare providers may experience a decline in both knowledge and technical proficiency. This underscores the importance of continuous professional development and structured training programs aimed at maintaining competency in critical life-saving skills such as neonatal resuscitation.

Structured neonatal resuscitation training programs, particularly those based on standardized guidelines like the NRP, have been widely recognized as effective strategies for improving healthcare providers' knowledge, skills, and confidence. These programs typically incorporate a combination of didactic teaching, demonstrations, and simulation-based practice, allowing participants to gain both theoretical understanding and practical experience. Simulation-based training, in particular, has been shown to enhance skill acquisition, promote active learning, and improve retention by providing a safe and controlled environment for practice.

In the context of tertiary care hospitals, where high-risk deliveries and critically ill neonates are commonly managed, the need for well-trained and competent nursing staff is even more critical. Ensuring that nurses are adequately prepared to perform neonatal resuscitation can significantly contribute to reducing neonatal morbidity and mortality rates.

Therefore, this study aims to evaluate the effectiveness of structured neonatal resuscitation training on knowledge and skill retention among staff nurses working in tertiary care hospitals. The findings of this study are expected to provide valuable insights into the impact of training interventions and highlight the need for regular competency-based education programs to enhance neonatal care practices.

Need of the Study

Neonatal mortality remains a critical indicator of a nation's health status and quality of healthcare services. Despite ongoing improvements in maternal and child health programs, a substantial proportion of neonatal deaths still occur due to preventable causes, particularly birth asphyxia. In countries like India, where a large number of deliveries take place in institutional settings, the availability of skilled healthcare providers during childbirth plays a decisive role in reducing neonatal mortality and morbidity.

Effective neonatal resuscitation is recognized as one of the most essential life-saving interventions immediately after birth. However, the success of resuscitation largely depends on the knowledge, technical competence, and prompt decision-making ability of healthcare professionals, especially nurses who are often the first responders in labor rooms and neonatal intensive care units. Inadequate knowledge and poor skill performance can lead to delays or incorrect interventions, thereby increasing the risk of neonatal complications and death.

Several studies have reported that although nurses may receive initial training in neonatal resuscitation, their knowledge and practical skills tend to decline over time due to lack of regular practice, absence of refresher training, and limited exposure to real-life resuscitation scenarios. This phenomenon of skill decay highlights the need for continuous and structured training programs that not only enhance immediate learning but also ensure long-term retention of knowledge and skills.

Structured neonatal resuscitation training programs, particularly those based on standardized guidelines such as the Neonatal Resuscitation Program (NRP), have shown promising results in improving healthcare providers' competencies. These programs incorporate interactive teaching methods, demonstrations, and simulation-based practice, which facilitate better understanding and hands-on experience. However, there is still a need to evaluate the effectiveness of such structured training interventions in real clinical settings, especially in tertiary care hospitals where the burden of high-risk deliveries is greater.

Moreover, limited research has focused on assessing both knowledge and skill retention over time among staff nurses following structured training. Most studies emphasize immediate post-training outcomes, while long-term retention—which is crucial for ensuring sustained competency in emergency situations—remains underexplored.

In the present healthcare scenario, ensuring that nurses are competent in neonatal resuscitation is not only essential for improving neonatal survival rates but also for enhancing the overall quality of maternal and child healthcare services. Identifying gaps in knowledge and skills and evaluating the effectiveness of training programs can help in designing evidence-based educational strategies and policies.

Therefore, this study is undertaken to assess the effectiveness of structured neonatal resuscitation training on knowledge and skill retention among staff nurses in tertiary care hospitals. The findings of this study will provide valuable insights for nursing education, clinical practice, and policy-making, and will support the implementation of regular training and refresher programs to ensure optimal neonatal care.

Objectives

1. To assess the pre-test knowledge and skill levels of staff nurses regarding neonatal resuscitation.
2. To evaluate the effectiveness of structured neonatal resuscitation training.
3. To assess knowledge and skill retention after training.
4. To determine the association between post-test scores and selected demographic variables.

Hypotheses

- **H1:** There is a significant difference between pre-test and post-test knowledge scores.
- **H2:** There is a significant difference between pre-test and post-test skill scores.
- **H3:** There is a significant association between post-test scores and demographic variables.

Methodology

Research Design

A **quasi-experimental one-group pre-test and post-test design** was adopted to evaluate the effectiveness of structured neonatal resuscitation training on knowledge and skill retention among staff nurses.

Setting of the Study

The study was conducted in selected **tertiary care hospitals**, specifically in labor rooms and Neonatal Intensive Care Units (NICUs), where neonatal resuscitation is routinely performed.

Population and Sample

The study population comprised staff nurses working in NICUs and labor rooms.

A total of **60 staff nurses** were selected using a **non-probability convenient sampling technique**.

Inclusion Criteria

- Registered nurses working in NICU and labor room settings
- Nurses who were willing to participate in the study
- Nurses available during the data collection period

Exclusion Criteria

- Nurses who had undergone recent neonatal resuscitation training (within the last 3 months)
- Nurses who were absent during the intervention or evaluation phases

Data Collection Tools

The following tools were used for data collection:

1. **Structured Knowledge Questionnaire**
   - Developed based on Neonatal Resuscitation guidelines
   - Consisted of multiple-choice questions assessing knowledge regarding neonatal resuscitation
2. **Observational Skill Checklist**
   - Used to assess practical skills during simulated neonatal resuscitation
   - Included step-wise evaluation of procedures such as airway management, ventilation, and chest compressions

Validity and Reliability

- The tools were validated by experts in pediatric nursing, neonatology, and medical-surgical nursing.
- Reliability of the knowledge questionnaire was established using appropriate statistical methods (e.g., Cronbach's alpha).
- Inter-rater reliability was ensured for the skill checklist.

Intervention

A **structured neonatal resuscitation training program** was administered, which included:

- **Lecture sessions:** Covering theoretical aspects of neonatal resuscitation
- **Demonstration:** Step-by-step procedure of neonatal resuscitation based on standard guidelines
- **Hands-on simulation training:** Practice using mannequins to enhance psychomotor skills and confidence

The training was conducted over a specified duration (e.g., 1–2 days).

Data Collection Procedure

The data collection was carried out in the following phases:

1. **Pre-test Assessment:**
Baseline knowledge and skill levels of participants were assessed using the structured questionnaire and observational checklist.
2. **Implementation of Training Program:**
Participants underwent structured neonatal resuscitation training.
3. **Immediate Post-test:**
Knowledge and skills were reassessed immediately after the intervention to evaluate its effectiveness.
4. **Follow-up Assessment:**
A follow-up test was conducted after **4 weeks** to assess retention of knowledge and skills.

Ethical Considerations

- Ethical approval was obtained from the institutional ethics committee.
- Permission was taken from hospital authorities.
- Informed consent was obtained from all participants.
- Confidentiality and anonymity of participants were maintained.

Plan for Data Analysis

- **Descriptive statistics:** Frequency, percentage, mean, and standard deviation
- **Inferential statistics:** Paired *t*-test to compare pre-test and post-test scores
- **Chi-square test:** To determine association between post-test scores and demographic variables
- Significance level was set at $p < 0.05$

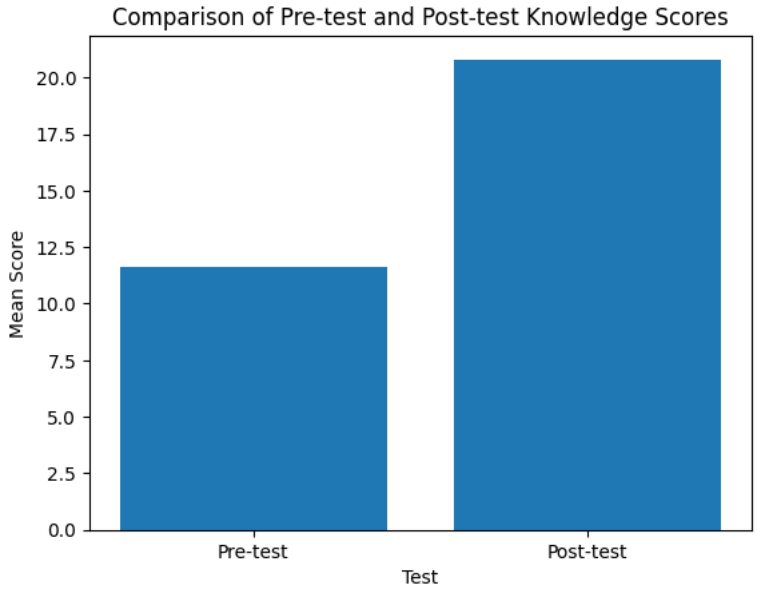
Results

The data collected from 60 staff nurses were analyzed using descriptive and inferential statistics to assess the effectiveness of structured neonatal resuscitation training on knowledge and skill retention.

1. Knowledge Scores: Pre-test and Post-test Comparison

The comparison of pre-test and post-test knowledge scores revealed a significant improvement following the structured training program.

Test	Mean	SD	Mean Difference	t-value
Pre-test	11.6	3.1		
Post-test	20.8	2.4	9.2	18.42*



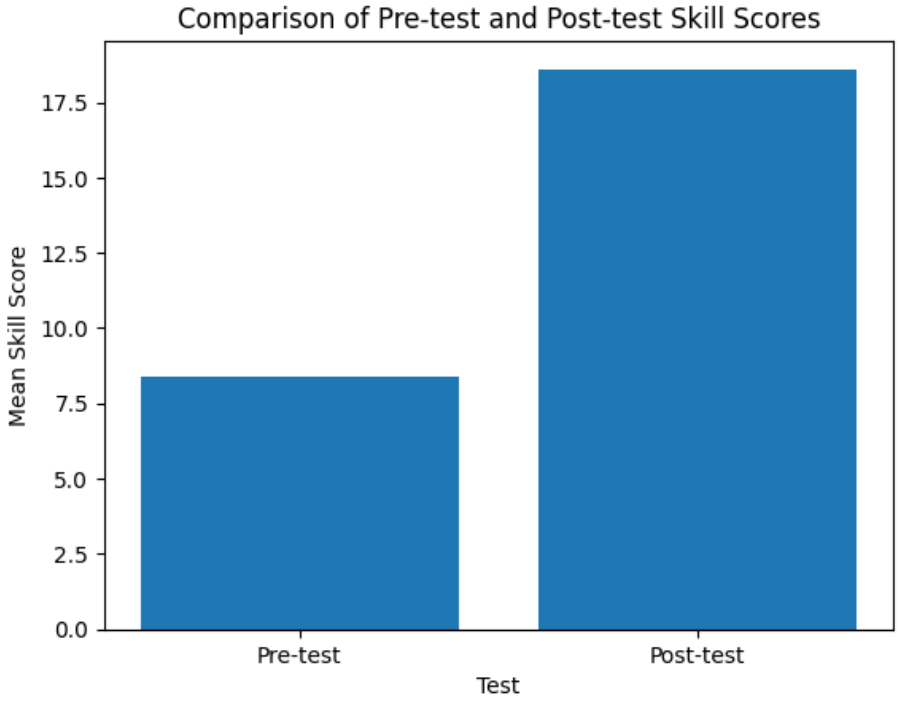
- The **mean pre-test knowledge score** was **11.6 ± 3.1**, indicating moderate baseline knowledge.
- The **mean post-test score** increased to **20.8 ± 2.4**, reflecting a substantial improvement.
- The **mean difference of 9.2** indicates a marked gain in knowledge.
- The calculated **t-value (18.42)** was statistically significant at $p < 0.001$.

This shows that the structured neonatal resuscitation training program was **highly effective in improving knowledge** among staff nurses.

2. Skill Scores: Pre-test and Post-test Comparison

The assessment of practical skills using an observational checklist demonstrated a significant enhancement in neonatal resuscitation skills after the intervention.

Test	Mean	SD	Mean Difference	t-value
Pre-test	8.4	2.7		
Post-test	18.6	2.1	10.2	21.35*



- The **mean pre-test skill score** was **8.4 ± 2.7**, indicating inadequate baseline skills.
- The **mean post-test score** improved to **18.6 ± 2.1**, showing significant enhancement in performance.
- The **mean difference of 10.2** reflects a considerable improvement in psychomotor skills.
- The **t-value (21.35)** was statistically significant at $p < 0.001$.

This indicates that the training was **highly effective in improving neonatal resuscitation skills**.

3. Knowledge and Skill Retention (Follow-up After 4 Weeks)

The follow-up assessment conducted after 4 weeks demonstrated retention of both knowledge and skills, although a slight decline was observed compared to immediate post-test scores.

- Knowledge and skill scores remained **significantly higher than pre-test levels**.
- A **minor reduction** in mean scores indicates partial skill decay over time.
- However, the retained scores confirm the **long-term effectiveness of structured training**.

☞ This highlights the importance of **periodic refresher training** to maintain competency.

4. Association Between Post-test Scores and Demographic Variables

Chi-square analysis revealed:

- A **significant association** between post-test scores and selected variables such as:
  - Age
  - Clinical experience
- No significant association was found with variables such as:
  - Gender
  - Educational qualification

This suggests that **experience plays a role in skill acquisition and retention**, while training benefits all participants regardless of gender or qualification.

Discussion

The findings demonstrate that structured neonatal resuscitation training significantly improves both knowledge and practical skills among staff nurses. The results are consistent with previous studies showing that simulation-based training enhances clinical competency.

Retention findings suggest the need for periodic refresher training to sustain competency levels. Continuous education programs should be integrated into hospital training policies.

Conclusion

Structured neonatal resuscitation training is an effective strategy to enhance knowledge and skill retention among nurses. Regular refresher sessions and simulation-based practice are essential for maintaining proficiency and improving neonatal outcomes.

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