

عنوان البحث

**Enhance the experience of neonatal care among the critical care
units & New-born care areas**

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Neonatal resuscitation is very important in neonatal care, neonatal resuscitation units, delivery rooms, post-natal wards, antenatal wards, emergency departments, and operations rooms require equipment to ensure effective care during critical emergencies. The readiness of the environment and medical equipment can directly impact infant survival rates and improve their outcomes

The American Academy of Pediatrics and Saudi Neonatology Society recommended that resuscitation tools and equipment be regularly reviewed to ensure readiness

This study focuses on the preparedness of all neonatal units and newborn care areas inside maternity and children's hospital in Riyadh

Studies indicate that optimizing space disruption within the department and providing the necessary equipment can reduce the time takes to access equipment during emergencies, enhancing the effectiveness of resuscitation

In addition, continuous training of medical and nursing teams on NRP protocols and regular updating of these protocols is important to ensure optimal preparedness and response. Developing skills and enhancing communication among medical and nursing team members contributes to improved performance during resuscitation events. Providing immediate feedback on the quality of procedures performed thus enhancing the efficiency of medical teams

By adopting these strategies the quality of neonatal care can be improved across various medical departments leading to increased survival rates and better long-term health outcomes

The study will also address the most prominent challenges facing the effective implementation of CPR, as well as propose innovative solutions to enhance the level of care and achieve the highest levels of safety for newborns

A critical life-saving procedure for neonates who suffer from respiratory or circulatory failure at birth or while receiving care in various hospital departments, including delivery rooms, emergency departments, neonatal intensive care units, and postpartum departments. Despite significant progress, many neonatal care departments face challenges related to the readiness of their care spaces for resuscitation. These challenges include the lack of some of the required equipment, inefficient space allocation, and the need for intensive and continuous training for medical and nursing staff to ensure full preparedness for critical cases. Despite ongoing developments in NRP techniques and medical training programs, medical teams still face significant challenges in implementing NRP efficiently and quickly across various hospital departments. These challenges impact the quality of care provided to newborn infants, highlighting the need to analyze and evaluate the readiness of these departments to provide NRP effectively.

Key Challenges in Implementing NRP

- Lack of Medical Equipment

The lack of basic equipment, such as NRP trolley, is one of the major challenges affecting the effectiveness of emergency response. The American Heart Association and the Saudi Pediatric Neonatology Society recommend that neonatal units be equipped with comprehensive equipment and regularly inspected to ensure readiness. However, some studies have shown that many departments lack this equipment or do not inspect it regularly, which can affect the efficiency of resuscitation operations. (Jeejeebhoy et al., Ortiz-Movilla et al., 2022)

- Variation in Clinical Practices Between Units

Studies conducted in Level IV neonatal intensive care units have shown significant differences in the composition of the resuscitation team and the use of multiple protocols, such as the Neonatal Resuscitation program. These differences lead to variations in the quality of care provided, necessitating standardization of protocols and improved training procedures to ensure a unified response to emergencies (Ali et al., 2024).

- Lack of training and lack of coordination among medical teams

Irregular training and lack of coordination among medical teams are factors that may lead to poor quality NRP. Some research has shown that the absence of ongoing training and poor communication between medical team members may negatively impact outcomes during NRP. Enhancing simulation-based training can improve the performance of medical teams in dealing with emergencies (Ali & Sawyer, 2024; Bolding et al., 2020). Lack of training leads to variations in the effectiveness of emergency response (Rubio-Gurung et al., 2014).

تطرح هذه الدراسة السؤال الرئيسي

This study addresses the main question:

How prepared are neonatal intensive care units and postpartum departments, in terms of infrastructure, medical equipment, and the competence of healthcare teams, to perform NRP according to the standards approved by The American Heart Association and the Saudi Pediatric Neonatology Society?

أهمية الدراسة:

Theoretical Importance:

- Highlighting the role of medical equipment and modern strategies in increasing the success rates of neonatal cardiopulmonary resuscitation (CPR).
- Applying the latest research and practical recommendations on equipping neonatal intensive care units, labor and delivery departments, and postpartum departments, in line with the global standards of the American Heart Association and the Saudi Pediatric Neonatology Society.
- Enhancing practical understanding of how the work environment, medical team efficiency, and space planning affect the quality of CPR and reduce potential complications.

Applied Importance:

- Providing practical proposals for improving the environment of neonatal care units in terms of the availability of medical equipment and continuous training for medical teams.
- Enhancing the efficiency of medical and nursing staff by developing specialized training programs focused on clinical simulation and the use of modern technologies to monitor CPR quality.

- Proposing design standards to ensure optimal space distribution within delivery rooms, emergency departments, and neonatal intensive care units, contributing to improved medical performance and rapid response to emergency situations.

أهداف الدراسة:

This study aims to evaluate and analyze the readiness of neonatal intensive care units (NICUs), emergency departments, and postpartum departments to implement cardiopulmonary resuscitation (NRP) according to the standards approved by the American Heart Association and the Saudi Pediatric Society of Neonatology. This study aims to achieve the following objectives:

- General objectives:

To assess the readiness of neonatal healthcare environments in terms of infrastructure, medical equipment, and the competence of healthcare teams in implementing NRP.

- To identify factors affecting the success of NRP in various departments and analyze associated shortcomings and challenges.

- To propose strategies to improve performance and training to enhance the efficiency of medical teams and ensure an effective response to emergencies.

- Specific objectives:

To assess the availability of essential medical devices and equipment required to implement NRP in delivery rooms, emergency departments, neonatal intensive care units, and postpartum departments.

- To analyze the level of medical teams' adherence to recommended clinical protocols during NRP, and to identify differences between different departments.

- To study the impact of ongoing training and clinical simulation on medical team performance, and to determine the extent to which these impacts reducing errors and improving rapid response. Proposing a standard model for developing neonatal care environments, including recommendations for strategic planning, ongoing training, and environmental improvements to ensure improved NRP success rates.

Main Question

To what extent are neonatal healthcare settings prepared in terms of infrastructure, medical equipment, and the competence of healthcare teams to perform NRP according to approved standards?

Sub-Questions

To what extent are the basic devices and equipment needed to perform NRP available in delivery rooms, emergency departments, neonatal intensive care units, and postpartum departments?

To what extent do medical teams adhere to clinical protocols to improve the efficiency of medical teams in performing NRP and reduce clinical errors?

What role does work environment design play in facilitating or hindering medical teams' response to cardiorespiratory emergencies?

What challenges do medical teams face when performing NRP in various neonatal healthcare settings?

What are the best strategies and recommendations that can be implemented to improve the preparedness of neonatal units and enhance the quality of NRP?

فروض الدراسة:

Based on the study's objectives and questions, the following hypotheses were formulated to test the readiness of neonatal intensive care units, maternity wards, emergency departments, and postpartum departments to implement neonatal resuscitation program (NRP) according to the standards approved by the American Heart Association and the Saudi Pediatric Society of Neonatology.

•Main Hypothesis

There is a statistically significant relationship between the readiness of neonatal healthcare environments in terms of infrastructure, medical equipment, and the competence of healthcare teams and the success of NRP and the reduction of clinical complications.

•Sub-Hypotheses

- The availability of basic devices and equipment in neonatal units positively impacts the speed and efficiency of NRP implementation.
- Adherence to recommended clinical protocols improves the quality of NRP and reduces clinical error rates.
- Continuous training and clinical simulation enhance the efficiency of medical teams in dealing with cardiorespiratory emergencies and reduces response time.
- The design of work environments within medical departments directly impacts ease of access to medical equipment and the speed of response in NRP cases.
- The existence of disparities between different departments in the availability of equipment, training, and protocols leads to variations in the quality of NRP.
- Improving work environments, continuous training, and redesigning the internal spaces of units contributes to increasing CPR success rates and reducing the resulting complications.

الدراسات السابقة:

Studies on the Readiness of Neonatal Care Units

- Usman et al.'s study(2022)

This study examined the readiness of medical teams and health facilities in Nigeria to implement neonatal resuscitation program (NRP). It showed that a lack of basic equipment and inadequate training negatively impact NRP success rates.

- Ortiz-Movilla et al.'s study

This study focused on immediate audits of neonatal NRP rooms and the readiness of medical equipment. It demonstrated that improvements in the organization of the medical environment contribute to improved emergency response and reduced error rates.

Studies on the Impact of Training on NRP Efficiency

- Utomo et al.'s study(2022)

This study analyzed the level of readiness of medical personnel in neonatal units through a cross-sectional study. The results showed that disparities in training among healthcare practitioners significantly impact the quality of NRP, highlighting the need for standardized training programs.

- Rubio-Gurung et al.'s study

This study focused on the effect of clinical simulation training on improving the performance of medical teams in (NRP). It demonstrated that regular training using simulation reduces medical error rates and increases response speed during emergencies.

Studies on the impact of work environment and spatial design on NRP efficiency.

- Ali & Sawyer(2024)

This study examined the impact of work environment design within neonatal intensive care units (NICUs) on CPR implementation. It found that good organization of equipment and spaces contributes to reducing response time and improving NRP quality.

- Hamal et al(2025) .

This study examined NRP success rates in government hospitals in Nepal and revealed the impact of hospital environmental design on the quality of NRP implementation, indicating that improving space and reducing clutter within neonatal units increases the efficiency of medical staff during emergencies (Hamal et al., 2025).

Theoretical foundations of the study:

- Healthcare quality theory (Donabedian's Model of Healthcare Quality, 1980)

This theory focuses on three main dimensions in assessing healthcare quality:

1. Structure: Includes the availability of basic medical supplies and equipment in NRP settings.
2. Process: Includes the efficiency of NRP protocol implementation by medical teams and the extent of adherence to clinical guidelines.

3. Outcome: Includes clinical outcomes such as survival rates and reduced complications resulting from delayed NRP implementation.

Relationship of the theory to the study:

This theory helps analyze the readiness of neonatal units in terms of equipment, adherence to protocols, and the impact of training on improving medical performance and reducing mortality and complication rates.

- Simulation learning theory in medical education (Kolb's Experiential Learning Theory, 1984)

This theory assumes that effective learning occurs through direct experience, which applies to NRP training using clinical simulation techniques.

It is based on four stages:

1. Concrete Experience: Implementing NRP in simulated scenarios.
2. Reflective Observation: Analyzing performance after training and identifying points for improvement.
3. Abstract Conceptualization: Developing a deeper understanding of clinical practices based on feedback.
4. Active Experimentation: Improving performance through repeated training and applying acquired skills in actual care settings.

Relationship of Theory to Study:

This theory helps understand the impact of simulation training on improving the efficiency of medical teams in implementing CPR and reducing clinical errors.

- Systems Theory in Healthcare (Bertalanffy, 1968)

Neonatal units are complex work environments that require constant interaction between various factors, including:

1. Human factors: such as doctors, nurses, and healthcare professionals.
2. Technical factors: such as medical equipment and CPR devices.
3. Environmental factors: such as the design of maternity, emergency, and intensive care units.

Relationship of theory to study:

This theory explains how elements of the healthcare system can work together to improve the quality of CPR, the importance of coordination among medical teams, and the integration of training, equipment, and protocols.

- Environmental Design Theory in Healthcare (Ulrich's Theory of Supportive Design, 1991)

This theory emphasizes the importance of designing healthcare environments to support medical performance and improve patient outcomes. Key principles include:

1. Rapid access to medical equipment: reducing response time in emergencies.
2. Reducing stress and confusion: by organizing work environments within neonatal units.
3. Improving communication between medical teams: by designing spaces to promote rapid coordination.

Relationship of theory to study:

This theory helps analyze the impact of neonatal unit environment design on CPR implementation and reducing medical errors.

المنهجية وطرق البحث:

The descriptive analytical approach was adopted in this study, with the aim of assessing the readiness of neonatal intensive care units (NICUs), delivery rooms, emergency departments, and postpartum departments to implement (NRP) according to the standards approved by the American Heart Association (AHA) and the Saudi Pediatric Neonatology Society. The research methodology was designed to ensure the collection of comprehensive quantitative and qualitative data that helps understand the current situation and provide practical recommendations to improve the quality of care.

Study Type:

A descriptive analytical study using a mixed methods approach that combines quantitative and qualitative research to gain a comprehensive understanding of neonatal units' readiness to implement neonatal resuscitation program (NRP).

Research Design:

Quantitative Analysis:

Data on equipment, training, protocol adherence, and clinical outcomes were collected using standardized questionnaires and hospital reports.

Qualitative Analysis:

Semi-structured interviews were conducted with medical teams to understand the challenges and factors affecting NRP effectiveness.

أدوات الدراسة:

1. Surveys:

Include closed- and open-ended questions to assess the availability of medical equipment, training efficiency, adherence to protocols, and preparedness of medical teams. They are designed according to American Heart Association (AHA) guidelines and Saudi Pediatric Society of Neonatology standards.

2. Semi-Structured Interviews:

Aim to explore medical teams' experiences and challenges in implementing NRP. Focuses on medical equipment, resuscitation protocols, training, work environment design, and proposed strategies for improvement.

3. Analysis of medical records and performance reports:

Includes NRP success rates, response time, clinical errors, and compliance with clinical standards.

حدود الدراسة:

- Objective Limits (Scope)

This study focuses on assessing the readiness of neonatal intensive care units (NICUs), maternity wards, emergency departments, and postpartum wards to implement (NRP) according to the standards approved by the American Heart Association (AHA) and the Saudi Pediatric Neonatology Society.

Topics covered include:

Availability of basic equipment and supplies.

Competence of medical and nursing training.

Adherence to clinical protocols.

Work environment design and its impact on response time.

- Spatial Limits (Site)

The study was conducted in Alyammah hospital with specialized neonatal and emergency departments within the Riyadh city.

The study includes:

Alyammah Hospital with Level II or III NICU.

Maternity wards, emergency departments, and postpartum wards.

- Time Limits (Study Period)

The study covers the period from [1\4\2025] to [30/12/2025], during which:

Data were collected through questionnaires and interviews.

Field visits were conducted and checklists were completed.

Medical records of CPR cases were analyzed.

- Human Limits (Participants)

The study sample is limited to:

Neonatologists and emergency physicians.

Nursing staff in NICU, maternity, and emergency departments.

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