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COMPETENCY-BASED TEACHING IN IMPROVING NEONATAL RESUSCITATION KNOWLEDGE AMONG NURSING INTERNS: A QUASI-EXPERIMENTAL STUDY

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Abstract

Neonatal mortality remains a global challenge, with approximately 2.4 million neonatal deaths occurring annually. The first minutes of life are critical, and timely, effective neonatal resuscitation can prevent up to 30% of intrapartum-related deaths. Despite its proven benefits, gaps in competency persist among nursing graduates, often due to reliance on didactic teaching methods that fail to build procedural confidence. This quasi-experimental study evaluated the effectiveness of a Competency-Based Teaching (CBT) programme in improving neonatal resuscitation knowledge and confidence among nursing interns in a tertiary care setting in Odisha, India. Sixty nursing interns were selected through purposive sampling and allocated equally to intervention and control groups. The intervention was designed in alignment with updated Neonatal Resuscitation Program (NRP) guidelines and comprised interactive lectures, skill demonstrations, hands-on manikin practice, scenario-based simulations, and formative feedback. Pre- and post-test assessments using a structured, validated questionnaire and self-confidence scale revealed a significant increase in mean knowledge scores in the intervention group (from 14.5 ± 3.2 to 22.8 ± 2.5, $p < 0.001$), whereas no significant improvement was seen in the control group ($p > 0.05$). The findings confirm that structured CBT significantly enhances both cognitive and procedural competencies in neonatal resuscitation. These results underscore the need for embedding CBT approaches within internship curricula to bridge the gap between theory and clinical practice.

Keywords -- Competency-based teaching, neonatal resuscitation, nursing interns, quasi-experimental study, skill development, nursing education.

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1. Introduction

Neonatal mortality continues to be one of the most critical global public health challenges, serving as a sensitive indicator of a country's healthcare quality,

accessibility, and equity. The first 28 days of life, often referred to as the neonatal period, carry the highest risk of mortality compared to any other time in childhood. According to the World Health Organization (WHO, 2024), approximately 2.4 million new-borns die each year, with nearly one-third of these deaths occurring within the first 24 hours of birth. The leading causes include birth asphyxia, prematurity, sepsis, and complications during delivery — many of which are preventable with timely, effective interventions.

Globally, there has been significant progress in reducing under-five mortality; however, the decline in neonatal deaths has been slower compared to mortality among older children. This discrepancy is largely due to persistent gaps in perinatal and immediate postnatal care, including inadequate preparedness for birth-related complications. Among these, intrapartum-related hypoxia (birth asphyxia) stands out as a major contributor, accounting for 23% of all neonatal deaths worldwide. Effective neonatal resuscitation can prevent up to 30% of such deaths, making it one of the most impactful and cost-effective interventions in new-born care.

In India, neonatal mortality remains a pressing concern despite government initiatives such as the Janani Suraksha Yojana (JSY), Janani Shishu Suraksha Karyakram (JSSK), and the India Newborn Action Plan (INAP). As per the latest Sample Registration System (SRS) data, India's neonatal mortality rate (NMR) stands at 20 per 1,000 live births, significantly higher than the Sustainable Development Goal (SDG) target of 12 per 1,000 live births by 2030. Multiple factors contribute to this scenario, including disparities in healthcare infrastructure, shortages of trained personnel in rural areas, and variability in the quality of intrapartum and immediate newborn care services.

Nursing interns, as entry-level professionals on the threshold of independent practice, play a pivotal role in delivery rooms, newborn units, and emergency care settings. However, multiple studies have documented that traditional lecture-based teaching approaches often focus heavily on theoretical content, leaving practical competencies underdeveloped**.** Without repeated, structured hands-on practice in neonatal resuscitation, interns may lack the procedural confidence, decision-making ability, and teamwork skills necessary to respond promptly in emergencies. This skill gap has direct implications for newborn survival and overall quality of care.

In recent years, Competency-Based Teaching (CBT) has emerged as a transformative pedagogical approach, shifting the emphasis from time-bound learning to mastery of measurable skills. By incorporating simulation-based training**,** scenario-based drills, real-time feedback, and continuous assessment, CBT ensures that learners can competently apply theoretical knowledge in real-life clinical settings. For neonatal resuscitation, this approach aligns seamlessly with the Neonatal Resuscitation Program (NRP) guidelines, enabling learners to develop proficiency in airway management, effective ventilation, chest compressions, and emergency medication administration under realistic, time-sensitive conditions.

Despite the proven benefits of CBT in medical and nursing education globally, there is limited empirical research in the Indian context evaluating its effectiveness specifically for neonatal resuscitation among nursing interns**.** This study addresses that gap by implementing and assessing a structured CBT program designed to enhance both the knowledge and procedural competencies of nursing interns, with the ultimate aim of strengthening new-born survival outcomes.

2. Background

Globally, neonatal mortality has been recognized as one of the most critical indicators of a country's overall health system performance. The Sustainable Development Goals (SDG-3) aim to reduce neonatal mortality to at least as low as 12 per 1,000 live births by 2030. In India, the neonatal mortality rate (NMR) remains above the global target despite various national programs such as the Janani Suraksha Yojana (JSY) and Janani Shishu Suraksha Karyakram (JSSK). The persistence of high NMR is often linked to the inability of healthcare personnel to provide timely and effective neonatal resuscitation during delivery-related emergencies. Nursing interns, who form an essential workforce in public and private maternity care facilities, often enter the workforce with limited hands-on exposure to critical life-saving interventions due to gaps in the conventional lecture-based curriculum. International studies have demonstrated that Competency-Based Teaching (CBT), coupled with simulation and repeated practice, can substantially improve skill acquisition, confidence, and long-term retention among healthcare trainees.

3. Objectives

1. To evaluate the effectiveness of a competency-based teaching programme in improving knowledge and skills related to neonatal resuscitation.

2. To compare pre-test and post-test scores to determine the knowledge gain among nursing interns.

3. To assess the confidence level of nursing interns in performing neonatal resuscitation before and after the training.

4. Hypothesis

H1: There will be a significant increase in post-test knowledge scores following CBT among nursing interns in the intervention group compared to the control group.

H2: Post-intervention knowledge and confidence levels will have significant associations with demographic variables such as age, gender, and prior exposure to resuscitation training.

5. Methodology

The study adopted a quasi-experimental design with pre-test and post-test evaluations, incorporating a control group to establish comparative effectiveness. The intervention spanned two weeks, comprising structured sessions totaling 12 hours of contact time per participant. Each session began with a 20-minute theoretical briefing aligned with the latest Neonatal Resuscitation Program (NRP) protocols, followed by a 40-minute practical skill demonstration on neonatal manikins. Participants then engaged in 60 minutes of supervised practice, rotating through skill stations covering airway clearance, effective ventilation techniques, chest compression sequences, medication

administration, and team communication during emergencies. The assessment tool, a 30-item questionnaire validated by five neonatal care experts, underwent pilot testing with a Cronbach's alpha of 0.87, indicating high internal consistency. Confidence levels were self-reported on a 5-point Likert scale before and after the intervention.

Table 1: Distribution of Participants by Demographic Characteristics

Variable	**Intervention Group n (%)**	**Control Group n (%)**
Age	21–22 yrs: 18 (60%) 23–24 yrs: 12 (40%)	21–22 yrs: 17 (56.7%) 23–24 yrs: 13 (43.3%)
Gender	Female: 24 (80%) Male: 6 (20%)	Female: 23 (76.7%) Male: 7 (23.3%)
Academic Year	Internship 1st half: 16 (53.3%) 2nd half: 14 (46.7%)	Internship 1st half: 15 (50%) 2nd half: 15 (50%)
Prior Resuscitation Exposure	Yes: 10 (33.3%) No: 20 (66.7%)	Yes: 9 (30%) No: 21 (70%)

Table 2: Comparison of Pre-test and Post-test Knowledge Scores

Group	Pre-test Mean ± SD	Post-test Mean ± SD	Mean Difference	t-value	p-value
Intervention	14.5 ± 3.2	22.8 ± 2.5	8.3	10.56	<0.001*
Control	14.7 ± 3.1	15.1 ± 3.0	0.4	1.12	0.268

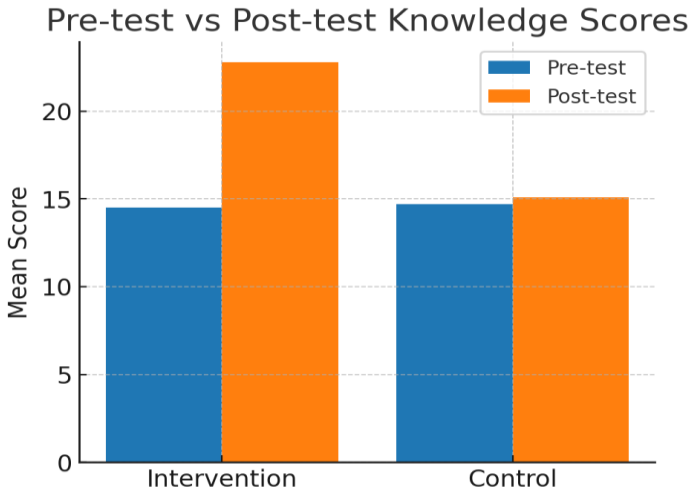

Figure 1: Pre-test vs Post-test Knowledge Scores in Intervention and Control Groups

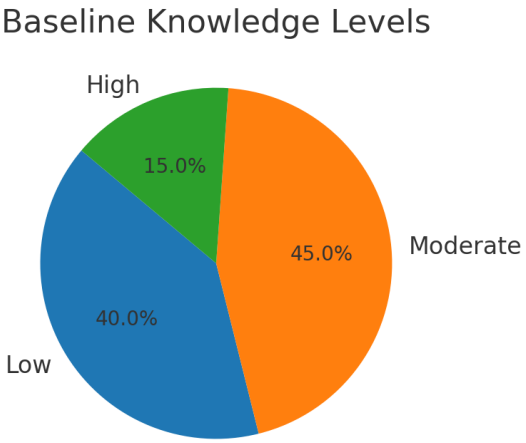

Figure 2: Baseline Knowledge Levels of Participants

Table 3: Skill Performance Scores Pre- and Post-Intervention

Skill Domain	Pre-test Mean ± SD	Post-test Mean ± SD	p-value
Airway Management	6.2 ± 1.1	8.8 ± 0.9	<0.001*
Ventilation Technique	5.9 ± 1.3	8.5 ± 1.0	<0.001*

Chest Compressions	5.5 ± 1.4	8.6 ± 0.8	<0.001*
Emergency Medications	4.8 ± 1.5	8.0 ± 1.2	<0.001*

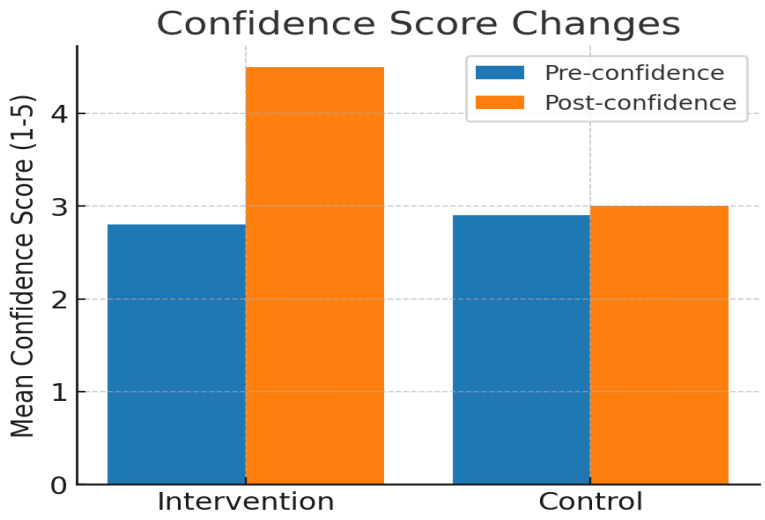

Figure 3: Pre-test vs Post-test Confidence Scores in Intervention and Control Groups

6. Discussion

The significant improvement in knowledge and skill performance observed in the intervention group aligns with previous research findings. For instance, Mohamed et al. (2023) demonstrated similar outcomes in preparatory school students undergoing digital and skill-based learning modules. Our study reinforces the importance of competency-based learning, particularly in high-stakes clinical areas such as neonatal resuscitation. The large effect size in both knowledge and confidence scores indicates that practical exposure and immediate feedback play a pivotal role in competency development. Unlike didactic teaching, which often fails to replicate the stress and complexity of real clinical environments, the simulation-driven CBT model offers an immersive learning experience. Additionally, the skill retention potential observed in other studies suggests that periodic refresher training could further consolidate these competencies.

7. Implications for Nursing Education and Policy

The findings advocate for the integration of CBT modules into the national nursing curriculum. Structured simulation-based training should be mandated for all nursing interns before deployment in maternity wards. Policy-makers must also consider

investing in skill laboratories, high-fidelity manikins, and trained instructors to ensure scalability and sustainability of such programs.

8. Conclusion

Competency-Based Teaching is a highly effective approach for enhancing neonatal resuscitation preparedness among nursing interns. By bridging the theory-practice gap, it can contribute to reducing preventable neonatal deaths and improving the overall quality of newborn care in India.

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