INPLASY PROTOCOL

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None declared.

Comparison of the effects of different early activities on ICU acquired weakness：A protocol for systematic review and network meta-analysis

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Review question / Objective: **ICU-AW is a serious complication of mechanical ventilation in ICU. Early activity can effectively reduce the incidence of acquired fatigue in ICU. However,there are various types of early activities used in critically ill patients, and the existing original research or meta analysis only compares one of the activities, and there is a lack of comparative studies to verify many different activities. This study used network meta-analysis to explore the pros and cons of different forms of early activity on the occurrence of ICU-AW, and provide a basis for the formulation of early activity programs for patients in the intensive care unit.**

Information sources: **Studies will be obtained from the China National Knowledge Infrastructure (CNKI), Wan Fang Data, Chinese Scientific Journals Database (VIP), PubMed, CBM, Embase, Web of science and Cochrane Library, regardless of publication date or language. The databases will be retrieved by combining the subject words with random words. Taking PubMed as an example, the retrieval strategy is shown in Table 1. The search terms will be adapted appropriately to conform to the different syntax rules of the different databases.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 07 July 2021 and was last updated on 07 July 2021 (registration number INPLASY202170017).

INTRODUCTION

Review question / Objective: **ICU-AW is a serious complication of mechanical ventilation in ICU. Early activity can effectively reduce the incidence of acquired fatigue in ICU. However,there are various types of early activities used in critically ill patients, and the existing original research or meta analysis only compares one of the activities, and there is a lack of comparative studies to verify many**

different activities. This study used network meta-analysis to explore the pros and cons of different forms of early activity on the occurrence of ICU-AW, and provide a basis for the formulation of early activity programs for patients in the intensive care unit.

Condition being studied: ICU-AW is an unexplained neuromuscular dysfunction that occurs in critically ill patients during their stay in the ICU, and it can include the development of severe polyneuropathy, myasthenia gravis, or pathological neuromyopathy. ICU-AW is a common complication of critically ill patients and is a serious complication of ICU patients that received mechanical ventilation. Patients with ICU-AW may experience a series of clinical syndromes, such as quadriplegia, muscular atrophy, difficulty going off mechanical ventilation, and decreased reflexes[3]. Studies have shown that after 5-7 days of mechanical ventilation, the incidence of ICU-AW is 25% to 65% during the wake-up test, and the incidence of ICU-AW in patients with long-term mechanical ventilation (≥10 d) is >67%. At discharge, ICU-AW still occurred in 36% of patients. The occurrence of acquired debilitating ICU-AW leads to a prolonged hospital stay of patients, increases the patient's mortality and family burden, and later reduces the patient's quality of life. The 2017 American Ventilation Guidelines for Critical Patients with Mechanical Ventilation clearly states that patients with mechanical ventilation for more than 24 hours should undergo early rehabilitation activities. Early activity can not only increase lung ventilation, enhance cardiopulmonary function, reduce the incidence of ventilator-associated pneumonia and ICU-AW, reduce the occurrence of complications such as deep vein thrombosis, muscle atrophy, delirium, and thus shorten the time of mechanical ventilation and ICU stay, It can also reduce inflammation and oxidative stress. At present, there are various types of early activities used in critically ill patients, and the existing original research or meta analysis only compares one of the activities, and there is a lack of comparative studies to verify many different activities. This study used mesh meta-analysis to explore the pros and cons of different forms of early activity on the occurrence of ICU-AW, and provide a basis for the formulation of early activity programs for patients in the intensive care unit.

METHODS

Participant or population: ICU patients with mechanical ventilation.

Intervention: On the basis of conventional nursing care, the experimental group was added with other activity methods.The commonly used other activity methods include: Passive and active activities, Respiratory function exercise, Neuromuscular electric stimulation, dynamometer bicycle and so on.

Comparator: The control group was routine education and routine nursing.

Study designs to be included: The included studies will be RCTS in this systematic review regardless of publication status and language.

Eligibility criteria: The PICOS principles were given full consideration to establish inclusion and exclusion criteria of this systematic review.

Information sources: Studies will be obtained from the China National Knowledge Infrastructure (CNKI), Wan Fang Data, Chinese Scientific Journals Database (VIP), PubMed, CBM, Embase, Web of science and Cochrane Library, regardless of publication date or language. The databases will be retrieved by combining the subject words with random words. Taking PubMed as an example, the retrieval strategy is shown in Table 1. The search terms will be adapted appropriately to conform to the different syntax rules of the different databases.

Main outcome(s): The primary outcomes should include ICU-AW incidence, ICU

hospitalization time, mechanical ventilation time, MRC muscle strength score, Barthel.

Data management: According to the Cochrane Handbook for Systematic Reviews of Intervention, the two researchers extracted the author, publication time, participant number, age, race, intervention measures, course of treatment and outcome indicators, filled in the data extraction table, and compared with each other.

Quality assessment / Risk of bias analysis: Two researchers will be designated to assess the quality of included RCTs independently by utilizing the Cochrane risk of bias assessment tool. As specified by Cochrane Handbook V.5.1.0, the following sources of bias will be considered: random sequence generation, allocation concealment, participant blinding, outcome assessor blinding, incomplete outcome data, selective reporting, and other sources of bias. Each domain will be rated as high, low or unclear risk of bias as appropriate. The two reviewers will resolve any disagreements through discussion, and a third reviewer may be involved if no consensus is reached.

Strategy of data synthesis: Traditional meta-analysis. Direct comparisons of outcomes will be performed using Review Manager 5.3. The outcomes will be mainly represented by the mean difference (MD) or odds ratio (OR) with 95% confidence intervals. For continuous data, the pooled standarized mean differences(SMDs) and their corresponding 95% confidence intervals (95%CIs) were used to assess the strength P<.05 was considered as statistically significant. The Cochrane Q-test and I2statistics were used to assess heterogeneity. When P50%,which indicates statistical heterogeneity, a random-effects model will be used to calculate the outcomes; otherwise, a fixed-effects model will be considered. Network meta-analysis. A network evidence diagram will be drawn to visually represent the comparisons between the studies. The size of the nodes represents the number of participants, and the thickness of the edges represents the number of comparisons. Stata 14.2 and WinBUGS 1.4.3Software will be used to carry out Bayesian network meta-analysis. Bayesian inference will carried out using the Markov chain Monte Carlo method, the posterior probability will be inferred from the prior probability, and estimation and inference will be assumed when Markov Chain Monte Carlo reaches a stable convergence state. As a result, the rank of the CHI effect will be presented by the surface under the cumulative ranking curve.Inconsistencies between direct and indirect comparisons will be evaluated using the node splitting method.[13]The choices between fixed- and random-effect models and between consistent and inconsistent models will be made by comparing the deviance information criteria for each model.

Subgroup analysis: If there is high heterogeneity in the included studies, we will perform subgroup analyses to explore the differences in age, sex, race, lesion location, and course of the Intervention time.

Sensitivity analysis: To ensure robustness of the combined results, sensitivity analyses will be performed to assess the impact of studies with a high risk of bias. We will compare the results to determine whether lower-quality studies should be excluded.

Country(ies) involved: China.

Keywords: Early activities; IUC-AW; Network meta-analysis.

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