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Nursing Protocol for Mechanical Ventilation Weaning of Critically Ill Adult Patients in the Intensive Care Unit: A Rapid Systematic Review

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ADMINISTRATIVE INFORMATION

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Review Stage at time of this submission - Data analysis.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 2 June 2026 and was last updated on 2 June 2026.

INTRODUCTION

Review question / Objective To synthesize current scientific evidence regarding the efficacy of nurse-led mechanical ventilation weaning protocols for adult patients in intensive care units through a systematic review.
The research question was formulated using the PICO framework (Population, Intervention, Comparator, and Outcome):
• Population (P): Critically ill adult patients in the Intensive Care Unit (ICU).
• Intervention (I): Nurse-led mechanical ventilation weaning protocols.
• Comparator (C): Standard/conventional weaning protocols or physician-directed weaning.
• Outcome (O): Adaptation to spontaneous breathing or successful discontinuation of mechanical ventilation.

Rationale Critically ill patients exhibit physiological instability that threatens survival and organ function. Consequently, patients suffering from respiratory failure require organ support via mechanical ventilation (MV). Prolonged mechanical ventilation or weaning failure is associated with increased morbidity, mortality, prolonged hospital stay, and higher healthcare costs.
Weaning strategies encompass interventions aimed at achieving early reduction of ventilatory support and timely extubation. This process is defined as the "transition from mechanical ventilatory support to patient-controlled spontaneous breathing". Given that this transition can be difficult, prolonged, and challenging to predict, interventions must focus on cultivating readiness for spontaneous breathing. This involves continuous assessment, spontaneous breathing trials (SBT), and gradual liberation from the ventilator.
Nursing care represents a critical variable within this process, integrating physical and cognitive clinical assessments to determine weaning readiness. Critical care nurses possess the

specialized knowledge required to identify key indicators and implement interventions for successful liberation. However, studies spanning the past two decades remain inconclusive and have yet to fully demonstrate the professional impact of nurse-led protocols, particularly within Latin America. Therefore, this systematic review aims to synthesize the evidence concerning the outcomes of nurse-driven weaning protocols to determine their efficacy in adult ICUs.

Condition being studied While several studies suggest positive outcomes for nurse-led or nurse-collaborative mechanical ventilation weaning protocols, their implementation as standardized, protocol-driven interventions remains scarce in Latin American ICUs, as most clinical trials originate in Europe and Asia. Prolonged mechanical ventilation-associated complications increase mortality rates, escalate healthcare costs, and delay secondary treatments and post-ICU recovery. Furthermore, implementing these programs within understaffed health systems could optimize resources by enhancing care quality. Thus, promoting research focused on nurse-led interventions is crucial to optimizing recovery outcomes in critically ill patients.

METHODS

Search strategy A systematic search will be conducted in accordance with the PRISMA 2020 guidelines for literature published up to April 18, 2026, across electronic databases including PubMed, Web of Science, Scopus, SciELO, LILACS, and TESIUNAM.
The search syntax for PubMed is defined as follows: ("ventilator weaning"[MeSH Terms] [title/abstract]) AND ("nursing"[MeSH Terms] OR "nursing program"[MeSH Terms] [title/abstract]).
For the remaining databases, the following strategy will be deployed: ("ventilator weaning"[MeSH Terms]) AND ("nursing"[MeSH Terms]).
Additionally, a grey literature search will be conducted to identify unpublished or non-indexed studies for potential inclusion.
Titles and abstracts retrieved by the search strategy will be independently screened by two reviewers (H.M-AI and R.J-D). Full-text copies of potentially relevant articles meeting initial screening criteria will be retrieved and rigorously evaluated against the established eligibility criteria.

Participant or population Critically ill adult patients 18 years.

Intervention Nurse-led or nurse-driven mechanical ventilation weaning protocols.

Comparator Conventional, physician-led, or standard care weaning protocols.

Study designs to be included Randomized controlled trials (RCTs), quasi-experimental studies, and pre-experimental designs.

Eligibility criteria Studies meeting the following criteria will be included:
• A) Randomized controlled trials (RCTs), quasi-experimental, and pre-experimental designs.
• B) Nursing-implemented or nurse-led mechanical ventilation weaning protocols.
• C) Report on clinical outcomes of nurse-driven protocols.
• D) Measure duration of mechanical ventilation.
• E) Evaluate respiratory weaning predictors/ indicators (heart rate (HR), respiratory rate (RR), SpO2, temperature, CO2, PaO2).
• F) Assess successful extubation or liberation from MV.
• G) Report ICU length of stay > 12 hours.
• H) Published in English or Spanish, or providing official translations.

Information sources Electronic databases such as PubMed, Scopus, Web of Science, SciELO, LILACS and TESIUNAM.

Main outcome(s) The primary clinical outcomes of interest are those demonstrating patient benefit following liberation from mechanical ventilation: specifically, successful extubation rate and maintenance of sustained spontaneous breathing 48 hours.

Additional outcome(s) Characterization of the types of nursing interventions utilized.

Data management Two investigators will independently screen studies, extract relevant data points, and assess the risk of bias of the included studies. Discrepancies will be resolved through consensus or by arbitration with a third reviewer. In cases of missing or incomplete data, corresponding authors will be contacted directly. Where feasible, pooled estimates of overall mean differences for the primary continuous variables will be computed.

Quality assessment / Risk of bias analysis Retrieved full-text studies will undergo detailed methodological quality assessment. The Risk of Bias 2 (RoB 2) tool will be used for randomized trials, and the ROBINS-I tool will be used for non-randomized interventions.

Strategy of data synthesis An inferential synthesis of therapeutic outcomes regarding nurse-led or fully nurse-participatory respiratory weaning protocols in critically ill adult ICU patients will be conducted.

Subgroup analysis Stratified analysis will be performed based on clinical variables associated with the treatment effect size.

Sensitivity analysis Studies published in any language will be considered, provided an English translation is available.

Language restriction Studies published in any language will be considered, provided an English translation is available.

Country(ies) involved Mexico.

Keywords ventilator weaning; critical care nursing; nursing; mechanical ventilation; nursing program.

Dissemination plans The findings derived from this systematic review will be submitted for publication in a peer-reviewed international scientific journal.

Contributions of each author

Author 1 - Jorge Andres Gomez-Cisneros - drafted the manuscript.
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