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A Review of Systematic Reviews

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INTRODUCTION

The Intensive Care Unit (ICU), a department within the hospital reserved for only the most critically ill or injured patients, is where patients are frequently mechanically ventilated, intubated, or sedated. Extended stays in the ICU often result in post-hospitalization syndrome[1], lower quality of life[2], disuse muscle atrophy, osteopenia, increased risk of deep vein thrombosis, pulmonary embolism, hypovolemia, hypoxemia, pressure ulcers and skin breakdown, lymphedema, constipation, atelectasis, pneumonia, insulin resistance and systemic changes that mimic accelerated aging.[3, 4]

Early mobilization of critically ill patients in the ICU was introduced in 1944 to improve morale, general health and muscle strength.[5] Originally, it was considered that patients in the ICU were "too ill" to participate in early rehabilitation.[6] However, current research suggests that early mobilization is feasible through sedation interruption for the purpose of performing early physical medicine and rehabilitation with little to no adverse or life threatening effects.[7,8]

PURPOSE

To determine the effect of early mobilization on reducing the side effects associated with prolonged bed rest in patients in the ICU.

SUBJECTS

This review evaluated seven systematic reviews totaling 281 studies and 41,132 patients from peer-reviewed research journals fitting inclusion/exclusion criteria.

METHODS

CINAHL, The Cochrane Library, PEDro and PubMed were searched between April 2015 to August 2015 to identify systematic reviews published from 2000 to 2015 with the keywords "ambulation", "critical care", "early mobilization", "systematic review", "ICU", "physical therapy" resulting in the retrieval of eight potential articles. All studies were systematic reviews containing early mobilization. Three reviewers independently rated study quality and extracted data.

RESULTS

Initial search yielded 187 articles with seven fitting inclusion/exclusion criteria, published from 2009 to 2013. These reviews were rated using the validated AMSTAR checklist and were organized according to outcome measure. The AMSTAR scores ranged from 6 to 9 with a mean score of 6.86. Outcome measures reported in the systematic reviews varied but included the following objective measures: length of stay in the ICU, length of stay in the hospital, hand grip strength, mortality, functional independence measure, 6 minute walk distance, duration of intubation and duration of mechanical ventilation; and subjective measures, SF-36 and health related QOL. Results from systematic reviews that included duplicate RCTs were reported, but not statistically adjusted for in the synthesis of the results

Table 1. Summary of systematic reviews

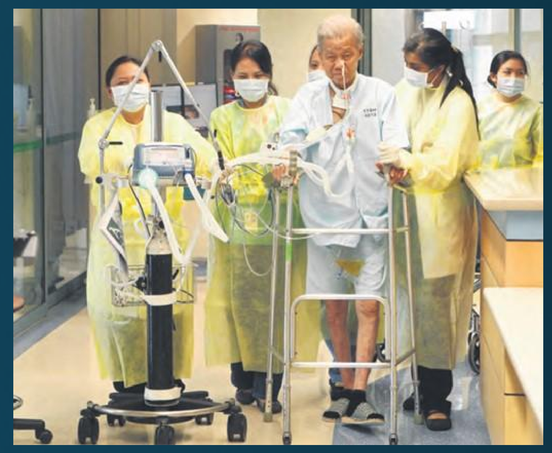
Author (Year)	AMSTAR Score	Aim of the Review	Search Strategies	# of Studies	# of Participants	Primary Outcomes
Adler, J. Malone, D. (2012)	6	To evaluate the literature related to mobilization of the critically ill patient with an emphasis on functional outcomes and patient safety.	PubMed, CINAHL, Medline, The Cochrane Library	15	1,437	• increased functional mobility • no significant increase in strength • future research required to determine outcomes regarding quality of life and patient symptoms.
Calvo-Ayala et al. (2013)	7	To identify effective interventions that improve long-term physical functioning of ICU survivors.	MEDLINE, EMBASE, CINAHL, PEDro	14	7,417	• physical therapy with exercise is the only effective intervention to improve long-term physical functioning
Engels et al. (2013)	6	To review the evidence for early mobilization of ICU patients; provide an introduction to the biomechanics, physiology and nomenclature of injuries; summarize evidence for each distinct body region of early mobilization; provide specific early mobilization for each patient population based on body region.	MEDLINE, EMBASE	105	11,623	• increased functional range of motion and strength • improved healing rate • higher return-to-work rate • decreased pain, hospital LOS, morbidity, incidence of pneumonia, days on ventilation, development of orthostatic hypotension and time to return to weight bearing
Kayambu, G. Boots, R. Paratz, J. (2013)	9	To review the evidence for exercise in critically ill patients.	MEDLINE, PubMed, CINAHL, The Cochrane Library	10	790	• increased LE skeletal muscle and respiratory muscle strength, quality of life, physical function • reduced ICU length of stay, days on ventilation • no impact on mortality
Li et al. (2013)	7	To investigate the effectiveness and safety of active mobilization on improving physical functioning and hospital outcomes in patients undergoing mechanical ventilation for more than 24 hours.	PubMed, EMBASE, CINAHL, PEDro, SinoMed, ISI Web of Knowledge	17	1,614	• increased respiratory muscle and skeletal muscles force production • decreased days on ventilation, length of stay, decreased mortality at one year • no difference in cost and patient safety
O'Connor, E. Walsham, J. (2009)	6	To review the literature to evaluate the worldwide availability of mobilization therapy in the intensive care unit and the mobilization therapy in patients requiring medical and surgical high dependency or intensive care.	PubMed	35	12,996	• decreased LOS, days on ventilation, postoperative complications, mortality, time to return to normal bowel functioning
Stiller, K (2013)		To examine the evidence concerning the effectiveness of physiotherapy for adult, intubated patients who are mechanically ventilated in the ICU.	PubMed, MEDLINE, CINAHL, EMBASE, The Cochrane Library, PEDro	85	5,255	• inconclusive evidence • early mobilization is feasible and safe • reduced hospital and ICU length of stay • further research is required to confirm efficacy of early mobilization and optimal dosage of physical therapy treatment

CONCLUSIONS

Early mobilization was successful in improving functional mobility, in three out of seven systematic reviews demonstrating improved patient's muscle strength. Length of stay in the ICU and the duration of required mechanical ventilation decreased in four out of seven systematic reviews; while mortality decreased in two of the seven studies. Standardization of outcome measures are needed to reduce variability and heterogeneity in the reporting of results. Further research surrounding the standardization of early mobilization protocols are warranted.

RELEVANCE

An increasing number of severely ill patients are surviving extended hospitalization and are susceptible to the effects of prolonged bedrest that cause moderate to severe functional impairments. Early mobilization has been shown to improve outcomes associated with functional mobility and strength but limited quantity and inconsistent methodological quality of the studies reduces the statistical power. This review summarizes and compiles current available research to provide a stronger evidence-based conclusion on which further research may follow.



ICU patient Koh Chong Ming, 75, bedridden for 3 months, shown here walking around while on a ventilator. ST PHOTO: SEAH KWANG PENG[12]

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