

# Comparing Non-Technical Skills in Neonatal Resuscitation Teams: Performance Across Medical Specialization

Comparing Non-Technical Skills in Neonatal Resuscitation Teams

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## ABSTRACT

**Objective:** The initial breath of a newborn is a critical milestone, marking the transition from placental dependence to self-sufficiency. Despite most infants adapting smoothly, some require resuscitation. This audit was conducted to analyze the impact of non-technical skills on neonatal resuscitation team performance across three medical specializations: pediatricians, obstetricians, and anesthesiologists.

**Study Design:** observational study

**Place and Duration of Study:** This study was conducted at the Medicare hospital Rawalpindi, between February and March 2024.

**Methods:** Video recordings from 60 delivery suites at Medicare hospitals were analyzed, assessing non-technical skills using the Global Assessment of Team Performance (GAOTP) checklist. The GAOTP measures six key domains: communication with patients/parents, task/case management, leadership and teamwork, situational awareness, communication between team members, and environment of the room. Each dimension was rated on a Likert scale from 1 to 5.

**Results:** Pediatricians scored the highest average non-technical skill score of 24.2, followed by anesthesiologists with 20.1, and obstetricians with 17.2, with statistically significant differences ( $p < 0.05$ ). Pediatricians excelled in "environment of the room," "teamwork and leadership," "communication and situational awareness," and "task management," highlighting the importance of effective communication and clear leadership. This study underscores the need for comprehensive training programs that address both technical and non-technical skills to enhance team performance in critical medical situations.

**Conclusion:** Our study highlight that comprehensive training in both technical and non-technical skills is vital for improving team performance in high-pressure medical situations

**Key Words:** neonatal resuscitation, non-technical skills, medical specialties, Global assessment of team performance

**Citation of article:** Khan H, Raza MY, Altaf R. Comparing Non-Technical Skills in Neonatal Resuscitation Teams: Performance Across Medical Specialization. Med Forum 2024;35(6):24-27.doi:10.60110/medforum.350605.

## INTRODUCTION

The initial breath a newborn takes is a critical milestone, marking the shift from dependence on the placenta to self-sufficiency<sup>1</sup>. A failure to successfully transition can pose significant risks, contributing to a considerable proportion around 2.7 million annual neonatal deaths worldwide<sup>2</sup>.

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Received: April, 2024

Accepted: May, 2024

Printed: June, 2024

Efforts to improve neonatal care is a universal need and evidence shows that even in developed countries, care quality sometimes falls short during this crucial period. Healthcare providers in delivery rooms must be skilled in supporting newborns through this transition, as well as in resuscitation. While most infants adapt smoothly to life outside the womb, some require additional interventions. The resuscitation process, often outlined in a step-by-step algorithm, may be rarely used in its entirety. As a result, healthcare teams might struggle to gain the experience needed for a coordinated response. Success in these scenarios depends not just on clinical expertise but also on a set of competencies known as non-technical skills, which encompass situational awareness, leadership, communication, teamwork, managing stress and decision-making<sup>3</sup>.

Unfortunately, limited evidence available on exact role of these non technical skills in the effectiveness of neonatal resuscitation. Understanding how these skills influence team performance during critical moments is crucial for improving outcomes. A potential method for investigating this aspect involves video recording

resuscitation teams in action<sup>2</sup>. This technique allows for detailed analysis of both technical and non-technical performance, providing insights into teamwork, communication, and other factors that contribute to successful resuscitations<sup>1,4-6</sup>.

Predicting which newborns will have trouble transitioning and require resuscitation can be challenging. Consequently, the responsibility for initial resuscitative measures often falls on first encountered person like midwives and obstetricians. Given this uncertainty, it is vital to assess the non-technical skills of interdisciplinary teams, including obstetricians, pediatricians and anesthesiologists. This audit aimed to use video recordings in delivery rooms to assess the level of non-technical skills among above mentioned specialized teams, with the goal of identifying areas for improvement and ultimately enhancing neonatal outcomes.

**METHODS**

This audit was conducted between February and March 2024, factual video recordings were collected from 60 delivery suites at Medicare hospitals to study newborn care during childbirth. Each suite was equipped with two or three high-definition mini-dome surveillance cameras and a ceiling-mounted microphone, providing an angled view of the room, including the neonatal resuscitation table. The recordings were automatically activated via Bluetooth. However, if the pregnant woman is not willing to be the part of this study, no recordings were made. The sixty recorded deliveries were divided into three groups based on the teams responsible for neonatal resuscitation: the anesthesia team, the obstetrician team, and the pediatrician team. Each team was involved in 20 resuscitations, resulting in 20 instances led by anesthesia, 20 by obstetricians, and 20 by pediatricians. All these teams were assessed for their non-technical skills during the neonatal resuscitation.

**Inclusion:** The inclusion criteria for this study were vaginal birth at gestational age of 34 weeks or more and cases where the newborn showed an insufficient response to stimulation. Each video was 9 minutes in duration, beginning 2 minutes before delivery to capture any preparation, and ending 7 minutes after delivery, regardless of the total video length. This approach ensured consistent observation time and minimized potential bias due to longer videos, which could lead to altered team performance or changing team members.

**Exclusion:** Women refused to participate and women delivered before 34 weeks of gestation.

To assess the non-technical skills of interdisciplinary teams during these recordings, the Global Assessment of Team Performance (GAOTP) checklist, built by Morgan et al<sup>7,8</sup>, was used. This tool was chosen among several validated instruments<sup>9</sup> because it is specifically

designed to assess non-technical performance in delivery rooms. The GAOTP checklist assesses following key domains:

1. Communication with Patients/Parents: Excellent performance involves sharing information with parents (family) and involving them in the newborn's care when appropriate.
2. Task/Case Management: This measures the team's ability to recognize the urgency of the clinical situation, set and communicate goals, and effectively utilize resources.
3. Leadership and Teamwork: Excellent performance is indicated when roles of team members are quickly recognized, a leader is identified, participants are motivated and roles and responsibilities are clear.
4. Situational Awareness: This dimension looks at early appreciation and prompt response to critical situations, timely summoning of extra personnel, and vigilance throughout the clinical event.
5. Communication between Team Members: A focus on clear communication with specific instructions, acknowledgment of messages, and confirmation that requested actions were completed indicates strong performance.
6. Environment of the Room: This dimension assesses whether the environment is orderly and controlled, with calm voices and no visible signs of stress or fatigue among team members.

Each dimension was rated on a Likert scale from 1 to 5, where "1" represents a poor non-technical score, "3" represents an average score, and "5" represents excellent performance. The overall GAOTP score was the mean of the six dimensions. Two physicians, experienced in using the GAOTP, independently rated all the videos, with each reviewer blinded to the other's ratings.<sup>10</sup>

**RESULTS**

Majority of the women, 50%, falls within the 21-25 age range. Most women, 65%, were multigravida. Primary education is the most common level of education, with

**Table No. 1: Variables with regard to age, prity and education**

Variable		frequency	Percentage
Age	15-20	02	3.3 %
	21-25	30	50 %
	26-30	25	41 %
	31-35	3	10 %
Prity	Primigravida	21	35%
	multigravida	39	65%
Education	Uneducated	14	23.3 %
	Primary	25	41.2 %
	Secondary	21	35%
Area of residence	Urban	45	75%
	Rural	15	25%

**Table No. 2: Variables with regard to gestational age**

Variable		Frequency	%tage
Gestational age	34-37weeks	22	36%
	>37 weeks	44	73%

41.2% had completed it. A significant majority, 75%, live in urban areas. Most of the women 73% had gestational amenorrhea of more than 37 weeks.

Our study evaluated the non-technical skills of three medical teams responsible for neonatal resuscitation using a Likert scale to assess their performance in a test scenario. These teams comprised pediatricians (Group 1), obstetricians (Group 2), and anesthesiologists (Group 3). The results showed significant differences in non-technical skill levels among the groups, suggesting that the team composition affects the quality of neonatal resuscitation.

The pediatricians in Group 1 achieved the highest average non-technical skill score of 24.2, with a range of 20 to 26 and a standard deviation (SD) of 3.4. The obstetricians in Group 2 had a mean score of 17.2, with a broader range of 15 to 19 and an SD of 7.9. The anesthesiologists in Group 3 achieved an average score of 20.1, with a range of 18 to 22 and an SD of 6.0. The differences in scores between these groups were statistically significant, with a p-value less than 0.05, Figure 1.

Further analysis revealed that the pediatricians (Group 1) demonstrated superior performance in several key areas of non-technical skills. They excelled in "environment of the room," "team work and leadership," "communication and situational awareness," and "task management." The pediatricians' higher scores in these areas contributed to their overall stronger performance, with statistically significant differences compared to both obstetricians and anesthesiologists ( $p < 0.04$ )



**Figure 1: Comparison of Non-technical skill between different teams**

**DISCUSSION**

Effective communication emerged as a crucial element for teamwork in critical situations. A competent leader

is key, providing guidance on patient care and recognizing essential tasks. The leader's role involves monitoring the situation, being vigilant for what might be needed next, and regularly assessing the clinical progress.

The pediatricians (Group 1) in the study showed exceptional performance in non-technical skills, particularly in "room environment," "teamwork and leadership," "communication and situational awareness," and "task management." These results underscore the importance of a clear leader who can coordinate the team effectively.

Training physicians in both technical and non-technical skills presents a significant challenge, especially for younger practitioners. While developing technical skills is crucial, it's equally important to cultivate competencies in communication, teamwork, and leadership. The ability to manage tasks effectively and maintain situational awareness is crucial for optimal patient outcomes. This study highlights the need for comprehensive training programs that address both technical and non-technical aspects of medical practice. Studies on non-technical skills—including leadership, situational awareness, communication, teamwork, decision-making, and stress and fatigue management—have revealed that the importance of these skills varies based on context, specific tasks, and medical specializations. For example, the demands on resuscitation teams that assemble ad hoc for emergency situations are quite different from those on surgical teams carrying out carefully planned procedures.

In a resuscitation scenario, teams require heightened situational awareness and rapid decision-making due to the high-pressure and unpredictable nature of the task. Communication and teamwork become even more critical when every second counts. In contrast, surgical teams in a controlled environment may focus more on leadership and task management, given the pre-planned nature of their work.

Our study has few limitations. The study had only nine recorded cases, with each team observed in only three resuscitations. This limited sample size can lead to reduced statistical power and affect the generalizability of the findings. The study was conducted in a single hospital network (Medicare), which could limit the generalizability of the results to other hospitals with different protocols, team structures, or patient demographics. While the study evaluated non-technical skills, it does not correlate these skills with actual neonatal outcomes.

**CONCLUSION**

Our study highlight that comprehensive training in both technical and non-technical skills is vital for improving team performance in high-pressure medical situations.

**Author's Contribution:**

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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

**Source of Funding:** None

**Ethical Approval:** No.2024/001/117 dated  
11.01.20214

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