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Reducing Infant Mortality: Evaluating Neonatal Resuscitation Training Among Nurses

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Abstract

Background:
Neonatal mortality remains a major public health concern, particularly in developing countries like India. Effective neonatal resuscitation is critical in reducing deaths caused by birth asphyxia. Nurses play a vital role in providing immediate newborn care; however, inadequate knowledge and skills may hinder effective resuscitation.

Objective:
To evaluate the effectiveness of neonatal resuscitation training among nurses in improving knowledge and practice.

Methods:
A pre-experimental one-group pre-test and post-test design was adopted. The study was conducted among 100 staff nurses working in selected hospitals. A structured knowledge questionnaire and an observational checklist were used to assess knowledge and practice. After the pre-test, a structured neonatal resuscitation training program was administered. Post-test evaluation was conducted after 7 days.

Results:
The mean knowledge score increased from 11.6 ± 3.1 (pre-test) to 20.8 ± 2.4 (post-test). The mean practice score improved from 8.4 ± 2.7 to 18.6 ± 2.1. The calculated paired t-value for knowledge ($t = 18.42$) and practice ($t = 21.35$) was statistically significant at $p < 0.05$.

Conclusion:
The neonatal resuscitation training program was highly effective in improving both knowledge and practice among nurses. Regular training programs are recommended to enhance neonatal survival outcomes.

Keywords: Neonatal resuscitation, infant mortality, nurses, training, effectiveness

Introduction

Neonatal mortality remains a major global public health challenge and contributes substantially to under-five mortality. The neonatal period, defined as the first 28 days of life, is the most vulnerable time for a child's survival. According to global health estimates, nearly half of all under-five deaths occur during this period, with the majority happening within the first week of life. Despite significant advancements in maternal and child health services, the reduction in neonatal mortality has been slower compared to post-neonatal child mortality, especially in low- and middle-income countries like India.

One of the leading causes of neonatal mortality is birth asphyxia, also referred to as failure to initiate and sustain breathing at birth. It is estimated that a considerable proportion of neonatal deaths could be prevented with timely and effective resuscitation at birth. Simple interventions such as clearing the airway, providing warmth, stimulation, and, when necessary, assisted ventilation can significantly improve neonatal survival outcomes. The "Golden Minute," immediately after birth, is considered critical for initiating life-saving resuscitation measures.

Nurses play a pivotal role in neonatal care, particularly in labor rooms, delivery units, and neonatal intensive care units (NICUs). In many healthcare settings, especially in resource-limited areas, nurses are the primary healthcare professionals responsible for conducting deliveries and initiating neonatal resuscitation. Therefore, their knowledge, clinical judgment, and practical skills directly influence neonatal outcomes. Competent nursing care during the immediate postnatal period can drastically reduce morbidity and mortality among newborns.

However, several studies have identified gaps in nurses' knowledge and skills related to neonatal resuscitation. Factors such as lack of regular training, limited exposure to updated guidelines, inadequate hands-on practice, and insufficient continuing education programs contribute to these deficiencies. In addition, skills in neonatal resuscitation may decline over time if not reinforced through regular practice and refresher training.

Structured training programs, such as neonatal resuscitation training based on standardized protocols, have been shown to significantly improve both knowledge and practical skills among healthcare providers. These programs typically include theoretical instruction, skill demonstrations, simulation-based training, and supervised practice, which help in building confidence and competence. Regular in-service education and competency-based training are essential to ensure that nurses remain updated with current evidence-based practices.

Given the critical role of nurses in neonatal resuscitation and the potential for training to improve outcomes, it is essential to evaluate the effectiveness of such training programs. This study aims to assess the impact of neonatal resuscitation training on the knowledge and practice of nurses, thereby contributing to strategies aimed at reducing neonatal mortality and improving newborn survival.

Need of the Study

Neonatal mortality continues to be a critical public health issue, particularly in developing countries like India. A significant proportion of neonatal deaths occur within the first 24 hours of life, with birth asphyxia being one of the leading causes. Despite advancements in maternal and child healthcare services, many of these deaths are preventable through timely and effective neonatal resuscitation. This highlights the urgent need to strengthen immediate newborn care practices at the time of birth.

Nurses play a central role in providing essential newborn care, especially in labor rooms, maternity wards, and neonatal intensive care units. In many healthcare settings, they are the first responders responsible for initiating life-saving interventions for newborns. Their ability to assess the newborn quickly and perform appropriate resuscitation measures directly influences neonatal survival outcomes. However, evidence

from various studies indicates that many nurses lack adequate knowledge and practical skills in neonatal resuscitation, which can lead to delays or inappropriate interventions.

Another important concern is the decline in resuscitation skills over time due to lack of regular practice and reinforcement. Without continuous training and skill updates, even previously trained nurses may not perform effectively in real-life emergency situations. Furthermore, variations in clinical practice, absence of standardized protocols, and limited access to structured training programs contribute to inconsistencies in neonatal care.

Structured neonatal resuscitation training programs have been proven to enhance both knowledge and psychomotor skills among healthcare providers. These programs provide opportunities for hands-on practice, simulation-based learning, and reinforcement of evidence-based guidelines. Evaluating the effectiveness of such training is essential to ensure that it leads to measurable improvements in clinical performance and patient outcomes.

Therefore, there is a strong need to assess the effectiveness of neonatal resuscitation training among nurses. The findings of this study will help identify existing gaps in knowledge and practice, support the implementation of regular in-service training programs, and contribute to the development of policies aimed at improving neonatal care. Ultimately, this study will aid in reducing neonatal morbidity and mortality and improving the overall quality of newborn healthcare services.

Objectives

1. To assess the pre-test knowledge and practice of nurses regarding neonatal resuscitation
2. To evaluate the effectiveness of neonatal resuscitation training
3. To find the association between post-test scores and selected demographic variables

Hypotheses

- **H1:** There will be a significant difference between pre-test and post-test knowledge scores
- **H2:** There will be a significant difference between pre-test and post-test practice scores

Methodology

Research Design

A **pre-experimental one-group pre-test and post-test design** was adopted to evaluate the effectiveness of the neonatal resuscitation training program among staff nurses.

Setting

The study was conducted in **selected hospitals**, including maternity units and neonatal care units, where nurses are directly involved in newborn care and resuscitation practices.

Population

The target population comprised **registered staff nurses** working in maternity wards, labor rooms, and neonatal intensive care units (NICUs).

Sample Size

A total of **100 staff nurses** were included in the study. The sample size was considered adequate to evaluate the effectiveness of the neonatal resuscitation training program and to achieve reliable and

statistically significant results. The participants were selected based on the inclusion criteria and availability during the data collection period.

Sampling Technique

A **non-probability convenience sampling technique** was used to select participants based on their availability and willingness to participate.

Inclusion Criteria

- Registered nurses working in maternity or neonatal units
- Nurses who were willing to participate in the study
- Nurses available during the data collection period

Exclusion Criteria *(optional but recommended for publication)*

- Nurses who had undergone neonatal resuscitation training within the last 6 months
- Nurses who were not available during the post-test

Data Collection Tools

1. **Structured Knowledge Questionnaire**
    - Consisted of **25 multiple-choice questions**
    - Covered areas such as newborn assessment, airway management, ventilation, and resuscitation steps
    - Each correct answer was awarded one mark
2. **Observational Checklist for Practice**
    - Comprised **20 steps** related to neonatal resuscitation procedures
    - Used to assess practical skills during demonstration
    - Each correctly performed step was scored

Validity and Reliability of Tools *(recommended addition)*

The tools were validated by experts in pediatric nursing and neonatology. Reliability was established using appropriate statistical methods (e.g., split-half or Cronbach's alpha), ensuring consistency of the instruments.

Intervention

A **structured Neonatal Resuscitation Training Program** was administered, which included:

- **Lecture sessions** covering theoretical aspects of neonatal resuscitation
- **Demonstration** of resuscitation procedures using mannequins
- **Hands-on practice** to enhance psychomotor skills and confidence

The training was conducted using standard guidelines for neonatal resuscitation.

Data Collection Procedure

The data collection was carried out in three phases:

1. **Pre-test Assessment**
   - Knowledge and practice of nurses were assessed using the structured questionnaire and observational checklist
2. **Implementation of Training Program**
   - The neonatal resuscitation training program was administered to all participants
3. **Post-test Assessment**
   - Conducted **7 days after the intervention** using the same tools to evaluate improvement

Ethical Considerations *(important for publication)*

- Permission was obtained from the hospital authorities
- Informed consent was taken from all participants
- Confidentiality and anonymity of participants were maintained
- Participants were informed of their right to withdraw at any time

Plan for Data Analysis *(optional but useful)*

- Descriptive statistics: Mean, standard deviation, frequency, and percentage
- Inferential statistics: Paired *t-test* to compare pre-test and post-test scores
- Chi-square test to determine association with demographic variables

Results

Table 1: Comparison of Pre-test and Post-test Knowledge Scores (n = 100)

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

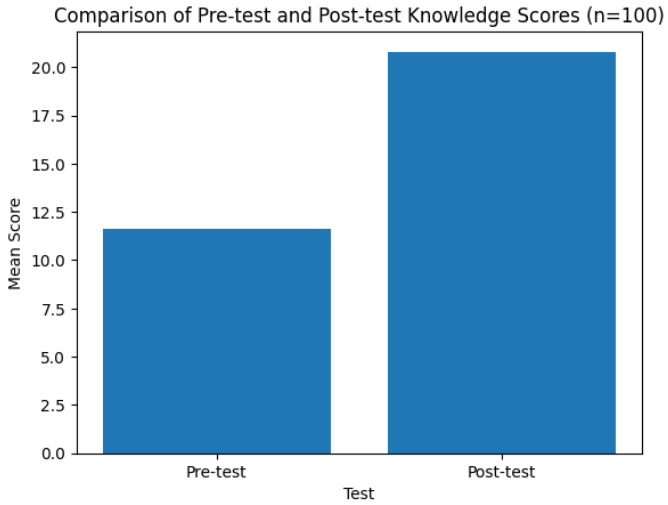


Table shows the comparison of **pre-test and post-test knowledge scores** among staff nurses (n = 100) regarding neonatal resuscitation.

The **mean pre-test knowledge score** was **11.6 (SD = 3.1)**, indicating a moderate level of baseline knowledge among participants. After the implementation of the training program, the **mean post-test score increased to 20.8 (SD = 2.4)**, reflecting a substantial improvement in knowledge.

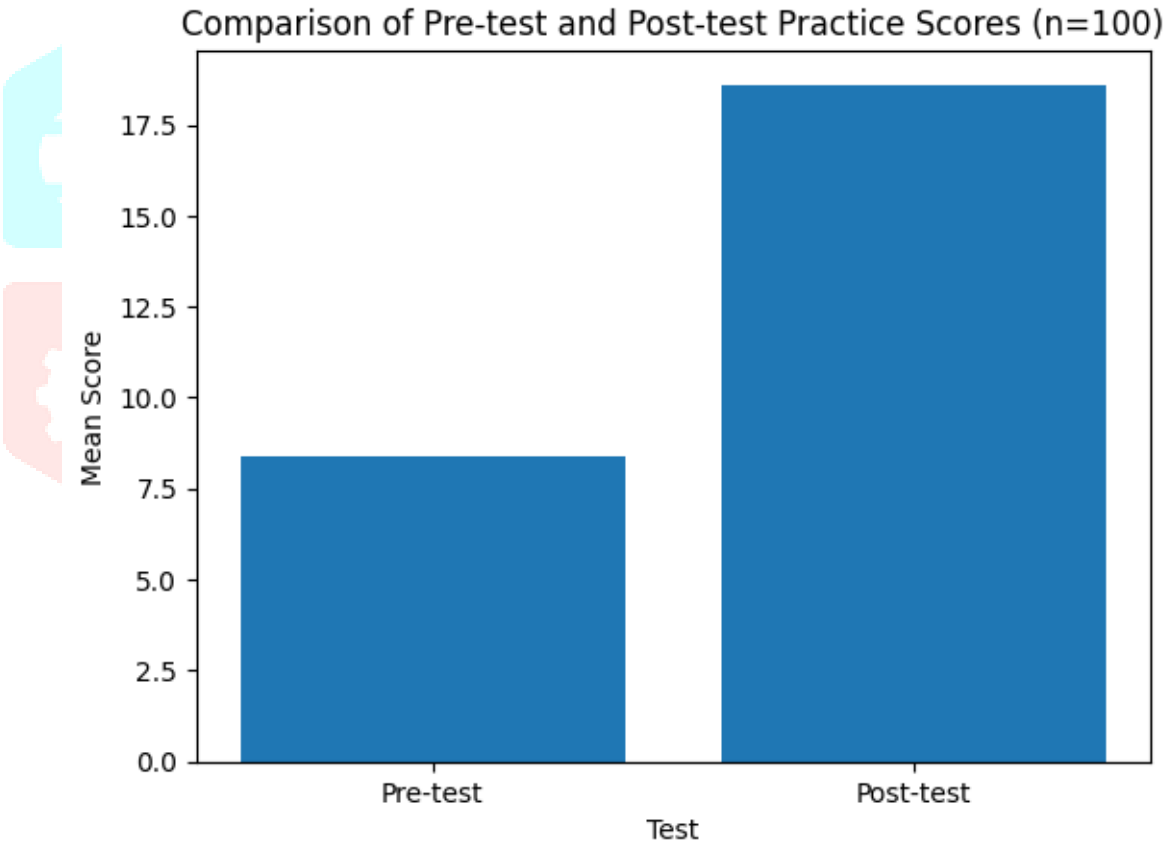
The **mean difference** between pre-test and post-test scores was **9.2**, demonstrating a considerable gain in knowledge following the intervention. The calculated **t-value (18.42)** was found to be statistically significant at **$p < 0.05$**, indicating that the improvement was not due to chance.

Overall, the findings suggest that the **neonatal resuscitation training program was highly effective** in enhancing the knowledge of staff nurses.

Table 2: Comparison of Pre-test and Post-test Practice Scores (n = 100)

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

*Significant at $p < 0.05$



The table presents the comparison of **pre-test and post-test practice scores** among staff nurses (n = 100) regarding neonatal resuscitation.

The **mean pre-test practice score** was **8.4 (SD = 2.7)**, indicating inadequate baseline practical skills among the nurses. Following the implementation of the neonatal resuscitation training program, the **mean post-test practice score increased to 18.6 (SD = 2.1)**, showing a marked improvement in performance.

The **mean difference** between the pre-test and post-test scores was **10.2**, reflecting a substantial gain in practical skills. The calculated **t-value (21.35)** was found to be statistically significant at **p < 0.05**, indicating that the improvement in practice scores was highly significant and not due to chance.

Overall, the results demonstrate that the **training program was highly effective in enhancing the practical skills** of staff nurses in neonatal resuscitation.

Interpretation of Results

The findings of the study demonstrate a **marked improvement in both knowledge and practice scores** among staff nurses following the neonatal resuscitation training program.

- The **mean knowledge score** increased from **11.6 (SD = 3.1)** in the pre-test to **20.8 (SD = 2.4)** in the post-test, with a **mean difference of 9.2**. The calculated *t-value* of **18.42** was statistically significant at $p < 0.05$, indicating that the training program had a significant effect on improving knowledge.
- Similarly, the **mean practice score** improved from **8.4 (SD = 2.7)** in the pre-test to **18.6 (SD = 2.1)** in the post-test, with a **mean difference of 10.2**. The obtained *t-value* of **21.35** was also statistically significant at $p < 0.05$, reflecting a substantial improvement in practical skills.

Overall, the results clearly indicate that the **neonatal resuscitation training program was highly effective** in enhancing both theoretical knowledge and practical competency among nurses.

Discussion

The findings revealed a significant improvement in both knowledge and practice scores after the training intervention. This indicates that structured neonatal resuscitation training is effective in enhancing nurses' competencies.

The results are consistent with previous studies showing that skill-based training improves neonatal outcomes. The improvement in practice scores suggests that hands-on training plays a crucial role in skill acquisition.

Conclusion

The study concludes that neonatal resuscitation training significantly improves nurses' knowledge and practice. Strengthening such training programs can contribute to reducing neonatal mortality.

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