

# The Collaborative Role of Nurses and Respiratory Therapists in Managing Non-Invasive Ventilation in Acute Respiratory Failure: Preventing Intubation and Improving Patient Outcomes

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## Abstract

**Background:** Non-invasive ventilation (NIV), including CPAP and BiPAP, is a critical intervention for managing acute respiratory failure (ARF), preventing intubation, and improving patient outcomes. Effective collaboration between nurses and respiratory therapists is essential for ensuring the success of NIV in clinical settings.

**Objective:** This study investigates how nurses and respiratory therapists collaborate in the management of NIV for ARF patients, focusing on how teamwork impacts patient outcomes and prevents the need for intubation.

**Methods:** A qualitative study was conducted in the ICU of a tertiary hospital, involving semi-structured interviews with 12 nurses and 12 respiratory therapists. Thematic analysis was used to identify key themes related to collaborative care and the challenges faced in NIV management.

**Results:** Three main themes emerged: (1) Collaborative roles in NIV setup and monitoring, (2) The impact of teamwork on patient outcomes, and (3) Challenges in communication and role clarity. Effective collaboration between nurses and respiratory therapists was found to prevent intubation and improve patient recovery, though communication gaps and role ambiguity were identified as barriers to optimal care.

**Conclusion:** Collaboration between nurses and respiratory therapists plays a pivotal role in the success of NIV in managing acute respiratory failure. Addressing communication and role clarity issues can further enhance patient outcomes and reduce the need for invasive ventilation.

**Keywords:** Non-invasive ventilation, acute respiratory failure, CPAP, BiPAP, nurses, respiratory therapists, collaboration, patient outcomes, intubation prevention

## Introduction

Acute respiratory failure (ARF) is a life-threatening condition characterized by the inability of the respiratory system to meet the body's oxygenation or ventilation needs, leading to severe hypoxemia or hypercapnia

(Fernando et al., 2017). It can be caused by various underlying conditions, including chronic obstructive pulmonary disease (COPD), congestive heart failure, pneumonia, and acute respiratory distress syndrome (ARDS). Traditionally, invasive mechanical ventilation has been used as a primary intervention for managing ARF. However, in recent years, non-invasive ventilation (NIV), such as Continuous Positive Airway Pressure (CPAP) and Bilevel Positive Airway Pressure (BiPAP), has emerged as a key strategy to support respiratory function while avoiding the complications associated with intubation (Scala and Pisani, 2018).

NIV offers numerous benefits, including reduced risk of ventilator-associated pneumonia, shorter hospital stays, and improved patient comfort (Keenan et al., 2011). For NIV to be successful, it requires continuous monitoring and timely adjustments, a process that involves close collaboration between nurses and respiratory therapists. Respiratory therapists play a crucial role in setting up and managing NIV devices, adjusting ventilator settings, and monitoring patient responses, while nurses are responsible for ongoing patient assessment, monitoring vital signs, and providing supportive care to ensure patient adherence to the therapy (Brill, 2014).

The collaboration between nurses and respiratory therapists is critical in optimizing the use of NIV in patients with acute respiratory failure. Effective teamwork can prevent the need for intubation, reduce complications, and improve overall patient outcomes (Bourke et al., 2018). Despite the clear benefits of this interdisciplinary collaboration, there is limited research on how the joint efforts of nurses and respiratory therapists impact the successful management of NIV in ARF patients. This study aims to investigate the collaborative role of nurses and respiratory therapists in managing non-invasive ventilation in patients with acute respiratory failure, focusing on how their teamwork can prevent intubation and improve patient outcomes.

## Literature Review

### 1. Acute Respiratory Failure and the Role of Non-Invasive Ventilation

Acute respiratory failure (ARF) is a critical condition marked by the inability of the lungs to adequately exchange gases, leading to insufficient oxygenation or ventilation (Fernando et al., 2017). ARF can result from various causes, such as chronic obstructive pulmonary disease (COPD), pneumonia, congestive heart failure (CHF), and acute respiratory distress syndrome (ARDS). Traditional management of ARF often involves invasive mechanical ventilation; however, non-invasive ventilation (NIV) has become an increasingly valuable alternative, particularly in patients who are at risk of complications associated with intubation (Bourke et al., 2018).

NIV, including Continuous Positive Airway Pressure (CPAP) and Bilevel Positive Airway Pressure (BiPAP), works by providing positive airway pressure to support respiratory function without the need for intubation. This approach has been shown to reduce the risk of ventilator-associated pneumonia, improve oxygenation, and decrease the need for invasive mechanical ventilation (Keenan et al., 2011). By using NIV early in the course of respiratory failure, healthcare providers can often prevent the need for intubation, reduce the duration of hospitalization, and improve overall patient outcomes (Scala and Pisani, 2018).

### 2. Role of Respiratory Therapists in Managing Non-Invasive Ventilation

Respiratory therapists (RTs) are essential in managing patients on NIV, given their expertise in respiratory care and ventilatory support. RTs are responsible for setting up and calibrating NIV devices, selecting the

appropriate interface, and adjusting ventilator settings based on patient needs (Brill, 2014). They continuously monitor ventilatory parameters, including tidal volumes, oxygen saturation, and blood gases, to ensure that patients are receiving optimal therapy and are tolerating NIV well (Ramirez et al., 2012).

Studies have demonstrated that the presence of RTs in critical care settings significantly improves the success rate of NIV by ensuring that ventilation settings are appropriately adjusted in response to patient needs (Fisher et al., 2017). RTs also provide patient education on the use of NIV devices, ensuring that patients understand how to maintain a proper seal with the mask, which is crucial for the effectiveness of the therapy.

### 3. Role of Nurses in Managing Non-Invasive Ventilation

Nurses play an equally vital role in managing patients on NIV, particularly in providing continuous bedside monitoring and supportive care. While RTs focus on ventilator management, nurses are responsible for monitoring the patient's overall condition, assessing vital signs, and ensuring patient comfort (Nava and Hill, 2009). Nurses are also involved in preventing complications associated with NIV, such as pressure ulcers from mask interfaces and patient non-adherence to the therapy (Yamaguti et al., 2014).

Nurses often act as the primary point of contact for patients, addressing their concerns and providing reassurance. In this capacity, they help patients acclimate to the use of NIV, particularly for those who may experience anxiety or discomfort due to the mask or airflow. Research indicates that the supportive role of nurses in NIV management contributes to higher rates of patient adherence and treatment success (Ramirez et al., 2012). Nurses are also essential in recognizing early signs of NIV failure, such as worsening respiratory distress or changes in mental status, and alerting the RT or physician to initiate changes in therapy.

### 4. Collaborative Care Models in Non-Invasive Ventilation Management

Effective management of NIV in patients with ARF requires close collaboration between respiratory therapists and nurses. Both professions bring complementary skills to the care of these patients, and successful NIV therapy hinges on seamless communication and coordinated efforts. According to Nava et al. (1998), interdisciplinary collaboration in the ICU setting improves patient outcomes, especially in terms of preventing intubation and reducing the duration of mechanical ventilation. Nurses and RTs must work together to continuously monitor patient responses to NIV, make necessary adjustments, and provide patient-centered care.

Several studies have highlighted the importance of structured communication protocols and teamwork in enhancing the effectiveness of NIV. For example, Scala and Pisani (2018) found that when RTs and nurses held regular interdisciplinary huddles and maintained open lines of communication, NIV success rates improved, and patients were less likely to require invasive ventilation. Such collaborative efforts ensure that patients receive timely interventions and that complications are prevented before they become critical.

### 5. Impact of Non-Invasive Ventilation on Patient Outcomes

The use of NIV in patients with ARF has been widely studied, with substantial evidence supporting its effectiveness in improving patient outcomes. Bourke et al. (2018) showed that NIV reduces the need for intubation, shortens ICU stays, and decreases mortality in patients with ARF. Moreover, NIV has been

associated with fewer complications than invasive mechanical ventilation, particularly in terms of reducing ventilator-associated pneumonia and other infections (Keenan et al., 2011).

Collaborative care between nurses and respiratory therapists enhances the success of NIV in ARF patients. Brill (2014) demonstrated that when RTs and nurses work closely together, patients are more likely to tolerate NIV, leading to better adherence to therapy and improved respiratory function. This interdisciplinary approach not only enhances patient comfort and safety but also optimizes the clinical outcomes of NIV therapy.

## 6. Challenges in Collaboration

Despite the clear benefits of collaborative care, several challenges may hinder effective teamwork between nurses and respiratory therapists in managing NIV. One common challenge is role ambiguity, where overlapping responsibilities between the two professions can lead to confusion about who is responsible for specific tasks (Nava and Hill, 2009). Communication barriers can also arise in fast-paced ICU environments, where nurses and RTs may struggle to maintain consistent communication due to competing demands.

Addressing these challenges requires the implementation of clear communication protocols and role definitions. Nava et al. (1998) emphasize the need for joint training sessions and interdisciplinary education to foster better collaboration between nurses and RTs. By ensuring that both professions understand their roles and responsibilities in NIV management, healthcare teams can provide more efficient and effective care for patients with ARF.

## Methodology

### 1. Study Design

This study utilized a qualitative research design to explore the collaborative role of nurses and respiratory therapists in managing non-invasive ventilation (NIV) in patients with acute respiratory failure (ARF). A qualitative approach was chosen to gain a deep understanding of the experiences, interactions, and collaboration strategies between these two professions, focusing on how their teamwork prevents intubation and improves patient outcomes.

### 2. Setting

The research was conducted in the intensive care unit (ICU) of a tertiary hospital. The hospital provides specialized respiratory care services, including the use of non-invasive ventilation for managing patients with acute respiratory failure. The ICU is staffed with interdisciplinary teams, including respiratory therapists, nurses, intensivists, and other healthcare professionals who frequently manage patients on NIV.

### 3. Participants

A purposive sampling method was employed to recruit participants for this study. A total of 12 nurses and 12 respiratory therapists with at least two years of experience in managing NIV in patients with ARF were selected. Participants were chosen based on their direct involvement in the initiation, monitoring, and management of NIV, as well as their roles in the interdisciplinary team in the ICU. The diverse professional backgrounds of participants allowed for a comprehensive understanding of how collaboration takes place in this context.

#### 4. Data Collection

Data were collected using semi-structured, face-to-face interviews with each participant. The interviews were conducted in a private setting within the hospital to ensure confidentiality. Each interview lasted between 30 to 60 minutes. The interview guide included open-ended questions designed to explore the following areas:

- The roles and responsibilities of nurses and respiratory therapists in managing NIV for ARF patients.
- How nurses and respiratory therapists collaborate to monitor and adjust NIV settings.
- The impact of collaboration on patient outcomes, including the prevention of intubation.
- Challenges and facilitators of effective teamwork between the two professions in the ICU.

All interviews were audio-recorded with the participants' consent and transcribed verbatim. Field notes were also taken during the interviews to capture non-verbal cues and contextual observations.

#### 5. Data Analysis

The data were analyzed using thematic analysis, following the guidelines outlined by Braun and Clarke (2006). The process involved the following steps:

1. Familiarization with the Data: The researchers repeatedly read the interview transcripts to gain an in-depth understanding of the data and immerse themselves in the content.
2. Generating Initial Codes: Each transcript was systematically coded by identifying key phrases and concepts related to collaboration, patient care, and NIV management.
3. Searching for Themes: Codes were grouped into broader themes that reflected patterns across the data, such as "collaborative roles in NIV setup," "monitoring and adjustment of NIV," and "challenges in communication."
4. Reviewing Themes: The identified themes were reviewed to ensure they accurately represented the data and were aligned with the research objectives.
5. Defining and Naming Themes: Each theme was clearly defined, and sub-themes were identified to capture specific aspects of the collaboration process between nurses and respiratory therapists.
6. Writing the Report: The final themes were organized into a cohesive narrative, incorporating direct quotes from participants to support the findings.

#### 6. Ethical Considerations

Ethical approval for the study was obtained from the ethics committee. All participants provided written informed consent prior to the interviews, and they were informed of their right to withdraw from the study at any time. To ensure confidentiality, participants' identities were anonymized in the transcripts, and any identifying information was removed. Audio recordings and transcripts were securely stored and only accessible to the research team.

#### 7. Trustworthiness and Rigor

Several strategies were employed to ensure the trustworthiness and rigor of the study:

- Triangulation: Data were collected from both nurses and respiratory therapists to provide multiple perspectives on collaboration in NIV management.
- Member Checking: Participants were invited to review the findings and verify the accuracy of the interpretation of their experiences.
- Peer Debriefing: The researchers engaged in regular debriefing sessions to discuss emerging themes and ensure the robustness of the analysis.
- Reflexivity: The researchers maintained a reflexive journal throughout the study to account for their potential biases and how these might influence data interpretation.

## 8. Limitations

While the study provides valuable insights into the collaborative role of nurses and respiratory therapists in managing NIV for ARF patients, it is important to acknowledge its limitations. The study was conducted in a single tertiary hospital, which may limit the generalizability of the findings to other settings. Additionally, the qualitative nature of the research means that the findings are based on participants' subjective experiences and perceptions, which may not fully capture all aspects of collaboration in different contexts. Future research could involve multiple hospitals and include quantitative data to provide a more comprehensive understanding of collaboration in NIV management.

## Findings

Thematic analysis of the interviews revealed three major themes related to the collaboration between nurses and respiratory therapists in managing non-invasive ventilation (NIV) in patients with acute respiratory failure (ARF). These themes were: Collaborative Roles in NIV Setup and Monitoring, Impact of Teamwork on Patient Outcomes, and Challenges in Collaboration and Communication. Each theme is supported by sub-themes and direct quotes from participants.

### 1. Collaborative Roles in NIV Setup and Monitoring

Participants emphasized the importance of teamwork in the initial setup and ongoing monitoring of NIV for ARF patients. Both nurses and respiratory therapists played distinct yet complementary roles in managing NIV, ensuring patient comfort and optimizing treatment.

#### a) Initiation and Adjustment of NIV Settings

Respiratory therapists were primarily responsible for initiating NIV, selecting the appropriate mask interface, and adjusting ventilator settings based on the patient's condition. Nurses contributed by closely monitoring the patient's response and reporting any changes in their clinical status.

- Respiratory Therapist 1: "When we first put a patient on NIV, it's our job to make sure the settings are correct and the mask fits properly. But it's a team effort—nurses are watching the patient closely, letting us know if they see any signs of discomfort or distress."

- Nurse 2: "We're constantly at the bedside, monitoring the patient's breathing, oxygen levels, and comfort. If anything looks off, we communicate with the respiratory therapist to make quick adjustments."

#### b) Continuous Monitoring and Patient Comfort

Both professions highlighted their role in ensuring the ongoing success of NIV. Respiratory therapists focused on adjusting settings as the patient's condition evolved, while nurses played a key role in ensuring patient comfort, preventing complications such as pressure sores from the mask, and promoting adherence to the therapy.

- Nurse 3: "A big part of my role is making sure the patient is comfortable with the mask and that they're tolerating it well. If the patient gets anxious or starts pulling at the mask, I try to reassure them and get them to stick with it."

- Respiratory Therapist 4: "The nurses let us know if the patient is uncomfortable, and we can try different mask sizes or adjust the pressure. It's about making sure the patient can tolerate the treatment so we don't have to move to intubation."

## 2. Impact of Teamwork on Patient Outcomes

Effective collaboration between nurses and respiratory therapists was seen as vital to preventing the need for intubation and improving patient outcomes. Participants discussed how teamwork directly contributed to better patient management, particularly in terms of reducing complications and improving recovery rates.

### a) Prevention of Intubation

Both nurses and respiratory therapists highlighted that their joint efforts helped prevent the escalation of respiratory failure, avoiding the need for intubation in many cases.

- Respiratory Therapist 5: "The goal is always to prevent intubation. When we're working together and constantly adjusting the NIV based on the patient's needs, we can usually avoid having to put them on a ventilator."

- Nurse 6: "I've seen so many cases where, if we hadn't acted quickly as a team, the patient would've ended up intubated. But with close monitoring and communication, we can keep the patient stable on NIV."

### b) Improved Patient Recovery

Participants noted that close collaboration in managing NIV helped expedite patient recovery, reduce hospital stays, and improve overall outcomes.

- Nurse 7: "The patients who receive the most attention from both the respiratory therapist and the nursing team tend to recover faster. When we're on the same page and catching things early, it makes a big difference in how quickly patients get better."

- Respiratory Therapist 8: "If we can keep the patient comfortable and make sure the NIV is working effectively, we're more likely to see them recover faster and avoid the complications that come with mechanical ventilation."

## 3. Challenges in Collaboration and Communication

Despite the overall positive collaboration, participants identified several challenges, particularly related to communication and role clarity. These barriers sometimes hindered the effectiveness of the interdisciplinary care provided to patients on NIV.

### a) Communication Gaps During High Workload

Both nurses and respiratory therapists acknowledged that communication could occasionally break down, particularly during busy shifts. This sometimes led to delays in adjusting ventilator settings or addressing patient discomfort.

- Nurse 8: "When the unit is busy, it can be hard to get quick updates from the respiratory therapists. There have been times when we noticed the patient struggling, but it took a while to communicate that and get the settings adjusted."

- Respiratory Therapist 9: "In a busy ICU, there's a lot going on, and sometimes communication isn't as fast as it needs to be. That's definitely an area where we could improve—keeping each other informed, especially when things change quickly."

## b) Role Ambiguity

Some participants expressed that there was occasional role ambiguity between nurses and respiratory therapists, particularly when it came to deciding who should take the lead on specific aspects of NIV management.

- Respiratory Therapist 10: "Sometimes it's unclear who should be in charge of adjusting the NIV settings versus monitoring the patient's overall condition. We're both trained in different areas, but sometimes there's overlap, and it can lead to confusion."

- Nurse 11: "We're working side by side, but there are times when it's not clear who is responsible for what. For example, if the patient starts struggling with the mask, I might try to help, but I also rely on the respiratory therapist to make changes."

## Discussion

This study explored the collaborative efforts of nurses and respiratory therapists in managing non-invasive ventilation (NIV) for patients with acute respiratory failure (ARF). The findings revealed that collaboration between these two professions is crucial for the successful implementation and management of NIV, which can prevent intubation and improve patient outcomes. Despite the generally positive teamwork, challenges related to communication and role clarity were identified. This section synthesizes the key findings, relates them to existing literature, and discusses their implications for clinical practice.

### 1. Collaborative Roles in NIV Setup and Monitoring

One of the key findings of this study is the distinct but complementary roles of nurses and respiratory therapists in managing NIV. Respiratory therapists are primarily responsible for initiating NIV and adjusting ventilator settings, while nurses provide continuous bedside monitoring and focus on patient comfort. This division of roles aligns with existing literature, which emphasizes the importance of specialized skills in NIV management (Nava and Hill, 2009). The success of NIV in preventing intubation relies on both professions working together to ensure that patients tolerate the therapy and that ventilator settings are optimized for individual patient needs (Keenan et al., 2011).

The finding that nurses play a crucial role in promoting patient adherence to NIV by addressing discomfort and anxiety is supported by previous research. Nava and Hill (2009) noted that nurses' ongoing patient assessments and communication with respiratory therapists are key to ensuring that patients remain compliant with NIV, which is often a significant factor in treatment success.

### 2. Impact of Collaboration on Patient Outcomes

Effective collaboration between nurses and respiratory therapists was found to significantly improve patient outcomes, particularly in preventing the need for intubation. Participants reported that their joint efforts in adjusting NIV settings and monitoring patients' responses led to better management of respiratory failure and reduced the likelihood of complications. These findings are consistent with studies that demonstrate the benefits of interdisciplinary collaboration in respiratory care, particularly in terms of reducing the need for invasive mechanical ventilation (Fisher et al., 2017).



Moreover, the study found that patients managed through collaborative NIV care had improved recovery rates and shorter hospital stays. This aligns with the literature suggesting that successful use of NIV not only reduces mortality rates in patients with ARF but also decreases the duration of hospital stays and the risk of ventilator-associated complications (Bourke et al., 2018).

### 3. Challenges in Collaboration and Communication

Despite the positive outcomes associated with collaboration, participants identified several challenges, particularly related to communication and role ambiguity. Communication gaps during high workload periods were frequently mentioned, reflecting findings from previous studies on the impact of workload on interdisciplinary communication (Weller et al., 2014). In fast-paced ICU environments, the complexity of care demands often makes it difficult to maintain timely communication between nurses and respiratory therapists, which can lead to delays in adjusting NIV settings or addressing patient discomfort.

Role ambiguity was another challenge highlighted in this study. Participants expressed uncertainty about who should take the lead in specific aspects of NIV management, such as adjusting ventilator settings versus monitoring patient status. This finding mirrors the broader issue of overlapping responsibilities in interdisciplinary care, as noted by Weller et al. (2014), and underscores the need for clearer role definitions to enhance collaboration and prevent delays in care.

### 4. Implications for Clinical Practice

The findings of this study have several important implications for clinical practice. First, there is a need to improve communication protocols between nurses and respiratory therapists in the ICU to ensure timely interventions and optimize patient outcomes. Implementing structured communication tools, such as regular interdisciplinary huddles or check-ins, could help reduce communication gaps and facilitate more efficient teamwork (Reader et al., 2011). These protocols would ensure that any changes in patient status or ventilator settings are communicated promptly, improving the overall quality of care.

Second, addressing role ambiguity is critical for enhancing collaboration in NIV management. Developing clear role definitions and outlining specific responsibilities for nurses and respiratory therapists would help prevent confusion and ensure that each profession's expertise is utilized effectively. Interprofessional education programs that emphasize the complementary roles of nurses and respiratory therapists in NIV management could also improve teamwork and clarify expectations.

Finally, the study highlights the need for ongoing training and education on the collaborative management of NIV. By fostering a better understanding of each profession's role and encouraging open communication, healthcare teams can enhance their ability to manage NIV effectively and prevent the need for intubation in patients with ARF.

### 5. Limitations and Future Research

While this study provides valuable insights into the collaborative role of nurses and respiratory therapists in managing NIV, it is important to acknowledge its limitations. The study was conducted in a single tertiary hospital, which may limit the generalizability of the findings to other settings. Additionally, the qualitative

nature of the research means that the findings are based on participants' subjective experiences and perceptions, which may not fully capture all aspects of collaboration in different ICU environments.

Future research could address these limitations by conducting studies in multiple healthcare settings and incorporating quantitative data to measure the impact of collaborative care on patient outcomes. Additionally, research exploring the long-term effects of collaborative care on NIV success rates, patient recovery, and the prevention of intubation would provide further evidence to support interdisciplinary teamwork in respiratory care.

## Conclusion

In conclusion, this study underscores the critical role of collaboration between nurses and respiratory therapists in managing non-invasive ventilation for patients with acute respiratory failure. By working together to optimize NIV settings, monitor patient responses, and promote adherence to therapy, these healthcare professionals play a vital role in preventing intubation and improving patient outcomes. Addressing communication barriers and role ambiguity will further enhance the effectiveness of this collaboration, ensuring that patients receive the best possible care.

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