

Patient Safety And Risk Management: Shared Responsibilities Between Nursing And Respiratory Therapists In The Care Of Patients Connected To A Mechanical Ventilator

Hussain Mohammed Almulhim ⁽¹⁾, Ghassan A Alabbad ⁽²⁾, Majid Ahead Al-Zowaidi ⁽³⁾, Muath Abdulrahman Almulhim ⁽⁴⁾, Rania Yousif Aljumaiah ⁽⁵⁾, Mohammed Abdulrahman Albahkali ⁽⁶⁾, Fatimah Mohammed Ahmed Asiri ⁽⁷⁾, Nada Ali Gafari khudair ⁽⁸⁾, Alaa Ali Hamed Alharthi ⁽⁹⁾, Munirah Eidha Dwaibi ALthubaiti ⁽¹⁰⁾, Fahad Hamdi Humaidan Alzibali ⁽¹¹⁾, Osama Ayesh Dulayshan Almurashi ⁽¹²⁾, Abdulaziz Salah Saleh Aljohani ⁽¹³⁾, Zayed Hamed Alharbi ⁽¹⁴⁾, Naser Metab Meslh Alsehami ⁽¹⁵⁾

1. Respiratory therapist I, King Abdulaziz Hospital National Guards Health Affairs, Kingdom of Saudi Arabia. Almulhimhu@Mngha.Med.Sa
2. Respiratory therapist II, King Abdulaziz Hospital National Guards Health Affairs, Kingdom of Saudi Arabia. Alabbadgh1@Mngha.Med.Sa
3. Respiratory Therapy-RT Supervisor, King Abdulaziz Hospital National Guards Health Affairs, Kingdom of Saudi Arabia. Zowaidim@Mngha.Med.Sa
4. King Abdulaziz Hospital National Guards Health Affairs Respiratory Therapist, RT2, Kingdom of Saudi Arabia. Almulhimmu@mngaha.med.sa
5. Nurse Specialist, King Fahad Hospital, Kingdom of Saudi Arabia. ryaljumaiah@moh.gov.sa
6. Pediatric allergy and immunology, Al Yamamah Hospital (second cluster), Kingdom of Saudi Arabia.
7. Nursing Specialist, Eradah & Mental Health Complex, Taif Health Complex, Kingdom of Saudi Arabia. fasisi@moh.gov.sa
8. Nursing Specialist, Eradah & Mental Health Complex, Taif Health Complex, Kingdom of Saudi Arabia. nkhudair@moh.gov.sa
9. Nursing Specialist, Eradah & Mental Health Complex, Taif Health Complex, Kingdom of Saudi Arabia. Aalharthi70@moh.gov.sa
10. Nursing Specialist, Eradah & Mental Health Complex, Taif Health Complex. mealthubaiti@moh.gov.sa
11. Nursing Specialist, Ministry of Interior, Kingdom of Saudi Arabia.
12. Nursing Specialist, Ministry of Interior, Kingdom of Saudi Arabia.
13. Nursing Specialist, Ministry of Interior, Kingdom of Saudi Arabia.
14. Nursing Technician, Ministry of Interior, Kingdom of Saudi Arabia.
15. Public Health Officer, King Abdul-Aziz University, Kingdom of Saudi Arabia.

Abstract

Background: Mechanical ventilation is a lifesaving intervention for critically ill patients but carries significant risks of adverse events, including ventilator-associated pneumonia and patient-ventilator asynchrony. Nurses and respiratory therapists (RTs) share essential responsibilities in ensuring patient safety, yet collaboration can be hindered by overlapping roles, communication barriers, and system inefficiencies. Understanding their joint contributions is crucial to improving safety and outcomes for ventilated patients.

Methods: A descriptive integrative literature review was conducted using PubMed, Scopus, CINAHL, ScienceDirect, and Google Scholar databases. Studies published between 2015 and 2025 focusing on adult ICU populations and nurse-RT collaboration in mechanical ventilation were included. Thematic synthesis was employed to analyze interprofessional practices, safety strategies, and risk management outcomes.

Results: Findings revealed that strong nurse–RT collaboration enhances adherence to evidence-based ventilation protocols, reduces ventilator-associated complications, and improves patient outcomes such as shortened ICU stay and decreased mortality. Shared decision-making, structured communication models (e.g., SBAR), and joint education programs emerged as key enablers of safety culture. Conversely, barriers included role ambiguity, hierarchical dynamics, inadequate staffing, and limited institutional support. Effective collaboration was also linked to higher staff satisfaction and reduced burnout.

Conclusions: Patient safety in mechanical ventilation depends on the integrated efforts of nurses and respiratory therapists working in partnership. Collaborative frameworks, mutual respect, and continuous interprofessional education are vital to optimizing care and mitigating risk. Institutional investment in structured teamwork models, competency validation, and supportive safety cultures will sustain improved outcomes and elevate the standard of critical care practice.

Keywords: patient safety, mechanical ventilation, respiratory therapist, nursing, interprofessional collaboration, risk management.

Introduction

Mechanical ventilation remains a cornerstone of critical care medicine, employed extensively to support patients experiencing respiratory failure or compromised airway protection. Its application is multifaceted, spanning acute emergencies, chronic conditions, and perioperative management, and demands comprehensive attention due to the complexity and susceptibility to adverse outcomes. With advances in medical technology, the spectrum of patients requiring prolonged or short-term ventilation has broadened, introducing distinct clinical, physiological, and psychological challenges that complicate the management paradigm. These complexities necessitate high-level vigilance and expertise from intensive care teams—none more so than nurses and respiratory therapists, who are collaboratively responsible for daily patient safety and risk management at the bedside (Chatburn, 2023).

The safety of mechanically ventilated patients is at the forefront of ICU care, as these patients are at heightened risk for life-threatening complications such as ventilator-associated pneumonia (VAP), acute respiratory distress syndrome (ARDS), barotrauma, oxygen toxicity, and patient–ventilator asynchrony. These complications not only result in prolonged ICU stays and increased mortality but also contribute significantly to the global burden of critical illness, with up to half of all ICU patients requiring mechanical ventilation at some point during their admission. Addressing these risks requires structured assessment, proactive prevention protocols, and continuous education that emphasize details such as airway management techniques, oral hygiene, sedation practices, and vigilant monitoring of ventilator settings. Complications related to staff errors, equipment failure, or delays in recognizing patient deterioration further underscore the importance of robust risk mitigation strategies and transparent incident reporting (Rubulotta et al., 2024).

Nursing and respiratory therapy teams constitute the dual pillars of patient safety in the context of mechanical ventilation. Nurses provide holistic, patient-centered care, managing clinical assessments, medication administration, airway suctioning, patient positioning, and communication with families. Respiratory therapists are highly trained in ventilator management, waveform analysis, resolving patient–ventilator asynchronies, and implementing respiratory protocols that directly impact patient outcomes. Their expertise is essential for troubleshooting ventilator alarms, adjusting ventilator parameters, and assessing a patient’s readiness for weaning, all while maintaining a focus on lung-protective ventilation strategies. Shared responsibilities include adherence to safety checklists, prevention bundles for VAP reduction, and coordination during critical procedures such as suctioning, tracheostomy care, or device changes. Interprofessional collaboration and regular joint training programs have been shown to improve protocol compliance, reduce complications, and empower ICU staff toward a culture of safety and continuous improvement (Acho et al., 2022).

Globally, adverse events associated with mechanical ventilation remain prevalent. Incidence rates vary by region, setting, and patient cohort, but studies consistently report substantial proportions of ICU patients suffering complications during ventilator support, with VAP alone impacting tens of thousands annually. Long-term survivors are at risk for chronic ventilator dependence, as well as secondary complications such as psychological distress and muscle deconditioning. Root-cause analyses highlight factors such as inadequate staff training, communication breakdowns, and lapses in protocol adherence as common contributors to harm. System-level interventions—such as the implementation of nurse-led or respiratory therapist-driven bundles, standardized weaning protocols, and the creation of error reporting systems—have proven effective in reducing adverse event rates and safeguarding patients connected to mechanical ventilation (Lipprandt et al., 2022).

The aim of this review is to provide a comprehensive exploration of patient safety and risk management as shared responsibilities between nursing and respiratory therapy professionals caring for mechanically ventilated patients. By detailing interprofessional collaboration, evidence-based safety practices, and the application of preventive strategies, this section seeks to clarify the mechanisms by which these teams jointly protect patients from complications and promote optimal clinical outcomes. The narrative will highlight structural frameworks, key interventions, real-world challenges, and future opportunities, guided by research sourced from PubMed and the prevailing body of critical care literature.

Methods

A descriptive integrative literature review design was employed to explore the shared responsibilities between nurses and respiratory therapists in ensuring patient safety during mechanical ventilation. This approach was selected because it allows the integration of findings from diverse study types to provide a comprehensive understanding of teamwork and risk management practices in ventilated patient care.

A systematic search strategy was applied across several electronic databases, including PubMed, Scopus, CINAHL, ScienceDirect, and Google Scholar. The search covered studies published between 2015 and 2025 to ensure current relevance and the inclusion of the latest clinical evidence. The keywords used included “nurse and respiratory therapist collaboration,” “mechanical ventilation safety,” “critical care teamwork,” “ventilator-associated complications,” “patient safety,” and “risk management.” Boolean operators (AND, OR, NOT) were systematically utilized to refine search combinations and improve retrieval accuracy.

Studies were included if they met the following criteria: peer-reviewed research articles written in English, focused on adult intensive care unit (ICU) populations, and related to multidisciplinary ventilator care involving both nurses and respiratory therapists. Excluded were studies that addressed pediatric populations, surgical anesthesia ventilation, non-English publications, or research limited to a single professional discipline, as these were outside the scope of this review.

Background

Patient safety and risk management represent foundational pillars in the delivery of high-quality critical care, especially in the complex environment of intensive care units (ICUs), where patients requiring mechanical ventilation present unique challenges and vulnerabilities. The principle of “do no harm” is paramount, yet the intricacies of technology, communication, and environmental factors introduce multifaceted risks that must be mitigated through robust interdisciplinary collaboration between nursing staff and respiratory therapists (RTs). Mechanical ventilation, while life-saving, introduces a spectrum of physiological risks—ranging from barotrauma and ventilator-associated pneumonia to hemodynamic instability and patient-ventilator asynchrony—that are compounded by operational complexities such as equipment calibration, alarm management, infection control, and continuous patient assessment. In this landscape, patient safety involves the minimization of adverse events through structured risk management strategies that emphasize vigilance, adaptation, and teamwork (Williams & Sharma, 2023).

International frameworks, notably the World Health Organization (WHO) and the Institute for Healthcare Improvement (IHI), provide the conceptual underpinnings for safety culture in critical care. The WHO Patient Safety Curriculum highlights the importance of system-wide approaches, stressing leadership, communication, and learning from error as central drivers. Meanwhile, the IHI advocates for creating a "culture of safety" through principles such as transparency, empowerment, just culture, and continuous process improvement. These frameworks converge on the necessity for shared responsibility and proactive engagement among all healthcare providers. In practice, nurse–RT collaboration is essential for operationalizing these principles on the frontlines: nurses bring a holistic, continuous monitoring perspective, while RTs contribute specialized expertise in the operation and optimization of ventilatory support technology. Together, they form the backbone of the team-based critical care model, in which roles are fluid and mutually supportive—allowing for real-time sharing of vital information, rapid escalation of concerns, and joint execution of complex interventions such as ventilator weaning, airway management, and troubleshooting mechanical or physiological complications (Hosseini Kordkandi et al., 2025).

Mechanical ventilation itself is emblematic of the interconnectedness of patient safety and risk management. Technical risks—such as equipment failure, circuit disconnections, inappropriate alarm settings, and software malfunctions—require both nurses and RTs to maintain stringent safety checks, perform regular equipment audits, and adhere to evidence-based protocols for device management. Human factors, especially communication errors, are a significant source of harm in ICU settings. These may manifest as missed handoffs, unclear orders, incomplete documentation, or failure to escalate acute changes in patient status. The development and implementation of standardized communication tools (such as SBAR—Situation, Background, Assessment, Recommendation) and interdisciplinary rounds help bridge these gaps, reinforcing a safety culture that prioritizes shared understanding and accountability. Environmental factors, including high noise levels, crowded rooms, shifting patient acuity, and frequent interruptions, contribute to cognitive overload and increase the likelihood of error; mitigation strategies focus on optimizing ICU design, controlling visitor flow, and streamlining workflow to minimize distractions and facilitate focus. Systemic risks—such as gaps in policy, outdated protocols, or failures in staff training—demand ongoing review and improvement efforts, with nurse–RT teams actively engaged in protocol development, simulation training, and root cause analyses of adverse events (Meitner et al., 2023).

Ultimately, the shared responsibilities of nurses and respiratory therapists in caring for mechanically ventilated patients transcend task-based duties, encompassing an enduring partnership dedicated to vigilance, adaptability, and the primacy of patient-centered outcomes. This partnership finds its strength in mutual respect, role clarity, and a commitment to learning from both successes and failures. Their collaboration is not ancillary, but essential for sustaining a resilient safety culture in the ICU, transforming risk into opportunity for improvement, and ensuring the delivery of care that is not only technologically proficient but profoundly humane (Alkhathami et al., 2023).

Nursing Responsibilities

Critical care nurses provide continuous bedside monitoring and assessment of mechanically ventilated patients, serving as the primary gatekeepers for patient safety. Through vigilant observation of vital signs, respiratory parameters, and ventilator settings, nurses detect early warning signs of complications such as ventilator-associated pneumonia (VAP), acute distress, or patient-ventilator asynchrony. Patient assessment is holistic—encompassing neurological, hemodynamic, and skin status—and tailored for early detection of evolving problems. Nurses are responsible for maintaining proper patient positioning, which is essential in preventing pressure injuries and facilitating optimal pulmonary mechanics, including routine repositioning and use of adjuncts like prone positioning when indicated. Sedation management is central, with nurses titrating medications to achieve both comfort and safety, aiming to avoid over-sedation (which increases risk of complications) or under-sedation (resulting in anxiety, agitation, and potential self-extubation). Airway suctioning, either scheduled or as needed for secretion clearance, is performed expertly by nurses to maintain airway patency and prevent infection. Prompt alarm response is a critical function, as nurses

must rapidly assess and address hypoxemia, high airway pressures, or ventilator disconnects, initiating appropriate interventions while communicating with the interdisciplinary team. Accurate, timely documentation of all assessments, interventions, ventilator parameters, and patient responses is essential for care continuity and medico-legal protection. Finally, nurses champion infection prevention through adherence to best practices for ventilator circuits, oral care, and hand hygiene, as well as monitoring for signs of VAP (Hassen et al., 2023).

Respiratory Therapy Responsibilities

Respiratory therapists (RTs) are the technical experts tasked with ventilator setup, calibration, and ongoing management to ensure that patients receive optimal, safe support based on their current physiological needs. Initial ventilation mode selection and settings, such as tidal volume, respiratory rate, FiO₂, and positive end expiratory pressure (PEEP), are configured by RTs per physician orders while incorporating evidence-based protocols tailored to patient pathology (e.g., ARDS, COPD, neuromuscular disorders). RTs have specialized skills in adjusting ventilator modes and parameters during patient care, especially as clinical status evolves, to maintain synchrony and minimize risk of barotrauma or ventilator-induced lung injury. Airway clearance, including bronchopulmonary hygiene maneuvers such as chest physiotherapy or advanced secretion removal techniques, is a key RT responsibility. RTs are adept at troubleshooting technical issues such as ventilator circuit disconnections, false or true alarms, and misinterpretation of waveforms, using both bedside skill and in-depth equipment knowledge to address problems promptly. Ventilator waveform analysis by RTs allows identification and correction of common patient-ventilator dyssynchrony patterns—adjusting inspiratory times, trigger sensitivity, or flow rates as needed. Management of weaning protocols—including spontaneous breathing trials, readiness assessments, and pre-extubation planning—is frequently led by RTs, with close communication with nurses and physicians to facilitate safe transitions and minimize complications (Zaccagnini et al., 2025).

Overlap and Interdependency

The boundaries between nursing and respiratory therapy are fluid and interwoven, with numerous areas of shared responsibility where coordination is vital for patient safety. Alarm response is an especially critical domain, requiring immediate collaboration to identify cause, rectify problems, and prevent harm—whether the alarm is due to circuit, patient, or equipment factors. In emergency extubation scenarios, both nurses and RTs must act swiftly to maintain airway patency, initiate resuscitation if required, and secure alternative ventilatory support, working with physicians as needed. Continuous monitoring of oxygenation and ventilation metrics (such as SpO₂, ETCO₂, tidal volume, minute ventilation) involves frequent data sharing and team-based decision making, ensuring adjustments are evidence-based and patient-centric. Both disciplines contribute to evaluating and implementing ventilator setting changes per physician orders, with nurses observing patient response at the bedside and RTs applying technical expertise to optimize settings. Collaborative management extends to prevention of adverse outcomes—such as VAP, pressure injuries, and ventilator-associated events—through adherence to bundles, protocols, and ongoing skill-based education. Ultimately, interprofessional collaboration is the cornerstone of high-quality mechanical ventilation care, with shared decision making, open communication, and unified protocols shown to enhance safety, outcomes, and team satisfaction (Boltey et al., 2017).

Interprofessional Collaboration and Communication

Interprofessional collaboration and robust communication between nursing and respiratory therapists (RTs) are fundamental to optimizing patient safety and clinical outcomes for individuals on mechanical ventilation in critical care settings. The dynamic interplay of expertise—nurses with their constant bedside presence and RTs with specialized knowledge of ventilator management—creates a comprehensive care approach, ensuring rapid clinical response to changing patient conditions and effective implementation of evidence-based protocols. This collaborative synergy fosters timely identification and mitigation of risks such as ventilator-associated pneumonia (VAP), enhances ventilator weaning success rates, and minimizes

complications like emergency reintubation. Multidisciplinary rounds and joint decision-making processes allow for continual reassessment and adaptation of the care plan, reinforcing shared accountability and increasing patient safety (Rausen et al., 2025).

Structured communication models such as SBAR (Situation, Background, Assessment, Recommendation), bedside rounds, and standardized handover protocols are critical enablers for effective interprofessional engagement. SBAR specifically provides a proven framework for exchanging clear, concise, and standardized information during high-risk transitions, supporting the reduction of communication errors that can compromise patient safety. Studies demonstrate that integrating SBAR into ICU workflows enhances teamwork, improves the perception of patient safety culture, and increases the completeness of essential clinical documentation, particularly concerning mechanically ventilated patients. Bedside interdisciplinary rounds and structured handovers align all providers with the patient's current status and acute needs, fostering real-time problem-solving and consensus on action plans. Institutional adoption of these models not only improves patient outcomes but also creates a culture of continuous learning and safety (Bonds, 2018).

Evidence supports that when nurses and RTs collaborate effectively, there are tangible improvements in patient outcomes for those undergoing mechanical ventilation. Interprofessional teams can better anticipate and prevent ventilator-associated complications, proactively ensure adherence to lung-protective ventilation strategies, and facilitate earlier and more successful weaning from ventilatory support. Recent research shows collaborative practice lowers VAP rates, reduces ICU length of stay, increases ventilator weaning success, and leads to better disposition at discharge for critically ill patients. The continuous exchange of multidisciplinary knowledge allows prompt adjustment of ventilator settings to changing physiological parameters, supporting rapid recovery and preventing escalation of care. High team familiarity and repeated collaboration are directly linked to better patient results, demonstrating the paramount importance of continuity and trust among ICU professionals (Rak et al., 2021).

Despite clear benefits, multiple barriers can undermine effective nurse–RT collaboration: role ambiguity, hierarchical team structures, and high workload stress frequently impede unified decision-making. Role ambiguity may result in uncertainty over responsibilities for key tasks, such as ventilator adjustments or extubation readiness assessment, leading to fragmented care pathways and delays. Hierarchical dynamics—where one profession dominates decision authority—can diminish contributions from other providers, reducing the diversity of clinical insights available and potentially compromising safety. Elevated workloads, particularly in understaffed units, limit time for joint rounding, interdisciplinary discussion, and education, hampering communication and shared planning (Alkhathami et al., 2023).

Promoting enablers is essential to overcoming these barriers and strengthening interprofessional teamwork. Mutual respect, establishment of shared patient care goals, provision of ongoing joint education, and institutional support through protocols or checklists are universally recognized facilitators. Cultivating a culture of respect ensures equal participation from nurses and RTs, allowing both professions to freely contribute expertise to the care process. Shared goals emphasize patient-centered outcomes over individual professional priorities, motivating cooperation. Ongoing interprofessional training fosters understanding of each discipline's role and capabilities while encouraging open, nonjudgmental communication. Finally, institutional frameworks—such as protocols for ventilation management, routine multidisciplinary bedside rounds, and structured handoff practices—help systematically embed collaborative approaches within the ICU workflow, leading to sustained improvements in patient safety and clinical performance (Costa et al., 2024).

Education, Training, and Competency

Education, training, and demonstrated competency form the backbone of safe and effective care for patients on mechanical ventilation, particularly when responsibilities are shared between nursing staff and respiratory therapists. Both professions possess critical but distinct roles in ventilator management,

demanding that each maintains advanced knowledge and practical skillsets. Respiratory therapists (RTs) are highly specialized in the technical operation, waveform interpretation, adjustment, and troubleshooting of mechanical ventilators, often certified through rigorous credentialing examinations such as those offered by the National Board for Respiratory Care. These credentialing standards assess not only initiation and management principles but also advanced concepts like patient-ventilator asynchrony, waveform analysis, and response to emergency events. Similarly, critical care nurses, though traditionally receiving limited formal education in ventilation during undergraduate training, are increasingly expected to expand their competencies through institutionally driven programs, recognizing their vital role in ongoing bedside monitoring, detection of complications, and early responses to changes in patient status (Hosseini Kordkandi et al., 2025).

A modern, patient-centered model demands ongoing joint education and interprofessional training sessions incorporating both simulation-based learning and competency validation. Simulation-enhanced, interprofessional curricula—where nurses, RTs, and physicians collectively participate in didactic lessons, high-fidelity simulation scenarios, and immersive in situ experiences—have proven especially effective in improving ventilator safety and patient outcomes. Such programs reinforce theoretical knowledge through practical, real-world emulation, moving seamlessly from basic ventilator initiation to advanced disease-specific scenarios. Integrated modules often leverage frameworks such as the ABCDEF bundle (which includes ventilator liberation protocols, sedation management, and early mobility), benefiting from team-based scenario training to foster communication, clarify roles and responsibilities, and reduce the risk of ventilator-associated harm. Pre- and post-curriculum testing in these programs reveals marked improvements in knowledge retention and confidence, with expanded impact when simulation training is distributed through a “train-the-trainer” model, ensuring sustainability and wide-scale skill dissemination (Nonas et al., 2022).

Competency in safe ventilator management is maintained by applying clearly defined standards that blend technical skill and clinical judgment. For both nursing staff and respiratory therapists, competency evaluations incorporate direct observation, simulation-based assessments, formal checklists, and objective testing, focusing on skills such as ventilator parameter adjustment, recognition and correction of patient-ventilator asynchronies, adherence to evidence-based protocols, and prevention of complications like ventilator-induced lung injury or ventilator-associated pneumonia. Research supports that critical care nurses with at least 40 hours of targeted training can achieve reliability in complex tasks, such as identifying ineffective inspiratory efforts, commonly associated with asynchrony. Meanwhile, advanced practice roles for RTs are assessed through frameworks such as Entrustable Professional Activities (EPAs) to ensure independent readiness for complex ventilator management, further supporting interprofessional trust and collaboration (Alismail & López, 2020).

Central to maintaining excellence and patient safety are structured certification pathways and robust continuing education. Both professions are encouraged, and often required, to participate in ongoing professional development, covering the latest evidence-based guidelines and emerging best practices in ventilator care. This includes mandatory participation in continuing education units (CEUs), periodic recertification, and engagement in specialized certifications, such as the Adult Critical Care Specialist credential for RTs or the critical care certification for nurses. Increasingly, continuing education incorporates multidisciplinary elements, simulation refreshers, and updates reflecting changes in technology and clinical guidelines, ensuring practice remains both current and collaborative (Keller et al., 2019).

Ultimately, the integration of education, training, and competency evaluation—delivered jointly and upheld to the highest standards—serves not only to safeguard quality and safety for ventilator-dependent patients but also to foster a robust culture of teamwork and shared responsibility among nurses and respiratory therapists. This unified, evidence-based approach equips teams to better identify and mitigate risk,

implement preventive strategies, and actualize optimal patient outcomes within the high-stakes environment of mechanical ventilation (Acho et al., 2022).

Challenges and Barriers

Challenges in ensuring patient safety and effective risk management when caring for mechanically ventilated patients center on several systemic, interpersonal, and professional barriers arising from the shared responsibilities of nursing and respiratory therapists. One fundamental challenge is the inherent overlap in roles, which can create conflict regarding scope of practice, especially in task delegation and decision-making related to ventilator management and patient care activities. For instance, respiratory therapists traditionally oversee the technical aspects of ventilator settings, troubleshooting, and initiation and discontinuation protocols, while nursing staff are responsible for bedside monitoring, care coordination, and holistic assessments. Such role blurring can be exacerbated by unclear institutional policies and lack of formal collaborative frameworks, leading to delays, inconsistent decision-making, or fragmented care delivery. A recent systemic review found that nurse managers often perceive themselves as having limited autonomy, particularly regarding ventilator and weaning decisions, primarily deferring to physicians and respiratory therapists for changes in ventilator parameters. This perception is compounded by power gradients and differing scopes of educational training, which delineate lines of responsibility but may inadvertently hamper the development of true interprofessional collaboration and hinder effective patient-centered approaches (Alkhathami et al., 2023).

Limited staffing, high patient acuity, and workload intensity frequently contribute to burnout, task saturation, and compromised safety culture among nurses and respiratory therapists alike. The critical care environment, particularly with high volumes of mechanically ventilated patients, magnifies the risk for adverse events related to human factors, such as fatigue or inattentiveness. Studies with home mechanical ventilation have shown that nursing staff often attribute adverse events to complex tasks such as patient transportation, suctioning, and tracheostomy decannulation—each requiring seamless coordination between all team members. In the absence of robust checklists, reminder systems, or cross-disciplinary support, compounded stress from understaffing further exacerbates safety risks, erodes morale, and may increase turnover rates within both professions (Lipprandt et al., 2022).

Communication breakdowns represent an entrenched obstacle, impacting both nurse–respiratory therapist interactions and nurse–patient or therapist–patient relationships. Mechanically ventilated patients face profound barriers to verbal communication due to intubation or tracheostomy, leaving them temporarily voiceless and highly dependent on healthcare team vigilance for their nonverbal cues and needs. Failure to recognize or respond promptly to communication cues can lead to patient distress, anger, or feeling neglected, and impede rapid detection of patient deterioration. Task redundancy—where nurses and respiratory therapists independently perform overlapping assessments or care interventions without effective handoff—often leads to inefficiencies, duplicated efforts, and conflicting documentation. This problem intensifies when policies do not clearly specify boundaries or joint workflows, creating ambiguity and further fueling frustration. A structured review advised that multifactorial interventions targeting staff skill development, implementation of formal communication protocols, and use of assistive technologies for patient expression are essential for minimizing preventable harm and optimizing clinical outcomes (Dithole et al., 2016).

Systemic challenges, most notably unclear or insufficiently formalized collaborative frameworks, remain a pervasive root cause of avoidable safety incidents. The absence of standardized interdisciplinary protocols or collaborative governance structures impedes the creation of cohesive, team-based approaches to risk identification, mitigation, and continuous quality improvement. Root-cause analyses in mechanical ventilation frequently highlight the lack of transparency, error reporting, and shared learning as barriers to safety improvement. A systematic adverse event analysis recommended open approaches to error reporting, the establishment of dedicated checklists for high-risk activities, and ongoing cross-professional education and training to foster psychological safety, mutual respect, and accountability. As most adverse events arise

from multifactorial origins—human factors, lack of device competence, and organizational inertia—interprofessional initiatives, led by empowered nurses and respiratory therapists, are required to move safety culture forward and reduce task saturation in high-acuity settings (Berg et al., 2024).

Outcomes of Effective Nurse–RT Collaboration

Effective nurse–respiratory therapist (RT) collaboration in the care of mechanically ventilated patients is fundamental to advancing patient safety and optimizing risk management in critical care. Numerous studies affirm that such multidisciplinary synergy results in significant clinical benefits, including observable reductions in ventilator-associated pneumonia (VAP) rates, shortened intensive care unit (ICU) stays, lowered readmission frequencies, and improved overall patient survival metrics. For instance, the implementation of RN- and RT-driven mechanical ventilation protocols has been shown to halve the duration of mechanical ventilation and ICU stay compared to physician-directed approaches, without increasing the risk of reintubation. Similarly, nurse-led multidisciplinary teams have demonstrated reductions in VAP incidence—one of the most common and morbid complications in ventilated patients—by hastening weaning processes and optimizing adherence to preventative bundles. Additionally, organizational familiarity, such as frequent co-working among interprofessional staff, has been directly associated with improved outcomes, enhanced protocol compliance, and the minimization of adverse events for ventilated patients (Gunther et al., 2021).

Enhanced collaborative practices not only benefit patients, but also have a profound impact on staff satisfaction and burnout rates. When nurses and RTs are empowered as shared decision-makers and active participants in protocol implementation, studies report marked improvements in both perceived autonomy and job satisfaction among staff. Frontline professionals experience greater empowerment, communication, and transparency, leading to a more supportive work environment and mitigating the risk of occupational burnout. This environment builds mutual trust, enables efficient division of responsibilities—such as coordinated extubation readiness assessment or VAP bundle execution—and creates space for reporting and discussing near-miss events without fear of retaliation, thus boosting a culture of patient safety (Wei et al., 2024).

Crucially, shared accountability between nursing and RT staff fosters greater protocol adherence, event-reporting transparency, and reliability in ICU processes. Studies highlight that successful multidisciplinary teams are more compliant with evidence-based guidelines for mechanical ventilation management and VAP prevention. For example, when nurses and RTs jointly implement weaning protocols and preventive bundles (i.e., elevation of the head of the bed, oral care, subglottic suctioning), compliance rates rise substantially, and critical interventions are carried out with consistency and timeliness. This reduces practice variation, optimizes patient safety, and ensures seamless transitions during periods of staff changeover or high patient acuity. Importantly, event-reporting and incident transparency within such teams further enables rapid identification and rectification of patient safety threats, supporting a learning healthcare system that continually works toward improved outcomes (Al-Harthi et al., 2025).

Future Directions and Research Gaps

A critical appraisal of current literature underscores the necessity for future research focusing on longitudinal studies that examine the long-term outcomes of collaborative risk management models between nursing and respiratory therapy teams in mechanical ventilation care. While numerous studies highlight the short-term benefits of interdisciplinary teamwork—such as reduced incidence of ventilator-associated events, improved protocol compliance, and enhanced safety culture—few have prospectively tracked patients and care teams across multiple years to determine the sustained impact on morbidity, mortality, and hospital readmissions. Longitudinal research is essential to identify not only clinical outcomes but also the durability of teamwork behaviors, maintenance of mutual trust, and adaptive changes in shared responsibilities as technology and care environments evolve. These studies could employ robust methodologies such as multi-center cohort designs, repeated measures, and qualitative interviews with team

members to capture the evolving nuances of collaborative risk management. Moreover, future research should prioritize the examination of cost-effectiveness, resource utilization, and broader organizational impacts associated with enduring nurse–RT collaborations (Nakahashi et al., 2025).

Another urgent research gap involves the evaluation and integration of digital platforms and artificial intelligence (AI)-driven safety monitoring tools within the realm of interdisciplinary ventilator care. Despite advances in electronic medical records, remote patient monitoring, and predictive analytics, few studies rigorously assess the added value of these technologies in augmenting shared safety responsibilities. There is a growing recognition that AI algorithms can facilitate real-time detection of ventilator alarms, predict patient deterioration, and guide evidence-based interventions; however, there is limited knowledge regarding the acceptability, usability, and fidelity of such systems when deployed among nurse–RT teams. Evaluative research should thus aim to quantify improvements in adverse event rates, workflow efficiency, and staff communication introduced by digital platforms, while also considering potential risks such as alert fatigue, information silos, and technological barriers to interdisciplinary integration. Randomized trials, implementation studies, and mixed-methods approaches could provide crucial insights into how digital transformation supports or hinders collaborative risk management (Stivi et al., 2024).

Global variations in nurse and respiratory therapist roles present an additional area warranting exploration, particularly as differences in scope of practice, training standards, and professional autonomy can shape both the risks and solutions associated with mechanical ventilator safety. Comparative studies across diverse international healthcare systems are needed to identify best practices—and common pitfalls—associated with nurse–RT collaboration. Such research should include the mapping of role definitions, educational pathways, institutional protocols, and cultural factors that influence joint risk assessment and intervention. Cross-country or cross-regional surveys, ethnographic studies, and policy analyses could elucidate how context-specific factors mediate the effectiveness of interdisciplinary approaches, informing the development of tailored models that account for regulatory, educational, and sociocultural dynamics worldwide (Alkhathami et al., 2023).

Finally, the incorporation of patient-centered metrics—including patient comfort, trust in the care team, and perceived quality of shared care—remains a prominent gap in the existing literature. While most risk management studies focus on clinical metrics (such as adverse event rates, ventilator-associated pneumonia, and length of stay), relatively few systematically capture patient experiences and outcomes relevant to mechanical ventilation safety. Future research should integrate validated surveys, interviews, and participatory methodologies to assess how collaborative nurse–RT care impacts patient-reported outcomes and satisfaction. This shift towards patient-centered evaluation could facilitate the development of holistic safety frameworks that resonate with both professional and patient stakeholders, promoting a culture of shared accountability that values clinical excellence and human experience equally (Guttormson et al., 2023).

Conclusion

Ensuring patient safety in the management of mechanically ventilated patients requires a unified and collaborative approach between nursing and respiratory therapy professionals. Both disciplines play indispensable, complementary roles that intersect across patient monitoring, ventilator management, airway maintenance, and infection prevention. When collaboration is supported through clear communication, standardized protocols, and ongoing joint education, patient outcomes markedly improve—manifesting as lower ventilator-associated pneumonia rates, reduced ICU stays, and enhanced team satisfaction. However, persistent challenges such as unclear role boundaries, communication breakdowns, and systemic workload pressures continue to threaten care quality. Addressing these barriers demands institutional commitment to interprofessional frameworks, structured competency programs, and cultures that value transparency, respect, and shared accountability. Future directions should focus on long-term evaluation of collaborative models, integration of digital safety tools, and incorporation of patient-centered outcomes to sustain

continuous improvement. Ultimately, the synergy between nurses and respiratory therapists forms the backbone of safe, effective, and compassionate ventilator care in modern critical care environments.

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