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Early Mobilization for Critically Ill Adults in the Intensive Care Unit: An Evidence-Based Practice Project

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**Early Mobilization for Critically Ill Adults in the Intensive Care Unit:
An Evidence-Based Practice Project**

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Keywords: cognition, delirium, early mobility, functional mobility, intensive care unit, interdisciplinary

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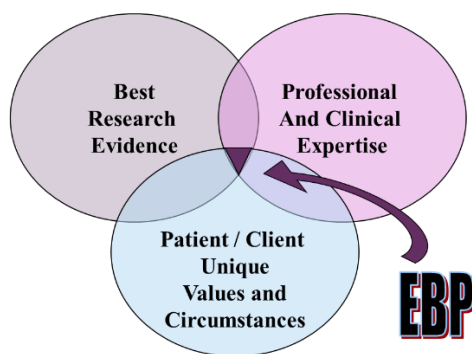
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Introduction

Evidence Based Practice

Evidence based practice is defined as the integration of knowledge from professional and clinical expertise, patient/client unique values and circumstances, and best research evidence (Straus, Richardson, Glasziou, & Haynes, 2005). The EBP courses in the St. Catherine University occupational therapy programs emphasizes skill building in finding, analyzing, and synthesizing research.

A definition of Evidence-Based Practice (EBP)



(Straus, Richardson, Glasziou & Haynes, 2005)



The EBP Project

Occupational therapy graduate students at St. Catherine University complete an EBP project in partial fulfillment of the requirements for a course on Evidence-Based Practice.

The EBP Process

- Begins with a practice dilemma
- Dilemma is framed as an EBP question and PICO
P (population/problem) I (intervention) C (comparison group) O (outcome(s) of interest)
- Background learning
- Search for the best evidence
- Initial appraisal and critical appraisal of the evidence
- Summary of themes from the evidence
- Recommendations for practice
- Next steps – implementation in practice

EBP Practice Dilemma: Evidence Based Practice Case Scenarios

The overall focus of each of case scenarios are related to assessment or interventions that are related to Choosing Wisely Campaign® items 1, 2, 3, 5, 8, 10. Case scenarios were developed related to each initiative with clientele and conditions across the lifespan in various practice settings. Practice settings included school district, outpatient pediatric, primary care, skilled nursing facility, work rehabilitation, and acute care.

Six EBP Projects: Choosing Wisely Campaign®

(Things Providers and Patients Should Question)

The six projects are representative of 6 campaign things for the Choosing Wisely Campaign® initiative. There are a total of 10 campaign things promoted by the American Occupational Therapy Association.

Thing 1: Don't provide intervention activities that are non-purposeful (e.g., cones, pegs, shoulder arc, arm bike).

Thing 2: Don't provide sensory-based interventions to individual children or youth within documented assessment results of difficulties processing or integrating sensory information.

Thing 3: Don't use physical agent modalities (PAMS) without providing purposeful and occupation-based intervention activities.

Thing 5: Don't provide cognitive-based interventions (e.g., paper and pencil tasks, table-top tasks, cognitive training software) without direct application to occupational performance.

Thing 8: Don't use reflex integration programs for individuals with delayed primary motor reflexes without clear links to occupational outcomes.

Thing 10: Don't provide ambulation or gait training interventions that do not directly link to functional mobility.

Background on Choosing Wisely Campaign®

The Choosing Wisely started in 2012 by American Board of Internal Medicine (ABIM) and *Consumer Reports®*, which includes 75 health care provider organization partners, with the American Occupational Therapy Association (AOTA) being one of the organizations. Choosing Wisely aims to promote meaningful conversations between health care practitioners and clients to ensure that appropriate and quality care is being provided (AOTA, 2021). The mission is helping health care providers and clients in making informed and effective health care decisions, promote effective health care resources, and improve quality and safety of health care in the United States (AOTA, 2021). More specifically, campaign promotes assessment and interventions are evidence based, effective, necessary, safe, and not duplicated among health care providers including occupational therapy practitioners. Experts within this campaign developed and published 10 things providers and clients should question with occupational therapy services across various practice settings (Table 1).

Table 1

10 Things Patients and Providers Should Question

Thing	Related Item
1	Don't provide intervention activities that are non-purposeful (e.g., cones, pegs, shoulder arc, arm bike).
2	Don't provide sensory-based interventions to individual children or youth within documented assessment results of difficulties processing or integrating sensory information.
3	Don't use physical agent modalities (PAMS) without providing purposeful and occupation-based intervention activities.
4	Don't use pulleys for individuals with hemiplegic shoulder.
5	Don't provide cognitive-base interventions (e.g., paper and pencil tasks, table-top tasks, cognitive training software) without direction application to occupational performance.
6	Don't initiate occupational therapy interventions without completion of the client's occupational profile and setting collaborative goals.
7	Don't provide interventions for autistic persons to reduce or eliminate "restricted and repetitive patterns of behavior, activities, or interests" without evaluating and understanding the meaning of the behavior to the person, as well as personal and environmental factors.
8	Don't use reflex integration programs for individuals with delayed primary motor reflexes without clear links to occupational outcomes.
9	Don't use slings for individuals with a hemiplegic arm that place the arm in a flexor pattern for extended periods of time.
10	Don't provide ambulation or gait training interventions that do not directly link to functional mobility.

Note. American Occupational Therapy Association. (2021). *10 Things Patients and Providers Should Question*

Resources Regarding Choosing Wisely Campaign

What is the AOTA Choosing Wisely Campaign?

Website Link: <https://www.aota.org/Practice/Researchers/choosing-wisely.aspx>

Implementing the Choosing Wisely Recommendations

Website Link: <https://www.aota.org/Publications-News/otp/Archive/2019/implementing-choosing-wisely.aspx>

Ten Things Patients and Providers Should Question (Updated July 2021)

Website Link: <https://www.choosingwisely.org/societies/american-occupational-therapy-association-inc/>

AOTA Choosing Wisely Campaign Resources (Select Clinical Application Resources)

Website Link: <https://www.aota.org/Practice/Researchers/choosing-wisely.aspx>

References

American Occupational Therapy Association. (2021). *AOTA's Involvement with Choosing Wisely*®. Retrieved from <https://www.aota.org/practice/researchers/choosing-wisely.aspx>

Appraisals of Best Evidence, Themes, and Recommendations

After searching and finding evidence available from library databases and alternative sources, students conducted an initial appraisal to evaluate the quality and relevance of the evidence and select the best research for further review. Then they conducted critical appraisals of the best formal reviews of primary research (e.g., systematic reviews, meta-analyses) and/or primary/original research studies. One of the steps in the CAP process is to evaluate the strength or level of the research design and the types of conclusions that are possible from each design.

Initial Appraisal

- Quality of the evidence
- Type of evidence and research design
- Investigator qualifications and journal/publication/website
- Journal/publication/website
- Relevance of the evidence

Critical Appraisal

- Appraisal of methods, results, and implications
- Classification of type of research study
 - Reviews of primary research (e.g., systematic reviews, meta-analyses)
 - Qualitative studies
 - Psychometric studies
 - Primary quantitative research studies
 - Level 1: randomized controlled trials
 - Level 2: two groups, nonrandomized/cohort and case control
 - Level 3: nonrandomized, pretest/posttest and cross-sectional
 - Level 4: single subject
 - Level 5: case report or series

After completing initial and critical appraisals, themes are summarized related to the EBP question and other findings that emerged from the evidence. Recommendations for practice and reflection on participating in an EBP project are identified in the conclusions.

Evidence Based Practice Question

What is the current evidence regarding the benefits of mobilization and activity for functional mobility in adult clientele within an intensive care unit?

Presentation Slides

12/15/2021

Choosing Wisely Campaign: Thing #10

Early Mobilization for Critically Ill Adults in the Intensive Care Unit: An Evidence-Based Practice Project

Presenters: Tori Brown, Jessica Jenny, Kalley Kadlec, Karis Knoff, Chloe Lantz, Bryana Leverenz, Madeline Prosser, & Sophie Willems

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Choosing Wisely® Campaign

- The Choosing Wisely Campaign (2021) is a national initiative that ensures meaningful and necessary medical treatments for patients.
- Thing #10: "Do not provide ambulation or gait training interventions that do not directly link to functional mobility"
- Relation to occupational therapy: Meaningful movement

(AOA, 2021)

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Case Scenario

You work in an acute care hospital that serves an adult to aging populations that are critically ill in the Intensive Care Unit (ICU). Physicians have approached you regarding the evidence and outcomes specific to early mobilization (EM) with critically ill patients. Your supervisor suggests that the occupational therapy team provide education to physicians and medical residents on the benefits of mobilization and activity on a patients' functional performance when therapy is provided in ICU.

(Choosing Wisely Campaign, 2021)

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Evidence Based Practice - Question

What is the current evidence regarding the benefits of mobilization and activity for functional mobility in adult clientele within an intensive care unit?

Population: Adult & aging population in ICU (hospital), critically ill

Intervention: Early mobilization

Comparison: Mobilized early vs not mobilized early

Outcomes: Functional performance

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Rationale for Evidence

- Evidence Based Practice is essential to provide the most efficient care
- OT is an evidence based practice profession
 - Better outcomes
 - Quality care
 - Critical thinking

(AOA, 2021; WFOT, 2021)

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Background Knowledge

- OT practitioners serve an important role in the ICU
- What is functional mobility?
- What is early mobilization and rehabilitation?
- Older adults make up half of the ICU population

(Misi & Hua, 2019; OTRF, 2020; Patino et al., 2021)


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Search Process: Tools

- Date of Search
 - November 2021
- Database Search

<ul style="list-style-type: none"> ○ CINAHL ○ Science Direct ○ PUBMED ○ MEDLINE 	<ul style="list-style-type: none"> ○ PSYInfo ○ PEDro ○ ProQuest ○ OTSeeker
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Search Process: Tools cont.

- Other Resources: OTPF, AOTA, JACOT
- Alternative Search

<ul style="list-style-type: none"> ○ Google Scholar ○ Government Websites ○ Rehabilitation Measures Database ○ American Journal of Occupational Therapy (AJOT) 	<ul style="list-style-type: none"> ○ Occupational Therapy in Mental Health (OTMH) ○ Journal of Occupational Therapy Education (JOTE) ○ American Occupational Therapy Foundation (AOTF) ○ World Occupational Therapy Federation (WFOT)
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Search Process: Details

- Keywords
 - Early mobilization
 - Functional Mobility
 - Older Adults
 - Rehabilitation
 - Occupational therapy
 - Intensive Care Unit
 - Critically Ill
 - Gait Training
 - Acute Care
- Inclusion Criteria / Filters
 - Within the last 10 years
 - Peer reviewed
 - Full text
 - English



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Search Process: Details cont.

- Level of Evidence Found
 - Levels I-V
 - Primary research studies
 - Randomized controlled trials
 - Prospective studies
 - Retrospective studies
- Review of research studies
 - Systematic reviews
 - Meta-analyses
- Conceptual and theoretical studies
 - Editorials and expert opinion

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Overview of Initial Appraisals

- Levels of Evidence: I, III, IV, & V
- Majority systematic reviews and meta-analyses
- Article Categories
 - Primary Research Studies
 - Review of Research Studies
 - Conceptual and Theoretical
- Stakeholders: Clients, OTP, PTP, Nursing, Administrators

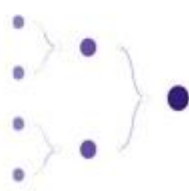


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Critical Appraisals


- 3 Most Applicable Articles
 - Level I evidence
 - Focus on safety and effectiveness of EM and rehabilitation on functional mobility in ICU



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(Hyatt et al., 2017; Topping et al., 2017; Zeng et al., 2019)

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Critical Appraisal #1 

Title: Safety of patient mobilization and rehabilitation in the intensive care unit.

- Level of Evidence: I
- Research Design: Systematic review & Meta-Analysis
- Key Takeaway:
 - Safe to implement in ICU

(Nydehl et al., 2017) St. CATHERINE UNIVERSITY

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Critical Appraisal #2 

Title: The effect of early mobilization in critically ill patients: A meta-analysis.

- Level of Evidence: I
- Research Design: Meta-Analysis
- Key Take-Away:
 - ICU acquired weakness, functional mobility and functional outcomes

(Zang et al., 2019) St. CATHERINE UNIVERSITY

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Critical Appraisal #3 

Title: The effects of active mobilization and rehabilitation in ICU on mortality and function: A systematic review.

- Level of Evidence: I
- Research Design: Systematic review
- Key Take-Away:
 - Improved body function, reduced activity limitations, and reduced participation restriction at 6 months

(Topping et al., 2017) St. CATHERINE UNIVERSITY


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 **Theme One: Early Mobilization and Rehabilitation is Safe and Feasible**


- EM in the ICU for critically ill patients is a safe and feasible intervention
- No significant difference in safety events between standard care and EM

(Davis et al., 2013; de Almeida et al., 2017; Nydehl et al., 2017; Vilaz Vieira et al., 2020; Zhang et al., 2019) St. CATHERINE UNIVERSITY

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 **Theme One: Early Mobilization and Rehabilitation is Safe and Feasible cont.**

- There are safety precautions that clinicians need to consider during EM treatment
- Precautions should apply to
 - Neurological
 - Cardiovascular
 - Respiratory



(Hodgson et al., 2014; Lang et al., 2020) St. CATHERINE UNIVERSITY

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 **Theme Two: Role of Occupational Therapy and Early Mobilization in Intensive Care Unit Settings**

- OT Interventions
 - ADL
 - IADL
 - Patient education
- OT Assessments
 - Barthel Index Scale


(Becker et al., 2019; Blencourt et al., 2021; Hodgson et al., 2019; Li et al., 2013; Schaller et al., 2016; Zang et al., 2019) St. CATHERINE UNIVERSITY

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Theme Two: Role of Occupational Therapy and Early Mobilization in Intensive Care Unit Settings cont.

- Maintaining the use of early mobilization and activity programs in the ICU
- Further advocacy for OT role in the ICU




(Becker et al., 2010; Jarczewski et al., 2018)

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Theme Three: Improved Cognitive and Functional Status in Critically Ill Patients

- Decline in cognitive status can lead to post-intensive care syndrome (PICS)
- Assess, prevent, and manage (APM) protocol to treat delirium
- Environmental modifications and functional mobility



(Fotbel et al., 2020; Fuks et al., 2018; Weeks et al., 2017)

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Theme Three: Improved Cognitive and Functional Status in Critically Ill Patients cont.

- Decrease in intensive care unit acquired weakness (ICU-AW)
- Statistically significant increase in muscle strength
- Improved walking distance at hospital discharge

(Anelike et al., 2020; Arias-Fernández et al., 2018; Fuks et al., 2018; Li et al., 2013; Tipping et al., 2017; Zang et al., 2019; Zhang et al., 2019)

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Theme Four: Early Mobilization and Rehabilitation Impact on Hospital Outcomes

- Some studies showed that early mobilization resulted in a decrease in hospital or ICU stay
 - Schaller et al. → p value = 0.0054
- Others did not find a correlation between early mobilization and reduced hospital stay

(Zang et al., 2019; Pandolfo et al., 2015; Schaller et al., 2010; Li et al., 2013; Weeks et al., 2017; Semmar-Kazerooni et al., 2020)

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Theme Four: Early Mobilization and Rehabilitation Impact on Hospital Outcomes cont.

- Researchers did not find EM and rehabilitation to have an effect on mortality rate
- Researchers found conflicting results suggesting that EM decreased the ICU and in-hospital mortality rate
 - p value = 0.009

(Coles et al., 2020; Eggman et al., 2020; Li et al., 2013; Okada et al., 2019; Semmar-Kazerooni et al., 2021; Tipping et al., 2017; Zang et al., 2017; Zhang et al., 2019)

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Summary

Early mobilization and activity in the intensive care unit for critically ill adult patients is:

- Safe and feasible intervention
- Improves cognitive and functional status
- Impacts hospital outcomes
- OT practitioners role supports functional mobility

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Implications For Practice

Occupational therapy practitioners play an important role in early mobilization

Early mobilization and rehabilitation link to improved functional mobility

Mobilization in the intensive care unit for critically ill adult patients is safe, feasible, and cost effective

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Limitations

Lack of standardized methodology

Small sample sizes

Lack of universal definitions

Studies focus on physical therapy practitioners role over occupational therapy practitioners functional aspect

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(Pardullo et al., 2015; Weeks et al., 2017)

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Recommendations

1. More research regarding early mobilization
1. Need universal definitions for functional mobility and feasibility
1. Standardized safety precautions and protocols for early mobilization and rehabilitation in the intensive care unit

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Conclusion

Summary:

- Choosing Wisely Thing #10
- Themes
 - Safe and feasible
 - Occupational therapy role
 - Improved cognitive and functional status
 - Hospital outcomes
- Implications

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Conclusion cont.

Key Takeaway

Occupational therapy practitioners are needed in the intensive care unit to promote functional mobility and increase participation in occupations through early mobilization interventions and activities.

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Themes

Mobilization and activity for functional mobility is a diverse and integral component to rehabilitation for critically ill adults in the intensive care unit. As defined by Semsar-Kazerooni et al. (2020), “The goal of early mobilization is to prevent the negative consequences of bedrest and to help people maintain or regain their prehospital functional capabilities” (p. 232). After a review of 80 articles, we initially appraised 40 articles. Of the 40 articles, 27 peer-reviewed articles were appraised, and four themes related to early mobilization and functional rehabilitation were identified. The themes found include early mobilization as a safe and feasible treatment, the role of occupational therapy and early mobilization in the intensive care unit, improved cognitive and functional status in critically ill patients, and the impact of hospital outcomes.

Theme One: Early Mobilization and Rehabilitation is Safe and Feasible

Previous literature confirms that there are no severe safety concerns with early mobilization in the intensive care unit (ICU) patients. A systematic review of 48 articles examined the potential for safety events for critically ill ICU patients who received early mobilization treatment (Nydahl et al., 2017). The researchers found that there are no severe risks or concerns for safety with these interventions (Nydahl et al., 2017). The authors found safety concerns for patients who recently had an endotracheal tube (ETT) removed, and these two cases were also on ventilators for an amount of time during their ICU stay (Nydahl et al., 2017). The researchers also found that out of 24 studies, the reported consequences of any safety events were 0.6%, which is quite low (Nydahl et. al, 2017). However, a primary research study in 2013 found that using early mobilization for ventilator patients in the ICU was not only feasible but also safe (Davis et al., 2013). It was found that early goal-directed mobilization protocol could be safely implemented after intubation and mechanical ventilation after 3 days (Hodgson et. al, 2016). Zhang et al. (2019) looked at implementation of early mobilization in the ICU setting. The researchers found several benefits to using early mobilization, but also concluded that it was safe to do in an ICU setting on critically ill patients (Zhang et al., 2019). Based on the findings of these three level one evidence articles,

there is significant evidence to support that early mobilization in the ICU setting is safe (Davis et al., 2013; Nydahl et al., 2017; Zhang et al., 2019).

Furthermore, de Almedia et al. (2017) assessed early mobilization benefits for functional mobility in abdominal cancer patients. They found that there was not a significant difference in levels of safety between standard care and early mobilization. These areas included pain [$p=0.368$], wound infection [$p=0.437$], dehiscence [$p=0.618$], and postural hypotension [$p=0.483$]. Because there was no strong statistical difference between the two types of care, the evidence suggests that there are no increased adverse safety effects between standard care and early mobilization (de Almedia et al., 2017). Vitor Viera et al. (2020) used 17 peer-reviewed articles to identify the effects of early mobilization in ICU settings. Not only did the authors find benefits of early mobilization, but they also concluded that it is a safe intervention (Vitor Viera et al., 2020).

Although early mobilization is safe and feasible, there are a wide variety of safety precautions related to neurological, cardiovascular, respiratory, and lines/attachment safety considerations which need to be considered during early mobilization treatment (Lang et. al, 2020). An expert consensus safety criteria article also included safety precautions with early mobilization in their final report (Hodgson et al., 2014). The authors made safety considerations for respiratory, cardiovascular, and neurological patients. This conclusion was drawn from 94 multidisciplinary ICU clinicians (Hodgson et al., 2014). Examples of lines/attachment safety concerns include securing the airways before exercise, checking the length and placement of lines before exercise, and ensuring that lines are detangled before mobilization (Lang et. al, 2020). Given the evidence, it is feasible to suggest that early interventions are safe for an ICU setting, given certain precautions (de Almedia et al., 2017; Hodgson et al., 2014; Lang et al., 2020; Vitor et al., 2020;).

Theme Two: Role of Occupational Therapy and Early Mobilization in Intensive Care Unit Settings

Regarding early mobilization in the ICU, occupational therapists play a vital role in the rehabilitation of critically ill adults. The main intervention that occupational therapists conduct is the training of activities of daily living (ADLs) through self-care, eating, toileting, and getting dressed, as well as instrumental activities of daily living (IADLs) such as writing, reading and scheduling routines (Bittencourt et al., 2021). Becker et al. (2019), suggests other OT interventions used during early mobilization in the ICU, such as patient education on early mobilization programs.

The OT practice domain of activities of daily living can be assessed in adult ICU patients using the Barthel Index Scale (Li et al., 2013; Zang et al., 2019). Early goal-directed mobilization has a focus on improving function which aligns with the interventions provided by occupational therapists. Zang et al. (2019) performed a meta-analysis and found the average Barthel Index score to be significantly higher at discharge for patients who received early mobilization intervention compared to patients who did not receive early mobilization intervention. In two primary research studies, there were positive outcomes when early goal-directed mobilization was implemented in adult ICU patients (Hodgson et al., 2016; Shaller et al., 2016).

Occupational therapy has an established role in providing early mobilization interventions; additionally, the profession has demonstrated promising approaches for implementing and maintaining early mobilization programs in the ICU setting (Jarzenski et al. 2019; Becker et al., 2019). Jarzenski et al. (2019) performed a systematic review and meta-analysis that found occupational therapists support behavioral change approaches in the ICU medical staff to help maintain early mobilization programs. Becker et al., (2019) also performed a systematic review that emphasized OT's role to implement successful culture change required to maintain interdisciplinary ICU early mobilization teams. The unique behavioral approach occupational therapists use will be beneficial to implement and maintain early mobilization programs.

Although OT plays a vital role in the early mobilization of critically ill adults in the ICU, further advocacy is required, as occupational therapists are not being used to their fullest potential (Becker et al., 2019). Becker et al. (2019) suggests that occupational therapists use their knowledge on evidence-based practices of early mobilization techniques to appeal to interdisciplinary teams in order to increase their use in the ICU to treat critically ill adults.

Theme Three: Improved Cognitive and Functional Status in Critically Ill Patients

Early mobilization has been shown to improve cognitive status in the ICU (Fuke et al., 2018; Foidel et al., 2020; Weeks et al., 2017). Cognitive status in the ICU can be assessed through client orientation, communication, awareness of tasks, and comprehension of directions (Weeks et al., 2017). Decline in cognitive status can lead to post-intensive care syndrome (PICS), a syndrome established in 2010 to define the accumulation of cognitive, physical, and mental health impairments (Fuke et al., 2018). Delirium, another type of severe decline in cognitive functioning particularly in the ICU, is defined by Foidel et al. (2020) as a sudden change in mental functioning affecting attention and awareness. Delirium can also present as impaired memory, disorderly thinking, and/or disorientation (Foidel et al., 2020). Occupational therapists address delirium in the ICU utilizing the assess, prevent, and manage (APM) protocol (Foidel et al., 2020). APM can be implemented through measurements like the Confusion Assessment Method - ICU (CAM-ICU) and prevented and managed by therapeutic activities and maintaining routines (Foidel et al., 2020). Environmental modifications (55.4%) and functional mobility (48.2%) were reported by occupational therapists in a convenience sample survey as the most frequently used interventions in managing and preventing delirium (Foidel et al., 2020). A retrospective analysis completed by Weeks et al. reported that most participants, identified through a hospital database as needing mechanical ventilation during an ICU stay, had an increase in cognitive function following early mobilization intervention (2017). The findings of these studies support further research exploring benefits of early mobilization to support current literature on improved cognitive function in the ICU.

Early mobilization and rehabilitation interventions in an ICU setting have been shown to improve functional mobility (Anekwe et al., 2020; Arias-Fernández et al., 2018; Fuke et al., 2018; Li et al., 2013;

Tipping et al., 2017; Zang et al., 2019; Zhang et al., 2019). According to the *Occupational Therapy Practice Framework: Domain and Process (4th ed.)*, functional mobility includes, “Moving from one position or place to another (during performance of everyday activities), such as in-bed mobility, wheelchair mobility, and transfers (e.g., wheelchair, bed, car, shower, tub, toilet, chair, floor); includes functional ambulation and transportation of objects” (p. 30). Through examining the existing evidence, researchers from three systematic reviews and one meta-analysis concluded that early mobilization and rehabilitation led to a statistically significant decrease ($p < 0.05$) in the incidence of ICU acquired weakness (ICU-AW), a common complication of an ICU stay that results in a decrease of functional mobility (Anekwe et al., 2020; Fuke et al., 2018; Zang et al., 2019; Zhang et al., 2019). Moreover, researchers from three systematic reviews concluded that there was statistically significant increase ($p < 0.05$) in muscle strength in the early mobilization and rehabilitation intervention groups compared to control groups (Arias-Fernández et al., 2018; Li et al., 2013; Tipping et al., 2017). In addition to a reduction of ICU-AW and an increase in muscle strength, researchers from two systematic reviews concluded that at hospital discharge, patients who received early mobilization and rehabilitation interventions demonstrated an improved walking distance compared to those who received standard interventions (Arias-Fernández et al., 2018; Zhang et al., 2019). Ultimately, researchers concluded that early mobilization and rehabilitation compared to standard interventions has the potential to improve functional mobility through a decrease in the incidence of intensive care unit acquired weakness, increased muscle strength, and improved walking distance for patients in the ICU (Anekwe et al., 2020; Arias-Fernández et al., 2018; Fuke et al., 2018; Li et al., 2013; Tipping et al., 2017; Zang et al., 2019; Zhang et al., 2019).

Theme Four: Early Mobilization and Rehabilitation Impact on Hospital Outcomes

Early mobilization and rehabilitation impact the length of hospital and ICU stays. Many researchers found that adults in the ICU who received early mobilization or rehabilitation had a decreased length of stay in the hospital and ICU (Pandullo et al., 2015; Schaller et al., 2016; Weeks et al., 2017; Zang et al., 2019). Specifically, a randomized control trial by Schaller et al. (2016) concluded that an

early mobilization program in the surgical ICU resulted in a shorter length of stay than those who did not receive the intervention ($p=0.0054$). Weeks et al. (2017) found that patients with oncology diagnoses on mechanical ventilation in the ICU who received increased OT sessions had a shortened length of stay in the hospital. Additionally, Zang et al. (2019) found that early mobilization and rehabilitation decreased the length of hospital and ICU stay for adults admitted in the ICU which was statistically significant ($p<0.001$). However, some studies have shown no correlations between early mobilization and reduced hospital stay (Li et al., 2013; Semsar-Kazerooni et al., 2020). Semsar-Kazerooni et al. (2020) found that early mobility treatment did not impact ICU or hospital stay length for cardiac ICU patients ($p=0.63$ and $p=0.54$). Although most researchers found that early mobility treatment reduces the length of hospital stay for ICU patients, there were limitations of the studies that could impact conclusions. Some studies did not report functional status of ICU patients prior to admission which resulted in lack of baseline data to compare with discharge data (Pandullo et al., 2015; Weeks et al., 2017). More research is needed to conclude whether or not early mobility and rehabilitation interventions decrease length of hospital stay.

Early mobilization and rehabilitation have not shown to have a significant effect on mortality rate. Cole et al. (2020) found that early mobilization decreased the ICU and in-hospital mortality rate. A retrospective pre-post study completely by Cole et al. (2020) found that the post early mobilization group had a lower ICU mortality (21.6% vs. 12.8%; $p = 0.009$) and in-hospital mortality (25.3% vs. 17.5%; $p = 0.031$). Some studies found that early mobilization and rehabilitation did not affect the mortality rate (Eggman et al., 2020; Okada et al., 2019; Tipping et al., 2017; Zang et al., 2017; Zhang et al., 2019). A meta-analysis conducted by Zang et al. (2017) showed that early mobilization produced a similar mortality rate compared to the control group (RR = 1.31, 95% CI: 0.97, 1.76; $p = 0.074$). However, there was no heterogeneity between the studies that were analyzed (Zang et al., 2017). Additionally, a systematic review conducted by Tipping et al. (2017) found that early mobilization and rehabilitation did not impact short or long-term mortality ($p > 0.05$). Zhang et al. (2019) conducted a systematic review that showed that early mobilization did not decrease the 28-day mortality rate (RR: 1.23, 95% CI [0.81, 1.85]; $p = 0.330$), ICU mortality rate (RR: 1.12, 95% CI [0.82, 1.52]; $p = 0.474$) or hospital mortality rate (RR:

1.10, 95% CI [0.89, 1.37]; $p = 0.380$). Other studies reported conflicting results on the results of early mobilization and rehabilitation on the mortality rate (Li et al. 2013; Semsar-Kazooroni et al., 2021). The implications of these studies suggest that more evidence is needed to reach a conclusion about the impact on mortality rate. However, it is important to acknowledge all the different variables that relate to mortality rate and make it difficult to account for all factors within a study.

Conclusion

Based on the current literature, the four themes we identified included early mobilization as a safe and feasible treatment, improved cognitive and functional status in critically ill patients, the role of early mobilization in the intensive care unit and the impact of hospital outcomes. The use of early mobilization and rehabilitation in an ICU setting has been shown to be a safe and feasible intervention for critically ill patients, given certain precautions. The role of OT for implementing early mobilization in the ICU encompasses utilizing ADLs, goal directed mobilization, and specific behavioral approaches to ensure the maintenance of these programs within ICU. Early mobilization and rehabilitation have also been shown to improve cognitive and functional status through decreasing the incidence of PICS, delirium, ICU-AW, as well as increasing muscle strength and walking ability. Mobility activities in the ICU have the potential to impact hospital outcomes such as ICU and hospital stay length and mortality rates. These findings support the need for further research to continue to explore the benefits, use, and implementation of early mobilization and functional mobility in the ICU.

Executive Summary

Current evidence regarding the benefits of mobilization for functional mobility in adult clientele within an intensive care unit (ICU) is an extensive research topic among healthcare providers. The Choosing Wisely Campaign (2021) is a national initiative that ensures meaningful and necessary medical treatments for patients. The tenth initiative of the campaign states, "Do not provide ambulation or gait training interventions that do not directly link to functional mobility" (Choosing Wisely Campaign, 2021). This initiative directly relates to our problem-based question that states, "What is the current evidence regarding the benefits of mobilization and activity for functional mobility in adult clientele within an intensive care unit?". Based on our appraisal and findings, four themes were identified as well as strengths and limitations in the current research, and suggestions regarding future considerations related to early mobilization (EM) and activity in the ICU were concluded.

Take-Home Message

Our evidence-based practice project discovered several vital points to be considered before utilizing EM. The first is that EM can be safely implemented in an ICU setting. There are multiple pieces of evidence to support the safety and feasibility of utilizing EM in the ICU with critically ill patients. Another critical point we found was that the role of an occupational therapist during EM and rehabilitation in the intensive care unit includes interventions of ADL and IADL training, as well as patient education. The results of our search and appraisal also showed that protocols utilizing EM could impact hospital outcomes. Finally, the current evidence suggests that cognitive and functional status in the ICU are improved when EM protocols and therapeutic activities are implemented. These key findings support the effectiveness of EM and rehabilitation in the ICU, but one should also consider the need to conduct further research regarding the benefits, use, and implementation of EM.

Findings

Evidence suggests that EM in the ICU for critically ill patients is a safe and feasible intervention. Current literature indicates that there is not a significant difference in safety events between standard care

and EM. Although EM is viable and safe in an ICU setting, there are some safety precautions that clinicians need to consider during EM treatment. These precautions should apply to neurological, cardiovascular, and respiratory patients (Hodgson et al., 2014; Lang et al., 2020).

The role of occupational therapy practitioners during EM in the ICU includes activities of daily living (ADL) and instrumental activities of daily living (IADL) interventions, as well as patient education. EM focused on goal-directed movement, and ADL training has produced higher functional status in adult ICU patients. Occupational therapists can advocate for the maintenance of EM programs within the ICU through implementing behavioral changes to the interdisciplinary ICU team (Becker et al., 2019; Zang et al., 2019).

Overall, cognitive and functional status improves in critically ill patients when practitioners implement EM protocols and therapeutic activities. Maintaining and improving the cognitive status of critically ill patients may enhance occupational performance. EM and therapeutic activities are helpful interventions for managing and preventing delirium. Moreover, EM and rehabilitation interventions implemented in the ICU have the potential to increase functional status through increasing functional mobility. Improving functional mobility and cognitive status allows patients to participate in meaningful activities (Foidel et al., 2020; Tipping et al., 2017).

Early mobilization protocols administered in an ICU can influence hospital outcomes. By examining hospital outcomes, we can observe the impact EM has on functional status and the long-term effects of EM in the ICU (Semsar-Kazerooni et al. 2020; Zang et al., 2019). From our appraisal and findings, we came across conflicting results. Early mobility in the ICU does not influence the mortality rate. However, most of our findings suggested that hospital and ICU stay decreases when the ICU utilizes EM and therapeutic activities.

Strengths and Limitations

After reviewing the literature, there are strengths and limitations within the body of evidence. Many of the studies related to EM provided high-level evidence regarding our question. We incorporated several level one studies, including systematic reviews, meta-analyses, and randomized controlled trials.

Furthermore, a large body of research focuses on mobilization and rehabilitation for critically ill patients in an ICU setting.

One limitation is the heterogeneity in the methodology of intervention and treatment groups. The lack of standardized methodology decreases the convergent validity of the compiled results. Concerning treatment groups, some studies did not provide baseline functional status when patients entered the ICU, so outcomes of ICU rehabilitation were hard to compare (Pandullo et al., 2015; Weeks et al., 2017). Another limitation is the lack of universal definitions for early mobilization and feasibility. Additionally, most of the studies had small sample sizes. Lastly, many studies focused on physical therapy's role in EM rather than the functional aspect of mobility, which is reflective of occupational therapy's role.

Implications and Recommendations

Specific implications drawn from our collected research are that utilizing EM in the ICU can be safely conducted. It is feasible and can be cost-effective for hospitals and patients. There are also implications that OTs play an essential role in implementing EM in adult ICU patients.

Based on our review of current literature, we developed several recommendations to guide future research. There is a need for further research on the use of early mobilization as several of our studies did not have enough data to support it being beneficial. We also found inconsistent definitions of functional mobility and feasibility. It would be helpful to create one clear definition for each. It would be beneficial for healthcare workers to have standard guidelines and precautions for conducting EM in the ICU. Creating a standardized protocol for early mobilization and rehabilitation would help improve the convergent validity of future studies. More research about the long-term outcomes of early mobilization is also needed.

With all the previously given recommendations, we also emphasize the need for OT's specific role and intervention in research. OTs can play an important and beneficial role in EM intervention. However, there is a need for more substantial research focusing on these functional components of EM and OT's role within EM intervention. Occupational therapy-specific research is also recommended to intentionally focus on function and cognition.

Future Considerations

One of the primary future considerations we offer is the increased need for occupational therapy's involvement in EM. We suggest an improvement of advocacy for the OT profession in EM as their role has proven to be beneficial in the rehabilitation of critically ill adults in the ICU. Furthermore, we recommend that researchers continue to conduct primary research studies that include larger sample sizes and randomized control trials to increase external validity. Additionally, longitudinal studies are required to emphasize the long-term effects of EM.

Conclusion

Four themes were developed based on our evidence-based practice process. These themes suggest that occupational therapists have a role in facilitating EM and rehabilitation in the ICU, EM and rehabilitation has been shown to be safe and feasible, improve cognition and functional status, and impact hospital outcomes. These themes helped us to better understand how EM in the ICU can benefit adults' functional mobility regarding the Choosing Wisely Campaign's tenth initiative. Although there were some identified limitations regarding lack of standardized methodology, sample size, and universal definitions were discovered, there were also many identified strengths within multiple systematic reviews and meta-analyses. Additional research and recommendations include topics of OT advocacy and an increase in primary research studies to increase confidence and understanding in the benefits of EM for functional mobility and rehabilitation in the ICU.

Evidence Based Resources

Table 1

General Resources

Title/Name	Brief Description	Source
CDC - Centers for Disease Control and Prevention	National Public Health agency of the United States that provides health information and conducts critical science to protect the public (Center for Disease Control [CDC], 2021).	www.cdc.gov
Mayo Clinic	Major medical center with an emphasis on education, research, and evidenced-based practice (Mayo Clinic, 2021).	https://www.mayoclinic.org/
Medicare/ Medicaid	National health insurance program for Americans over the age of 65 (Centers for Medicare and Medicaid Services, 2021).	https://www.medicare.gov/
NCBI - National Center for Biotechnology Information	National database to provide access to biotechnology information to advance health and science (National Center for Biotechnology Information, n.d.).	www.ncbi.nlm.nih.gov
US Department of Health and Human Services	Executive branch of the US government that protects the health of Americans through essential human services (U.S Department of Health and Human Services, 2021).	https://www.hhs.gov/

Table 2*Professional Resources*

Title/Name	Brief Description	Source
American Occupational Therapy Association	AOTA is the national professional association that contains the interests and concerns and helps educate OT practitioners, colleagues, and students. It's goal is to improve the quality of OT services (American Occupational Therapy Association [AOTA], 2021).	https://www.aota.org/
American Journal of Occupational Therapy	Collections of journals created directly by the American Occupational Therapy Association (AOTA) that work to put together work that is relevant to OTs (American Journal of Occupational Therapy [AJOT], n.d.).	https://www.aota.org/Publications-News/AmericanJournalOfOccupationalTherapy.aspx
Occupational Therapy in Health Care Journal	The Occupational Therapy in Health Care Journal is a collection of peer-reviewed healthcare articles related to occupational therapy (Taylor Francis Online, 2021b).	https://www.tandfonline.com/toc/iohc20/current
OT Seeker	Database that contains different levels of evidence examining different OT interventions (OT Seeker, n.d.).	http://www.otseeker.com/
University of Florida-Department of Occupational Therapy	Department of Occupational Therapy. Free links to journals and articles regarding OT from the college of public health and health professions (University of Florida Department of Occupational Therapy, 2021).	https://ot.php.ufl.edu/current-students/links-to-free-sources-of-evidence/#journals
Willard and Spackman's Textbook (13th Edition)	The most current reference for occupational therapy practice (Boyt Schell & Gillen, 2019).	Textbook, no link Boyt Schell, B. A., & Gillen, G. (Eds.). (2019). <i>Willard & Spackman's occupational therapy</i> (Thirteenth edition). Wolters Kluwer.

Table 3*Interdisciplinary Journals, Databases, Professional Association*

Title/Name	Brief Description	Source
American Physical Therapy Association (APTA)	National association for physical therapy. The association “advocates for positive change, raises public awareness, advances evidence-based practice, supports the continued growth of our members, and develops the next generation” (American Physical Therapy Association [APTA], 2021).	SCU Library has access to this journal & articles https://www.apta.org/
American Journal of Critical Care (AJCC)	Publishes articles that address patients in critical care, articles focus on research and innovation (American Journal of Critical Care [AJCC], 2021).	SCU Library has access to this journal & articles https://aacnjournals.org/ajcconline
American Journal of Nursing (AJN)	Broad collection of peer-reviewed articles that discuss evidence based practices, best practices, case studies, and research in the Nursing field (American Journal of Nursing [AJN], 2021).	SCU Library has access to this journal & articles https://journals.lww.com/ajnonline/pages/default.aspx
Archives of Physical Medicine and Rehabilitation	Focuses on the practice, research, and educational aspects on physical medicine and rehabilitation. These articles educate physicians on maximizing function of those with disabilities, physical treatments of impairments, and new rehabilitation technology (Archives of Physical Medicine and Rehabilitation, 2021).	https://www.archives-pmr.org/content/authorinfo#ita
CINAHL	This is the definitive research tool for nursing and allied health professionals. Users get fast and easy full-text access to top journals, evidence-based care sheets, quick lessons and more (CINAHL Complete, 2021).	Available through SCU online library https://web.s.ebscohost.com/ehost/search/advanced?vid=0&sid=1d14d0ce-299b-4778-aa4b-b57bb1cc83ef%40redis
Physical & Occupational Therapy in Geriatrics	Focuses on interdisciplinary OT/PT practice in older adults including rehabilitation, long-term care, skills needed to work with older adults and innovative solutions for maximizing function (Taylor Francis Online, 2021).	https://www.tandfonline.com/toc/ipo/g20/current
PubMed	Created by the National Library of Medicine, works for several disciplines (U.S. National Library of Medicine, n.d.).	Available through SCU online library https://pubmed.ncbi.nlm.nih.gov/?otool=stkatelib

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meta-analysis. *PLoS ONE*, 14(10), 1-16. doi: 10.1371/journal.pone.0223185

Appendix A. Initial Appraisals

Primary Research Studies

	Overview of Article
Type of article	Overall Type: Primary Research Study Specific Type: Prospective cohort study, mixed quantitative and qualitative
APA Reference	Davis, J., Crawford, K., Wierman, H., Osgood, W., Cavanaugh, J., Smith, K. A., Mette, S., & Orff, S. (2013). Mobilization of ventilated older adults. <i>Journal of Geriatric Physical Therapy</i> , 36(4), 162–168. https://doi.org/10.1519/JPT.0b013e31828836e7
Abstract	<p>“Background: Recent studies of ventilated, critically ill patients have shown early mobilization to be safe and resulting in better functional outcomes at discharge but have not focused on older adults. Objectives: The objectives of this pilot study were to examine the feasibility of and to describe functional outcomes associated with providing early mobilization to critically ill, older adult patients. Methods: This is a prospective cohort study that took place in the medical and surgical intensive care units of a tertiary, academic medical center. Participants were aged 65 years or older, were on mechanical ventilation for 72 or more hours, and had a preadmission Barthel Index score of 70 or greater. Patients with an open ventriculostomy, continuous hemodialysis, or hospitalization of 7 or more days prior to intubation were excluded. A standardized early mobilization protocol was applied by a trained physical and occupational therapist to eligible participants according to previously published guidelines. Demographic information, hospitalization data, RAND 36-Item Short Form Health Survey (SF-36), and Barthel Index scores from preadmission, hospital discharge, and 30-day follow-up were collected. Results: Patients who survived to hospital discharge compared with nonsurvivors were similar in their admission and hospital stay demographics. Survivors reported significantly higher functioning than nonsurvivors on preadmission functional status on both the physical functioning and general health RAND SF-36 subscales. Nonsurvivors reported significantly lower physical functioning, general health, vitality, and mental health on preadmission function when compared with the published normative RAND SF-36 data for patients aged 75 years and older. Patients who did survive hospitalization reported significantly more bodily pain at 30-day follow-up than the published normative data. Patients met criteria for therapy 92% of planned interventions, 99% of those sessions were completed, and adverse events occurred in less than 1% of interventions. Conclusion: Overall results indicate the feasibility and safety of implementing an early mobilization program to critically ill older adult patients” (p. 162).</p>
Author	<p>Credentials: Josaleen Davis, MD Position and Institution: Maine Medical Center, Portland Maine; Allina Health Systems Minneapolis Minnesota. Publication History in Peer-Reviewed Journals: Limited</p>

Publication	Type of publication: Journal of Geriatric Physical Therapy: scholarly, physical therapy association. Publisher: APTA Geriatrics
Date and Citation History	Date of publication: 2013, October-December Cited By: 35
Stated Purpose or Research Question	“The objectives of this pilot study were to examine the feasibility of and to describe functional outcomes associated with providing early mobilization to critically ill, older adult patients” (p. 162).
Author’s Conclusion	“Overall results indicate the feasibility and safety of implementing an early mobilization program to critically ill older adult patients” (p. 162).
Overall Relevance to your EBP Question	Overall Relevance of Article: good Rationale: This paper adequately demonstrates evidence surrounding the results of early mobilization for critically ill older adults in the ICU. This article addresses early mobilization, functional outcomes, and critically ill older adults. All of these terms are vital to answering this research question. The author’s conclusion that early mobilization is feasible and safe supports the aims of our question.
Overall Quality of Article	Overall Quality of Article: Good Rationale: This article uses valid and reliable measurements to obtain its scores. It also uses a sample that reflects the population of general critically ill older adults, although it is a small population. The publication is a trusted and peer-reviewed scholarly journal. Furthermore, the paper was published within the last 10 years. However, limitations include that a convenience sample was used, the population size was small, and that it was a pilot study.

	Overview of Article
Type of article	Overall Type: Primary Research Study Specific Type Randomized control trial, mixed qualitative and quantitative
APA Reference	de Almeida, E. P. M., de Almeida, J. P., Landoni, G., Galas, F. R. B. G., Fukushima, J. T., Fominskiy, E., de Brito, C. M. M., Cavichio, L. B. L., de Almeida, L. a. A., Ribeiro, U., Osawa, E. A., Diz, M. P., Cecatto, R. B., Battistella, L. R., & Hajjar, L. A. (2017). Early mobilization programme improves functional capacity after major abdominal cancer surgery: A randomized controlled trial. <i>British Journal of Anaesthesia</i> , <i>119</i> (5), 900–907. https://doi.org/10.1093/bja/aex250
Abstract	<p>“Background Major abdominal oncology surgery is associated with substantial postoperative loss of functional capacity, and exercise may be an effective intervention to improve outcomes. The aim of this study was to assess efficacy, feasibility and safety of a supervised postoperative exercise programme. Methods We performed a single-blind, parallel-arm, randomized trial in patients who underwent major abdominal oncology surgery in a tertiary university hospital. Patients were randomized to an early mobilization postoperative programme based on supervised aerobic exercise, resistance and flexibility training or to standard rehabilitation care. The primary outcome was inability to walk without human assistance at postoperative day 5 or hospital discharge. Results A total of 108 patients were enrolled, 54 into the early mobilization programme group and 54 into the standard rehabilitation care group. The incidence of the primary outcome was nine (16.7%) and 21 (38.9%), respectively (P=0.01), with an absolute risk reduction of 22.2% [95% confidence interval (CI) 5.9–38.6] and a number needed to treat of 5 (95% CI 3–17). All patients in the intervention group were able to follow at least partially the exercise programme, although the performance among them was rather heterogeneous. There were no differences between groups regarding clinical outcomes or complications related to the exercises. Conclusions An early postoperative mobilization programme based on supervised exercises seems to be safe and feasible and improves functional capacity in patients undergoing major elective abdominal oncology surgery. However, its impact on clinical outcomes is still unclear.” (p. 900)</p>
Author	Credentials: Position and Institution: Rehabilitation Department, Institute of Cancer; Faculty of Medicine at Universidade de Sao Paulo, Sao Paulo, Brazil Publication History in Peer-Reviewed Journals: EPM de Almeida, moderate
Publication	Type of publication: British Journal of Anaesthesia, scholarly peer-reviewed journals Publisher: Oxford Academic
Date and Citation History	Date of publication: 2017, November Cited By: 36
Stated Purpose or Research Question	“The aim of this study was to assess efficacy, feasibility and safety of a supervised postoperative exercise programme” (p. 900).

<p>Author's Conclusion</p>	<p>“An early postoperative mobilization programme based on supervised exercises seems to be safe and feasible and improves functional capacity in patients undergoing major elective abdominal oncology surgery. However, its impact on clinical outcomes is still unclear” (p. 900)</p>
<p>Overall Relevance to your EBP Question</p>	<p>Overall Relevance of Article: moderate Rationale: This paper adequately demonstrates evidence surrounding the results of early mobilization. However, this article does not address critically ill people, because the sample includes those recovering from abdominal oncology surgery after cancer. This article also does not address those in the ICU. Instead, the participants are in a tertiary university hospital after surgery. The author's conclusion supports that early mobilization is feasible, but states that functional outcomes remain unclear.</p>
<p>Overall Quality of Article</p>	<p>Overall Quality of Article: good Rationale: The publication that published this article is a trusted and peer-reviewed scholarly journal. Furthermore, the paper was published within the last 5 years. This study was a single-blind study with randomized groups and included a control group. This increases the level of evidence of this article. The sample size was large. A total of 109 patients were enrolled. However, limitations include that a convenience sample was used, causing limitations to external validity.</p>

	Overview of Article
Type of article	Overall Type: Primary Research Study Specific Type: Randomized controlled trial
APA Reference	Eggmann, S., Luder, G., Verra, M. L., Irincheeva, I., Bastiaenen, C. H. G., & Jakob, S. M. (2020). Functional ability and quality of life in critical illness survivors with intensive care unit acquired weakness: A secondary analysis of a randomised controlled trial. <i>PLoS One</i> , 15(3), e0229725. http://dx.doi.org.pearl.stkate.edu/10.1371/journal.pone.0229725
Abstract	<p>“Introduction Intensive care unit acquired weakness (ICUAW) may contribute to functional disability in ICU survivors, yet performance-based data for general ICU patients are lacking. This study explored functional outcomes of (1) and risk factors for (2) weakness at ICU discharge. Methods Data from a randomised controlled trial that investigated two early exercise regimes in previously independent, ventilated adults (n = 115) without any significant outcome-differences were used for the present analysis. ICUAW was clinically diagnosed in cooperative participants (n = 83) at ICU discharge with the Medical Research Council sum-score (MRC-SS) using a cut-off <48 for moderate or <36 for severe weakness. Primary outcomes were the 6-Minute Walk Test and Functional Independence Measure at hospital discharge. Secondary outcomes included health-related quality of life after six months. Risk factors during the ICU stay were explored for their effect on MRC-SS with linear regression. Results Functional outcomes and length of hospital stay significantly differed in patients with severe, moderate to no weakness (6-Minute Walk test: p = 0.013; 110m [IQR 75–240], 196m [90–324.25], 222.5m [129–378.75], Functional Independence Measure: p = 0.001; 91[IQR 68–101], 113[102.5–118.5], 112[97–123], length of stay after ICU discharge: p = 0.008; 20.9d [IQR 15.83–30.73], 16.86d [13.07–27.10], 11.16d [7.35–19.74]). However, after six months participants had similar values for quality of life regardless of their strength at ICU discharge (Short-Form 36 sum-scores physical health: p = 0.874, mental health: p = 0.908). In-bed immobilisation was the most significant factor associated with weakness at ICU discharge in the regression models (MRC-SS: -24.57(95% CI [-37.03 to -12.11]); p<0.001). Conclusions In this general, critically ill cohort, weakness at ICU discharge was associated with short-term functional disability and prolonged hospital length of stay, but not with quality of life, which was equivalent to the values for patients without ICUAW within six months. Immobilisation may be a modifiable risk factor to prevent ICUAW. Prospective trials are needed to validate these results” (pp. 1-2).</p>
Author	Credentials: Critical care physiotherapist, MSc in neurorehabilitation, PgDipin Critical Care Position and Institution: Department of Physiology at the University of Bern Switzerland Publication History in Peer-Reviewed Journals: 33, extensive
Publication	Type of publication: Peer-reviewed scholarly article Publisher: Plos One

Date and Citation History	Date of publication: 2020, March 4 Cited By: 14
Stated Purpose or Research Question	“This exploratory study therefore aimed first to investigate functional outcomes at hospital discharge and health-related quality of life after six months in critically ill patients with severe, moderate or no ICUAW at ICU discharge, and second to explore the role of early risk factors for reduced muscle strength at ICU discharge in mechanically ventilated, critically ill adults” (p. 2).
Author’s Conclusion	“Participants without ICUAW had superior functional performance at hospital discharge and shorter length of hospital stays when compared to participants with ICUAW. The increased strength was associated with early out-of-bed mobilisations during the ICU. However, after six months, participants with ICUAW reached similar health-related quality of life to participants without ICUAW at ICU discharge” (p. 12).
Overall Relevance to your EBP Question	Overall Relevance of Article: Moderate Rationale: The article examines the effects of early endurance training on a ventilator versus no early endurance training on a ventilator while also looking at the functional abilities associated. This directly relates to our EBP question looking at the benefits of mobilization for functional mobility in adults in the ICU.
Overall Quality of Article	Overall Quality of Article: Moderate Rationale: The article is not cited by many other articles, but the article is peer-reviewed, recently published, used relevant tables and charts, and included limitations.

	Overview of Article
Type of article	Overall Type: Primary Research Study Specific Type: “This qualitative descriptive feasibility study examined occupational therapists’ perceptions of APM in acute care settings in the Pacific Northwest” (p. 2).
APA Reference	Foidel, S.E., Birrer, C.M., Stinogel, A.K., & Krusen, N.E. (2020). Delirium in acute care: Occupational therapists’ perspectives, experiences, and practice implications. <i>Journal of Acute Care Occupational Therapy</i> , 3(1), 1-25.
Abstract	“The prevalence of delirium places assessment, prevention, and management (APM) at the forefront of occupational therapy intervention in acute care. This qualitative descriptive feasibility study examined occupational therapists’ perceptions of APM in acute care settings in the Pacific Northwest. In a convenience sample, 25 of 46 (62%) participants returned surveys addressing roles, assessment, intervention, barriers, recommendations, and preparedness. Data revealed opportunities for improving practice consistent with those reported in the current literature. Education emerged as a theme from the data across roles, strategies for prevention and management, barriers to implementation, and means to improve site-specific APM services. Authors recommend additional education and research expanded to additional geographic and practice settings” (p. 2).
Author	Credentials: OTD, OTR/L Position and Institution: Pacific University Publication History in Peer-Reviewed Journals: Extensive (8+)
Publication	Type of publication: Scholarly peer-reviewed journal Publisher: Journal of Acute Care Occupational Therapy (JACOT) Other: Blinded, peer reviewed, twice-yearly open access publication with internet-based distribution
Date and Citation History	Date of publication: 2020, Summer Cited By: None found
Stated Purpose or Research Question	“The purpose of the study was to explore acute care occupational therapists’ perceptions of the role of occupational therapy in assessment, prevention, and management (APM). Additionally, the authors’ aim was to identify implications for practice and guide future research” (p. 4).
Author’s Conclusion	“Results of this study suggest opportunities for occupational therapists to address delirium in acute care. Occupational therapists may be recipients and providers of education. Therapists’ roles may include leadership, patient advocacy, and education to interprofessional team members for effective APM” (p. 19).
Overall Relevance to your EBP Question	Overall Relevance of Article: Moderate Rationale: Our EBP question explores the evidence to support early mobilization in the ICU for older adults and this article explores occupational therapists’ role in treating patients in the ICU, specifically addressing delirium. This article is applicable to our question as it also looks at early mobilization but will not be the main source in gathering our information.

Overall Quality of Article	Overall Quality of Article: Moderate Rationale: While it is not a systematic review like my other sources, it is a qualitative study that still provides strong evidence. There are again multiple authors involved and the journal is very reputable.
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	Overview of Article
Type of article	Overall Type: Primary Research Study Specific Type: Quantitative, Pre-test and Post-test: measurements taken at recruitment and outcomes were taken during the first 7 days.
APA Reference	Hartley, P., DeWitt, A. L., Forsyth, F., Romero-Ortuno, R., & Deaton, C. (2020). Predictors of physical activity in older adults early in an emergency hospital admission: A prospective cohort study. <i>BMC Geriatrics</i> , 20(1), 177. https://doi.org/10.1186/s12877-020-01562-3
Abstract	<p>“Background: Reduced mobility may be responsible for functional decline and acute sarcopenia in older hospitalised patients. The drivers of reduced in-hospital mobility are poorly understood, especially during the early phase of acute hospitalisation. We investigated predictors of in-hospital activity during a 24-h period in the first 48 h of hospital admission in older adults. Methods: This was a secondary analysis of a prospective repeated measures cohort study. Participants aged 75 years or older were recruited within the first 24 h of admission. At recruitment, patients underwent a baseline assessment including measurements of pre-morbid functional mobility, cognition, frailty, falls efficacy, co-morbidity, acute illness severity, knee extension strength and grip strength, and consented to wear accelerometers to measure physical activity during the first 7 days (or until discharge if earlier). In-hospital physical activity was defined as the amount of upright time (standing or walking). To examine the predictors of physical activity, we limited the analysis to the first 24 h of recording to maximise the sample size as due to discharge from hospital there was daily attrition. We used a best subset analysis including all baseline measures. The optimal model was defined by having the lowest Bayesian information criterion in the best-subset analyses. The model specified a maximum of 5 covariates and used an exhaustive search. Results: Seventy participants were recruited but eight were excluded from the final analysis due to lack of accelerometer data within the first 24 h after recruitment. Patients spent a median of 0.50 h (IQR: 0.21; 1.43) standing or walking. The optimal model selected the following covariates: functional mobility as measured by the de Morton Mobility Index and two measures of illness severity, the National Early Warning Score, and serum C-reactive protein. Conclusions: Physical activity, particularly in the acute phase of hospitalisation, is very low in older adults. The association between illness severity and physical activity may be explained by symptoms of acute illness being barriers to activity. Interdisciplinary approaches are required to identify early mobilisation opportunities. Keywords: Aged, Hospital, Physical activity, Accelerometers, Functional mobility, Illness severity” (p. 1).</p>
Author	Credentials: PHd Position and Institution: Primary Care Unit, Department of Public Health and Primary Care, University of Cambridge, Cambridge, UK 2; Department of Physiotherapy, Cambridge University Hospital NHS Foundation Trust, Cambridge, UK; Discipline of Medical Gerontology, Trinity College Dublin, Mercer’s Institute for Successful Ageing, St James’s Hospital, Dublin, Ireland.

	Publication History in Peer-Reviewed Journals: minimal
Publication	Type of publication: Scholarly Peer-Reviewed Publisher: BMC Geriatrics
Date and Citation History	Date of publication: 2020, May 18 Cited By 7
Stated Purpose or Research Question	“We investigated clinical predictors of in hospital activity during the first 24 h of hospital admission in older adults in the United Kingdom (UK) using the innovative method of best-subset analysis” (p. 2).
Author’s Conclusion	“Physical activity, particularly in the acute phase of hospitalisation, is very low in older adults. The association between illness severity and physical activity may be explained by symptoms of acute illness being barriers to activity. Interdisciplinary approaches are required to identify early mobilisation opportunities” (p. 1).
Overall Relevance to your EBP Question	Overall Relevance of Article: Moderate Rationale: This article addresses critically ill people and references client factors which may predict mobilization in the first 24 hours. However, this article does not address the benefits of mobilization and activity on functional performance. This article also does not address those in the ICU. Instead, the participants are in a tertiary university hospital emergency room. The author’s findings support that physical activity in hospitals is limited and that providing early mobilization may help to reduce negative effects related to lack of movement.
Overall Quality of Article	Overall Quality of Article: Moderate Rationale: The publication that published this article is a trusted and peer-reviewed scholarly journal. Furthermore, the paper was published within the last year, so it is very recent. Also, the measurement tools used in this study were reliable and valid. This study was a single-blind study with randomized groups and included a control group. This increases the level of evidence of this article. The sample size was large, compared to other studies. A total of 62 patients were enrolled. However, limitations include that a convenience sample was used. The sample size was not large enough to apply to the general population. Also, patients with significant cognitive impairments were not included in the study.

	Overview of Article
Type of article	Overall Type: Primary Research Study Specific Type: Quantitative
APA Reference	Hodgson, C. L., Bailey, M., Bellomo, R., Berney, S., Buhr, H., Denehy, L., Gabbe, B., Harrold, M., Higgins, A., Iwashyna, T. J., Papworth, R., Parke, R., Patman, S., Presneill, J., Saxena, M., Skinner, E., Tipping, C., Young, P., Webb, S., & Trial of Early Activity and Mobilization Study Investigators. (2016). A binational multicenter pilot feasibility randomized controlled trial of early goal-directed mobilization in the ICU. <i>Critical Care Medicine</i> , 44 (6), 1145-52. doi: 10.1097/CCM.0000000000001643.
Abstract	<p>“Objectives: To determine if the early goal-directed mobilization intervention could be delivered to patients receiving mechanical ventilation with increased maximal levels of activity compared with standard care. Design: A pilot randomized controlled trial. Setting: Five ICUs in Australia and New Zealand. Participants: Fifty critically ill adults mechanically ventilated for greater than 24 hours. Intervention: Patients were randomly assigned to either early goal-directed mobilization (intervention) or to standard care (control). Early goal-directed mobilization comprised functional rehabilitation treatment conducted at the highest level of activity possible for that patient assessed by the ICU mobility scale while receiving mechanical ventilation. Measurements and Main Results: The ICU mobility scale, strength, ventilation duration, ICU and hospital length of stay, and total inpatient (acute and rehabilitation) stay as well as 6-month post-ICU discharge health-related quality of life, activities of daily living, and anxiety and depression were recorded. The mean age was 61 years and 60% were men. The highest level of activity (ICU mobility scale) recorded during the ICU stay between the intervention and control groups was mean (95% CI) 7.3 (6.3–8.3) versus 5.9 (4.9–6.9), $p = 0.05$. The proportion of patients who walked in ICU was almost doubled with early goal-directed mobilization (intervention $n = 19$ [66%] vs control $n = 8$ [38%]; $p = 0.05$). There was no difference in total inpatient stay (d) between the intervention versus control groups (20 [15–35] vs 34 [18–43]; $p = 0.37$). There were no adverse events. Conclusions: Key Practice Points: Delivery of early goal-directed mobilization within a randomized controlled trial was feasible, safe and resulted in increased duration and level of active exercises” (pp. 1145-1146).</p>
Author	<p>Credentials: PT, PhD, (Chair) Position and Institution: Australian and New Zealand Intensive Care Research Center, Department of Epidemiology and Preventive Medicine, Monash University, Melbourne, VIC, Australia; Alfred Hospital, Melbourne, VIC, Australia Publication History in Peer-Reviewed Journals: extensive</p>
Publication	<p>Type of publication: Scholarly peer-reviewed journals. Publisher: Wolters Kluwer Other: Critical Care Medicine</p>
Date and Citation History	<p>Date of publication: 2016, June 1 Cited By: 135</p>

Stated Purpose or Research Question	“The aim of this study was to investigate whether individual patient randomization to EGDM was feasible in a multicenter study and to inform the design of a definitive trial of EGDM compared with standard care” (p. 1146).
Author’s Conclusion	“It was found that EGDM could be safely delivered early after intubation and mechanical ventilation at all sites (within 3 d). In addition, this pilot study demonstrated differences between the control and EGDM groups with respect to both the highest level of activity achieved during the ICU stay and the time spent exercising” (p. 1150).
Overall Relevance to your EBP Question	Overall Relevance of Article: Good Rationale: This study looked at early goal-directed mobilization (EGDM) compared to standard care in the ICU.
Overall Quality of Article	Overall Quality of Article: Good Rationale: The quality of this article is good because the research methods are sound and the <i>p</i> value was significant.

	Overview of Article
Type of article	Overall Type: Primary Research Study (qualitative, quantitative, etc.) Specific Type: Design: A retrospective observational study
APA Reference	Lai, C. C., Chou, W., Chan, K. S., Cheng, K. C., Yuan, K. S., Chao, C. M., & Chen, C. M. (2017). Early mobilization reduces duration of mechanical ventilation and intensive care unit stay in patients with acute respiratory failure. <i>Archives of Physical Medicine and Rehabilitation</i> , 98(5), 931–939. doi: 10.1016/j.apmr.2016.11.007
Abstract	<p>“Objective: To evaluate the effects of a quality improvement program to introduce early mobilization on the outcomes of patients with mechanical ventilation (MV) in the intensive care unit (ICU). Design: A retrospective observational study. Setting: Nineteen-bed ICU at a medical center. Participants: Adults patients with MV (NZ153) admitted to a medical ICU.</p> <p>Interventions: A multidisciplinary team (critical care nurse, nursing assistant, respiratory therapist, physical therapist, patient’s family) initiated the protocol within 72 hours of MV when patients become hemodynamically stable. We did early mobilization twice daily, 5d/wk during family visits (30min each time), and cooperated with family, if possible. Main Outcome Measures: MV duration, rate of successful weaning, and length of ICU and hospital stay. Results: We enrolled 63 patients in the before protocol group and 90 in the after-protocol group. The 2 groups were well matched in age, sex, body height, body weight, body mass index, disease severity, cause of intubation, number of comorbidities, and most underlying diseases. After protocol group patients had shorter MV durations (4.7d vs 7.5d; $P<0.001$) and ICU stays (6.9d vs 9.9d; $P<0.001$) than did before protocol group patients. Early mobilization was negatively associated with the duration of MV (bZ.269; $P<0.002$; 95% confidence interval [CI], 4.767 to 1.072), and the risk of MV for 7 days was lower in patients who underwent early mobilization (odds ratio, .082; 95% CI, .021e.311).</p> <p>Conclusions: The introduction of early mobilization for patients with MV in the ICU shortened MV durations and ICU stays. A multidisciplinary team that includes the patient’s family can work together to improve the patient’s clinical outcomes” (p. 931).</p>
Author	<p>Credentials: Chih-Cheng Lai, MD</p> <p>Position and Institution: Department of Intensive Care Medicine, Chi Mei Medical Center, Liouying, Tainan; Department of Recreation and Health-Care Management, Chia Nan University of Pharmacy and Science, Tainan; Departments of Intensive Care Medicine, Internal Medicine, Chi Mei Medical Center, Tainan; Department of Safety, Health and Environment, Chung Hwa University of Medical Technology, Tainan; Department of Medical Research, Chi Mei Medical Center, Tainan; Department of Business Management, National Sun Yat-Sen University, Kaohsiung, Taiwan</p> <p>Publication History in Peer-Reviewed Journals: Google search came up with 3,000 results, went through the first 5 pages and found a minimum of 50+</p>
Publication	<p>Type of publication: scholarly peer-reviewed journal</p> <p>Publisher: Archives of Physical Medicine and Rehabilitation</p> <p>Other: American Congress of Rehabilitation Medicine</p>

Date and Citation History	Date of publication: 2017, May Cited By: 69
Stated Purpose or Research Question	“We conducted this study to evaluate the effects of this early rehabilitation protocol on the outcomes of patients with MV in the ICU” (p. 932).
Author’s Conclusion	“The introduction of early mobilization for patients with MV in the ICU can help shorten the duration of their MV and ICU stays” (p. 938).
Overall Relevance to your EBP Question	Overall Relevance of Article: Good Rationale: This article looks at early mobilization, specifically in the ICU. This relates to our EBP question asking about the effect of early mobilization in the ICU. This article will help answer our question and we will be able to use the findings from this study to support our project and overall recommendation.
Overall Quality of Article	Overall Quality of Article: Moderate Rationale: The author’s credentials show his competence in his research. He has multiple other articles he has published and worked on. The observational study used a small sample in the ICU at a medical center, however, these results can still be used to answer our research question. The publication date is also within the past five years (2017), and this article has been cited in other articles as well.

	Overview of Article
Type of article	Overall Type: Primary Research Study Specific Type: Randomized Controlled Trial, quantitative
APA Reference	Lai, X., Lin, B., Hongwei, Z. C., Wu, Z., Du, H., & Huo, X. (2021). Effects of lower limb resistance exercise on muscle strength, physical fitness, and metabolism in pre-frail elderly patients: A randomized controlled trial. <i>BMC Geriatrics</i> , 21, 1-9. http://dx.doi.org/10.1186/s12877-021-02386-5
Abstract	<p>Background: Few studies examined interventions in frail elderly in China, while the awareness of applying interventions to prevent frailty in pre-frail elderly is still lacking. This study aimed to explore the effects of lower limb resistance exercise in pre-frail elderly in China. Methods: This was a randomized controlled trial of patients with pre-frailty. The control group received routine care, while the exercise group received a 12-week lower limb resistance exercise based on routine care. The muscle strength in the lower limbs, physical fitness, and energy metabolism of the patients was evaluated at admission and after 12 weeks of intervention. Results: A total of 60 pre-frail elderly were included in this study. The patients were divided into the exercise group (n = 30) and control group (n = 30) by random grouping. There were 17 men and 13 women aged 65.3 ± 13.4 in the exercise group, and 15 men and 15 women aged 67.6 ± 11.9 years in the control groups. The Barthel index was 80.3 ± 10.6 and 85.1 ± 11.6, respectively. The characteristics of the two groups were not significantly different before intervention (all $p > 0.05$). The results of repeated measurement ANOVA showed that there was statistically significant in crossover effect of group * time (all $p < 0.05$), that is, the differences of quadriceps femoris muscle strength, 6-min walking test, 30-s sit-to-stand test, 8-ft “up & go” test, daily activity energy expenditure and metabolic equivalent between the intervention group and the control group changed with time, and the variation ranges were different. The main effects of time were statistically significant (all $p < 0.05$), namely, femoris muscle strength, 6-min walking test, 30-s sit-to-stand test, 8-ft “up & go” test, daily activity energy expenditure and metabolic equivalent of the intervention group and the control group were significantly different before and after intervention. The main effects of groups were statistically significant ($p < 0.05$), namely, femoris muscle strength, 6-min walking test, 30-s sit-to-stand test, daily activity energy expenditure and metabolic equivalent before and after intervention were significantly different between the intervention group and the control group, while there were no significant differences in 8-ft “up & go” test between groups. Conclusion: Lower limb resistance exercise used for the frailty intervention could improve muscle strength, physical fitness, and metabolism in pre-frail elderly” (pp.1-2)</p>
Author	<p>Credentials: no credentials Position and Institution: Department of Health Care, Peking Union Medical College Hospital, Beijing, 100730, China Publication History in Peer-Reviewed Journals: First Author on six other papers. Listed author for eight total publications. Cited in total by 63 others. This article was not cited by others but it is less than a year old.</p>

Publication	Type of publication: Scholarly Peer-reviewed journal Publisher: BMC Geriatrics
Date and Citation History	Date of publication: 2021, July 30 Cited By: none
Stated Purpose or Research Question	“This study aimed to explore the effects of lower limb resistance exercise in pre-frail elderly in China” (p. 2).
Author’s Conclusion	“Lower limb resistance exercise used for the frailty intervention could improve muscle strength, physical fitness, and metabolism in pre-frail elderly” (p. 3).
Overall Relevance to your EBP Question	Overall Relevance of Article: I believe this has good relevance to our question. Rationale: It focuses on early intervention and has strong data to support its conclusion. It also directly talks about early mobilization methods.
Overall Quality of Article	Overall Quality of Article: I would say this is a good and valid article Rationale: Although this article isn’t cited by many, it has only been out for a few months so I think that it makes sense. It is a randomised controlled trial which is one of the strongest trials to conduct and it has a clear conclusion. The primary author has many other studies out and is highly cited by those that are not from the past year. Even though I couldn’t find clear credentials for the primary author, they do a lot in their field and work with a legit program.

	Overview of Article
Type of article	Overall Type: Primary Specific Type: Randomized Control Trial
APA Reference	Mirza, Mansha; Gecht-Silver, Maureen; Keating, Emily; Krishcer, Amy; Kim, Hajwa & Kottorp, Anders. (2020). Feasibility and preliminary efficacy of occupational therapy intervention for older adults with chronic conditions in a primary care clinic. <i>American Journal of Occupational Therapy, 74(5)</i> , https://doi.org/10.5014/ajot.2020.039842
Abstract	<p>“Importance: Occupational therapy can play a role in primary care management of chronic diseases among older adults. Objective: To assess the feasibility of delivering a primary care occupation-focused intervention (Integrated Primary care and Occupational therapy for Aging and Chronic disease Treatment to preserve Independence and Functioning, or i-PROACTIF) for older adults with chronic disease. Design: Feasibility study comparing i-PROACTIF with complex care management using a two-group randomized controlled trial design with data gathered at baseline and during and after the 8-wk intervention. Setting: Family medicine clinic serving an urban, low-income, working-class community. Outcomes and Measures: Feasibility indicators were recruitment, retention, utility of clinical assessments, and acceptability of interventions assessed through feedback surveys completed by patients and primary care providers (PCPs). Patient outcomes, including perspectives on chronic illness care, occupational performance, and overall well-being, were collected using standardized, validated measures and analyzed descriptively. Participants: Eighteen adult volunteers, ages ≥ 50 yr, with heart disease, arthritis, and uncontrolled diabetes completed the study. Ten PCPs completed feedback surveys. Intervention: i-PROACTIF focuses on preserving functional independence, is based on the Person–Environment–Occupation framework and consists of two assessment sessions and six weekly treatment sessions. Results: Recruitment goals were achieved, with an 86% retention rate. Clinical measures unearthed deficits in areas that were unreported or underreported by patients. Participants reported being extremely satisfied with the intervention. Physicians and nurses also supported the intervention. Both groups showed improved scores on most outcomes. Conclusion and Relevance: Delivering and evaluating i-PROACTIF was feasible and acceptable. Future efficacy trials are needed before it can be used in clinical settings. What This Article Adds: The results of this study can inform future occupational therapy interventions and clinical trials in primary care for older adults with chronic conditions” (p. 1).</p>
Author	<p>Credentials: PhD, OTR/L, MSHSOR Position and Institution: Associate Professor, Department of Occupational Therapy, University of Illinois at Chicago Publication History in Peer-Reviewed Journals: 50+, Extensive</p>
Publication	<p>Type of publication: Peer- Reviewed Journal Publisher: AJOT Other: AOTA</p>

Date and Citation History	Date of publication: 2020 Cited By: 8
Stated Purpose or Research Question	“Our study aimed to develop and deliver an occupation-focused intervention for preserving functional independence among older adults with chronic diseases in a primary care setting. The feasibility study compared i-PROACTIF (Integrated Primary care and Occupational therapy for Aging and Chronic disease Treatment to preserve Independence and Functioning) with an occupational therapy–informed complex care management (CCM) protocol” (p. 2).
Author’s Conclusion	“The i-PROACTIF intervention, an occupation-focused intervention for preserving functional independence among older adults with chronic diseases, can feasibly be delivered in a primary care setting. The intervention was acceptable to patients and appreciated by PCPs” (p. 12).
Overall Relevance to your EBP Question	Overall Relevance of Article: Poor Rationale: This article addresses different factors of our EBP question such as older adults and chronic conditions, as well as the OT’s role, however it lacks specificity in our EBP question. It could perhaps be used to compare between a primary care clinic and an ICU.
Overall Quality of Article	Overall Quality of Article: Moderate Rationale: I believe that this is a strong article as it is a well-organized two group randomized control trial. The author is highly credible and the article is very relevant and recent.

	Overview of Article
Type of article	Overall Type: Primary Research Study Specific Type: Retrospective study “A retrospective study was performed at a tertiary hospital with a 24-bed adult ICU” (p. 1239).
APA Reference	Pandullo, S. M., Spilman, S. K., Smith, J. A., Kingery, L. K., Pille, S. M., Rondinelli, R. D., & Sahr, S. M. (2015). Time for critically ill patients to regain mobility after early mobilization in the intensive care unit and transition to a general inpatient floor. <i>Journal of Critical Care</i> , 30(6), 1238–1242. https://doi.org/10.1016/j.jcrc.2015.08.007
Abstract	“ Purpose: The purpose of this study is to determine if patient mobility achievements in an intensive care unit (ICU) setting are sustained during subsequent phases of hospitalization, specifically after transferring to inpatient floors and on the day of hospital discharge. Materials and Methods: The study is an analysis of adult patients who stayed in the ICU for 48 hours or more during the second quarter of 2013. The study sample included 182 patients who transferred to a general inpatient floor after the ICU stay. Results: Patients experienced an average delay of 16 hours to regain or exceed chair level of mobility and 7 hours to regain ambulation level after transferring to an inpatient floor. One third of patients ambulated in the ICU, and those patients had significantly shorter post-ICU and hospital stays compared with patients who did not ambulate in the ICU. Delays in regaining mobility on the floor were modestly associated with initial Morse Fall Score and being male. Conclusions: Mobility progression through the hospital course is imperative to improving patient outcomes. Study Findings: show the need for improvement in maintaining early ICU mobilization achievement during the crucial phase between ICU stay and hospital discharge” (p. 1238).
Author	Credentials: Registered Nurse, Critical care nurse Position and Institution: ARNP, CCNS-BC, Clinical nurse specialist at UnityPoint Health Des Moines Publication History in Peer-Reviewed Journals: 1, Poor
Publication	Type of publication: Scholarly peer-reviewed article Publisher: Journal of Critical Care Other: Elsevier
Date and Citation History	Date of publication: 2015 Cited By: 34
Stated Purpose or Research Question	“The main goal of this study is to examine whether or not levels of functional mobility achieved in the ICU are maintained after transitions to post-ICU care locations in the hospital, specifically during the move from the ICU to general inpatient floors and on the day of hospital discharge” (pp. 1238-1239).
Author’s Conclusion	“Early mobilization of patients in the ICU has been shown to have a positive impact on patient outcomes; it is therefore imperative to maintain mobility efforts during the crucial transition from the ICU to the in-patient floor” (p. 1242).
Overall Relevance to	Overall Relevance of Article: Moderate

your EBP Question	Rationale: The study examined the effect of functional mobilization on adults in the ICU, but our question does not necessarily focus on time.
Overall Quality of Article	Overall Quality of Article: Excellent Rationale: The author has valid credentials, the article has been cited quite a few other times, the publisher is a very credible source, and provides relevant tables and charts.

	Overview of Article
Type of article	Overall Type: Primary Research Study Specific Type: Randomized controlled trial
APA Reference	Schaller, S. J., Anstey, M., Blobner, M., Edrich, T., Grabitz, S. D., Gradwohl-Matis, I., Heim, M., Houle, T., Kurth, T., Latronico, N., Lee, J., Meyer, M. J., Peponis, T., Talmor, D., Velmahos, G. C., Waak, K., Walz, J. M., Zafonte, R., & Eikermann, M. (2016). Early, goal-directed mobilisation in the surgical intensive care unit: A randomised controlled trial. <i>The Lancet</i> , 388(10052), 1377–1388. https://doi.org/10.1016/S0140-6736(16)31637-3
Abstract	<p>“Background: Immobilisation predicts adverse outcomes in patients in the surgical intensive care unit (SICU). Attempts to mobilise critically ill patients early after surgery are frequently restricted, but we tested whether early mobilisation leads to improved mobility, decreased SICU length of stay, and increased functional independence of patients at hospital discharge. Methods: We did a multicentre, international, parallel-group, assessor-blinded, randomised controlled trial in SICUs of five university hospitals in Austria (n=1), Germany (n=1), and the USA (n=3). Eligible patients (aged 18 years or older, who had been mechanically ventilated for <48 h, and were expected to require mechanical ventilation for ≥24 h) were randomly assigned (1:1) by use of a stratified block randomisation via restricted web platform to standard of care (control) or early, goal-directed mobilisation using an inter-professional approach of closed-loop communication and the SICU optimal mobilisation score (SOMS) algorithm (intervention), which describes patients’ mobilisation capacity on a numerical rating scale ranging from 0 (no mobilisation) to 4 (ambulation). We had three main outcomes hierarchically tested in a pre-specified order: the mean SOMS level patients achieved during their SICU stay (primary outcome), and patient’s length of stay on SICU and the mini-modified functional independence measure score (mmFIM) at hospital discharge (both secondary outcomes). This trial is registered with ClinicalTrials.gov (NCT01363102). Findings: Between July 1, 2011, and Nov 4, 2015, we randomly assigned 200 patients to receive standard treatment (control; n=96) or intervention (n=104). Intention-to-treat analysis showed that the intervention improved the mobilisation level (mean achieved SOMS 2·2 [SD 1·0] in intervention group vs 1·5 [0·8] in control group, p<0·0001), decreased SICU length of stay (mean 7 days [SD 5–12] in intervention group vs 10 days [6–15] in control group, p=0·0054), and improved functional mobility at hospital discharge (mmFIM score 8 [4–8] in intervention group vs 5 [2–8] in control group, p=0·0002). More adverse events were reported in the intervention group (25 cases [2·8%]) than in the control group (ten cases [0·8%]); no serious adverse events were observed. Before hospital discharge 25 patients died (17 [16%] in the intervention group, eight [8%] in the control group). 3 months after hospital discharge 36 patients died (21 [22%] in the intervention group, 15 [17%] in the control group). Interpretation: Early, goal-directed mobilisation improved patient mobilisation throughout SICU admission, shortened patient length of stay in the SICU, and improved patients’ functional mobility at hospital discharge” (p. 1377).</p>

Author	Credentials: Professor and PhD Position and Institution: The Charite University Hospital in Berlin, Germany Publication History in Peer-Reviewed Journals: Extensive
Publication	Type of publication: Scholarly peer-reviewed article Publisher: The Lancet
Date and Citation History	Date of publication: 2016, October 1 Cited By: 428
Stated Purpose or Research Question	“In this study we tested if early, goal-directed mobilisation, using a strict mobilisation algorithm combined with facilitated inter-professional communication, in critically ill SICU patients leads to improved mobility during SICU admission, decreased length of stay on the SICU, and increased functional independence at hospital discharge.” (p. 1377)
Author’s Conclusion	“Early, goal-directed mobilisation therapy in the SICU increased patients’ mobility level, decreased the length of stay in the SICU and hospital, and improved functional independence at hospital discharge” (p. 1385).
Overall Relevance to your EBP Question	Overall Relevance of Article: Good Rationale: Our EBP question focuses on the benefits of mobilization of adult patients in the ICU and this article directly relates to goal-directed mobilization in the surgical ICU.
Overall Quality of Article	Overall Quality of Article: Good Rationale: The study is a randomized control trial that has a very reputable author and has been cited by many other sources.

	Overview of Article
Type of article	Overall Type: Primary Research Study Specific Type: Early physical and occupational therapy in mechanically ventilated, critically ill patients: A randomised controlled trial
APA Reference	Schweickert, W. D., Pohlman, M. C., Pohlman, A. S., Nigos, C., Pawlik, A. J., Esbrook, C. L., Spears, L., Miller, M., Franczyk, M., Deprizio, D., Schmidt, G. A., Bowman, A., Barr, R., McCallister, K. E., Hall, J. B., & Kress, J. P. (2009). Early physical and occupational therapy in mechanically ventilated, critically ill patients: A randomised controlled trial. <i>Lancet</i> , 373(9678), 1874–1882. doi: 10.1016/S0140-6736(09)60658-9
Abstract	<p>“Background: Long-term complications of critical illness include intensive care unit (ICU)-acquired weakness and neuropsychiatric disease. Immobilisation secondary to sedation might potentiate these problems. We assessed the efficacy of combining daily interruption of sedation with physical and occupational therapy on functional outcomes in patients receiving mechanical ventilation in intensive care. Methods: Sedated adults (≥ 18 years of age) in the ICU who had been on mechanical ventilation for less than 72 h, were expected to continue for at least 24 h, and who met criteria for baseline functional independence were eligible for enrolment in this randomised controlled trial at two university hospitals. We randomly assigned 104 patients by computer-generated, permuted block randomisation to early exercise and mobilisation (physical and occupational therapy) during periods of daily interruption of sedation (intervention; $n=49$) or to daily interruption of sedation with therapy as ordered by the primary care team (control; $n=55$). The primary endpoint—the number of patients returning to independent functional status at hospital discharge—was defined as the ability to perform six activities of daily living and the ability to walk independently. Therapists who undertook patient assessments were blinded to treatment assignments. Secondary endpoints included duration of delirium and ventilator-free days during the first 28 days of hospital stay. Analysis was by intention to treat. This trial is registered with ClinicalTrials.gov, number NCT00322010. Findings: All 104 patients were included in the analysis. Return to independent functional status at hospital discharge occurred in 29 (59%) patients in the intervention group compared with 19 (35%) patients in the control group ($p=0.02$; odds ratio 2.7 [95% CI 1.2–6.1]). Patients in the intervention group had shorter duration of delirium (median 2.0 days, IQR 0.0–6.0 vs 4.0 days, 2.0–8.0; $p=0.02$), and more ventilator-free days (23.5 days, 7.4–25.6 vs 21.1 days, 0.0–23.8; $p=0.05$) during the 28-day follow-up period than did controls. There was one serious adverse event in 498 therapy sessions (desaturation less than 80%). Discontinuation of therapy as a result of patient instability occurred in 19 (4%) of all sessions, most commonly for perceived patient-ventilator asynchrony. Interpretation: A strategy for whole-body rehabilitation—consisting of interruption of sedation and physical and occupational therapy in the earliest days of critical illness—was safe and well tolerated, and resulted in better functional outcomes at hospital discharge,</p>

	a shorter duration of delirium, and more ventilator-free days compared with standard care” (p. 1874).
Author	Credentials: William D Schweickert, MD Position and Institution: Department of Medicine, Division of Pulmonary, Allergy and Critical Care Medicine, University of Pennsylvania, Philadelphia, PA, USA Publication History in Peer-Reviewed Journals: Google search came up with 2,000 results, went through the first 4 pages and found a minimum of 40+
Publication	Type of publication: Scholarly peer-reviewed journal Publisher: The Lancet
Date and Citation History	Date of publication: 2009, May 14 Cited By: 3,086
Stated Purpose or Research Question	“We postulated that this intervention, tested in a randomised controlled trial, would affect both functional outcomes and neuropsychiatric outcomes, such as ICU-associated delirium” (p. 1875).
Author’s Conclusion	“Patients assigned to intervention had shorter duration of delirium and left the hospital with better functional status. This study highlights the robust outcomes that can be achieved with the coordinated efforts of multiple disciplines dedicated to the survival and mental and physical recovery of critically ill patients receiving mechanical ventilation” (p. 1881).
Overall Relevance to your EBP Question	Overall Relevance of Article: Good Rationale: This article relates to our EBP question. It is a randomised controlled trial that evaluates the effectiveness of early physical and occupational therapy and early mobilization. The results of this study can be used to answer our project question about the effects of early mobilization in the ICU.
Overall Quality of Article	Overall Quality of Article: Moderate Rationale: This study is strong as it is a randomised controlled trial. The author’s credentials are sound and he has been a part of many other articles and studies. This article has also been cited by quite a few other articles. However, this is one of my older articles, being that it is from 2009.

	Overview of Article
Type of article	Overall Type: Primary Research Study Specific Type: Randomized controlled trial “the pre-intervention cohort consisted of consecutive patients admitted to theCICU from January 1, 2017, to December 30, 2017. The Intervention group consisted of consecutive patients admitted to the CICU from February 1, 2018 (the date of EM program implementation), to June 30, 2019” (p. 233).
APA Reference	Semsar-kazerooni, K., Dima, D., Valiquette, J., Berube-Dufour, J., & Goldfarb, M. (2021). Early mobilization in people with acute cardiovascular disease. <i>Canadian Journal of Cardiology</i> , 37(2), 232–240. https://doi.org/10.1016/j.cjca.2020.03.038
Abstract	“ Background: Early mobilization (EM) is recommended in critical care units. However, there is little known about EM in people with acute cardiovascular disease. Methods: Consecutive admissions to a tertiary-care cardiovascular intensive care unit (CICU) before and after implementation of an EM program were reviewed. The Level of Function (LOF) Mobility Scale, which ranges from 0 (bed immobile) to 5 (able to walk>20 m), was used to measure and guide mobility. The primary outcome was discharged home. Results: There were 1489 patients included in the analysis (pre-intervention, N¼637; intervention, N¼852). There were no differences in age, sex, or admission for ischemic heart disease (age 68.116.1 years; 39.3% female). In the intervention cohort, one-quarter (N¼222; 26.1%) had at least mildly impaired prehospital functional status. The LOF was 4.60.7 prehospital, 3.21.4 on admission, and 4.2 0.9 on CICU discharge. Half of patients (51.6%) increased their LOF by1 during CICU admission. Nearly all mobility opportunities had a mobility activity (97.0%). The adverse event rate was 0.3% with no life-threatening events, falls, line dislodgement, or health care personnel injuries. The intervention group, compared with the pre-intervention group, was more likely to be discharged home (83.9% vs 78.3%, P<0.007) and had a lower rate of in-hospital death (4.2% vs 6.8%; P¼0.04). When adjusted for age, sex, and comorbid illness, admission LOF was a predictor of discharge to health care facility (odds ratio¼0.7; P<0.001). Conclusions: EM is safe and feasible in the CICU and effective at increasing discharge home” (p. 232).
Author	Credentials: DEC Position and Institution: Student at McGill University Publication History in Peer-Reviewed Journals: Limited-Moderate
Publication	Type of publication: Scholarly peer-reviewed article Publisher: Canadian Journal of Cardiology Other: Elsevier
Date and Citation History	Date of publication: 2020, March 25 Cited By: 8
Stated Purpose or Research Question	“The objectives of this study were (1) to assess the safety of a pragmatic EM program in people with acute CV disease and (2) to determine whether EM is associated with improved outcomes” (p. 233).

<p>Author's Conclusion</p>	<p>“Our findings provide support for the safety and effective-ness of EM in people with acute CV disease. The results should inform efforts to educate clinicians about the role and importance of EM in acute CV disease and to transform acute cardiology mobility culture” (p. 238).</p>
<p>Overall Relevance to your EBP Question</p>	<p>Overall Relevance of Article: Moderate Rationale: The article focused on adults over 65 with cardiopulmonary disease engaging in an early mobilization program and related it to how it affects functional mobility. This relates to our EBP question.</p>
<p>Overall Quality of Article</p>	<p>Overall Quality of Article: Poor Rationale: Article does not explicitly state that it is a randomized controlled trial, but it compares two groups and is published by a reputable source. However, the author has not been cited many times and is a graduate student at a university which makes the overall quality poor.</p>

	Overview of Article
Type of article	Overall Type: Primary Research Study Specific Type: Retrospective Review
APA Reference	Weeks, A., Campbell, C., Rajendram, P., Shi, W., & Voigt, L. (2017). A descriptive report of early mobilization for critically ill ventilated patients with cancer. <i>Rehabilitation Oncology</i> (American Physical Therapy Association. Oncology Section), 35(3), 144–150. https://doi.org/10.1097/01.REO.0000000000000070
Abstract	<p>“Background—Early mobilization protocols have been successfully implemented to improve function in critically ill patients; however, no study has focused on the oncology population. Objectives—To investigate the feasibility of early mobilization and describe the rehabilitation interventions and discharge outcomes in a cohort of critically ill patients with cancer. Design—Retrospective review. Methods—A retrospective analysis of patients with cancer who participated in occupational and physical therapy while on mechanical ventilation utilizing an institutional early mobilization protocol from June 2010 – July 2011, was completed. Demographic and clinical variables were abstracted, as well as occupational and physical therapy interventions. Results—A cohort of 42 cancer patients on mechanical ventilation in the mixed medical/surgical intensive care unit of a comprehensive cancer center received early mobilization during the study period. The majority of participants demonstrated improved cognitive and functional status from the intensive care unit to hospital discharge. There were no reported adverse events during the occupational and physical therapy sessions. Among the 30 hospital survivors, 53% required continued rehabilitation services in their home environment and 40% were transferred to a rehabilitation facility. Limitations—Due to the small sample size, these findings are not generalizable to all critically ill cancer patients. There was no post-acute care follow-up of cognitive and physical functional performance” (p. 1).</p>
Author	Credentials: MOT, OTR/L Position and Institution: Memorial Sloan Kettering Cancer Center Publication History in Peer-Reviewed Journals: minimal
Publication	Type of publication: <i>Rehabilitation Oncology</i> , scholarly peer-reviewed Publisher: Academy of Oncologic Physical Therapy of the American Physical Therapy Association.
Date and Citation History	Date of publication: 2017, July Cited By: 2
Stated Purpose or Research Question	“To investigate the feasibility of early mobilization and describe the rehabilitation interventions and discharge outcomes in a cohort of critically ill patients with cancer” (p. 144).
Author’s Conclusion	“The majority of participants demonstrated improved cognitive and functional status from

	the intensive care unit to hospital discharge. There were no reported adverse events during the occupational and physical therapy sessions” (p. 144).
Overall Relevance to your EBP Question	Overall Relevance of Article: good Rationale: This article is very relevant to our research question. This article addresses an early mobilization protocol. The sample size is in the ICU and is considered critically ill with cancer. The results refer to functional status, which addresses functional mobility.
Overall Quality of Article	Overall Quality of Article: good Rationale: Rehabilitation Oncology is a trusted and peer-reviewed scholarly journal. Furthermore, the paper was published within the three years, so it is very recent.. Also the measurement tools used in this study were reliable and valid. This increases the level of evidence of this article. The sample size was medium, compared to other studies. A total of 42 patients were enrolled. However, limitations include that a convenience sample was used. However, the authors describe the convenience sample as carefully selected. The sample size was not large enough to apply to the general population. Furthermore, the therapists did not address the impact of cancer on the patient’s functional mobility, which may be an extraneous variable.

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: Review
APA Reference	Coles S. J., Erdogan, M., Higgins, S. D., & Green, R. S. (2020). Impact of an early mobilization protocol on outcomes in trauma patients admitted to the intensive care unit: A retrospective pre-post study. <i>Journal of Trauma and Acute Care Surgery</i> , 88(4), 515-521. doi: 10.1097/TA.0000000000002588.
Abstract	<p>Background: Prolonged immobility has detrimental consequences for critically ill patients admitted to the intensive care unit (ICU). Previous work has shown that early mobilization of ICU patients is a safe, feasible and effective strategy to improve outcomes; however, few of these studies focused on trauma ICU patients. Our objective was to assess the impact of implementing an ICU early mobilization protocol (EMP) on trauma outcomes. Methods: We conducted a retrospective pre-post study of adult trauma patients (>18 years old) admitted to ICU at a Level I trauma center over a 2-year period prior to and following EMP implementation, allowing for a 1-year transition period. Data were collected from the Nova Scotia Trauma Registry. We compared outcomes (mortality, length of stay [LOS], ventilator-free days) between patients admitted during pre-EMP and post-EMP periods, and assessed for factors associated with outcomes using binary logistic regression and generalized linear models. Results: Overall, 526 patients were included in the analysis (292 pre-EMP, 234 post-EMP). Ages ranged from 18 years to 92 years (mean, 49.0 ± 20.4 years) and 74.3% were men. The post-EMP group had lower ICU mortality (21.6% vs. 12.8%; p = 0.009) and in-hospital mortality (25.3% vs. 17.5%; p = 0.031). After controlling for confounders, patients in the post-EMP group were less likely to die in the ICU (odds ratio, 0.43; 95% confidence interval, 0.24–0.79; p = 0.006) or in-hospital (odds ratio, 0.55; 95% confidence interval; 0.32–0.94; p = 0.03). In-hospital LOS, ICU LOS, ICU-free days, and number of ventilator-free days were similar between the two groups. Conclusion: Trauma patients admitted to ICU during the post-EMP period had decreased odds of ICU mortality and in-hospital mortality. This is the first study to demonstrate a significant reduction in trauma mortality following implementation of an ICU mobility protocol. (<i>J Trauma Acute Care Surg.</i> 2020;88: 515–521. Copyright © 2020 Wolters Kluwer Health, Inc. All rights reserved.) Level of evidence: Therapeutic, level III” (p. 515).</p>
Author	Credentials: MSc Position and Institution: not found Publication History in Peer-Reviewed Journals: limited
Publication	Type of publication: scholarly peer-reviewed journals Publisher: Lippincott, Williams & Wilkins Other: The journal of trauma and acute care surgery

Date and Citation History	Date of publication: 2020, January 15 Cited By: 5
Stated Purpose or Research Question	“The objective of this study was to examine whether implementation of an EMP in the ICU at a tertiary trauma center had an effect on the outcomes of major trauma patients” (p. 515).
Author’s Conclusion	“In summary, major trauma patients who were part of a progressive ICU mobility program had improved survival compared with patients admitted to ICU prior to EMP implementation. Af- ter controlling for confounders, patients admitted to ICU during the post-EMP period had decreased odds of ICU mortality and in-hospital mortality” (p. 520).
Overall Relevance to your EBP Question	Overall Relevance of Article: Good Rationale: This study looks at early mobilization in ICU patients which aligns with our EBP question.
Overall Quality of Article	Overall Quality of Article: Moderate Rationale: The authors state this has an evidence level of level III. It will still make a good source of evidence for our question.

Review of Research Studies

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: Systematic review of full-text articles published between January 2012 to April 2020.
APA Reference	Alaparathi, G. K., Gatty, A., Samuel, S. R., & Amaravadi, S. K. (2020). Effectiveness, safety, and barriers to early mobilization in the intensive care unit. <i>Critical care research and practice</i> , 2020, 7840743. https://doi-org.pearl.stkate.edu/10.1155/2020/7840743
Abstract	<p>“Purpose: Patients admitted to the intensive care unit (ICU) are generally confined to bed leading to limited mobility that may have detrimental effects on different body systems. Early mobilization prevents or reduces these effects and improves outcomes in patients following critical illness. The purpose of this review is to summarize different aspects of early mobilization in intensive care. Methods: Electronic databases of PubMed, Google Scholar, ScienceDirect, and Scopus were searched using a combination of keywords. Full-text articles meeting the inclusion criteria were selected. Results: Fifty-six studies on various aspects such as the effectiveness of early mobilization in various intensive care units, newer techniques in early mobilization, outcome measures for physical function in the intensive care unit, safety, and practice and barriers to early mobilization were included. Conclusion: Early mobilization is found to have positive effects on various outcomes in patients with or without mechanical ventilation. The newer techniques can be used to facilitate early mobilization. Scoring systems—specific to the ICU—are available and should be used to quantify patients’ status at different intervals of time. Early mobilization is not commonly practiced in many countries. Various barriers to early mobilization have been identified, and different strategies can be used to overcome them” (p. 1).</p>
Author	<p>Credentials: Dr. Gopala Krishna Alaparathi; Master of Physiotherapy and PhD; Assistant Professor at University of Sharjah; Specialization in cardiopulmonary physiotherapy, research interests: intensive care rehabilitation, pulmonary rehabilitation, and cardiac rehabilitation. Position and Institution: Department of Physiotherapy, College of Health Sciences, University of Sharjah, Sharjah, UAE Publication History in Peer-Reviewed Journals: Cited within 35 works in the ORCID Connecting research and researchers; selected publications within university profile: 27 sources; cited within 47 results of google scholar search. I would consider this record as extensive.</p>
Publication	<p>Type of publication: Scholarly, peer-reviewed journal Publisher: Hindawi is a member of the Committee on Publication Ethics (COPE) and aims to adhere to its guidelines and core practices. Other: Publishing Partnerships with Phenom; partnered with GeoScienceWorld, AAAS (American Association For The Advancement of Science), Wiley, Cambridge University Press, and Sage Publishing.</p>

Date and Citation History	Date of publication: 2020 November 26 Cited By: This article has been cited by nine other authors. Since the article is fairly new, this makes sense.
Stated Purpose or Research Question	“The purpose of this review is to summarize different aspects of early mobilization in intensive care” (p. 1).
Author’s Conclusion	“Early mobilization—in different intensive care units, namely, surgical, cardiac, and neurological ICU—has been studied and found to be effective. As suggested by most of the systematic reviews, further good quality studies need to be conducted” (p. 11).
Overall Relevance to your EBP Question	Overall Relevance of Article: This article has good relevance to our EBP question. Rationale: This systematic review provides evidence for the efficacy of interventions regarding early mobilization, specifically in an ICU setting (Alparthi et al., 2020).
Overall Quality of Article	Overall Quality of Article: Good Rationale: I think this article is good because it is published within a credible, scholarly, and peer reviewed journal. Further, it is a systematic review that is very recent.

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: Systematic review
APA Reference	Anekwe, D. E., Biswas, S., Bussi�eres, A., & Spahija, J. (2020). Early rehabilitation reduces the likelihood of developing intensive care unit-acquired weakness: A systematic review and meta-analysis. <i>Physiotherapy</i> , 107, 1–10. https://doi.org/10.1016/j.physio.2019.12.004
Abstract	<p>“Background: Intensive care unit-acquired weakness (ICUAW) is associated with significant impairments in body structure and function, activity limitation, and participation restriction. The etiology and management of ICUAW remain uncertain. Objective: To estimate the extent to which early rehabilitation interventions (early mobilization [EM] and/or neuromuscular electrical stimulation [NMES]) compared to usual care reduce the incidence of ICUAW in critically ill patients. Data sources: We searched MEDLINE, EMBASE, CINAHL, Cochrane Central and Physiotherapy Evidence Database databases from inception to May 1st, 2017. Eligibility criteria: Randomized controlled trials of EM and/or NMES interventions in critically ill adults. Data extraction and data synthesis: Data on the incidence of ICUAW and secondary outcomes were extracted. Both odds and risk ratios for ICUAW were pooled using the random-effects model. Results: We identified 1421 reports after duplicate removal. Nine studies including 841 patients (419 intervention and 422 usual care) were included in the final analysis. The interventions involved EM in five trials, NMES in three trials, and both EM and NMES in one trial. Early rehabilitation decreased the likelihood of developing ICUAW: odds ratio of 0.63 (95% CI: 0.43 to 0.92) in the screened population, and 0.71 (95% CI: 0.53 to 0.95) in the randomized population. Conclusion, implications of key findings: Early rehabilitation was associated with a decreased likelihood of developing ICUAW. Our findings support early rehabilitation in the ICU. While results were consistent in both the screened and randomized populations, the wide confidence intervals suggest that well-conducted trials are needed to validate our findings. Systematic review registration number: PROSPERO registration ID: CRD42017065031. Keywords: Discharge location; Early mobilization; Intensive care unit acquired weakness; Mechanical ventilation duration; Mortality; Neuromuscular electrical stimulation” (p. 1).</p>
Author	<p>Credentials: Credentials were not stated Position and Institution: School of Physical and Occupational Therapy, McGill University, Montreal, Quebec, Canada; Research Center, CIUSSS du Nord-de-l’Ile-de-Montr�al, Sacr�-Coeur Hospital, Universit� de Montr�al, Montr�al, Quebec, Canada; Center for Interdisciplinary Research in Rehabilitation in Montreal, CISS du Nord-de-l’�le-de-Montr�al, Jewish Rehabilitation Hospital, Laval, Quebec, Canada. Publication History in Peer-Reviewed Journals: Moderate (4 articles)</p>
Publication	Type of publication: Scholarly peer-reviewed Publisher: Elsevier Ltd Other: Chartered Society of Physiotherapy

Date and Citation History	Date of publication: 2019, December 19 Cited By: 38
Stated Purpose or Research Question	“The specific research questions were: to what extent do the early rehabilitation interventions of EM and NMES, compared to usual care, reduce the incidence of ICUAW among patients in the ICU, and alter other outcomes that may be associated ICUAW (i.e. length of time on mechanical ventilator, discharge location, ICU and hospital length of stay, and acute mortality)” (p.2).
Author’s Conclusion	“This systematic review and meta-analysis provides the first evidence that early rehabilitation in the ICU is associated with lower odds of developing ICUAW. Our results imply that beginning rehabilitation early in the course of critical illness reduces the odds of developing ICUAW” (p. 9).
Overall Relevance to your EBP Question	Overall Relevance of Article: Good Rationale: Our EBP questions explores the current evidence to support early mobilization to help adults in the intensive care unit. This article is a systematic review of the benefits from early rehabilitation, specifically early mobilization, in the ICU and preventing ICU acquired weakness.
Overall Quality of Article	Overall Quality of Article: Good Rationale: As a systematic review, this article presents a wealth of information in a very reliable format. A systematic review is a form of level 1 evidence, which indicates it is very strong.

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: Rehabilitation and early mobilization in the critical patient: Systematic review
APA Reference	Arias-Fernández, P., Romero-Martin, M., Gómez-Salgado, J., & Fernández-García, D. (2018). Rehabilitation and early mobilization in the critical patient: Systematic review. <i>Journal of Physical Therapy Science</i> , 30(9), 1193–1201. doi: 10.1589/jpts.30.1193
Abstract	<p>“Purpose: To review the literature that examines rehabilitation and early mobilization and that involves different practices (effects of interventions) for the critically ill patient. Materials and Methods: A PRISMA-Systematic review has been conducted based on different data sources: Biblioteca Virtual en Salud, CINHALL, Pubmed, Scopus, and Web of Science were used to identify randomized controlled trials, crossover trials, and case-control studies. Results: Eleven studies were included. Early rehabilitation had no significant effect on the length of stay and number of cases of Intensive Care Unit Acquired Weaknesses. However, early rehabilitation had a significant effect on the functional status, muscle strength, mechanical ventilation duration, walking ability at discharge, and health quality of life. Conclusion: Rehabilitation and early mobilization are associated with an increased probability of walking more distance at discharge. Early rehabilitation is associated with an increase in functional capacity and muscle strength, an improvement in walking distance and better perception of the health-related quality of life. Cycloergometer and electrical stimulation can be used to maintain muscle strength. Further research is needed to establish stronger evidences” (p. 1193).</p>
Author	<p>Credentials: Patricia Arias-Fernández, RN Position and Institution: Health Sciences School, Department of Nursing and Physiotherapy, Intensive Care Unit, University Hospital of León, Spain; Red Cross Nursing School, University of Sevilla, Spain; Nursing School, University of Huelva: 21071 Huelva, Spain; University Espiritu Santo, Ecuador; Health Sciences School, Department of Nursing and Physiotherapy, University of León, Spain Publication History in Peer-Reviewed Journals: This is the only article I could find that she contributed to.</p>
Publication	<p>Type of publication: scholarly peer-reviewed journal Publisher: IPEC Inc. Other: The Journal of Physical Therapy Science</p>
Date and Citation History	<p>Date of publication: 2018, June 29 Cited By: 53</p>
Stated Purpose or Research Question	<p>“To analyse the effects of early mobilization in critically-ill patients is of vital importance, so the aim of this systematic review has been to review the literature that examines rehabilitation and early mobilization and that involves different practices (effects of interventions) in critically-ill patients” (p. 1194).</p>
Author’s Conclusion	<p>“The results have showed that rehabilitation and early mobilization produce an effect on the decrease of the days of admittance both at the ICU and at the hospital. On the</p>

	contrary, we can affirm that there is an effect on the progress of the functional capacity, strength, mobility, quality of life, less duration of mechanical ventilation, and a higher probability of being discharged to home” (p. 1200).
Overall Relevance to your EBP Question	Overall Relevance of Article: Good Rationale: This article was a systematic review looking at the evidence of early mobilization in the ICU. I would be able to use this article to answer our EBP question. This study showed that rehabilitation and early mobilization can decrease the number of days a patient is admitted to the ICU and the hospital. It also talked about functional capacity and quality of life.
Overall Quality of Article	Overall Quality of Article: Good Rationale: This article was a systematic review. While the first author listed did not have other articles, this article has been cited by numerous other articles. The article also talked about and acknowledged the limitations this review had. It is also one of my newer articles (2018).

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: Systematic Review
APA Reference	Bittencourt, E. D. s., Moreira, P. S., da Paixão, G. M., & Cardoso, M. M. (2021). The role of the occupational therapist in the intensive care unit: A systematic review. <i>Terepia Ocupacional</i> https://www.scielo.br/j/cadbto/a/4CxnYPgPX9WGt455YfhTCDw/?format=pdf&lang=en
Abstract	Introduction: The participation of the occupational therapist (OT) in Intensive Care Units (ICU) is still discreet in Brazil, perhaps because of this, there is a little discussion of interventions and insertion of this professional in this area. Objective: To synthesize the actions of OT to restore function in adult patients admitted to the ICU most frequently described in the specialized literature. Method: Systematic review based on the PRISMA recommendation. The search for the studies was carried out on the Cochrane, PubMed, OTSeek, and PEDro platforms using the search terms “Occupational Therapy”, in the title or abstract, (AND) “Intensive Care Unit” (OR) “Critical Illness” (OR) “Critical Care”, in other parts of the text. English-language

	<p>texts published in the last 20 years were included and texts that describe interventions in pediatric/neonatal ICU, psychiatric diseases, and review articles were excluded. Two independent researchers selected the articles and the agreement was submitted to Kappa analysis. The level of evidence and methodological quality of the included studies were assessed using the PEDro Scale and the Cochrane Collaboration Tool, respectively. Results: The main interventions were related to the training of Activities of Daily Living (ADLs) and tasks related to Instrumental Activities of Daily Living (IADLs). These private attributions of the profession occurred isolated or with physiotherapists. The sessions, excluding the contraindication criteria, took place early (24-48h). Conclusion: The findings show early mobilization interventions, followed by ADLs/IADLs training and it is also noted that the work of the occupational therapist in the ICU is under development. Studies on other effects of prolonged ICU stay should be conducted” (p. 1).</p>
Author	<p>Credentials: cannot find any listed credentials Position and Institution: Universidade Federal do Pará – UFPA, Belém, PA, Brasil. Publication History in Peer-Reviewed Journals: Using Google Scholar, Bittencourt, was associated with 7 total published sources. Four of which were peer-reviewed.</p>
Publication	<p>Type of publication: Scholarly Peer-reviewed journal Publisher: Brazilian Journal of Ocupacional Terapia Other: Cadernos Brasileiros de Terapia Ocupacional</p>
Date and Citation History	<p>Date of publication: 2021 Cited By: According to google scholar it has not been cited by</p>
Stated Purpose or Research Question	<p>“To synthesize the actions of OT to restore function in adult patients admitted to the ICU most frequently described in the specialized literature” (p. 1).</p>
Author’s Conclusion	<p>“The findings show early mobilization interventions, followed by ADLs/IADLs training and it is also noted that the work of the occupational therapist in the ICU is under development. Studies on other effects of prolonged ICU stay should be conducted” (p. 1).</p>
Overall Relevance to your EBP Question	<p>Overall Relevance of Article: I would say this article is moderately relevant. Rationale: This article primarily focuses on OT’s role in the ICU but doesn’t specifically discuss early mobilization. However I think it would still be a useful resource for our topic and could help guide us in the right direction on certain roles and OT could specifically assist with in an ICU setting.</p>
Overall Quality of Article	<p>Overall Quality of Article: Moderate Rationale: I think partially because this article was published through a non-American source and was originally published in Spanish instead of English. It was hard to find any credentials for the primary author. This article is level one evidence and it is useful and it draws a conclusion based on its evidence. It also is associated within the field of occupational therapy specifically.</p>

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: Systematic Review
APA Reference	Connolly, Salisbury, L., O'Neill, B., Geneen, L., Douiri, A., Grocott, M. P. W., Hart, N., Walsh, T. S., & Blackwood, B. (2016). Exercise rehabilitation following intensive care unit discharge for recovery from critical illness: executive summary of a Cochrane Collaboration systematic review: Exercise rehabilitation following intensive care unit discharge. <i>Journal of Cachexia, Sarcopenia and Muscle</i> , 7(5), 520–526. https://doi.org/10.1002/jcsm.12146
Abstract	“Skeletal muscle wasting and weakness are major complications of critical illness and underlie the profound physical and functional impairments experienced by survivors after discharge from the intensive care unit (ICU). Exercise-based rehabilitation has been shown to be beneficial when delivered during ICU admission. This review aimed to determine the effectiveness of exercise rehabilitation initiated after ICU discharge on primary outcomes of functional exercise capacity and health-related quality of life. We sought randomized controlled trials, quasi-randomized controlled trials, and controlled clinical trials comparing an exercise intervention commenced after ICU discharge vs. any other intervention or a control or ‘usual care’ programme in adult survivors of critical illness. Cochrane Central Register of Controlled Trials, Medical Literature Analysis and Retrieval System Online (MEDLINE), Excerpta Medica Database, and Cumulative Index to Nursing and Allied Health Literature databases were searched up to February 2015. Dual, independent screening of results, data extraction, and quality appraisal were performed. We included six trials involving 483 patients. Overall quality of evidence for both outcomes was very low. All studies evaluated functional exercise capacity, with three reporting positive effects in favour of the intervention. Only two studies evaluated health-related quality of life and neither reported differences between intervention and control groups. Meta-analyses of data were precluded due to variation in study design, types of interventions, and selection and reporting of outcome measurements. We were unable to determine an overall effect on functional exercise capacity or health-related quality of life of interventions initiated after ICU discharge for survivors of critical illness. Findings from ongoing studies are awaited. Future studies need to address methodological aspects of study design and conduct to enhance rigour, quality, and synthesis” (p. 1).
Author	Credentials: Bronwen Connolly - BSc, PhD, MSc Position and Institution: PhD Supervisor within the school of medicine, dentistry and biomedical sciences at Queen’s University Belfast. Publication History in Peer-Reviewed Journals: 796 results came up when I searched for her publication history in google scholar. I would consider this to be an extensive history.
Publication	Type of publication: Scholarly peer-reviewed journal Publisher: Wiley Online Library

Date and Citation History	Date of publication: 2016, September 16 Cited By: Cited by 45
Stated Purpose or Research Question	“This review aimed to determine the effectiveness of exercise rehabilitation initiated after ICU discharge on primary outcomes of functional exercise capacity and health-related quality of life” (p. 1).
Author’s Conclusion	“There was insufficient evidence to determine an overall effect on functional exercise capacity or health-related quality of life of an exercise-based intervention initiated after ICU discharge for survivors of critical illness. The degree of heterogeneity across included studies precluded a meta-analysis of data, and individual study findings were inconsistent with regards a beneficial effect on functional exercise capacity. No effect on health-related quality of life was reported” (p. 524).
Overall Relevance to your EBP Question	Overall Relevance of Article: Moderate Rationale: This article has moderate relevance to the EBP question since it examines rehabilitation after ICU discharge rather than in the ICU. I think it is relevant to how occupational therapists approach rehabilitation in an ICU setting since it is examining outcomes of functionality and quality of life (Connolly et al., 2016).
Overall Quality of Article	Overall Quality of Article: Moderate Rationale: I think this article is of credible merit since it is published within a scholarly, peer-reviewed journal and at least the first author has shown competency and expertise on the subject matter. However, this study was published in 2016, which means that there could be newer, different information that has been published since then.

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: Systematic review
APA Reference	Doiron, K. A., Hoffmann, T. C., & Beller, E. M. (2018). Early intervention (mobilization or active exercise) for critically ill adults in the intensive care unit. <i>Cochrane Library</i> , 2018(12). https://doi.org/10.1002/14651858.CD010754.pub2
Abstract	<p>“Background: Survivors of critical illness often experience a multitude of problems that begin in the intensive care unit (ICU) or present and continue after discharge. These can include muscle weakness, cognitive impairments, psychological difficulties, reduced physical function such as in activities of daily living (ADLs), and decreased quality of life. Early interventions such as mobilizations or active exercise, or both, may diminish the impact of the sequelae of critical illness. Objectives: To assess the effects of early intervention (mobilization or active exercise), commenced in the ICU, provided to critically ill adults either during or after the mechanical ventilation period, compared with delayed exercise or usual care, on improving physical function or performance, muscle strength and health-related quality of life. Search methods: We searched CENTRAL, MEDLINE, Embase and CINAHL. We searched conference proceedings, reference lists of retrieved articles, databases of trial registries and contacted experts in the field on 31 August 2017. We did not impose restrictions on language or location of publications. Selection criteria: We included all randomized controlled trials (RCTs) or quasi-RCTs that compared early intervention (mobilization or active exercise, or both), delivered in the ICU, with delayed exercise or usual care delivered to critically ill adults either during or after the mechanical ventilation period in the ICU. Data collection and analysis: Two researchers independently screened titles and abstracts and assessed full-text articles against the inclusion criteria of this review. We resolved any disagreement through discussion with a third review author as required. We presented data descriptively using mean differences or medians, risk ratios and 95% confidence intervals. A meta-analysis was not possible due to the heterogeneity of the included studies. We assessed the quality of evidence with GRADE. Main results: We included four RCTs (a total of 690 participants), in this review. Participants were adults who were mechanically ventilated in a general, medical or surgical ICU, with mean or median age in the studies ranging from 56 to 62 years. Admitting diagnoses in three of the four studies were indicative of critical illness, while participants in the fourth study had undergone cardiac surgery. Three studies included range-of- motion exercises, bed mobility activities, transfers and ambulation. The fourth study involved only upper limb exercises. Included studies were at high risk of performance bias, as they were not blinded to participants and personnel, and two of four did not blind outcome assessors. Three of four studies reported only on those participants who completed the study, with high rates of dropout. The description of intervention type, dose, intensity and frequency in the standard care control group was poor in two of four studies. Three studies (a total of 454 participants) reported at least one measure of physical function. One study (104 participants) reported low- quality evidence of beneficial effects in the intervention</p>

	<p>group on return to independent functional status at hospital discharge (59% versus 35%, risk ratio (RR) 1.71, 95% confidence interval (CI) 1.11 to 2.64); the absolute effect is that 246 more people (95% CI 38 to 567) per 1000 would attain independent functional status when provided with early mobilization. The effects on physical functioning are uncertain for a range measures: Barthel Index scores (early mobilization: median 75 control: versus 55, low quality evidence), number of ADLs achieved at ICU (median of 3 versus 0, low quality evidence) or at hospital discharge (median of 6 versus 4, low quality evidence). The effects of early mobilization on physical function measured at ICU discharge are uncertain, as measured by the Acute Care Index of Function (ACIF) (early mobilization mean: 61.1 versus control: 55, mean difference (MD) 6.10, 95% CI -11.85 to 24.05, low quality evidence) and the Physical Function ICU Test (PFIT) score (5.6 versus 5.4, MD 0.20, 95% CI -0.98 to 1.38, low quality evidence). There is low quality evidence that early mobilization may have little or no effect on physical function measured by the Short Physical Performance Battery score at ICU discharge from one study of 184 participants (mean 1.6 in the intervention group versus 1.9 in usual care, MD -0.30, 95% CI -1.10 to 0.50), or at hospital discharge (MD 0, 95% CI -1.00 to 0.90). The fourth study, which examined postoperative cardiac surgery patients did not measure physical function as an outcome.</p> <p>Adverse effects were reported across the four studies but we could not combine the data. Our certainty in the risk of adverse events with either mobilization strategy is low due to the low rate of events. One study reported that in the intervention group one out of 49 participants (2%) experienced oxygen desaturation less than 80% and one of 49 (2%) had accidental dislodgement of the radial catheter. This study also found cessation of therapy due to participant instability occurred in 19 of 498 (4%) of the intervention sessions. In another study five of 101 (5%) participants in the intervention group and five of 109 (4.6%) participants in the control group had postoperative pulmonary complications deemed to be unrelated to intervention. A third study found one of 150 participants in the intervention group had an episode of asymptomatic bradycardia, but completed the exercise session. The fourth study reported no adverse events. Authors' conclusions: There is insufficient evidence on the effect of early mobilization of critically ill people in the ICU on physical function or performance, adverse events, muscle strength and health-related quality of life at this time. The four studies awaiting classification, and the three ongoing studies may alter the conclusions of the review once these results are available. We assessed that there is currently low-quality evidence for the effect of early mobilization of critically ill adults in the ICU due to small sample sizes, lack of blinding of participants and personnel, variation in the interventions and outcomes used to measure their effect and inadequate descriptions of the interventions delivered as usual care in the studies included in this Cochrane Review” (pp. 1-2).</p>
Author	<p>Credentials: not stated Position and Institution: Doctor of Physiotherapy Program, Faculty of Health Sciences and Medicine, Bond University, Gold Coast, Australia Publication History in Peer-Reviewed Journals: limited</p>

Publication	Type of publication: Database of Systematic Reviews Publisher: Cochrane Database of Systematic Reviews
Date and Citation History	Date of publication: 2018, March 27 Cited By: 121
Stated Purpose or Research Question	“To assess the effects of early intervention (mobilization or active exercise), commenced in the ICU, provided to critically ill adults either during or after the mechanical ventilation period, compared with delayed exercise or usual care, on improving physical function or performance, muscle strength and health-related quality of life” (p. 8).
Author’s Conclusion	“The evidence for the effectiveness of early mobilization of mechanically ventilated, critically ill patients in the intensive care unit (ICU) on measures of physical function and performance is inconsistent and uncertain due to its low quality... There is wide variation in the type, timing, intensity and progression of the interventions delivered to this population (Jolley 2014), and there is insufficient, high-quality evidence to disentangle these factors currently” (p. 20).
Overall Relevance to your EBP Question	Overall Relevance of Article: Good Rationale: This article is extremely relevant to the EBP question because it reviews multiple studies that look at the effectiveness of early mobilization. Although the results were inconsistent and uncertain it still provides sound evidence related to the question.
Overall Quality of Article	Overall Quality of Article: Good Rationale: The quality of this article is good, providing a peer-reviewed systematic review of the results of studies done on this topic.

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: Systematic Review and Meta Analysis
APA Reference	Fuke, R., Hifumi, T., Kondo, Y., Hatakeyama, J., Takei, T., Yamakawa, K., Inoue, S., & Nishida, O. (2018). Early rehabilitation to prevent post intensive care syndrome in patients with critical illness: a systematic review and meta-analysis. <i>BMJ open</i> , 8(5), e019998. https://doi-org.pearl.stkate.edu/10.1136/bmjopen-2017-019998
Abstract	<p>Introduction: We examined the effectiveness of early rehabilitation for the prevention of post intensive care syndrome (PICS), characterised by an impaired physical, cognitive or mental health status, among survivors of critical illness.</p> <p>Methods: We performed a systematic literature search of several databases (Medline, Embase and Cochrane Central Register of Controlled Trials) and a manual search to identify randomised controlled trials (RCTs) comparing the effectiveness of early rehabilitation versus no early rehabilitation or standard care for the prevention of PICS. The primary outcomes were short-term physical-related, cognitive-related and mental health-related outcomes assessed during hospitalisation. The secondary outcomes were the standardised, long-term health-related quality of life scores (EuroQol 5 Dimension (EQ5D) and the Medical Outcomes Study 36-Item Short Form Health Survey Physical Function Scale (SF-36 PF)). We used the Grading of Recommendations Assessment, Development and Evaluation approach to rate the quality of evidence (QoE). Results: Six RCTs selected from 5105 screened abstracts were included. Early rehabilitation significantly improved short-term physical-related outcomes, as indicated by an increased Medical Research Council scale score (standardised mean difference (SMD): 0.38, 95% CI 0.10 to 0.66, p=0.009) (QoE: low) and a decreased incidence of intensive care unit-acquired weakness (OR 0.42, 95%CI 0.22 to 0.82, p=0.01, QoE: low), compared with standard care or no early rehabilitation. However, the two groups did not differ in terms of cognitive-related delirium-free days (SMD: -0.02, 95%CI -0.23 to 0.20, QoE: low) and the mental health-related Hospital Anxiety and Depression Scale score (OR: 0.79, 95%CI 0.29 to 2.12, QoE: low). Early rehabilitation did not improve the long-term outcomes of PICS as characterised by EQ5D and SF-36 PF.</p> <p>Conclusions: Early rehabilitation improved only short-term physical-related outcomes in patients with critical illness. Additional large RCTs are needed” (p. 1).</p>
Author	<p>Credentials: Credentials were not stated</p> <p>Position and Institution: Division of Infectious Diseases and Infection Control, Tohoku Medical and Pharmaceutical University, Sendai, Miyagi, Japan</p> <p>Publication History in Peer-Reviewed Journals: 3, limited</p>
Publication	<p>Type of publication: Scholarly- peer review</p> <p>Publisher: BMJ open</p>
Date and Citation History	<p>Date of publication: 2018</p> <p>Cited By: 8</p>
Stated Purpose or	<p>“The present systematic review aimed to assess the effectiveness of early rehabilitative interventions for the prevention of PICS in ICU patients” (p. 2).</p>

Research Question	
Author's Conclusion	“Early rehabilitation has a limited effect on the prevention of PICS, although it led to significant improvements in short-term physical-related outcomes, including MRC scores and the incidence of ICU-AW” (p. 9).
Overall Relevance to your EBP Question	Overall Relevance of Article: Good Rationale: This article is relevant to our EBP question because it addresses early rehabilitation in patients who are critically ill. Although our EBP question does not address post-intensive care syndrome, I still think it contains enough information to be useful in our EBP question.
Overall Quality of Article	Overall Quality of Article: Good Rationale: This is a very well-organized metal analysis and systematic review. The author is highly credible, and it is very recent. This article has a very extensive citation history as well.

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: “This systematic review adheres to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Guidelines (Liberati et al.,2009).” (p.5)
APA Reference	Jarzenski, T., Becker, C., King, E., Cooper, S., Montague, C., Mulhausen, H., Pritchard, K. (2019). Behavior change strategies used to implement early mobility programs in the intensive care unit: A systematic review. <i>Journal of Acute Care Occupational Therapy</i> , 2(2),1-29.
Abstract	“The aim of the study was to identify and categorize behavior change strategies used when implementing early mobility in the ICU. Search strategies incorporated a combination of controlled vocabulary and text words for intensive care units, health personnel, and mobility. Inclusion criteria included (a) publication in a peer-reviewed journal (b) description of interventions to improve early mobility implementation in at least one adult ICU setting (c) reporting of ICU-specific data on early mobility outcomes. Exclusion criteria: studies (a) not available in English (b) in pediatric settings. Interventions used to facilitate early mobility behavior change were extracted utilizing the 9 strategies described in the Behavior Change Wheel (BCW) (Michie et al., 2011). Each article was appraised using the Modified Downs and Black checklist for measuring study quality of healthcare interventions (Downs & Black, 1998). Additional data recorded included: level of evidence, study design, professionals participating in intervention. Frequency of strategies utilized: education (89%), enablement (84%), training (63%), restriction (57%), persuasion (42%), environmental restructuring (42%), modeling (42%), incentivisation (31%), coercion (0%). Interventions most utilized for behavior change focused on positive reinforcement such as education, enablement and training while interventions used the least on the BCW were incentivisation and coercion. Review of behavior change strategies utilized by others can assist in the creation of programs designed to implement and improve early mobility in the intensive care unit” (p. 2).
Author	Credentials: OTR/L Position and Institution: Position and institution not stated Publication History in Peer-Reviewed Journals: Limited (1 article)
Publication	Type of publication: Scholarly peer-reviewed journal Publisher: The Journal of Acute Care Occupational Therapy (JACOT) Other: Blinded, peer reviewed, twice-yearly open access publication with internet-based distribution
Date and Citation History	Date of publication: December 2019 Cited By: None found
Stated Purpose or Research Question	“The purpose of this systematic review was to examine behavior change strategies that influence the culture in ICUs regarding the implementation of sustainable early mobility practice. The researcher’s identified which behavior change strategies are implemented most often in the literature. Secondary aims described the rigor within

	<p>this body of research in addition to the proportion of key stakeholders who define interdisciplinary early mobility teams” (p. 5).</p>
<p>Author’s Conclusion</p>	<p>“By thoroughly reviewing the 19 included studies, the researchers determined that application of behavior change strategies for early mobility implementation is a unique experience within the ICU culture. Creating a behavior change plan to implement or improve early mobility in an ICU should begin with an assessment of current strengths, weaknesses and barriers to early mobility performance in that ICU” (p. 17).</p>
<p>Overall Relevance to your EBP Question</p>	<p>Overall Relevance of Article: Good Rationale: Our EBP question explores the evidence supporting early mobilization in the ICU and this article systematically reviews the behavior change strategies utilized for early mobilization in the ICU. It gives a unique look into important factors when implementing early mobilization.</p>
<p>Overall Quality of Article</p>	<p>Overall Quality of Article: Good Rationale: As a systematic review, this is level 1 evidence and they clearly state their means to gathering the evidence. There are multiple authors on the article, with many of them having backgrounds in occupational therapy.</p>

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: systematic review
APA Reference	Lang, J.K., Paykel, M. S., Haines, K. J., Hodgson, C. L. (2020) Clinical practice guidelines for early mobilization in the ICU: A systematic review. <i>Critical Care Medicine</i> , 48(11). doi: 10.1097/CCM.0000000000004574. PMID: 32947470.
Abstract	<p>Objectives: To evaluate the methodological quality and thematic completeness of existing clinical practice guidelines, addressing early mobilization of adults in the ICU. Data Sources: Systematic review of Medline, Embase, CINAHL, Cochrane, and grey literature from January 2008 to February 2020. Study Selection: Two reviewers independently screened titles and abstracts and then full texts for eligibility. Ten publications were included. Data Extraction: A single reviewer extracted data from the included publications and a second reviewer completed cross-checking. Qualitative data were extracted in five categories relating to the key factors influencing delivery of early mobilization to critically ill patients. Data Synthesis: Methodological quality was appraised using the Appraisal of Guidelines for Research and Evaluation II tool. Appraisal of Guidelines for Research and Evaluation II scores for applicability were low. Median quality scores for editorial independence, rigor of development, and stakeholder engagement were also poor. Narrative synthesis of publication content was undertaken. All publications supported implementation of early mobilization. Most documents agreed upon seven topics: 1) early mobilization is safe and may reduce healthcare costs, 2) safety criteria should be provided, 3) a protocolized or structured approach should be used, 4) collaborative teamwork is required, 5) staff require specific skills or experience, 6) patient and family engagement is important, and 7) program evaluation and outcome measurement are a key component of implementation. There was no consensus on dosage and patient selection. The areas of team culture and leadership were poorly addressed. Conclusions: Despite significant variation in the methodological quality of clinical practice guidelines for early mobilization, there were important consistencies in recommendations internationally. Future research should address gaps related to patient selection, dosage, team culture, and expertise. Future clinical practice guidelines in this area should focus on engagement of patients and families in the development process and provision of resources to support implementation based on the consideration of known barriers and facilitators” (p. e1121).</p>
Author	<p>Credentials: BPhysio (Hons) Position and Institution: Australian and New Zealand Intensive Care Research Centre (ANZIC- RC), School of Public Health and Preventive Medicine, Monash University, Melbourne, VIC, Australia; Department of Physiotherapy, Western Health, St Albans, VIC, Australia. Publication History in Peer-Reviewed Journals: 4</p>
Publication	<p>Type of publication: peer-reviewed journals Publisher: Wolters Kluwer Other: Critical Care Medicine</p>

Date and Citation History	Date of publication: 2020, November 3 Cited By: 8
Stated Purpose or Research Question	“The primary objective of this systematic review was to evaluate the methodological quality of existing CPGs addressing the EM of adults in the ICU. The secondary objectives were to evaluate the content of existing recommendations to identify the areas of agreement and thematic coverage of the known barriers and facilitators for EM” (p. e1122).
Author’s Conclusion	“Key areas for improvement in guideline methodology and reporting were identified, including patient and family engagement, and provision of recommendations for implementation based on existing barrier and facilitator literature.” (p. e1127)
Overall Relevance to your EBP Question	Overall Relevance of Article: Good Rationale: This review is very relevant to our EBP question because it looks at multiple studies and examines how early mobilization has been implemented in the ICU.
Overall Quality of Article	Overall Quality of Article: Good Rationale: This systematic review provides us with good quality information specifically on the guidelines for implementing early mobilization in the ICU.

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: Systematic review
APA Reference	Li, Z., Peng, X., Zhu, B., Zhang, Y., & Xi, X. (2013). Active mobilization for mechanically ventilated patients: a systematic review. <i>Archives of Physical Medicine and Rehabilitation</i> , 94(3), 551–561. https://doi.org/10.1016/j.apmr.2012.10.023
Abstract	<p>Objective: To investigate the effectiveness and safety of active mobilization on improving physical function and hospital outcomes in patients undergoing mechanical ventilation for more than 24 hours. Data Sources: PubMed, Embase, CINAHL, CENTRAL, Physiotherapy Evidence Database, SinoMed, and ISI Web of Knowledge were searched for randomized controlled trials (RCTs), quasi-RCTs, other comparative studies, and case series with 10 or more consecutive cases. Additional Studies were identified through references, citation tracking, and by contacting the authors of eligible studies. Study Selection: Two reviewers independently selected potential studies according to the inclusion criteria. Data Extraction: Two reviewers independently extracted data and assessed the methodologic quality. Data Synthesis: A narrative form was used to summarize study characteristics and outcomes, because the substantial heterogeneity between the individual studies precluded formal meta-analyses. Among the 17 eligible studies, 7 RCTs, 1 quasi-RCT, 1 prospective cohort study, and 1 history controlled study were used to examine the effectiveness; and 2 RCTs, 1 prospective cohort study, and 7 case series were used to examine the safety of active mobilization in patients receiving mechanical ventilation for more than 24 hours. We found that active mobilization may improve muscle strength, functional independence, and the ability to wean from ventilation and may decrease the length of stay in the intensive care unit (ICU) and hospital. However, only 1 study reported that active mobilization reduced the 1-year mortality rate. No serious adverse events were reported among included studies. Conclusions: Active mobilization appears to have a positive effect on physical function and hospital outcomes in mechanical ventilation patients. Early active mobilization protocols may be initiated safely in the ICU setting and continued in post-ICU settings. However, the current available studies have great heterogeneity and limited methodologic quality. Further research is needed to provide more robust evidence to support the effectiveness and safety of active mobilization” (p. 551).</p>
Author	Credentials: MD Position and Institution: Department of Critical Care Medicine, Fuxing Hospital, Capital Medical University, Beijing Publication History in Peer-Reviewed Journals: Extensive
Publication	Type of publication: Scholarly peer-reviewed article Publisher: Archives of Physical Medicine and Rehabilitation Other: American Congress of Rehabilitation Medicine
Date and Citation History	Date of publication: 2013 Cited By: 228

Stated Purpose or Research Question	“Therefore, this systematic review was undertaken, in accordance with PRISMA guidelines, to assess the effectiveness and safety of active mobilization intervention in patients who have been mechanically ventilated for more than 24 hours” (p. 552).
Author’s Conclusion	“Active mobilization therapy for patients who have undergone mechanical ventilation in ICU/HDU settings appears to have a positive effect on physical function and hospital outcomes with no severe adverse events. Furthermore, early active mobilization protocols may be initiated in the ICU setting and continued in the post-ICU setting” (p. 560).
Overall Relevance to your EBP Question	Overall Relevance of Article: Good Rationale: The article specifically focuses on adults in the ICU that have been exposed to active mobilization and related it to functional outcomes.
Overall Quality of Article	Overall Quality of Article: Moderate Rationale: The article is 8 years old but the author is reputable and the source has been cited by other articles many times.

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: Systematic review and meta-analysis
APA Reference	Menges, D., Seiler, B., Tomonaga, Y., Schwenkglenks, M., Puhan, M. A., & Yebyo, H. G. (2021). Systematic early versus late mobilization or standard early mobilization in mechanically ventilated adult ICU patients: Systematic review and meta-analysis. <i>Critical Care (London, England)</i> , 25(1), 16–16. https://doi.org/10.1186/s13054-020-03446-9
Abstract	<p>Background: This systematic review and meta-analysis aimed to determine the effectiveness of systematic early mobilization in improving muscle strength and physical function in mechanically ventilated intensive care unit (ICU) patients.</p> <p>Methods: We conducted a two-stage systematic literature search in MEDLINE, EMBASE and the Cochrane Library until January 2019 for randomized controlled trials (RCTs) examining the effects of early mobilization initiated within 7 days after ICU admission compared with late mobilization, standard early mobilization or no mobilization. Priority outcomes were Medical Research Council Sum Score (MRC-SS), incidence of ICU-acquired weakness (ICUAW), 6-min walk test (6MWT), proportion of patients reaching independence, time needed until walking, SF-36 Physical Function Domain Score (PFS) and SF-36 Physical Health Component Score (PCS). Meta-analysis was conducted where sufficient comparable evidence was available. We evaluated the certainty of evidence according to the GRADE approach.</p> <p>Results: We identified 12 eligible RCTs contributing data from 1304 participants. Two RCTs were categorized as comparing systematic early with late mobilization, nine with standard early mobilization and one with no mobilization. We found evidence for a benefit of systematic early mobilization compared to late mobilization for SF-36 PFS (MD 12.3; 95% CI 3.9–20.8) and PCS (MD 3.4; 95% CI 0.01–6.8), as well as on the proportion of patients reaching independence and the time needed to walking, but not for incidence of ICUAW (RR 0.62; 95% CI 0.38–1.03) or MRC-SS. For systematic early compared to standard early mobilization, we found no statistically significant benefit on MRC-SS (MD 5.8; 95% CI – 1.4 to 13.0), incidence of ICUAW (RR 0.90; 95% CI 0.63–1.27), SF-36 PFS (MD 8.1; 95% CI – 15.3 to 31.4) or PCS (MD – 2.4; 95% CI – 6.1 to 1.3) or other priority outcomes except for change in 6MWT from baseline. Generally, effects appeared stronger for systematic early compared to late mobilization than to standard early mobilization. We judged the certainty of evidence for all outcomes as very low to low. Conclusion: The evidence regarding a benefit of systematic early mobilization remained inconclusive. However, our findings indicate that the larger the difference in the timing between the intervention and the comparator, the more likely an RCT is to find a benefit for early mobilization” (p. 1).</p>
Author	Credentials: MD, PhD candidate Position and Institution: Department of Epidemiology, Epidemiology, Biostatistics and Prevention Institute (EBPI), University of Zurich, Hirschengraben 84, 8001 Zurich, Switzerland

	Publication History in Peer-Reviewed Journals: extensive
Publication	Type of publication: scholarly peer-reviewed journals Publisher: Springer Nature Other: Critical Care
Date and Citation History	Date of publication: 2021, January 6 Cited By: 4
Stated Purpose or Research Question	“In this systematic review and meta-analysis, we aimed to determine the effectiveness of systematic early mobilization in mechanically ventilated adult ICU patients, while explicitly considering the timing of the delivery of the comparator intervention” (p. 2).
Author’s Conclusion	“This systematic review and meta-analysis found a beneficial effect of systematic early mobilization in mechanically ventilated adult ICU patients on muscle strength and physical function when compared to late mobilization, but did not find evidence for such an effect when compared to standard early mobilization initiated within 7 days of ICU admission” (p. 22).
Overall Relevance to your EBP Question	Overall Relevance of Article: Good Rationale: This article is relevant to our EBP question because it examines effectiveness of early mobilization in the ICU. This article provides information for the intervention portion of our PICO question.
Overall Quality of Article	Overall Quality of Article: Good Rationale: This is a level I article and is both a systematic review and meta-analysis. It was published in a peer reviewed journal this year and has already been cited 4 times.

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: systematic review
APA Reference	Morton, N., Keating, J., & Jeffs, K. (2010). Exercise for acutely hospitalised older medical patients. In The Cochrane Collaboration (Ed.), Cochrane Database of Systematic Reviews (p. CD005955). John Wiley & Sons, Ltd. https://doi.org/10.1002/14651858.CD005955
Abstract	<p>“Background: A high incidence of functional decline (deterioration in physical or cognitive function) during hospitalisation of older adults is reported. The role of exercise in preventing these deconditioning effects is unclear. Objectives: To determine the effect of exercise interventions for acutely hospitalised older medical patients on functional status, adverse events and hospital outcomes. Search methods: We searched MEDLINE (1966-Feb 2006), CINAHL (1982-Feb 2006), EMBASE (1988 to Feb 2006), Cochrane Database of Systematic Reviews and Cochrane Central Register of Controlled Trials (The Cochrane Library Issue 1, 2006), PEDro (1929- Feb 2006), Current Contents (1993- Feb 2006) and Sports Discus (1830-Feb 2006). The Journal of the American Geriatrics Society was hand searched. Additional studies were identified through reference and citation tracking, personal communications with a content expert and contacting authors of eligible trials. There was no language restriction. Eligible studies were prospective randomised controlled trials (RCT) or prospective controlled clinical trials (CCT) comparing exercise for acutely hospitalised older medical patients to usual care or no treatment controls. Data collection and analysis: Two independent reviewers extracted data relating to patient and hospital outcomes and assessed the method quality of included studies. Data were pooled in meta-analysis using the relative risk (RR) and absolute risk reduction (ARR) for dichotomous outcomes and the standardised mean difference (SMD) or the weighted mean difference (WMD) for continuous outcomes. Main results: Of 3138 potentially relevant articles screened, 7 randomised controlled trials and 2 controlled clinical trials were included. The effect of exercise on functional outcome measures is unclear. No intervention effect was found on adverse events. Pooled analysis of multidisciplinary interventions that included exercise indicated a small significant increase in the proportion of patients discharged to home at hospital discharge (Relative Risk 1.08, 95% CI 1.03 to 1.14 and Numbers Needed to Treat 16, 95% CI 11 to 43) and a small but important reduction in acute hospital length of stay (weighted mean difference, - 1.08 days, 95% CI -1.93 to -0.22) and total hospital costs (weighted mean difference, - US\$278.65, 95% CI -491.85 to -65.44) compared to usual care. Pooled analysis of exercise intervention trials found no effect on the proportion of patients discharged to home or acute hospital length of stay” (p. 1).</p>
Author	Natalie de Morton Credentials: PhD Position and Institution: The Northern Clinical Research Centre, The Northern Hospital, Epping, Australia

	Publication History in Peer-Reviewed Journals extensive
Publication	Type of publication: Cochrane Review Publisher: John Wiley & Sons, Ltd
Date and Citation History	Date of publication: Edited version published in 2010 Cited By: 215
Stated Purpose or Research Question	“To determine the effect of exercise interventions for acutely hospitalised older medical patients on functional status, adverse events and hospital outcomes” (p. 1).
Author’s Conclusion	The effect of exercise on functional outcome measures is unclear. No intervention effect was found on adverse events. Pooled analysis of multidisciplinary interventions that included exercise indicated a small significant increase in the proportion of patients discharged to home at hospital discharge and a small but important reduction in acute hospital length of stay and total hospital costs compared to usual care. Pooled analysis of exercise intervention trials found no effect on the proportion of patients discharged to home or acute hospital length of stay.
Overall Relevance to your EBP Question	Overall Relevance of Article: Moderate Rationale: This article is relevant to our research question. This article addresses exercise for older medical patients. Some of the articles in the systematic review specifically referred to early mobilization, but most were just about exercise in general. The sample size includes those admitted to a hospital ward or those admitted to a unit with “acute exacerbation of a medical condition” (p. 3). Some of the studies included in this systematic review included critically ill patients, but this was not necessary for inclusion. The sample included older adults, which was out target population
Overall Quality of Article	Overall Quality of Article: good Rationale: This article was a systematic review, which is the highest level of research according to the tiered system. The sample size of articles reviewed was sufficient and the methodology for reviewing these articles was sound. This article was published in a trusted peer reviewed journal (Cochrane Review). A limitation of this article was that it was published in 2010. The results may not be reflective of contemporary literature.

	Overview of Article
Type of article	Overall Type: Review of Research Studies Specific Type: Systematic review and meta-analysis
APA Reference	Neito-garcia, L., Carpio-parez, A., Moreio-barroso, T.M., Alonso-sardon, M., (2020) Can an early mobilisation programme prevent hospital-acquired pressure injures in an intensive care unit?: A systematic review and meta-analysis <i>Wiley Online Library</i> DOI: https://doi.org/10.1111/iwj.13516
Abstract	“A systematic review and meta-analysis were conducted to clarify the effect of an early mobilisation programme on the prevention of hospital-acquired pressure injuries in an intensive care unit as opposed to standard care. We searched a total of 11 databases until 1 May 2020 and included seven studies (n = 7.520) related to the effect of early mobilisation protocol in the prevention of hospital-acquired pressure injuries (five quasi-experimental and two random comparative). The five quasi-experimental studies were significantly heterogenous ($P = .02$ for Q test and 66% for I^2), and the odds ratio was 0.97 (95% CI: 0.49-1.91) with a non-significant statistical difference between both groups ($P = .93$). Our study shows inconclusive outcomes related to the effect of the implementation of an early mobility programme in the prevention of pressure injuries in critical patients. Future research is needed considering the small number of articles on the topic” (p. 209).
Author	Credentials: Credentials not stated, but she is from the institute for biomedical research in Salamanca, Spain. Position and Institution: Professor at La Universidad de Salamanca and the institute for the biomedical research in Salamanca, Spain. Publication History in Peer-Reviewed Journals: 3, Limited
Publication	Type of publication: Scholarly peer-reviewed journals Publisher: International Wound Journal Other: Wiley Online Journal
Date and Citation History	Date of publication: 2020, November 25 Cited By: 4
Stated Purpose or Research Question	“This study aims to establish whether the implementation of an EMP could reduce the development of HAPIs in an ICU” (p. 210).
Author’s Conclusion	“From a qualitative assessment of the seven studies, three of the studies found that the correlation between HAPI prevalence rates and EMP implementation was not statistically significant, three of them reported a decrease of HAPI rates with statistical significance, and only one observed reduced HAPI rates but without statistical significance” (p. 213).
Overall Relevance to your EBP Question	Overall Relevance of Article: Moderate Rationale: While this article relates to the idea of early mobilization in the ICU, it focuses too much on too much on pressure injuries, which I don’t think correctly relates to our EBP question.

Overall Quality of Article	Overall Quality of Article: Good Rationale: This article is a systematic review and meta-analysis. The authors have good credentials and the article is nicely organized and shows results that are useful to the research question. It does lack some credential history.
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	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: Meta-analysis
APA Reference	Nydahl, P., Sricharoenchai, T., Chandra, S., Kundt, F. S., Huang, M., Fischill, M., & Needham, D. M. (2017). Safety of patient mobilization and rehabilitation in the intensive care unit. Systematic review with meta-analysis. <i>Annals of the American Thoracic Society</i> , 14(5), 766-777. DOI: https://doi.org/10.1513/AnnalsATS.201611-843SR
Abstract	<p>“Background: Early mobilization and rehabilitation of patients in intensive care units (ICUs) may improve physical function, and reduce the duration of delirium, mechanical ventilation, and ICU length of stay. However, safety concerns are an important barrier to widespread implementation. Objectives: To synthesize safety data regarding patient mobilization and rehabilitation in the ICU, including falls, removal of endotracheal tubes, removal or dysfunction of intravascular catheters, removal of other catheters/tubes, cardiac arrest, hemodynamic changes, and desaturation. Data Sources: Systematic literature review, including searches of five databases. Eligible studies evaluated patients who received mobilization-related interventions in the ICU. Exclusion criteria included: (1) case series with fewer than 10 patients; (2) majority of patients under 18 years of age; and (3) data not reported to permit calculation of incidence of safety events. Data Extraction: Number of patients, mobilization/rehabilitation sessions, potential safety events, and events with negative consequences (e.g., requiring intervention or additional therapy). Synthesis: Heterogeneity was assessed by I2 statistics, and bias assessed by the Newcastle–Ottawa Scale and Cochrane risk of bias assessment. The literature search identified 20,660 titles. There were 48 eligible publications evaluating 7,546 patients, with 583 potential safety events occurring in 22,351 mobilization/rehabilitation sessions. There was a total of 583 (2.6%) potential safety events with heterogeneity in the definitions for these events. For the safety event types that could be meta-analyzed, pooled incidences per 1,000 mobilization/rehabilitation sessions (95% confidence interval), were: hemodynamic changes, 3.8 (1.3–11.4), and desaturation, 1.9 (0.9–4.3). A total of 24 studies of 3,404 patients reported on any consequences of potential safety events (e.g., needing to increase dose of vasopressor due to mobility-related hypotension), with a frequency of 0.6% in 14,398 mobilization/rehabilitation sessions. Conclusions: Patient mobilization and physical rehabilitation in the ICU appears safe, with a low incidence of potential safety events, and only rare events having any consequences for patient management. Heterogeneity in the definition of safety events across studies emphasizes the importance of implementing existing consensus-based definitions” (pp. 1-2).</p>
Author	Credentials: R.N., M.Sc.N. Position and Institution: Nursing Research, University Hospital of Schleswig-Holstein, Kiel, Germany

	<p>Publication History in Peer-Reviewed Journals: From an initial search, there was 1,670 hits for this author. After looking through the first three pages he has at least 25+ sources that he is an author for.</p>
Publication	<p>Type of publication: Peer-reviewed and Scholarly Publisher: ATS Journals Other: Annals of the American Thoracic Society</p>
Date and Citation History	<p>Date of publication: February 21, 2017 Cited By: 224</p>
Stated Purpose or Research Question	<p>“To synthesize safety data regarding patient mobilization and rehabilitation in the ICU, including falls, removal of endotracheal tubes, removal or dysfunction of intravascular catheters, removal of other catheters/tubes, cardiac arrest, hemodynamic changes, and desaturation” (p. 1).</p>
Author’s Conclusion	<p>“Patient mobilization and physical rehabilitation in the ICU appears safe, with a low incidence of potential safety events, and only rare events having any consequences for patient management. Heterogeneity in the definition of safety events across studies emphasizes the importance of implementing existing consensus-based definitions” (p.2).</p>
Overall Relevance to your EBP Question	<p>Overall Relevance of Article: I believe this has moderate relevance to our question. Rationale: This meta-analysis specifically focuses on mobilization and rehabilitation in the ICU, which helps give our question perspective on the ICU specifically. It also gives some insight into mobilization in particular as well. However, it dives a little deeper into certain specifics of the ICU that we don’t need in our paper and focuses more on general safety precautions than what we need to discuss.</p>
Overall Quality of Article	<p>Overall Quality of Article: This is a good quality article. Rationale: This is a level one resource because it is a meta-analysis. It is highly structured and well organized and was also published within the last five years so it contains recent information. The primary author has good credentials and this specific article has been cited by a lot of people which also makes it good quality.</p>

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: systematic review and meta-analysis
APA Reference	Okada, Unoki, T., Matsuishi, Y., Egawa, Y., Hayashida, K., & Inoue, S. (2019). Early versus delayed mobilization for in-hospital mortality and health-related quality of life among critically ill patients: a systematic review and meta-analysis. <i>Journal of Intensive Care</i> , 7(1), 57–57. https://doi.org/10.1186/s40560-019-0413-1
Abstract	<p>“Background: This systematic review and meta-analysis of randomized clinical trials aimed to investigate the efficacy of early mobilization among critically ill adult patients. Methods: We searched CENTRAL, MEDLINE, and Igaku-Chuo-Zasshi (a Japanese bibliographic database) databases until April 2019 and included randomized control trials to compare early mobilization started within 1 week of intensive care unit (ICU) admission and earlier-than-usual care with the usual care or mobilization initiated later than the intervention. Two authors independently extracted the data of the included studies and assessed their quality. The primary outcomes were in-hospital mortality, length of ICU/hospital stay, and health-related quality of life (QOL). Results: Among 1085 titles/abstracts screened, 11 studies (including 1322 patients) were included in the meta-analysis, which was conducted using the random-effects model. The pooled relative risk for in-hospital mortality comparing early mobilization to usual care (control) was 1.12 (95% CI [confidence interval]: 0.80 to 1.58, I² = 0%). The pooled mean differences for duration of ICU and hospital stay were -1.54 (95% CI: -3.33 to 0.25, I² = 90%) and -2.86 (95% CI: -5.51 to -0.21, I² = 85%), respectively. The pooled mean differences at 6 months post-discharge, as measured by the Short Form 36-Item Health Survey and Euro-QOL EQ-5D, were 4.65 (95% CI: -16.13 to 25.43, I² = 86%) for physical functioning and 0.29 (95% CI: -11.19 to 11.78, I² = 66%) for the visual analog scale. Conclusions: Our study indicated no apparent differences between early mobilization and usual care in terms of in-hospital mortality and health-related QOL. Detailed larger studies are warranted to evaluate the impact of early mobilization on in-hospital mortality and health-related QOL in critically ill patients. Trial registration: PROSPERO (identifier CRD42019139265) Keywords: Early mobilization, Rehabilitation, Physiotherapy, Occupational therapy, Critical care” (p. 1).</p>
Author	<p>Credentials: B.S. (Department of Applied Biological Science), M.S.(Department of Applied Biological Chemistry) & Ph.D. (Department of Applied Biological Science) Position and Institution: Associate Professor (Department of Applied Biological Science) Department of Primary Care and Emergency Medicine, Graduate School of Medicine, Kyoto University, Syogoin Kawaramachi 54, Sakyo, Kyoto 606-8507, Japan Preventive Services, School of Public Health in the Graduate School of Medicine, Kyoto University, Kyoto, Japan Publication History in Peer-Reviewed Journals: 300 results came up on google scholar; however, there may have been overlap in other authors since I wasn’t able to determine the author’s middle name.</p>

Publication	Type of publication: Scholarly peer-reviewed journal Publisher: Journal of Intensive Care; BioMed Central
Date and Citation History	Date of publication: 2019, December 9 Cited By: 24 in Google Scholar
Stated Purpose or Research Question	“This systematic review and meta-analysis of randomized clinical trials aimed to investigate the efficacy of early mobilization among critically ill adult patients” (p. 1).
Author’s Conclusion	“This systematic review and meta-analysis demonstrated no apparent differences between early mobilization and usual care regarding in-hospital mortality and health-related QOL (SF-36PF and EQ-5D VAS) among critically ill patients in the ICU. This suggests that currently available data are inadequate for evaluating the effect of early mobilization on relevant patient outcomes. Larger studies are warranted...” (p. 8).
Overall Relevance to your EBP Question	Overall Relevance of Article: Moderate Rationale: This review directly examines the benefits of early mobilization and is specifically looking at the ICU setting. However, it is important to keep in mind that it is in regards to in-hospital mortality and health-related QOL, rather than functional mobility.
Overall Quality of Article	Overall Quality of Article: Good Rationale: Since it is a systematic review published in a peer-reviewed, scholarly journal within the last 5 years.

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: Systematic review and meta-analysis
APA Reference	Rezaei-Shahsavarloo, Z., Foroozan Atashzadeh-Shoorideh, Gobbens, R. J. J., Ebadi, A., & Harouni, G. G. (2020). The impact of interventions on management of frailty in hospitalized frail older adults: A systematic review and meta-analysis. <i>BMC Geriatrics</i> , 20, 1-17. http://dx.doi.org/10.1186/s12877-020-01935-8
Abstract	<p>Background: One of the most challenging issues for the elderly population is the clinical state of frailty. Frailty is defined as a cumulative decline across psychological, physical, and social functioning. Hospitalization is one of the most stressful events for older people who are becoming frail. The aim of the present study was to determine the effectiveness of interventions focused on management of frailty in hospitalized frail older adults. Methods: A systematic review and meta-analysis of research was conducted using the Medline, Embase, Cochrane, ProQuest, CINAHL, SCOPUS and Web of Science electronic databases for papers published between 2000 and 2019. Randomized controlled studies were included that were aimed at the management of frailty in hospitalized older adults. The outcomes which were examined included frailty; physical, psychological, and social domains; length of stay in hospital; re-hospitalization; mortality; patient satisfaction; and the need for post discharge placement. Results: After screening 7976 records and 243 full-text articles, seven studies (3 interventions) were included, involving 1009 hospitalized older patients. The quality of these studies was fair to poor and the risk of publication bias in the studies was low. Meta-analysis of the studies showed statistically significant differences between the intervention and control groups for the management of frailty in hospitalized older adults (ES = 0.35; 95% CI: 0.067–0.632; z = 2.43; P < 0.015). However, none of the included studies evaluated social status, only a few of the studies evaluated other secondary outcomes. The analysis also showed that a Comprehensive Geriatric Assessment unit intervention was effective in addressing physical and psychological frailty, re-hospitalization, mortality, and patient satisfaction. Conclusions: Interventions for hospitalized frail older adults are effective in management of frailty. Multidimensional interventions conducted by a multidisciplinary specialist team in geriatric settings are likely to be effective in the care of hospitalized frail elderly. Due to the low number of RCTs carried out in a hospital setting and the low quality of existing studies, there is a need for new RCTs to be carried out to generate a protocol appropriate for frail older people” (p. 1).</p>
Author	<p>Credentials: Ph. D Position and Institution: Student Research Committee, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran Publication History in Peer-Reviewed Journals: From an initial search on google scholar this primary author is a part of seven other published works.</p>
Publication	Type of publication: Scholarly Peer-reviewed Publisher: BMC geriatrics

Date and Citation History	Date of publication: 2020, December 3 Cited By: 10
Stated Purpose or Research Question	“The aim of the present study was to determine the effectiveness of interventions focused on management of frailty in hospitalized frail older adults” (p. 2).
Author’s Conclusion	“Multidimensional interventions conducted by a multidisciplinary specialist team in geriatric settings are likely to be effective in the care of hospitalized frail elderly. Due to the low number of RCTs carried out in a hospital setting and the low quality of existing studies, there is a need for new RCTs to be carried out to generate a protocol appropriate for frail older people” (p. 2).
Overall Relevance to your EBP Question	Overall Relevance of Article: I would say the relevance of this review to our question is poor. Rationale: It doesn’t focus on enough early mobilization efforts and came to a somewhat inconclusive result because it says that there needs to be more randomized controlled trials done to examine this further. It also focuses a lot on frailty in the ICU which is somewhat relevant to our question but not the main focus.
Overall Quality of Article	Overall Quality of Article: The article is good quality Rationale: is only a year old and so being cited by 10 others still proves it is a good resource. It also has the strength of a level one piece of evidence. The author is also a valid person to be working on this topic and has other sources he’s been a part of.

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: “A systematic literature search was undertaken; retrieved data was evaluated against a recognised evaluation tool; research findings were analysed and categorised into themes; and a synthesis of conclusions from each theme was presented as an integrated summation of the topic” (p. 216).
APA Reference	Sosnowski, K., Lin, F., Mitchell, M. L., & White, H. (2015). Early rehabilitation in the intensive care unit: an integrative literature review. <i>Australian Critical Care: Official Journal of the Confederation of Australian Critical Care Nurses</i> , 28(4), 216–225. https://doi.org/10.1016/j.aucc.2015.05.002
Abstract	<p>Objectives: The aim of this review is to appraise current research which examines the impact of early rehabilitation practices on functional outcomes and quality of life in adult intensive care unit (ICU) survivors. Review method used: A systematic literature search was undertaken; retrieved data was evaluated against a recognised evaluation tool; research findings were analysed and categorised into themes; and a synthesis of conclusions from each theme was presented as an integrated summation of the topic. Data sources: Electronic databases of PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Ovid Medline and Google Scholar were searched using key search terms 'ICU acquired weakness', 'early rehabilitation' 'early mobility' and 'functional outcomes' combined with 'intensive care' and 'critical illness'. Additional literature was sourced from reference lists of relevant original publications.</p> <p>Results: Five major themes related to the review objectives emerged from the analysis. These themes included: critically ill patients do not always receive physical therapy as a standard of care; ICU culture and resources determine early rehabilitation success; successful respiratory and physical rehabilitation interventions are tailored according to individual patient impairment; early exercise in the ICU prevents the neuromuscular complications of critical illness and improves functional status; early exercise in the ICU is effective, safe and feasible. Conclusions: A limited body of research supports early rehabilitation interventions to optimise the short term outcomes and long term quality of life for ICU survivors. Critical care nurses are in an excellent position to drive change within their departments ensuring that early rehabilitation practices are adopted and implemented.</p> <p>Keywords: Critical illness; Delirium; Muscle weakness; Quality of life; Rehabilitation” (p. 216).</p>
Author	Credentials: RN, Grad Dip (ICN) Position and Institution: Intensive Care Unit, Logan Hospital, Australia; Griffith University, Australia Publication History in Peer-Reviewed Journals: Moderate (3)
Publication	Type of publication: Scholarly peer-reviewed journal Publisher: Elsevier Other: Australian Critical Care

Date and Citation History	Date of publication: 2015, July 2 Cited By: 74
Stated Purpose or Research Question	“This critical review of the research literature aimed to answer the following research question: What is the impact of early rehabilitation practices on functional outcomes and quality of life in adult ICU survivors?” (p. 217).
Author’s Conclusion	“Although limited, there is a growing body of research that confirms early rehabilitation interventions that incorporate both prevention of delirium and early physical exercise can optimise the short term outcomes and long term quality of life for intensive care unit survivors” (p. 224).
Overall Relevance to your EBP Question	Overall Relevance of Article: Good Rationale: Our EBP questions explores the evidence supporting early mobilization in the ICU and this article appraises the evidence regarding early mobilization and functional outcomes in the ICU.
Overall Quality of Article	Overall Quality of Article: Good Rationale: While at first it was unclear if this was a systematic review, the stated methodology proved that this was level 1 evidence with a systematic search and critical appraisal tools.

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: systematic review
APA Reference	Tipping, C. J., Harrold, M., Holland, A., Romero, L., Nisbet, T., & Hodgson, C. L. (2017). The effects of active mobilisation and rehabilitation in ICU on mortality and function: a systematic review. <i>Intensive care medicine</i> , 43(2), 171–183. https://doi-org.pearl.stkate.edu/10.1007/s00134-016-4612-0
Abstract	<p>“Purpose: Early active mobilisation and rehabilitation in the intensive care unit (ICU) is being used to prevent the long-term functional consequences of critical illness. This review aimed to determine the effect of active mobilisation and rehabilitation in the ICU on mortality, function, mobility, muscle strength, quality of life, days alive and out of hospital to 180 days, ICU and hospital lengths of stay, duration of mechanical ventilation and discharge destination, linking outcomes with the World Health Organization International Classification of Function Framework. Methods: A PRISMA checklist-guided systematic review and meta-analysis of randomised and controlled clinical trials. Results: Fourteen studies of varying quality including a total of 1753 patients were reviewed. Active mobilisation and rehabilitation had no impact on short- or long-term mortality ($p > 0.05$). Meta-analysis showed that active mobilisation and rehabilitation led to greater muscle strength (body function) at ICU discharge as measured using the Medical Research Council Sum Score (mean difference 8.62 points, 95% confidence interval (CI) 1.39–15.86), greater probability of walking without assistance (activity limitation) at hospital discharge (odds ratio 2.13, 95% CI 1.19–3.83), and more days alive and out of hospital to day 180 (participation restriction) (mean difference 9.69, 95% CI 1.7–17.66). There were no consistent effects on function, quality of life, ICU or hospital length of stay, duration of mechanical ventilation or discharge destination. Conclusion: Active mobilisation and rehabilitation in the ICU has no impact on short- and long-term mortality, but may improve mobility status, muscle strength and days alive and out of hospital to 180 days. Registration of protocol number: CRD42015029836. Keywords: Intensive care units, Critical illness, Early mobility, Rehabilitation, Mortality” (p.171).</p>
Author	<p>Credentials: Bachelor of Physiotherapy (Honours); Physiotherapist ICU Stream Position and Institution: Australian and New Zealand Intensive Care Research Centre, Department of Epidemiology and Preventive Medicine, Monash University, Melbourne, VIC, Australia. Department of Physiotherapy, The Alfred Hospital, Melbourne, VIC, Australia. It was difficult to find her credentials. I was unable to confirm her role besides being a Physiotherapist. Publication History in Peer-Reviewed Journals: 13 results in google scholar for other publications by this author. I would rate this as moderate compared to other authors.</p>
Publication	<p>Type of publication: scholarly peer-reviewed journal. Publisher: Springer Link Other: Springer Nature Switzerland AG</p>

Date and Citation History	Date of publication: 2016, November 18 Cited By: 349 results
Stated Purpose or Research Question	“The aims of this systematic review and meta-analysis were to determine the impact of active mobilisation and rehabilitation in the ICU on (1) patient mortality (measured at ICU discharge, hospital discharge, 3 and 6 months) compared to standard care; (2) patient’s functional status, mobility status, muscle strength, quality of life, number of days alive and out of hospital to 180 days, duration of mechanical ventilation, ICU and hospital length of stay and discharge destination compared to standard care” (p. 172).
Author’s Conclusion	“Active mobilisation and rehabilitation in the ICU improved body function, reduced activity limitation and improved participation measured using muscle strength, walking ability and days alive and out of hospital respectively. No differences in short- or long-term mortality were evident” (p. 181).
Overall Relevance to your EBP Question	Overall Relevance of Article: Good Rationale: I think this review is relevant to the EBP question as it is comparing the effects of early mobilization on many different variables, two of them being functional and mobility status. Further they investigated the effects of interventions within the ICU setting.
Overall Quality of Article	Overall Quality of Article: Good Rationale: I would consider this to be of good quality since it is a systematic review published in a peer-reviewed journal within the last 5 years.

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: “Systematic review of the literature that used the PI[C]OD methodology to compile the research question, which led to the search in the EBSCOHost search engine, in the CINAHL Complete and MEDLINE Complete databases, for the identification of studies published between 2016 and 2019” (p. 54).
APA Reference	Vítor Vieira, J., Ferrinho Ferreira, R., Palma Goes, M., Oliveira, H., Guerreiro Pacheco, R., & Pereira, J. (2020). Early mobilization of the critically ill patient: Literature systematic review. <i>Critical Care & Shock</i> , 23(2), 54–64. https://pearl.stkate.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=ccm&AN=142733915&site=ehost-live
Abstract	<p>“Introduction: The immobility and prolonged bed rest, to which the critically ill patient admitted to the intensive care unit is subjected, are harmful and have potential adverse effects, especially on the musculoskeletal system and, consequently, on motor functionality. Objectives: To characterize the impact of early mobilization on the critical patient admitted to an intensive care unit. Method: Systematic review of the literature that used the PI[C]OD methodology to compile the research question, which led to the search in the EBSCOHost search engine, in the CINAHL Complete and MEDLINE Complete databases, for the identification of studies published between 2016 and 2019. Four systematic reviews of the literature and three randomized controlled trials were selected. This review considered the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) recommendation. Levels of evidence were secured by the levels of evidence from The Joanna Briggs Institute and methodological quality was analyzed using the Critical Appraisal Skills Program. Results: Most of the articles included in this review point to the benefits of early mobilization in intensive care units, mainly for the improvement of motor functionality and functional capacity, and only one revision, due to the poor quality of the articles included, is inconclusive to the benefits of this intervention in this population. Conclusions: Early mobilization is a feasible, beneficial, and safe intervention for the critical patient admitted to an intensive care unit. However, due to the lack of studies on the subject and the limitations of the studies analyzed, it is suggested that more quantitative studies, with more representative samples, be carried out” (p. 54).</p>
Author	Credentials: No credentials stated Position and Institution: From Department of Health Sciences, Polytechnic Institute of Beja, Portugal Publication History in Peer-Reviewed Journals: Extensive (20+)
Publication	Type of publication: Scholarly peer-reviewed journal Publisher: Critical Care & Shock
Date and Citation History	Date of publication: 2020. March 1 Cited By: 1
Stated Purpose or	“To characterize the impact of early mobilization on the critical patient admitted to an intensive care unit” (p. 54).

Research Question	
Author's Conclusion	“Early mobilization is a feasible, beneficial, and safe intervention for the critical patient admitted to an intensive care unit. However, due to the lack of studies on the subject and the limitations of the studies analyzed, it is suggested that more quantitative studies, with more representative samples, be carried out” (p. 54).
Overall Relevance to your EBP Question	Overall Relevance of Article: Good Rationale: Our EBP question explores the available evidence to support early mobilization in the ICU for adults. This article similarly explores the evidence to demonstrate the benefits of early mobilization for the critically ill in the ICU.
Overall Quality of Article	Overall Quality of Article: Good Rationale: As a systematic review, this article is identified as level 1 evidence, which is very strong. In addition, there are multiple authors involved in the study.

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: Systematic review and meta-analysis
APA Reference	Wang, J., Ren, D., Liu, Y., Wang, Y., Zhang, B., & Xiao, Q. (2020). Effects of early mobilization on the prognosis of critically ill patients: A systematic review and meta-analysis. <i>International journal of nursing studies</i> , 110, 103708. https://doi-org.pearl.stkate.edu/10.1016/j.ijnurstu.2020.103708
Abstract	<p>“Background: Early mobilization is considered a safe and effective therapeutic strategy for accelerating the rehabilitation of patients admitted to the intensive care unit, with a proven benefit for critically ill patients. Objective: To evaluate the effects of early mobilization on the prognosis of critically ill patients through a meta-analysis of data pooled from studies meeting the inclusion criteria. Design: Systematic review and meta-analysis. Data source: Electronic databases including PubMed, EMBASE, the Cochrane Library, CINAHL, ProQuest, Web of Science, ProQuest Dissertations and Theses, Chinese BioMedical Literature Service System, WANFANG database, CNKI database, and Clinical Trial Register Platform were systematically searched from inception up to December 31, 2019. Review methods: Study eligibility was independently evaluated by two researchers. The title and abstract of the studies were first screened, and full-text articles of the remaining studies were screened for verification. Methodologic quality and risk of bias of the included studies were evaluated, and data were extracted from eligible studies. The meta-analysis was conducted using Review Manager v5.3 software. Key outcomes are presented as pooled risk ratio, weighted mean difference, and the corresponding 95% confidential interval. Results: A total of 39 articles were included in the meta-analysis. The results showed that early mobilization improved ventilator-associated pneumonia patients’ Medical Research Council score; reduced the incidence of intensive care unit-acquired weakness and intensive care unit-related complications such as ventilator-associated pneumonia, deep vein thrombosis, and pressure sores; and shortened the duration of mechanical ventilation, length of intensive care unit stay and hospital stay. However, there were no statistically significant differences in handgrip strength, delirium rate, intensive care unit mortality, hospital mortality, and physical function- and mental health-related quality of life at 2–3 months and 6 months post-hospital discharge. Conclusions: Early mobilization was effective in enhancing the recovery of critically ill patients, but more large-scale, multicenter randomized controlled trials are required to further confirm these findings” (p. 1).</p>
Author	<p>Credentials: I couldn’t confirm credentials; I tried to access information from many avenues, ORCID only listed school of nursing for education.</p> <p>Position and Institution: I wasn’t able to find the specific position; Capital Medical University, Beijing, China.</p> <p>Publication History in Peer-Reviewed Journals: 5,820 results came from google scholar; however, there could be another person with the same name. I couldn’t find a middle name to use to confirm it. I would consider this to be an extensive history in the research.</p>

Publication	Type of publication: scholarly peer-reviewed journal Publisher: Elsevier Other: International Journal of Nursing Studies
Date and Citation History	Date of publication: 2020, June 25 Cited By: 8 results in google scholar
Stated Purpose or Research Question	“Considering the inclusion of Chinese studies may provide a more robust description of the state of evidence, we carried out a systematic review of randomized controlled trials in Chinese and English electronic databases in order to further evaluate the effect of early mobilization on the prognosis of critically ill patients according to 15 outcome indicators (Medical Research Council score; handgrip strength; Barthel index score; occurrence of intensive care unit-acquired weakness; incidence of ventilator-associated pneumonia, deep vein thrombosis, pressure sores, and delirium; duration of mechanical ventilation; length of intensive care unit and hospital stays; intensive care unit and hospital mortality; and physical function- and mental health-related quality of life post-hospital discharge)” (p. 12).
Author’s Conclusion	“Evidence from this review indicate that early mobilization can improve muscle strength in critically ill patients and reduce the incidence of intensive care unit complications as well as shorten the duration of mechanical ventilation and length of intensive care unit and hospital stays. Whether it affects delirium rate, mortality rates in intensive care unit and hospital, and quality of life post-hospital discharge remains to be determined through large-scale, multicenter randomized controlled trials” (p. 10).
Overall Relevance to your EBP Question	Overall Relevance of Article: Moderate Rationale: I believe this review is relevant to the EBP question since it examines the effects of early mobilization on function specifically with those defined as critically ill. It also looked at a lot of different variables that don’t directly relate to the EBP question.
Overall Quality of Article	Overall Quality of Article: Good Rationale: I rate this as good because it is a systematic review and meta-analysis that is published in a peer-reviewed journal within the last one and a half years. However, it would be beneficial to know more about the author’s credentials.

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: The effect of early mobilization in critically ill patients: A meta-analysis
APA Reference	Zang, K., Chen, B., Wang, M., Chen, D., Hui, L., Gui, S., Ji, T., & Shang, F. (2019). The effect of early mobilization in critically ill patients: A meta-analysis. <i>Nursing in Critical Care</i> , 25(6), 360-367. doi: 10.1111/nicc.12455
Abstract	<p>“Background: The aim of this meta-analysis was to assess if early mobilization and rehabilitation in the intensive care unit (ICU) could reduce ICU-acquired weakness (ICU-AW), improve functional recovery, improve muscle strength, shorten the length of ICU and hospital stays, and reduce the mortality rate. Methods: A comprehensive literature search in PubMed, Embase, Web of Science, SinoMed (Chinese BioMedical Literature Service System, China), and National Knowledge Infrastructure, China (CNKI) was performed. Results were expressed as a risk ratio (RR) with 95% confidence intervals (95% CIs) or weight mean difference (WMD) with 95% CIs. Pooled estimates were calculated using a fixed-effects or random-effects model according to the heterogeneity among studies. Results: Fifteen randomized controlled trials involving a total of 1941 patients were included in this meta-analysis. Pooled estimates suggested that early mobilization significantly reduced the incidence of ICU-AW (RR = 0.49, 95% CI: 0.26, 0.91; P = .025), shortened the length of ICU (WMD = -1.82 days, 95% CI: -2.88, -0.76; P = .001) and hospital (WMD = -3.90 days, 95% CI: -5.94, -1.85; P < .001) stays, and improved the Medical Research Council score (WMD = 4.47, 95% CI: 1.43, 7.52; P = .004) and Barthel Index score at hospital discharge (WMD = 21.44, 95% CI: 10.97, 31.91; P < .001). Moreover, early mobilization also decreased complications such as deep vein thrombosis (RR = 0.16, 95% CI: 0.04, 0.59; P = .006), ventilator-associated pneumonia (RR = 0.26, 95% CI: 0.11, 0.63; P = .003), and pressure sores (RR = 0.14, 95% CI: 0.04, 0.44; P = .001). However, early mobilization did not reduce the ICU mortality rate (RR = 1.31, 95% CI: 0.97, 1.76; P = .074), improve the handgrip strength (WMD = 4.03 kg, 95% CI: -0.68, 8.74; P = .094), and shorten the duration of mechanical ventilation (WMD = 0.20 days, 95% CI: -0.10, 0.50; P = .194). Conclusion: This study indicated that early mobilization was effective in preventing the occurrence of ICU-AW, shortening the length of ICU and hospital stay, and improving the functional mobility. However, it had no effect on the ICU mortality rate and ventilator-free days. Relevance to clinical practice ICU-AW is a common neuromuscular complication of critical illness, and it is predictive of adverse outcomes. Early mobilization of critically ill patients is a candidate intervention to reduce the incidence and severity of ICU-AW. Some clinical studies have demonstrated this, whereas others found opposite results. The aim of our study is to assess if early mobilization and rehabilitation in the ICU could reduce the ICU-AW, improve functional recovery, improve muscle strength, shorten length of ICU and hospital stay, and reduce the mortality rate” (p. 360).</p>
Author	Credentials: Kui Zang (no other credentials listed)

	<p>Position and Institution: Department of Intensive Care Unit, The Affiliated Huaian No. 1 People's Hospital, Nanjing Medical University, Huaian, Chinae</p> <p>Publication History in Peer-Reviewed Journals: Initial Google Scholar search came up with 116 results, went through first 3 pages and found at least 25+ results</p>
Publication	<p>Type of publication: scholarly peer-reviewed journal</p> <p>Publisher: Wiley Online Library and British Association of Critical Care</p> <p>Other: Nursing in Critical Care journal</p>
Date and Citation History	<p>Date of publication: 2019, June 20</p> <p>Cited By: 62</p>
Stated Purpose or Research Question	<p>“In order to provide adequately powered information to detect the effect of early mobilization in ICU-AW, length of ICU and hospital stays, and functional recovery in critical ill patients, we summarized the published RCTs to conduct this meta-analysis” (p. 361).</p>
Author’s Conclusion	<p>“In conclusion, the present study suggested that early mobilization was effective in reducing the incidence of ICU-AW, shortening the length of ICU/hospital stay, and improving the MRC and Barthel Index scores. Moreover, it also prevented the occurrences of vein thrombosis, VAP, and pressure sores” (p. 366).</p>
Overall Relevance to your EBP Question	<p>Overall Relevance of Article: Good</p> <p>Rationale: This article could be utilized to help answer our EBP question. This review summarized the results of early mobilization. It specifically focused on the effect of early mobilization on ICU-acquired weakness, functional recovery, muscle strength, length of stay, and mortality rate. This will directly relate to our EBP question to help answer the effect of early mobilization on functional outcomes.</p>
Overall Quality of Article	<p>Overall Quality of Article: Good</p> <p>Rationale: This is a recent article that has been cited by numerous other articles. The author has been mentioned in other articles as well. It is also published by a credible journal. It is a meta-analysis so the strength of the evidence is also strong. It is well organized and provides detailed information.</p>

	Overview of Article
Type of article	Overall Type: Review of Research Study Specific Type: Early mobilization of critically ill patients in the intensive care unit: A systematic review and meta-analysis
APA Reference	Zhang, L., Hu, W., Cai, Z., Liu, J., Wu, J., Deng, Y., Yu, K., Chen, X., Zhu, L., Ma, J., & Qin, Y. (2019). Early mobilization of critically ill patients in the intensive care unit: A systematic review and meta-analysis. <i>PLoS ONE</i> , <i>14</i> (10), 1-16. doi: 10.1371/journal.pone.0223185
Abstract	<p>“Background: Physical therapy can prevent functional impairments and improve the quality of life of patients after hospital discharge. However, the effect of early mobilization on patients with a critical illness remains unclear. This study was performed to assess the evidence available regarding the effect of early mobilization on critically ill patients in the intensive care unit (ICU). Methods: Electronic databases were searched from their inception to March 21, 2019. Randomized controlled trials (RCTs) comprising critically ill patients who received early mobilization were included. The methodological quality and risk of bias of each eligible trial were assessed using the Cochrane Collaboration tool. Data were extracted using a standard collection form each included study, and processed using the Mantel-Haenszel (M-H) or inverse-variance (I-V) test in the STATA v12.0 statistical software. Results: A total of 1,898 records were screened. Twenty-three RCTs comprising 2,308 critically ill patients were ultimately included. Early mobilization decreased the incidence of ICU-acquired weakness (ICU-AW) at hospital discharge (three studies, 190 patients, relative risk (RR): 0.60, 95% confidence interval (CI) [0.40, 0.90]; $p = 0.013$, $I^2 = 0.0\%$), increased the number of patients who were able to stand (one study, 50 patients, 90% vs. 62%, $p = 0.02$), increased the number of ventilator-free days (six studies, 745 patients, standardized mean difference (SMD): 0.17, 95% CI [0.02, 0.31]; $p = 0.023$, $I^2 = 35.5\%$) during hospitalization, increased the distance the patient was able to walk unassisted (one study, 104 patients, 33.4 (0–91.4) meters vs. 0 (0–30.4) meters, $p = 0.004$) at hospital discharge, and increased the discharged-to-home rate (seven studies, 793 patients, RR: 1.16, 95% CI [1.00, 1.34]; $p = 0.046$). The mortality (28-day, ICU and hospital) and adverse event rates were moderately increased by early mobilization, but the differences were statistically non-significant. However, due to the substantial heterogeneity among the included studies, and the low quality of the evidence, the results of this study should be interpreted with caution. Publication bias was not identified. Conclusions: Early mobilization appears to decrease the incidence of ICU-AW, improve the functional capacity, and increase the number of ventilator-free days and the discharged-to-home rate for patients with a critical illness in the ICU setting” (pp. 1-2).</p>
Author	<p>Credentials: Lan Zhang (no other credentials listed) Position and Institution: Department of Neurology, The Second Affiliated Hospital of Chongqing Medical University, Chongqing, P. R. China Publication History in Peer-Reviewed Journals: Initial google results yielded lots of results, went through first 3 pages and found at least 20+</p>

Publication	Type of publication: scholarly peer-reviewed journal Publisher: PLoS ONE Other: found using PubMed database
Date and Citation History	Date of publication: 2019, October 3 Cited By: 109
Stated Purpose or Research Question	“...we conducted this study aim to comprehensively assess the evidence available regarding the effect of early mobilization on critically ill patients in the ICU” (p. 3).
Author’s Conclusion	“Regardless of the different techniques and periods of mobilization applied, early mobilization may be initiated safely in the ICU setting and appears to decrease the incidence of ICU-AW, improve the functional capacity, and increase the number of patients who are able to stand, number of ventilator-free days and discharged-to-home rate without increasing the rate of adverse events” (p. 11).
Overall Relevance to your EBP Question	Overall Relevance of Article: Good Rationale: This article relates to our EBP question. It answers the question of early mobilization in the ICU and found that it improved the functional capacity. This can be used in our research summary to support our recommendation.
Overall Quality of Article	Overall Quality of Article: Good Rationale: This article is a systematic review which defines it as a Level 1 article .This article was published recently (2019). It also has been cited by numerous different articles and the author has worked on other peer-reviewed articles. This study acknowledged its limitations and provided suggestions for future research. It was well organized and summarized the results in a clear manner.

Conceptual and Theoretical Studies

	Overview of Article
Type of article	Overall Type: Conceptual or theoretical article Specific Type: Editorial
APA Reference	Margetis, John L; Wilcox, Jamie; Mannion, Nicole & Thompson, Chelsea. (2021). Occupational therapy: Essential to critical care rehabilitation. <i>The American Journal of Occupational Therapy</i> , 75(2). https://doi.org/10.5014/ajot.2021.048827
Abstract	“The coronavirus disease 2019 (COVID-19) pandemic reshaped the health care landscape, leading to the reassignment of essential health care workers to critical areas and widespread furloughs of providers deemed nonessential, including occupational therapy practitioners. Although multidisciplinary critical care teams often include occupational therapy practitioners, efforts to define, measure, and disseminate occupational therapy’s unique contributions to critical care outcomes have been overlooked. This editorial provides recommendations to improve the occupational therapy profession’s readiness to meet society’s current and future pandemic needs. We propose a three-pronged strategy to strengthen occupational therapy clinical practice, education, and advocacy to illuminate the distinct value of occupational therapy in critical care” (p. 1).
Author	Credentials: OTD, OTR/L Position and Institution: Associate Professor of Clinical Occupational Therapy, Chan Division of Occupational Science & Occupational Therapy, University of Southern California, Los Angeles. Publication History in Peer-Reviewed Journals: 54, extensive
Publication	Type of publication: Peer- reviewed Journal Publisher: AJOT Other: AOTA
Date and Citation History	Date of publication: 2021 Cited By: 8
Stated Purpose or Research Question	“We propose a three-pronged strategy to improve occupational therapy’s capacity to meet society’s pandemic needs in critical care settings and call on professional occupational therapy organizations and their members to 1. Strengthen evidence-based clinical practice, 2. Enhance entry-level and post professional training, and 3. Promote awareness of occupational therapy practitioners’ impact on value-based health care” (p. 1).
Author’s Conclusion	“Occupational therapy practitioners specializing in critical care rehabilitation have illustrated the profession’s essential role in the COVID-19 pandemic by proactively applying best-practice guidelines to COVID-19 patient populations and incorporating the profession’s holistic patient-centered lens” (p. 4).
Overall Relevance to	Overall Relevance of Article: Moderate Rationale: While this article does not relate directly to our EBP question, I think it efficiently addresses the importance of having Occupational Therapy in the Intensive

your EBP Question	Care Unit. This could be useful in addressing an overview of OT in the ICU for our EBP question.
Overall Quality of Article	Overall Quality of Article: Moderate Rationale: Since this article is a guest editorial I think it lacks some statistical significance. It does offer good rationale for the results, as the author is highly credited, but I don't think it is the strongest article on the topic of OT in the ICU.

	Overview of Article
Type of article	Overall Type: Conceptual or Theoretical Article Specific Type: Expert recommendations
APA Reference	Raurell-Torredà, M., Regaira-Martínez, E., Planas-Pascual, B., Ferrer-Roca, R., Martí, J.D., Blazquez-Martínez, E., Ballesteros-Reviriego, G., Vinuesa-Suárez, I., and Zariquiey-Esteva G. (2021) Early mobilisation algorithm for the critical patient. Expert recommendations <i>Elsevier: Science Direct</i> DOI: https://doi.org/10.1016/j.enfie.2020.11.001
Abstract	<p>Introduction: Intensive care unit (ICU)-acquired weakness is developed by 40%–46% of patients admitted to ICU. Different studies have shown that Early Mobilisation (EM) is safe, feasible, cost-effective and improves patient outcomes in the short and long term. Objective: To design an EM algorithm for the critical patient in general and to list recommendations for EM in specific subpopulations of the critical patient most at risk for mobilisation: neurocritical, traumatic, undergoing continuous renal replacement therapy (CRRT) and with ventricular assist devices (VAD) or extracorporeal membrane oxygenation (ECMO). Methodology: Review undertaken in the Medline, CINAHL, Cochrane and PEDro databases of studies published in the last 10 years, providing EM protocols/interventions. Results 30 articles were included. Of these, 21 were on guiding EM in critical patients in general, 7 in neurocritical and/or traumatic patients, 1 on patients undergoing CRRT and 1 on patients with ECMO and/or VAD. Two figures were designed: one for decision-making, taking the ABCDEF bundle into account and the other with the safety criteria and mobility objective for each. Conclusions: The EM algorithms provided can promote early mobilisation (between the 1st and 5th day from admission to ICU), along with aspects to consider before mobilisation and safety criteria for discontinuing it” (pp. 153-154).</p>
Author	<p>Credentials: RN, Ph. D Position and Institution: Universidad de Barcelona, Investigadora principal proyecto MoviPre, Barcelona, Spain Publication History in Peer-Reviewed Journals:</p>
Publication	Type of publication: Scholarly and peer-reviewed Publisher: Elsevier
Date and Citation History	Date of publication: 2021, July-September Cited By: none
Stated Purpose or Research Question	“To design an EM algorithm for the critical patient in general and to list recommendations for EM in specific subpopulations of the critical patient most at risk for mobilisation: neurocritical, traumatic, undergoing continuous renal replacement therapy (CRRT) and with ventricular assist devices (VAD) or extracorporeal membrane oxygenation (ECMO)” (pp.1-2).
Author’s Conclusion	“The EM algorithms provided can promote early mobilisation (between the 1st and 5th day from admission to ICU), along with aspects to consider before mobilisation and safety criteria for discontinuing it” (p. 2).

Overall Relevance to your EBP Question	Overall Relevance of Article: I believe this is a moderately relevant article. Rationale: This is a strong article but it doesn't bring in early mobilization enough. It does however have good experts opinions on treatment for critically ill ICU patients which could help guide us through the question.
Overall Quality of Article	Overall Quality of Article: This is a good quality article. Rationale: It has a lot of experts' opinions. The primary author has strong credentials and works in the healthcare field.

Appendix B. Critical Appraisals

	Summary
APA Reference	<p>Beller, Elaine M, Doiron, Katherine A & Hoffmann, Tammy C. (2018). Early intervention (mobilization or active exercise) for critically ill adults in the intensive care unit. <i>Cochrane Database of Systematic Reviews</i>. https://doi.org/10.1002/14651858.CD010754.pub2</p>
Abstract	<p>“Background Survivors of critical illness often experience a multitude of problems that begin in the intensive care unit (ICU) or present and continue after discharge. These can include muscle weakness, cognitive impairments, psychological difficulties, reduced physical function such as in activities of daily living (ADLs), and decreased quality of life. Early interventions such as mobilizations or active exercise, or both, may diminish the impact of the sequelae of critical illness.</p> <p>Objectives To assess the effects of early intervention (mobilization or active exercise), commenced in the ICU, provided to critically ill adults either during or after the mechanical ventilation period, compared with delayed exercise or usual care, on improving physical function or performance, muscle strength and health-related quality of life.</p> <p>Search methods We searched CENTRAL, MEDLINE, Embase and CINAHL. We searched conference proceedings, reference lists of retrieved articles, databases of trial registries and contacted experts in the field on 31 August 2017. We did not impose restrictions on language or location of publications.</p> <p>Selection criteria We included all randomized controlled trials (RCTs) or quasi-RCTs that compared early intervention (mobilization or active exercise, or both), delivered in the ICU, with delayed exercise or usual care delivered to critically ill adults either during or after the mechanical ventilation period in the ICU.</p> <p>Data collection and analysis Two researchers independently screened titles and abstracts and assessed full-text articles against the inclusion criteria of this review. We resolved any disagreement through discussion with a third review author as required. We presented data descriptively using mean differences or medians, risk ratios and 95% confidence intervals. A meta-analysis was not possible due to the heterogeneity of the included studies. We assessed the quality of evidence with GRADE.</p> <p>Main results We included four RCTs (a total of 690 participants), in this review. Participants were adults who were mechanically ventilated in a general, medical or surgical ICU, with mean or median age in the studies ranging from 56 to 62 years. Admitting diagnoses in three of the four studies were indicative of critical illness, while participants in the fourth study had undergone cardiac surgery. Three studies included range-of-motion exercises, bed mobility activities, transfers and ambulation. The fourth study involved</p>

only upper limb exercises. Included studies were at high risk of performance bias, as they were not blinded to participants and personnel, and two of four did not blind outcome assessors. Three of four studies reported only on those participants who completed the study, with high rates of dropout. The description of intervention type, dose, intensity and frequency in the standard care control group was poor in two of four studies.

Three studies (a total of 454 participants) reported at least one measure of physical function. One study (104 participants) reported low-quality evidence of beneficial effects in the intervention group on return to independent functional status at hospital discharge (59% versus 35%, risk ratio (RR) 1.71, 95% confidence interval (CI) 1.11 to 2.64); the absolute effect is that 246 more people (95% CI 38 to 567) per 1000 would attain independent functional status when provided with early mobilization. The effects on physical functioning are uncertain for a range measures: Barthel Index scores (early mobilization: median 75 control: versus 55, low quality evidence), number of ADLs achieved at ICU (median of 3 versus 0, low quality evidence) or at hospital discharge (median of 6 versus 4, low quality evidence). The effects of early mobilization on physical function measured at ICU discharge are uncertain, as measured by the Acute Care Index of Function (ACIF) (early mobilization mean: 61.1 versus control: 55, mean difference (MD) 6.10, 95% CI -11.85 to 24.05, low quality evidence) and the Physical Function ICU Test (PFIT) score (5.6 versus 5.4, MD 0.20, 95% CI -0.98 to 1.38, low quality evidence). There is low quality evidence that early mobilization may have little or no effect on physical function measured by the Short Physical Performance Battery score at ICU discharge from one study of 184 participants (mean 1.6 in the intervention group versus 1.9 in usual care, MD -0.30, 95% CI -1.10 to 0.50), or at hospital discharge (MD 0, 95% CI -1.00 to 0.90). The fourth study, which examined postoperative cardiac surgery patients did not measure physical function as an outcome.

Adverse effects were reported across the four studies but we could not combine the data. Our certainty in the risk of adverse events with either mobilization strategy is low due to the low rate of events. One study reported that in the intervention group one out of 49 participants (2%) experienced oxygen desaturation less than 80% and one of 49 (2%) had accidental dislodgement of the radial catheter. This study also found cessation of therapy due to participant instability occurred in 19 of 498 (4%) of the intervention sessions. In another study five of 101 (5%) participants in the intervention group and five of 109 (4.6%) participants in the control group had postoperative pulmonary complications deemed to be unrelated to intervention. A third study found one of 150 participants in the intervention group had an episode of asymptomatic bradycardia, but completed the exercise session. The fourth study reported no adverse events.

Authors' conclusions

There is insufficient evidence on the effect of early mobilization of critically ill people in the ICU on physical function or performance, adverse events, muscle strength and health-related quality of life at this time. The four studies awaiting classification, and the three ongoing studies may alter the conclusions of the review once these results are

	available. We assessed that there is currently low-quality evidence for the effect of early mobilization of critically ill adults in the ICU due to small sample sizes, lack of blinding of participants and personnel, variation in the interventions and outcomes used to measure their effect and inadequate descriptions of the interventions delivered as usual care in the studies included in this Cochrane Review.” (p. 2)
Your Focused Question and Clinical Bottom Line	Question: Is early mobilization in the intensive care unit beneficial for critically ill older adults? Clinical Bottom Line: Unfortunately, there is still not enough evidence to support the hypothesis that early mobilization benefits critically ill older adults in the intensive care unit. Further research is required to draw stronger conclusions.
Your Lay Summary	This systematic review focused on the importance of having patients in the hospital begin moving their bodies early on in order to improve the chances of having them be able to continue doing their daily activities after they leave the hospital. The researchers reviewed many research articles to find significant results that supported this idea of being active early on. The results of the reviews did not have a lot of support, because there is not a lot of research on this topic yet. The authors recommend more research on this topic in order to be sure that making patients in the hospital move early on really is an effective treatment.
Your Professional Summary	Past hypotheses have argued the importance of having patients in the intensive care unit begin exercising or moving early on in order to increase their ability to perform activities of daily living (ADLs) on discharge from the hospital. Authors of the article performed a systematic review focused on the early mobilization of critically ill adults in the intensive care unit to support their ability of performing their everyday activities post discharge from the intensive care unit. Researchers compiled 7,185 articles, but after extensive exclusion of articles, only used four articles. The four articles included a sample size of 690 critically ill adults in the intensive care unit, all who had been randomly assigned to partake in early mobilization. Strengths of the article include the author’s credentials and the procedure of finding articles. Weaknesses include the small sample size, differences in participant diagnosis and inability to draw strong conclusions from the reviews. In conclusion, there is not enough evidence to support the idea that early mobilization for critically ill adults in the intensive care unit does support the return to activities of daily living post discharge. Authors encourage more research on this topic to draw stronger conclusions.
	Critical Appraisal
Stated Purpose or Research Question	“Does helping critically ill adults to move or exercise early in their stay in the intensive care unit (ICU) improve their ability to perform everyday activities such as walking, and the ability to perform daily self-care on discharge from hospital? We reviewed the evidence for this question, to see if there are benefits to early exercise, including the amount of time spent in the ICU or hospital, muscle strength, feelings of well-being, and also to see if there are harms, such as the occurrence of falls. The movement or exercise could include things such as moving in, or sitting out of bed, practicing standing up, walking, arm exercises, and self-care activities such as eating or brushing hair” (p. 2).

<p>Background Literature</p>	<p>Key points of the intro section: “Intensive care unit-acquired weakness (ICUAW) may be described as clinically identified weakness that develops during an ICU admission with no other known cause except the acute illness or its treatment“(p. 7).</p> <p>“The term 'post-intensive care syndrome' was developed to describe new or residual problems that are often experienced by survivors of critical illness. These include cognitive impairments (such as altered memory, attention and executive functioning); psychological difficulties (such as depression, anxiety and post- traumatic stress disorder) and physical impairments in pulmonary, neuromuscular and physical function” (p. 7)</p> <p>“Characteristics of the intervention such as type, provider skills and training, timing of delivery, dose/duration, tailoring and progression of intervention, and resources used in the delivery can greatly influence an intervention's efficacy as well as the heterogeneity of the population receiving the intervention” (p. 7).</p> <p>Theoretical perspective: Not Stated</p>
<p>Research Design</p>	<p>Research design: Systematic Review Rationale for the design: Not reported. For reviews of research, AOTA Level of Evidence: Level 1 evidence since it is a meta-analysis</p>
<p>Method</p>	<p>Primary methods to answer research question Variables: Functional status, adverse events, length of stay, muscle strength, health related quality of life, delirium, death from an cause, hospital costs,</p> <p>Keywords: “([mh "Intensive Care Units"] OR [mh ^"Critical Illness"] OR [mh "Critical Care"] OR (critical* NEAR3 (ill* OR care*)):ti,ab OR "intensive care":ti,ab OR (icu OR icuaw):ti,ab) AND ([mh "Exercise Therapy"] OR [mh "Physical Therapy Modalities"] OR [mh "Occupational Therapy"] OR (mobilizat* OR mobilisat* OR mobility):ti,ab OR exercis*:ti,ab OR (therap* NEAR3 (physical OR exercise OR occupation*)):ti,ab OR ((bed OR "daily living") NEAR3 activit*):ti,ab OR (training OR pregait OR pre-gait OR walk* OR adl OR physiotherap* OR ambulation):ti,ab OR ((cycle OR bicycle) NEAR1 ergomet*):ti,ab)</p> <p>(exp Intensive Care Units/ OR Critical Illness/ OR exp Critical Care/ OR (critical* adj3 (ill* or care*)):tw. OR intensive care.tw. OR (icu or icuaw).tw.) AND</p>

(exp Exercise Therapy/ OR exp Physical Therapy Modalities/ OR Occupational Therapy/ OR (mobilizat* or mobilisat* or mobility).tw. OR exercis*.tw. OR (therap* adj3 (physical or exercise or occupation*).tw. OR ((bed or daily living) adj3 activit*).tw. OR (training or pregait or pre-gait or walk* or adl or physiotherap* or ambulation).tw. OR ((cycle or bicycle) adj1 ergomet*).tw.)

AND

((randomized controlled trial OR controlled clinical trial).pt. OR randomized.ab. OR randomised.ab. OR placebo.ab. OR drug therapy.fs. OR randomly.ab. OR trial.ab. OR groups.ab.) not (exp animals/ not humans.sh.)

(icu:ab,ti OR icuaw:ab,ti OR 'intensive care':ab,ti OR ((critical* NEAR/3 (ill* OR care)):ab,ti) OR 'intensive care'/exp OR 'critical illness'/de OR 'intensive care unit'/de)

AND

(training:ab,ti OR pregait:ab,ti OR 'pre-gait':ab,ti OR walk*:ab,ti OR adl:ab,ti OR physiotherapy*:ab,ti OR (((cycle OR bicycle) NEAR/1 ergomet*):ab,ti) OR ambulation:ab,ti OR (((bed OR 'daily living') NEAR/3 activity):ab,ti) OR ((therap* NEAR/3 (physical* OR exercise OR occupation*)):ab,ti) OR exercis*:ab,ti OR mobiliz*:ab,ti OR mobilis*:ab,ti OR mobility:ab,ti OR 'occupational therapy'/de OR 'physiotherapy'/ exp OR 'kinesiotherapy'/exp)

AND

((random*:ab,ti OR placebo*:ab,ti OR crossover*:ab,ti OR 'cross over':ab,ti OR allocat*:ab,ti OR trial:ti OR ((doubl* NEXT/1 blind*):ab,ti) OR 'randomized controlled trial'/exp OR 'single blind procedure'/exp OR 'double blind procedure'/exp OR 'crossover procedure'/exp) NOT (('animal'/exp OR 'animal'/de OR 'nonhuman'/exp OR 'nonhuman'/de OR 'animal experiment'/exp OR 'animal experiment'/de) NOT (('animal'/exp OR 'animal'/de OR 'nonhuman'/exp OR 'nonhuman'/de OR 'animal experiment'/exp OR 'animal experiment'/de) AND 'human'/de)))” (p. 9)

Databases: Cochrane CENTRAL, MEDLINE, Embase and CINAHL

Procedures:

“We included all randomized controlled trials (RCTs) or quasi-RCTs that compared early intervention (mobilization or active exercise) of critically ill participants either during or after the mechanical ventilation period in the ICU with delayed exercise or usual care “ (p. 8)

“We included adults who had been admitted to an ICU and were mechanically ventilated” (p. 8)

“The intervention must have been conducted within the ICU and must have consisted of mobilization or active exercise, or both, that was designed to commence earlier than the care received by the control group (p. 8)

Primary and secondary outcomes

	<p>“We included all randomized controlled trials (RCTs) or quasi-RCTs that compared early intervention (mobilization or active exercise) of critically ill participants either during or after the mechanical ventilation period in the ICU with delayed exercise or usual care “ (p. 8)</p> <p>“We included adults who had been admitted to an ICU and were mechanically ventilated” (p. 8)</p> <p>“The intervention must have been conducted within the ICU and must have consisted of mobilization or active exercise, or both, that was designed to commence earlier than the care received by the control group” (p. 8).</p> <p>Primary and secondary outcomes</p> <p>Two researchers independently screened titles and abstracts and assessed full-text articles against the inclusion criteria of this review. We resolved any disagreement through discussion with a third review author as required. We presented data descriptively using mean differences or medians, risk ratios and 95% confidence intervals. A meta-analysis was not possible due to the heterogeneity of the included studies. We assessed the quality of evidence with GRADE.</p>
Filters	<p>Research Designs included and not included: “We included RCTs that compared early intervention (mobilization or active exercise) commenced in the ICU (either during or after the mechanical ventilation period) with delayed exercise or usual care for critically ill adults” (p. 12)</p> <p>Inclusion and exclusion criteria:</p> <p>Inclusion:</p> <ul style="list-style-type: none"> RCT mechanically ventilated adults control group no bias older adults <p>Exclusion:</p> <ul style="list-style-type: none"> Control group received intervention later Comparators did not match Participants may not have done exercise There was no difference in the timing of the intervention between groups. There was no difference in the timing of mobilization between groups. There was no difference in the timing of the intervention between groups. Not a RCT Trial of intensity, not timing <p>“We excluded 14 studies for the reasons identified in the Characteristics of excluded studies table. These included study design, comparators and timing of the intervention between groups. One study was not a RCT (Morris 2008), one study was conducted in a respiratory care centre (not the ICU) (Chen 2012); four studies used comparators that did not match those in this review; active or passive ROM, or both (Burtin 2009);</p>

	<p>passive chair transfer (Collings 2015); active and passive mobilization (Médrial 2013), and active intervention once versus twice per day (Yosef-Brauner 2015). Seven studies did not compare early versus later interventions (Brummel 2014; Chiang 2006; Denehy 2013; ISRCTN20436833; Moss 2016; Nava 1998; NCT01058421; Porta 2005)” (p. 16)</p> <p>Total references found: 7, 185 references, but ultimately used 4 Randomized control trials (p. 14)</p> <p>Process for eliminating references “identified 2303 duplicates and excluded 4858 further references as they were not eligible for this review” (p. 12) .</p> <p>“4883 records screened by title/abstract, 4858 records excluded” (p. 13) “25 full text assessed for eligibility, exclusion of 14 left us with 4 included” (p. 13)</p>
<p>Results</p>	<p>Description of the articles: “We included four RCTs in this review (Kayambu 2015; Morris 2016; Patman 2001; Schweickert 2009)” (p. 14)</p> <p>Analysis/theme one: Participants “ The most common reason for ICU admission varied across the studies. In Kayambu 2015, 19 of 26 (73%) participants in the intervention group and 17 of 24 (71%) in the control group were admitted with septic shock; in Morris 2016 68% had acute respiratory failure without chronic lung disease, 31% had acute respiratory failure with chronic lung disease and 2% had an ICU diagnosis of coma; in Patman 2001, 71 of 108 (66%) participants in the intervention group and 68 of 109 (62%) of those in the control group had undergone coronary artery surgery; and in Schweickert 2009 27 of 49 (55%) participants in the intervention group and 31 of 55 (56%) in the control group were admitted with acute lung injury” (p. 14)</p> <p>Analysis/theme two: Interventions “There was variation in most aspects of the interventions between the four studies: electrical muscle stimulation (EMS), tilt table therapy, arm or leg ergometry and activities ranging from passive to active to resisted range-of-motion exercises, transfers, balance training (sitting and standing) through to ambulation with assistance were part of the intervention in Kayambu 2015; passive range-of-motion, physical therapy including bed mobility, transfer training and balance training, and progressive resistance exercise using elastic resistance bands were used in Morris 2016; upper limb exercises were performed with the intervention group in the trial by Patman 2001; and activities ranging from passive to active-assisted exercises through to transfer training, ADL tasks and ambulation were implemented in Schweickert 2009” (p. 14)</p>

	<p>Analysis/theme three: Comparators “Information about the timing of treatment in the control group was reported in three studies “ (p. 15)</p> <p>Analysis/theme four: Outcomes Primary Physical function and performance Adverse events Secondary length of stay muscle strength health related quality of life delirium death from any cause hospital costs funding</p>
<p>Authors’ Discussion and Conclusion</p>	<p>Idea one: “Benefits from the intervention were found for return to independent functional status at hospital discharge in one study, and for greatest walking distance at hospital discharge and time from intubation to functional mobility in the same study (Schweickert 2009). However, no significant effect was found for other measures of this outcome in this study, including the number of independent ADLs achieved at ICU or hospital discharge and the Barthel Index Score at hospital discharge” (p. 19).</p> <p>Idea two: “There is insufficient evidence on the effect of early mobilization of critically ill people in the ICU on physical function or performance, adverse events, muscle strength and health-related quality of life at this time” (p. 19)</p> <p>Idea three: “We assessed that there is currently low-quality evidence for the effect of early mobilization of critically ill adults in the ICU due to small sample sizes, lack of blinding of participants and personnel, variation in the interventions and outcomes used to measure their effect and inadequate descriptions of the interventions delivered as usual care in the studies included in this Cochrane Review” (p. 19)</p> <p>Consistent findings: “Our certainty in the risk of adverse events with either mobilization strategy is low due to the low rate of events” (p. 2)</p> <p>Inconsistent findings: The effects of early mobilization for critically ill adults</p>
<p>Authors’ Limitations</p>	<p>“There are limitations in the applicability of the existing evidence and its completeness. Admission diagnoses in three of the studies signified critical illness and the majority of the participants were intubated for longer than three days (Kayambu 2015; Morris 2016; Schweickert 2009). While participants in the study by Patman 2001 were considered routine ICU patients after cardiac surgery, they were withdrawn</p>

	<p>from the study if mechanical ventilation was required for more than 24 hours. This is the only included study in which participants were withdrawn from the study on the basis of a predefined length of mechanical ventilation. This study also used only a small range of interventions and did not measure any functional outcomes (Patman 2001). Hence, the results from this study and its contribution to the body of evidence should be interpreted with these differences in mind (Patman 2001). “ (p. 19).</p>
<p>Authors’ Implications For Practice and Future Research</p>	<p>“Results from ongoing studies across multiple sites will provide some evidence regarding the impact of this intervention in critically ill patients in the ICU “ (p.20) “In order to be confident of the safety of early intervention, more randomized controlled trials with larger sample sizes, clearly reported interventions and control conditions, and blinded outcome assessment are needed” (p.20) “It is also important to disentangle early intervention from intensity of intervention in the design of new studies, in order to be able to confidently recommend either early intervention, or more intensive intervention, irrespective of timing” (p.20)</p>

	Summary
APA Reference	Davis, J., Crawford, K., Wierman, H., Osgood, W., Cavanaugh, J., Smith, K. A., Mette, S., & Orff, S. (2013). Mobilization of ventilated older adults. <i>Journal of Geriatric Physical Therapy, 36</i> (4), 162–168. https://doi.org/10.1519/JPT.0b013e31828836e7
Abstract	<p>“Background: Recent studies of ventilated, critically ill patients have shown early mobilization to be safe and resulting in better functional outcomes at discharge but have not focused on older adults.</p> <p>Objectives: The objectives of this pilot study were to examine the feasibility of and to describe functional outcomes associated with providing early mobilization to critically ill, older adult patients.</p> <p>Methods: This is a prospective cohort study that took place in the medical and surgical intensive care units of a tertiary, academic medical center. Participants were aged 65 years or older, were on mechanical ventilation for 72 or more hours, and had a preadmission Barthel Index score of 70 or greater. Patients with an open ventriculostomy, continuous hemodialysis, or hospitalization of 7 or more days prior to intubation were excluded. A standardized early mobilization protocol was applied by a trained physical and occupational therapist to eligible participants according to previously published guidelines. Demographic information, hospitalization data, RAND 36-Item Short Form Health Survey (SF-36), and Barthel Index scores from preadmission, hospital discharge, and 30-day follow-up were collected.</p> <p>Results: Patients who survived to hospital discharge compared with nonsurvivors were similar in their admission and hospital stay demographics. Survivors reported significantly higher functioning than nonsurvivors on preadmission functional status on both the physical functioning and general health RAND SF-36 subscales. Nonsurvivors reported significantly lower physical functioning, general health, vitality, and mental health on preadmission function when compared with the published normative RAND SF-36 data for patients aged 75 years and older. Patients who did survive hospitalization reported significantly more bodily pain at 30-day follow-up than the published normative data. Patients met criteria for therapy 92% of planned interventions, 99% of those sessions were completed, and adverse events occurred in less than 1% of interventions.</p> <p>Conclusion: Overall results indicate the feasibility and safety of implementing an early mobilization program to critically ill older adult patients” (p. 162).</p>
Your Focused Question and Clinical Bottom Line	<p>Question: What is the feasibility of and functional outcomes associated with early mobilization of ventilated older adults?</p> <p>Clinical Bottom Line: The results indicate that early mobilization is feasible and safe when working with critically older adults. The results also suggest that early mobilization may improve independence in ADLs and allow for more patients to be able</p>

	<p>to return home. However, because this is a pilot study, there is a small sample size and the research design, these results are inconclusive.</p>
<p>Your Lay Summary</p>	<p>This study focused on if an early mobilization program (movement program) for ill patients is feasible and safe in an ICU (Intensive Care Unit) setting. The researchers also examined the patient’s mobility and their success in completing their daily activities. To explore this question, researchers compiled data regarding quality of life and function in daily activities when the participants began the early mobilization program in the ICU and when the participants were discharged from the ICU. The results demonstrated that early mobilization is feasible and safe in a healthcare setting for mechanically ventilated older adults. Although the results were mostly inconclusive, there was some evidence to support that there was an improvement in the mental health and role emotional categories compared to the average hospital population. However, participants in the early mobilization group had similar scores to the hospital population in the measures of physical function, role physical bodily pain, general health and emotion. The strengths of this study include that researchers used evidence-based measurement tools, the researchers used an established early mobilization program (Peerme and Chandrashekar Early Mobilization Protocol), and that it is very related to the research question that our group is attempting to answer. The limitations of this study are that this was a pilot study, had a weak research design, and had a small number of participants.</p>
<p>Your Professional Summary</p>	<p>The objective of this study was to determine the feasibility of an early mobilization program in the ICU for critically ill older adults on ventilators. Researchers also collected functional outcome and patient mobility data. The design of this study was a pretest-posttest design, which measured one group from the initiation of services to discharge. The study used the Peerme and Chandrashekar Early Mobilization Protocol to streamline services. 15 patients recruited from Maine Medical Center ICU. Patients were 65+ and were mechanically ventilated for at least 48 hours. Within the study, there were 186 total therapy sessions among 15 participants. The measures to assess health and functional outcomes include the RAND 36-Item Short Form Health Survey, Barthel Index, Intensive Care Delirium Screening Checklist, and Riker Sedation Agitation Scale. The evidence suggests that Peerme and Chandrashekar Early Mobilization Protocol is feasible and safe for mechanically ventilated older adults. For functional outcomes, there was some evidence to support that there was an improvement in the mental health and role emotional categories compared to the average hospital population. Authors report that this is consistent with previous studies on this subject. However, participants in the early mobilization group had similar scores to the hospital population in the measures of physical function, physical bodily pain, general health and emotion. This contrasts with previous studies, which have found that there was a statistically significant difference between early mobilization treatment group and the normal hospital population. The strengths of this study was that the researchers outlined a structured protocol for early intervention services (Peerme and Chandrashekar Early Mobilization Protocol), they used reliable and valid measurement tools, and this study was related to the research question. The weaknesses of the study included that a convenience sample, designed to be a pilot study, looking mostly at feasibility and</p>

	safety, small sample size, and the study had a weak research design. Because the results of this study are inconclusive, further studies need to be completed on the benefits of ventilation of a geriatric ICU population.
	Critical Appraisal
Stated Purpose or Research Question	“The purpose of this pilot study was to determine the feasibility of employing a standard early mobilization protocol in an ICU setting, while systematically collecting patient mobility data and short-term functional outcomes from critically ill, mechanically ventilated, older adults” (p. 163)
Background Literature	<p><i>Key points of the intro section:</i></p> <p>Long term survival rates of critically ill patients: “Medical advancement in the care of mechanically ventilated patients has led to increased long-term survival rates. 1 ,2 However, survivors of critical illness generally have increased morbidity, including prolonged weakness, delirium, and reduced quality of life” p. 162)</p> <p>Definition of early mobilization: Early mobilization is “initiation of a mobility program when a critically ill, often mechanically ventilated patient is able to participate in rehabilitation, has a stable hemodynamic status, and is receiving acceptable levels of oxygen” (p. 162) “Requires patient’s active participation” (p. 162)</p> <p>Barriers to early mobilization “Concerns for patient safety and limited understanding of the benefit of early mobilization” (p. 163) “Clinicians lack evidence-based guidelines for progressing patients toward higher levels of mobility.” (p. 163)</p> <p><i>Theoretical perspective: Not reported.</i></p>
Research Design	<p><i>Research design: pretest-posttest design</i></p> <p><i>Rationale for the design:</i> This information was not given explicitly, but researchers wanted to see what the reported quality of life and ADL independence were before and after early mobilization. There was not a specific control group, but the authors compared it to the general hospital population.</p> <p><i>For quantitative primary research, AOTA Level of Evidence: Level 3:</i> There is only one group and it is pretest-posttest.</p>
Sampling	<p><i>Sampling method used and the rationale (if given).</i> A convenience sample was used. 15 patients were recruited from the Maine Medical Center ICU if they fit the criteria.</p> <p><i>Inclusion criteria:</i> age 65+ Mechanically ventilated for at least 48 hours</p> <p><i>Exclusion criteria:</i> Patients with a ventriculostomy</p>

	<p>Preadmission scores less than 70 of the BI index</p> <p>Enrollment in another study</p> <p>Patients with continuous venovenous dialysis</p> <p>Patients who were hospitalized for more than 7 days prior to intubation.</p> <p><i>Power/sample size estimate: not reported.</i></p>
Sample	<p><i>Number of Participants (Total and Subgroups):</i> 15 participants total. There were no subgroups.</p> <p><i>Characteristics of the Sample (Gender, Race/Ethnicity, Diagnosis/Disability):</i></p> <p>8 men & 7 women</p> <p>Average 76 y/o</p> <p>“Primary diagnoses included: vascular (3), respiratory (3), cardiovascular (3), trauma (2), gastrointestinal (1), neurologic (2), and oncologic (1)” (p. 165)</p> <p>People who were mechanically ventilated for at least 48 hours</p> <p><i>Dropouts:</i> 5 of the participants died prior to discharge from the ICU (p. 165)</p>
Groups	<p><i>Types of groups: (e.g., intervention, sample characteristic):</i></p> <p><i>There was only one group in this study: pre-test, post-test</i></p> <p><i>Group one description:</i> 15 people whose average age was 76 who were on a ventilator for at least 48 hours. This group received the intervention of the standardized mobilization protocol, previously established by Perme and Chandrashekar (Phases 1-4). Mobilization protocols were provided by occupational and physical therapists.</p>
Method	<p><i>Primary methods to answer research question (e.g., intervention, interview, survey, chart review)</i></p> <p>Patients were administered a preadmission RAND SF-36 short form and a Barthel Index survey.</p> <p>Occupational therapists and physical therapists used the early mobilization standard protocol used by Perme and Chandrashekar.</p> <p><i>Early mobilization program divided into four phases (See table 1: Early Mobilization Protocol [p. 164])</i></p> <p><i>Phase 1:</i> importance of positioning, exercise program and early mobility</p> <p><i>Phase 2:</i> transfer safety, importance of increasing sitting time out of bed</p> <p><i>Phase 3:</i> progressive mobility and safety during walking</p> <p><i>Phase 4:</i> discharge planning, family education, safety concerns, home exercises</p> <p>Early mobilization protocols were continued until hospital discharge.</p> <p>BI was administered weekly and RAND SF-36 were taken upon discharge.</p>
Measurement and Outcomes	<p><i>Measure: RAND 36-Item Short Form Health Survey (SF-36)</i></p> <p><i>Construct:</i> “assess self-perception of quality of life based on 8 categories (physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health</p>

	<p><i>reliability/validity, frequency” (p. 163)</i></p> <p>Reliability and Validity: “Cronbach’s alpha reliability values were 0.95, 0.98, 0.79, 0.74, 0.91, 0.88, 0.94, and 0.54” (p. 163)</p> <p>Frequency: Before and after</p> <p>Measure: Barthel Index</p> <p>Construct: assess function in daily activities.</p> <p>Reliability and Validity: report an interrater reliability of 0.94.</p> <p>Frequency: daily</p> <p>Measure: Intensive Care Delirium Screening Checklist (DSC)</p> <p>Construct: screens for delirium</p> <p>Reliability and Validity: “intraobserver reliability for this screening tool to be 0.94 and a sensitivity and specificity are 99% and 64%, respectively” (p. 163)</p> <p>Frequency: daily</p> <p>Measure: Riker Sedation Agitation Scale (SAS)</p> <p>Construct: measure sedation and agitation</p> <p>Reliability and Validity: “interrater reliability has been found to be 0.92” (p. 162)</p> <p>Frequency: daily</p> <p>Measure: Apache II score</p> <p>Construct: “used to assess disease severity and predict ICU mortality; higher scores indicate more severe disease” (p. 163)</p> <p>Reliability and Validity: not specified</p> <p>Frequency: baseline at start of therapy.</p> <p>Measure: Hospital Course</p> <p>Information collected: “length of stay, the number of mechanical ventilator days, mortality, and location at discharge and 30-day follow-up disposition” (p. 163)</p> <p>Measure: Demographic Information</p> <p>Information collected: “age, gender, admission diagnoses, comorbidities, body mass index, and race” (p. 163)</p> <p>Measure: Therapy Sessions</p> <p>Information collected: “Sessions attempted, sessions completed, and adverse events. Adverse events were categorized as a fall, tube removal, systolic blood pressure greater than 200 mm Hg or less than 90 mm Hg, desaturation greater than 80%, and extubation.” (p. 163)</p>
Results	<p>Description of the sample: A total of 15 participants, 8 men and 7 women averaging 76 years old</p>

	<p>Delirium: “A total of 109 DSC worksheets were completed and 76 DSC worksheets were incomplete or missing. Most common reason for sheets not being completed was admission or discharge/expiration of the patient from the ICU (39.5%). Of the screens completed, 45% had scores 4 or greater, which is a positive screen for delirium” (p. 163)</p> <p>Barthel Index Score: “Mean BI on preadmission, hospital discharge, and 30-day follow-up were 97, 42, and 86, respectively. Patients who survived to 30-day follow-up recovered 89% of baseline function based on the BI.”(p. 163)</p> <p>RAND SF-36 Scores: “RAND SF-36 scores at 30-day follow-up for those who survived were comparative to norms of community dwelling elders older than 75 years. However, these patients reported significantly more bodily pain at 30-day follow-up compared to the published normative data as shown in Figure 2” (p. 163)</p>
<p>Authors’ Discussion and Conclusion</p>	<p>Idea one: “The primary finding of this pilot study was that a previously described standardized early mobilization protocol was feasible, safe, and well-tolerated by a small sample of critically ill, mechanically ventilated older and very old adult patients” (p. 166)</p> <p>Idea two: “Those who survived to 30-day follow-up had similar scores on RAND SF-36 when compared with norms of community-dwelling persons older than 75 years” (p. 166)</p> <p>Idea three: “Participants in early mobilization at 30 days were similar in the categories of physical function, role physical, bodily pain, general health, and role emotional as graded by the RAND SF-36 compared with normative data for community-dwelling persons older than 75 years. Our finding of statistically significant improvement in the mental health and role emotional categories is consistent with previous studies” (p. 167)</p>
<p>Authors’ Limitations</p>	<p>It was designed to be a pilot study, so this is not the most comprehensive information. There is a small sample size and is not applicable to the general population. There is variation among the way therapy is completed among therapists, which may lead to extraneous variables. (Although the protocols are streamlined, there are slight variations among practitioners. There is only one group and there is a pre-test, post-test protocol, so this is level 3 evidence. This paper did not make it clear what were the pre and post effects of the early mobilization therapy. This could be made more clear</p>

<p>Authors' Implications For Practice and Future Research</p>	<p>“Further studies are needed to determine, more accurately, the benefits of early mobilization in a larger sample of the geriatric ICU population” (p. 167)</p> <p>“A study of longer duration of follow-up would help determine whether the benefits of perceived mental health continue over time.” p. 167</p> <p>“In addition, identifying other predictors of mortality that involve utilization of all or portions of the RAND SF-36 could be explored.” (p. 167)</p> <p>“Early mobilization requires a multidisciplinary team and is labor-intensive. Further studies should determine dosing value and cost-effectiveness of treatment.” (p. 167)</p>
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	Summary
APA Reference	Foidel, S.E., Birrer, C.M., Stinogel, A.K., & Krusen, N.E. (2020). Delirium in acute care: Occupational therapists' perspectives, experiences, and practice implications. <i>Journal of Acute Care Occupational Therapy</i> , 3(1), 1-25.
Abstract	"The prevalence of delirium places assessment, prevention, and management (APM) at the forefront of occupational therapy intervention in acute care. This qualitative descriptive feasibility study examined occupational therapists' perceptions of APM in acute care settings in the Pacific Northwest. In a convenience sample, 25 of 46 (62%) participants returned surveys addressing roles, assessment, intervention, barriers, recommendations, and preparedness. Data revealed opportunities for improving practice consistent with those reported in the current literature. Education emerged as a theme from the data across roles, strategies for prevention and management, barriers to implementation, and means to improve site-specific APM services. Authors recommend additional education and research expanded to additional geographic and practice settings" (p. 2).
Your Focused Question and Clinical Bottom Line	<i>Question:</i> How do early mobilization and activity for functional mobility help to prevent delirium in adults in the ICU? <i>Clinical Bottom Line:</i> There is a need for continued education in clarifying the role of occupational therapists in assessing, preventing and managing delirium in the ICU. It is understood as background knowledge that early mobilization is effective in reducing delirium. 48.2% of occupational therapists surveyed in this study reported functional mobility as an intervention to manage and prevent delirium.
Your Lay Summary	This study looked at how occupational therapists view their role in treating delirium, a sudden change in mental functioning affecting attention and awareness, in the intensive care unit (ICU) of hospitals. The researchers of this study created a 12 question survey for occupational therapists working in the Pacific Northwest. The survey asked questions about how occupational therapists assess, prevent, and manage delirium, a three word acronym known as APM. 46 occupational therapists were given the survey and 26 returned their answers. The answers were collected into a spreadsheet and reviewed for common themes and categories. This data revealed that most of the occupational therapists viewed APM as at least somewhat necessary, if not more. They listed common ways for preventing and managing delirium, like activities that are meaningful to the patient, opening blinds in the hospital room, and educating the family on how to be most helpful during this time. This study showed that occupational therapists have an important role in the APM of delirium and there should continue to be education and research on this.
Your Professional Summary	The objective of this study was to gather the perceptions of occupational therapists in the intensive care unit (ICU) on how they assess, prevent, and manage (APM) delirium. Using a convenience sample of 46 occupational therapists working full time and part time in the Pacific Northwest, 25 of the participants returned surveys responding to the roles, assessments, prevention and management interventions, and the barriers and improvements with delirium. This 12-item survey was made up of multiple-choice, Likert-type items (ranking 1-5) and open-ended questions. The

	<p>researchers compiled the returned data into Microsoft Excel, analyzed the results for themes and categories, with a third researcher independently coding to assure validity, and a fourth researcher reviewing the data. The Taylor-Powell and Renner approach was utilized. Of the 62% participants that responded, their answers reveal that 50% view delirium APM as necessary, 39.3% somewhat necessary, 3.6% not necessary, and 7.1% did not answer the question. Majority of respondents reported prevention, management and education as occupational therapist's role in assessing delirium. This study was limited as it was a snapshot of occupational therapists working in large, urban medical centers and data gathered within a short time frame. This study provides implications for further education on APM in acute care, research in providing effective education on APM, and addressing potential roles for occupational therapy as leaders and recipients of aforementioned education.</p>
	<p>Critical Appraisal</p>
Stated Purpose or Research Question	<p>“The purpose of the study was to explore acute care occupational therapists’ perceptions of the role of occupational therapy in assessment, prevention, and management (APM). Additionally, the authors’ aim was to identify implications for practice and guide future research.” (p.4)</p>
Background Literature	<p><i>Key points of the intro section:</i> [1]“Delirium is a rapid onset of impaired attention and lack of awareness, with a change in at least one cognitive domain, as described in the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013).” [2] “The highest risk for delirium includes patients 65 and older; patients with baseline cognitive impairments, dementia, poor mobility, visual and hearing impairments, sleep deprivation, severe illness; and post general anesthesia.” [3] “A lack of consensus and inconsistent use of protocols contribute to the incidence and poor management of delirium (Siddiqi, 2016).” [4] “While some studies have examined occupational therapy’s role in the prevention and management of delirium, we found limited evidence exploring occupational therapists’ perspectives and experiences of delirium management in acute care as part of the interprofessional team.” [5] “The implementation of evidence-based protocols to prevent and manage delirium reduces associated negative outcomes.” [6] “Because each patient has a unique occupational profile, there is no one-size-fits-all management strategy; therefore, to reduce the impact of delirium, interventions are best focused on risk reduction, re-orientation, and re-engagement of a patient’s typical routines (Hoolahan, 2011).” [7] “Given their multidimensional approach to patient care, the evidence supports the efficacy of occupational therapy in the prevention and management of delirium and indicates therapists’ unique role within the interdisciplinary team.” (pp.3-6)</p> <p><i>Theoretical perspective:</i> “Researchers applied the Taylor-Powell and Renner approach to content analysis of qualitative data (Taylor-Powell & Renner, 2003).” (p. 9)</p>
Research Design	<p><i>Research design:</i> “The researchers designed a descriptive study generating primarily qualitative data to explore occupational therapists’ perceptions related to acute care practice with persons experiencing delirium. The project was a feasibility study, investigating if a larger project would be relevant, manageable, and justifiable in</p>

	<p>terms of resources. The authors employed survey-based research with Likert-type closed questions and open-ended qualitative questions, enabling respondents to elaborate on complex topics describing how practice happens.” (p. 7)</p> <p><i>Rationale for the design:</i> “Descriptive inquiry is commonly used to study the state of an issue or phenomenon. Nayar and Stanley (2014) described qualitative descriptive inquiry as useful to examine people in context to illuminate a phenomenon of interest.” (p. 7)</p> <p><i>For quantitative primary research, AOTA Level of Evidence:</i> Level IV (one group perception). Descriptive study</p>
Sampling	<p><i>Sampling method used and the rationale (if given).</i> “Researchers sought a convenience sample of licensed occupational therapists working full-time or part-time in acute care.” (p. 8)</p> <p><i>Inclusion criteria:</i> “researchers contacted acute care occupational therapy departments in the Pacific Northwest for permission to distribute and collect paper surveys during departmental meetings” (p. 8)</p> <p><i>Exclusion criteria:</i> “Researchers excluded certified occupational therapy assistants from this study.” (p. 8)</p> <p><i>Power/sample size estimate:</i> Not reported - “While pilot studies may calculate sample size for a main study, neither feasibility studies nor qualitative descriptive studies typically involve power calculations” (p. 8)</p>
Sample	<p><i>Number of Participants (Total and Subgroups):</i> 25 of 46 participants returned</p> <p><i>Characteristics of the Sample (Gender, Race/Ethnicity, Diagnosis/Disability):</i> “licensed occupational therapists working full-time or part-time in acute care” (p. 8)</p> <p><i>Dropouts:</i> 21 participants</p>
Groups	<p><i>Types of groups: (e.g., intervention, sample characteristic):</i> The total group was not divided in this study</p>
Method	<p><i>Primary methods to answer research question (e.g., intervention, interview, survey, chart review)</i></p> <p>The researchers used a 12-item survey with 8 open ended questions and 4 multiple choice Likert-type questions. The items were developed from the literature review and asked for the OTR’s role and perspective in treating delirium. “Researchers requested feedback from five stakeholders for face validity, confirming relevance to research questions and readability of the survey.” (p.8)</p> <p>A few examples of the questions:</p> <p>“Describe the role OTRs play in the assessment, prevention, and management (APM) of delirium in acute care.” (open ended)</p> <p>“In general, therapists in this hospital feel that delirium APM is... necessary.” (Likert-type, 1-5)</p>
Measurement and Outcomes	<p><i>Measure: Microsoft Excel data entry</i></p> <p><i>Measure:</i> “Following data collection, two researchers separately analyzed Likert-type and open-ended data, retained independent audit trails, and then compared findings, matching themes and categories” (p. 9)</p> <p><i>Measure:</i> “A third researcher independently coded to triangulate data, mediating any discrepancies for consensus.” (p. 9)</p>

	<p><i>Measure: “A fourth researcher reviewed data entry, coding, and triangulation for meaning.” (p. 9)</i></p> <p><i>Measure: “Researchers applied the Taylor-Powell and Renner approach to content analysis of qualitative data (Taylor-Powell & Renner, 2003).” (p. 9)</i></p> <p><i>Measure: “a mix of skill... two entry-level clinical doctorate students... two other researchers were academic educators with 21 years and 39 years of experience.” (p. 10)</i></p>
<p>Results</p>	<p><i>Description of the sample: “Researchers noted a return rate of 62%, 25 of 46 participants responded. Respondents projected 50% of occupational therapists in the hospital believed delirium APM as necessary, 39.3% believed APM to be somewhat necessary, 3.6% believed APM not to be necessary. 7.1% of participants did not respond to this question.” (p. 11)</i></p> <p><i>Analysis/theme one: Analysis - “Participants identified the Confusion Assessment Method (CAM) Short-Form or CAM-ICU (57.1%), observation of functional cognition during ADL participation (50%), and other cognitive screens (32.1%) as most frequently used to detect signs associated with delirium.” (p. 12)</i></p> <p><i>Analysis/theme two: Prevention and Management - “Participants reported a broad variety of interventions occupational therapists most commonly use to prevent and manage delirium [Figure 2]. Therapeutic, meaningful, and routine activities (66.1%) including ADLs and activities performed in a patient’s typical routine. Environmental modifications (55.4%) including opening blinds, turning on lights, and reducing lighting at night. Functional mobility (48.2%) including out of bed activities, transfers, and ambulation for ADL tasks.” (p. 12)</i></p> <p><i>Analysis/theme three: Barriers and improvements - “Participants identified the most common barriers [Figure 3] and suggestions for improvements [Figure 4] at their sites. Data revealed most frequently identified barriers as lack of education of family and staff (46.4%); interdisciplinary consistency, coordination, and communication (35.7%); time to assess and implement (25%); and lack of resources (21.4%).” (p. 13)</i></p> <p><i>Analysis/theme four: “Preparedness to provide delirium assessment, prevention, and management” - “Participants felt moderately prepared or prepared for assessment (32% each category), prevention (36% and 32% respectively), and management (29% and 43% respectively).” (p. 15)</i></p>
<p>Authors’ Discussion and Conclusion</p>	<p><i>Idea one: “Data revealed roles, assessments, prevention and management, and opportunities for improving practice, consistent with those reported in the current literature as cited above. Data also revealed multiple barriers consistent with the literature, including time, knowledge of delirium, prevention and management strategies, lack of resources, and lack of control over the environment” (p. 16)</i></p> <p><i>Idea two: “The need for education appears to contribute to limited APM for occupational therapy practice in acute care.” (p. 16)</i></p> <p><i>Idea three: “Findings from the current study suggest that additional education for practitioners may be instrumental in clarifying roles, reducing barriers, and improving APM.” (p. 17)</i></p>

<p>Authors' Limitations</p>	<p>“Open-ended items allowed for a more in-depth response, but limited the opportunity for probing questions. While multiple practitioners established face validity for the non-standardized survey, there was no opportunity for further validation. The study was time-limited to gain a snapshot of practitioners across three medical facilities... Participants represented large medical centers in an urban area which may have more resources and opportunities for education than smaller and/or rural institutions. Despite the best intentions of researchers to bracket their beliefs, it is possible that the researchers' perspectives influence inquiry.” (pp.17-18)</p>
<p>Authors' Implications For Practice and Future Research</p>	<p>“This study of practitioners' perceptions suggests opportunities for education, practice, and research. Findings suggest acute care therapists should take a proactive role in obtaining continuing education in APM.” (p. 18)</p> <p>“Future research is needed to explore the most effective methods for improving on-going interdisciplinary education, communication, and collaboration.” (p. 18)</p> <p>“Results of this study suggest opportunities for occupational therapists to address delirium in acute care. Occupational therapists may be recipients and providers of education. Therapists' roles may include leadership, patient advocacy, and education to interprofessional team members for effective APM.” (p. 19)</p>

	Summary
APA Reference	Jarzenski, T., Becker, C., King, E., Cooper, S., Montague, C., Mulhausen, H., Pritchard, K. (2019). Behavior change strategies used to implement early mobility programs in the intensive care unit: A systematic review. <i>Journal of Acute Care Occupational Therapy</i> , 2(2),1-29.
Abstract	<p>“The aim of the study was to identify and categorize behavior change strategies used when implementing early mobility in the ICU. Search strategies incorporated a combination of controlled vocabulary and text words for intensive care units, health personnel, and mobility. Inclusion criteria included (a) publication in a peer-reviewed journal (b) description of interventions to improve early mobility implementation in at least one adult ICU setting (c) reporting of ICU-specific data on early mobility outcomes. Exclusion criteria: studies (a) not available in English (b) in pediatric settings. Interventions used to facilitate early mobility behavior change were extracted utilizing the 9 strategies described in the Behavior Change Wheel (BCW) (Michie et al., 2011). Each article was appraised using the Modified Downs and Black checklist for measuring study quality of healthcare interventions (Downs & Black, 1998). Additional data recorded included: level of evidence, study design, professionals participating in intervention. Frequency of strategies utilized: education (89%), enablement (84%), training (63%), restriction (57%), persuasion (42%), environmental restructuring (42%), modeling (42%), incentivisation (31%), coercion (0%). Interventions most utilized for behavior change focused on positive reinforcement such as education, enablement and training while interventions used the least on the BCW were incentivisation and coercion. Review of behavior change strategies utilized by others can assist in the creation of programs designed to implement and improve early mobility in the intensive care unit” (p. 2).</p>
Your Focused Question and Clinical Bottom Line	<p><i>Question:</i> What are the benefits to having occupational therapists as key stakeholders when implementing and sustaining early mobilization programs in adults within an intensive care unit?</p> <p><i>Clinical Bottom Line:</i> When occupational therapists are included as part of the team that implements early mobilization to adult patients in the ICU, those adults have lower readmission rates than the adults treated in an ICU without occupational therapists.</p>
Your Lay Summary	<p>Researchers looked at the behavior changes given to ICU medical staff when implementing early mobilization. They found that the most used strategies for this are education enablement, training, and restriction. It is also important to recognize that these strategies can only be effective if there are also resources, policies, and environmental changes to support early mobilization in the ICU long-term. The behavior changes with the largest impact on early mobilization in the ICU are the ones that include practice needs. This means that medical staff and the environment also need to be considered when implementing an early mobilization program in the ICU. When the medical staff are properly prepared with behavior change strategies to</p>

	implement early mobilization, the more likely they will be able to execute the early mobilization program. More research is needed to look at which behavior change strategies are the most effective in implementing early mobilization in the ICU.
Your Professional Summary	This systematic review examined the evidence from 19 peer-reviewed studies of various designs including non-randomized observational designs, case reports, and expert opinions that examined the behavior changes implemented with early mobilization programs in adult ICUs. This article is a level I systematic review that used specific inclusion and exclusion criteria to strengthen their analysis. For each study, the Behavior Change Wheel (BCW) was used to categorize the interventions of behavior changes into nine strategies. All studies reported that two or more strategies were used, and the most common strategies were education enablement, training, and restriction. The behavior change strategies with the largest impact on early mobilization implementation in the ICU are the ones that include practice needs. When occupational therapists were key stakeholders in the ICU early mobilization implementation, there was a lower readmission rate of adult patients in that ICU. This may mean that including occupational therapists in ICU teams and implementing behavior change strategies that focus on practice needs could be most effective when looking at early mobilization programs in the ICU. Cautions would include the inability to compare outcomes of the studies due to vast differences among the patients. Another limitation is use of the BCW because it limits interventions to nine categories. More research is needed to identify the most effective way to implement early mobilization programs in ICUs.
	Critical Appraisal
Stated Purpose or Research Question	“The purpose of this systematic review was to examine behavior change strategies that influence the culture in ICUs regarding the implementation of sustainable early mobility practice. The researcher’s identified which behavior change strategies are implemented most often in the literature. Secondary aims described the rigor within this body of research in addition to the proportion of key stakeholders who define interdisciplinary early mobility teams” (p. 5).
Background Literature	<i>Key points of the intro section:</i> “‘The benefits of early mobility are well understood, however, the practice of early mobility is underutilized... Current early mobility research often focuses solely on patient outcome statistics while lacking a description of how change was achieved. Behavior change theory seeks to utilize the most effective interventions and approaches to achieve desired behaviors (Michie et al. 2011). Of the ICUs that did not have early mobility programs in place, 78% reported that their institution was considering implementation, but various barriers prevented execution (Bakhru et al., 2015)” (pp. 3-4). <i>Theoretical perspective:</i> Behavior change theory, looked at studies that included the behavior strategies used to implement the intervention
Research Design	<i>Research design:</i> systematic review

	<p><i>Rationale for the design:</i> not reported</p> <p><i>For reviews of research, AOTA Level of Evidence:</i> Level I Evidence</p>
Method	<p><i>Primary methods to answer research question:</i> “This systematic review adheres to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Guidelines (Liberati et al., 2009). The search strategy incorporated a combination of controlled vocabulary and text words for intensive care units, health personnel, and mobility” (p. 5).</p> <p><i>Variables:</i> early mobilization implementation, ICU setting, ICU data on early mobilization outcomes.</p> <p><i>Keywords:</i> “combination of controlled vocabulary and text words for intensive care units, health personnel, and mobility” (p. 5).</p> <p><i>Databases:</i> “MEDLINE (Ovid), the Cochrane Library (Wiley), Embase (Elsevier), and CINAHL with Full Text (EBSCOhost)” (p. 5).</p> <p><i>Procedures:</i> “During full-text review, the aim was to identify, categorize, and describe behavior change strategies used with interdisciplinary personnel when implementing early mobility in the ICU. The interventions were categorized using the Behavior Change Wheel (BCW)” (p. 6).</p>
Filters	<p><i>Research Designs included and not included:</i> “Using Sackett’s Levels of Evidence (1997), nine of the included studies qualified as level III, seven as level IV, and three as level V. Study designs included non-randomized observational designs, case reports, or expert opinions” (p. 9).</p> <p><i>Inclusion and exclusion criteria:</i> “Inclusion criteria included studies published in peer-reviewed journals that (a) describing an intervention to improve early mobility implementation, (b) conducted in at least one adult ICU setting, and (c) articles reporting ICU-specific data on early mobility outcomes” (p. 6). “Exclusion criteria includes studies not published in English and describing ICU setting as pediatric focused” (p. 6).</p> <p><i>Total references found:</i> The initial database search yielded 3,619 articles” (p. 9).</p>

	<p><i>Process for eliminating references:</i> “Titles were screened through an unblinded group process and all disagreements were resolved with group discussion. Abstract and subsequent full- text reviews were screened with the same inclusion criteria, but performed in in pairs with an even distribution of the included articles. Each pair reviewed in a blinded individual process, and any disagreements among pairs were discussed with the entire review team” (p. 6).</p>
<p>Results</p>	<p><i>Description of the articles:</i> “19 meeting all inclusion criteria for review... The average quality score of the studies reviewed was 12 out of 27 points on the Down & Black appraisal tool. The range of the studies quality was 6 to 18 points and a standard deviation of 3.0 points. The average score was 12 which falls within the crude summary data for the Downs & Black (1998) appraisal tool that primarily focuses on reviews of quantitative methodology” (p. 9).</p> <p><i>Analysis/theme one:</i> “Behavior change wheel intervention strategies utilized in more than half the reviewed articles were education enablement, training, and restriction” (p. 11).</p> <p><i>Analysis/theme two:</i> “All studies used a multi-modal approach, incorporating at least two strategies from the BCW” (p. 12).</p> <p><i>Analysis/theme three:</i> “More specifically, each study reported various strategies used to implement staff behavior change” (p. 12).</p>
<p>Authors’ Discussion and Conclusion</p>	<p><i>Idea one:</i> “Providing education to health care staff regarding the benefits of early mobility should not be the solo intervention to improve behavior change toward early mobility in the intensive care unit. A staff that understands the benefits of early mobility, but does not have the necessary resources or policies to support early mobility, may benefit from more specific behavior strategies to address environmental restructuring or enablement ensure successful early mobility use long-term” (p. 14).</p> <p><i>Idea two:</i> “By categorizing and identifying behaviors we were able to identify behavior characteristics that were essential to have for developing a program that aims to improve early mobility with patient’s having critical illnesses” (p. 14).</p> <p><i>Idea three:</i> “challenges could be targeted through staff and patient education and staff training identified with characteristics described in the BWC” (p. 15).</p> <p><i>Idea four:</i></p>

	<p>“As one of the only hospital spending category where additional spending had a statistically significant association with lower readmission rates, occupational therapists have a distinct opportunity to demonstrate their value in ICU settings” (p. 15).</p> <p><i>Consistent findings:</i> “Utilization of behavior change strategies that address practice needs can provide the largest impact for early mobility implementation” (pp. 13-14).</p> <p>“Education, and enablement were the most frequently used strategies” (p. 14).</p> <p><i>Inconsistent findings:</i> “There is no evidence to suggest that using more behavioral strategies leads to more successful implementation of early mobility” (p. 13).</p>
<p>Authors’ Limitations</p>	<p>Limitations included “Reporting the usage of behavior change interventions does not indicate the success or failure of individual intervention types... inclusion criteria requiring a description of the interventions used, excluded most of the experimental studies located by our search... the use of the BCW as a classification tool... Studies that provided rich description of patient outcomes lacked description of implementation description, while studies with rich implementation description often lacked comparable descriptions of patient outcomes. Additionally, the wide range of patient outcomes measured prevented comparison between studies” (pp. 15-16).</p>
<p>Authors’ Implications For Practice and Future Research</p>	<p>“The outcomes provide a baseline for future research to focus on combinations of behavioral interventions to identify the most effective behaviors needed to develop and sustain long term early mobility success... There is a need for occupational therapists to conduct further research to understand which behavioral interventions are most effective for implementing behavior change and sustaining early mobility practices as well as identification of their role in driving change for early mobility and activity” (p. 17).</p>

	Summary
APA Reference	Nydahl, P., Sricharoenchai, T., Chandra, S., Kundt, F. S., Huang, M., Fischill, M., & Needham, D. M. (2017). Safety of patient mobilization and rehabilitation in the intensive care unit. Systematic review with meta-analysis. <i>Annals of the American Thoracic Society</i> , 14(5), 766-777. DOI: https://doi.org/10.1513/AnnalsATS.201611-843SR
Abstract	<p>“Background: Early mobilization and rehabilitation of patients in intensive care units (ICUs) may improve physical function, and reduce the duration of delirium, mechanical ventilation, and ICU length of stay. However, safety concerns are an important barrier to widespread implementation.</p> <p>Objectives: To synthesize safety data regarding patient mobilization and rehabilitation in the ICU, including falls, removal of endotracheal tubes, removal or dysfunction of intravascular catheters, removal of other catheters/tubes, cardiac arrest, hemodynamic changes, and desaturation.</p> <p>Data Sources: Systematic literature review, including searches of five databases. Eligible studies evaluated patients who received mobilization-related interventions in the ICU. Exclusion criteria included: (1) case series with fewer than 10 patients; (2) majority of patients under 18 years of age; and (3) data not reported to permit calculation of incidence of safety events.</p> <p>Data Extraction: Number of patients, mobilization/rehabilitation sessions, potential safety events, and events with negative consequences (e.g., requiring intervention or additional therapy).</p> <p>Synthesis: Heterogeneity was assessed by I2 statistics, and bias assessed by the Newcastle–Ottawa Scale and Cochrane risk of bias assessment. The literature search identified 20,660 titles. There were 48 eligible publications evaluating 7,546 patients, with 583 potential safety events occurring in 22,351 mobilization/rehabilitation sessions. There was a total of 583 (2.6%) potential safety events with heterogeneity in the definitions for these events. For the safety event types that could be meta-analyzed, pooled incidences per 1,000 mobilization/rehabilitation sessions (95% confidence interval), were: hemodynamic changes, 3.8 (1.3–11.4), and desaturation, 1.9 (0.9–4.3). A total of 24 studies of 3,404 patients reported on any consequences of potential safety events (e.g., needing to increase dose of vasopressor due to mobility-related hypotension), with a frequency of 0.6% in 14,398 mobilization/rehabilitation sessions.</p> <p>Conclusions: Patient mobilization and physical rehabilitation in the ICU appears safe, with a low incidence of potential safety events, and only rare events having any consequences for patient management. Heterogeneity in the definition of safety events across studies emphasizes the importance of implementing existing consensus-based definitions.” (pp. 1-2)</p>
Your Focused Question and Clinical Bottom Line	<p><i>Question:</i> Are there significant safety precaution concerns with mobilization and rehabilitation in critically ill ICU patients?</p> <p><i>Clinical Bottom Line:</i> According to Nydahl et al. mobilization and rehabilitation appear to be safe for critically ill adult ICU patients, however there are some cases that have some safety risks for patients in specific environment settings (2017). There are</p>

	<p>certain limitations regarding the studies that were chosen to look at, but overall, the review found mobilization and rehabilitation to be safe for ICU patients.</p>
<p>Your Lay Summary</p>	<p>This review looked at potential safety risks of using mobility and physical rehabilitation to help critically ill patients in the hospital. They found that in general there are not many risks or concerns involving mobilization and physical rehabilitation and that in general, it appears to be safe and helpful for these patients. This review looked at 48 carefully chosen studies that met the requirements of the main researchers and they used a specific analysis style to conduct their research. The authors originally gathered 20,660 articles but narrowed it down to 48 after this process. These carefully chosen articles consisted of different research styles that all included critically ill patients in intensive care units in a hospital, and early mobilization and physical rehabilitation interventions. The reason for starting this review was to see if there were any major safety concerns to be aware of when using these types of interventions in a hospital setting. Using the selected 48 articles they concluded that mobilization and physical rehabilitation for critically ill patients has minimal safety concerns given the few.</p>
<p>Your Professional Summary</p>	<p>This meta-analysis systematic-review looked at potential safety events regarding early mobilization and physical rehabilitation in critically ill intensive care unit (ICU) adult patients. They began this study to see not only the benefits of early mobilization and rehabilitation in an acute care setting, but also to see if there are any significant safety concerns regarding these kinds of interventions. This study used a systematic literature search recently designed by a medical librarian to narrow down the scope to which they were analyzing. Their initial search came up with 20,660 studies. The authors narrowed down to specific articles by including only ICU patients, patients over the age of 18, case studies with fewer than 10 participants, and non-reported data. This is considered a level one AOTA level of evidence because it follows the Cochrane library systematic review standards. After reducing the total number to only select articles meeting specific criteria, they had 48 eligible studies they used for the meta-analysis. The study has certain limitations including standardized definitions and assessments for aspects of safety hazards in different clinical settings. The authors concluded that there are no severe safety concerns with early mobilization and physical rehabilitation for adult critically ill ICU patients. However, there are certain conditions that could be further assessed. In particular, endotracheal tube removal patients. These studies had different findings than the overall interventions and could be further explored. There is also a need for more standard definitions within this scope of research. Specifically for safety events and screening criteria for in-bed and out-of-bed mobilization and rehabilitation. There can be further work done from this study but as a whole they concluded that early mobilization and physical rehabilitation can be safely in an ICU setting.</p>
	<p>Critical Appraisal</p>
<p>Stated Purpose or Research Question</p>	<p>“To synthesize safety data regarding patient mobilization and rehabilitation in the ICU, including falls, removal of endotracheal tubes, removal or dysfunction of intravascular catheters, removal of other catheters/tubes, cardiac arrest, hemodynamic changes, and desaturation.” (p.1)</p>

<p>Background Literature</p>	<p><i>Key points of the intro section:</i> safety concerns were a barrier to implementing early mobilizations in some settings Early mobilization and rehabilitation of patients in intensive care units (ICUs) may improve physical function, and reduce the duration of delirium, mechanical ventilation, and ICU length of stay. “Studies were selected for inclusion if they evaluated critically ill adult patients who received mobilization/rehabilitation in any type of ICU and reported data on potential safety events. The definition of safety events was adapted from pre-existing literature (26), with “potential safety events” defined as clinical deterioration in patient status or an event exceeding each study’s a priori safety limits” (p. 1) <i>Theoretical perspective:</i> Poisson Regression model fixed-effect model</p>
<p>Research Design</p>	<p><i>Research design:</i> Systemic review and meta-analysis <i>Rationale for the design:</i> “A systematic literature search was designed by a medical librarian and peer reviewed according to recent recommendations” (p. 2) <i>For quantitative primary research, AOTA Level of Evidence:</i> Level One</p>
<p>Method</p>	<p><i>Primary methods to answer research question</i> <i>Variables:</i> study identifier, study type, ICU type, number of patients, study population, ever MN (%), Male (%), and critically ill adult patients. <i>Keywords:</i> Early ambulation; exercise; patient safety; adverse effects. This search strategy focused on mobilization or physiotherapy conducted in the ICU, with the search strategy including the concepts of “ICU” or “critical care,” and “physical therapy,” “mobilization” or “rehabilitation” as MeSH terms, keywords, and/or controlled vocabulary (p. 2) <i>Databases:</i> PubMed, CINAHL, Excerpta Medica Database, Cochrane Library, Physiotherapy Evidence Database, Proquest health, and medical complete. <i>Procedures:</i> “This systematic review and meta-analysis was reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines (22, 23). The protocol, including complete search strategies, was registered in Prospero” (p. 2)</p>
<p>Filters</p>	<p><i>Research Designs included and not included:</i> “The 48 publications included 6 randomized controlled trials (RCTs; 32–34, 60–62), 2 non-RCTs (10, 35), 5 before/after studies (21, 36, 37, 63, 64), 22 prospective cohort studies (12, 14, 38–49, 57–59, 65–69), 11 retrospective cohort studies (50–54, 70–75), and 2 1-day point prevalence studies (55, 56).” (P.3) <i>Inclusion and exclusion criteria:</i> Inclusion: Studies that evaluated patients who were in the ICU and received mobilization related interventions. Exclusion: (1) case series with fewer than 10 patients (2) majority of patients under 18 years of age (3) data not reported to permit calculation of incidence of safety events (p. 1) <i>Total references found:</i> 20,660</p>

	<p><i>Process for eliminating references:</i> “6,483 removed during deduplication, resulting in 14,177 unique citations screened and 205 full-text publications reviewed. From this search, there were 48 eligible publication” (p. 3)</p>
<p>Results</p>	<p><i>Description of the sample:</i> A total of 20,660 citations were identified, with 6,483 removed during deduplication, resulting in 14,177 unique citations.</p> <p><i>Analysis/theme one:</i> Theme one is potential safety events. “Across the categories of potential safety events that were evaluated, the number of studies (% of all eligible studies) that did not evaluate for and report data on specific events were as follows: 21 (43%) falls, 20 (42%) ETT removal, 17 (35%) removal of intravascular catheters, 23 (48%) other catheter or tube removal, 22 (46%) cardiac arrest, 15 (31%) hemodynamic changes, and 15 (31%) oxygen desaturation” (p.6).</p> <p><i>Analysis/theme two:</i> Consequences for potential safety risks. “Of the 43 eligible publications, 23 (53%) reported consequences of potential safety events” (P.6)</p> <p><i>Analysis/theme three:</i> Results of Meta-analysis was the third theme. “...the possibility of publication bias; however, due to substantial heterogeneity in these events, cautious interpretation is required due to possible false-positive assessment for publication bias” (p.6).</p>
<p>Authors’ Discussion and Conclusion</p>	<p><i>Idea one:</i> The range of potential safety events is from 0%-23%. There are a lot of factors that affect this. There was a greater risk in morning mobilization sessions. But the risk of a safety event depends more on the treatment, environment, and facility.</p> <p><i>Idea two:</i> Main idea two discusses more specific examples of each ICU case that they looked at and how the safety event could vary given the situation. It also discusses why the literature they used were good sources for the study as a whole.</p> <p><i>Idea three:</i> Standardized screening was done for all cases that were looked at in each study and was consistent across the entire review.</p> <p><i>Consistent findings:</i> Early Mobilization is safe “This analysis demonstrated that early mobilization and rehabilitation in the ICU appears safe, with an overall cumulative incidence of potential safety events of 2.6% and rare (0.6%) medical consequences with the occurrence of events. These results were similar even with implementation of early mobilization/rehabilitation as part of usual care (compared with research studies)” (p. 6).</p> <p>Consequences of Potential Safety Events “Of the 43 eligible publications, 23 (53%) (10, 12, 14, 30, 33, 35, 36, 39, 42, 43, 46, 47, 51, 53, 56, 62, 63, 65–68, 71, 72) reported consequences of potential safety events (Table 3). In these 23 publications, there were 3,329 patients, 13,974 mobilization/rehabilitation sessions, and 308 potential safety events, for a cumulative incidence of 2% for events, with subsequent consequences reported in 0.6% (n = 78) of sessions” (p. 6).</p> <p>Hemodynamic “Hemodynamic and related events (n = 34) were addressed by laying down in 4 instances (12), returning to bed in 8 instances (55, 64), bed rest and restarting/</p>

increasing vasopressors and/or fluids in 8 instances (44, 45, 65, 67, 69), and temporarily pausing or stopping therapy in 14 instances (49, 67)” (p. 6).

Low Blood Pressure

“A low blood pressure (defined by eligible studies as MAP , 55–70 mm Hg) was reported in 11 publications (19, 35, 37, 38, 47, 50, 53, 54, 56, 66, 67) with 2,793 patients and 8,757 mobilization/ rehabilitation sessions, with a pooled incidence of 4.3 episodes (95% CI = 1.6–12.1) per 1,000 mobilization/rehabilitation sessions (I² = 67%). A low systolic blood pressure (defined as ,80 –90 mm Hg) was reported in 9 publications (12, 41, 42, 45) with 329 patients and 2,808 mobilization/ rehabilitation sessions, with a pooled incidence of 1.8 episodes (95% CI = 0.8 –3.9) per 1,000 mobilization/ rehabilitation sessions (I² = 0%).” (p. 6-8)

Removal of ETT Devices

“Removal of medical devices, such as ETTs and intravascular catheters, may be the greatest concern, given the potential for physiological instability, need for device replacement, or death (17–19). However, ETT removal was observed in only 2 instances, and removal or dysfunction of intravascular catheters occurred in only 35 instances. Calculation of the incidence of these events per 1,000 mobilization/ rehabilitation sessions was not possible due to missing data on ETT or intravascular catheter days with mobilization/ rehabilitation. However, the absolute number of such events was very low. Notably, no significant differences were found in the pooled incidences of potential safety events in publications that were conducted within research settings compared with routine clinical care, providing some reassurance of safety when translating research findings into clinical practice” (p. 9).

Inconsistent findings

Prospective and retrospective studies

“In subgroup analysis, there was no significant difference in results comparing prospective and retrospective studies (P = 0.719), nor in comparing intervention and control groups (P = 0.565). Table 3. In comparing the type of potential safety event assessment using “combined direct observation and routine data reporting” as the reference, direct observation and chart review, respectively, had higher pool incidences of adverse events (incidence ratios: 2.45 [95% CI = 1.09–5.49; P = 0.03] and 2.53 [95% CI = 0.99–6.42; p = 0.051])” (p. 9).

Standardized definitions

“Consequently, other issues, such as different patient characteristics or types of mobilization/ rehabilitation interventions, may have influenced heterogeneity. These findings demonstrate the need for standardized definitions and naming of physiological changes and potential safety events for future research and for evaluation as part of routine clinical practice” (p. 9).

Differences in Safety events

“It is important to recognize that not all potential safety events carry equal clinical importance (e.g., high blood pressure vs. cardiac arrest). All 4 cardiac arrests in this systematic review occurred in 1 of the 48 publications (56). In this publication, all four events occurred without any out-of-bed mobilization on the day of the cardiac arrest. No further information is available regarding whether or not these arrests were

	<p>unanticipated, occurred in the setting of palliative care, or resulted in cardiopulmonary resuscitation” (p. 9).</p> <p>Screening Criteria</p> <p>“In the eligible studies that could be included in the meta-analysis, before initiating mobilization/ rehabilitation, there was patient screening for hemodynamic, respiratory, and cognitive status, often using standardized criteria, to help ensure patient safety. Expert recommendations have been published regarding such screening criteria to assist with safely conducting both in-bed and out-of-bed active mobilization of mechanically ventilated patients” (p. 9).</p>
<p>Authors’ Limitations</p>	<p>Potential limitations for the study include:</p> <p>“given limitations in the methods commonly used to measure safety events, their frequency may have been underreported.” (p. 9)</p> <p>Publication bias</p> <p>“safety events for clinicians conducting mobility sessions (e.g., workplace injury) were not reported in any studies, and cannot be commented upon” (p. 9)</p>
<p>Authors’ Implications For Practice and Future Research</p>	<p>“Early mobilization and physical rehabilitation of critically ill patients appears to be safe, with a low risk of potential safety events, even when implemented as part of routine clinical practice. Safety events that resulted in additional consequences for patient management were very rare.” (p.10)</p> <p>The author mentions how heterogeneity in particular could be further looked into regarding “awareness and implementation of existing recommendations” (p.10).</p>

	Summary
APA Reference	Pandullo, S. M., Spilman, S. K., Smith, J. A., Kingery, L. K., Pille, S. M., Rondinelli, R. D., & Sahr, S. M. (2015). Time for critically ill patients to regain mobility after early mobilization in the intensive care unit and transition to a general inpatient floor. <i>Journal of Critical Care, 30</i> (6), 1238–1242. https://doi.org/10.1016/j.jcrc.2015.08.007
Abstract	<p>“Purpose: The purpose of this study is to determine if patient mobility achievements in an intensive care unit(ICU) setting are sustained during subsequent phases of hospitalization, specifically after transferring to inpatient floors and on the day of hospital discharge. Materials and Methods: The study is an analysis of adult patients who stayed in the ICU for 48 hours or more during the second quarter of 2013. The study sample included 182 patients who transferred to a general inpatient floor after the ICU stay. Results: Patients experienced an average delay of 16 hours to regain or exceed chair level of mobility and 7 hours to regain ambulation level after transferring to an inpatient floor. One-third of patients ambulated in the ICU, and those patients had significantly shorter post-ICU and hospital stays compared with patients who did not ambulate in the ICU. Delays in regaining mobility on the floor were modestly associated with initial Morse Fall Score and being male. Conclusions: Mobility progression through the hospital course is imperative to improving patient outcomes. Study findings show the need for improvement in maintaining early ICU mobilization achievement during the crucial phase between ICU stay and hospital discharge.” (p.1238)</p>
Your Focused Question and Clinical Bottom Line	<p><i>Question:</i> What are the benefits of mobilization for adults in the ICU for transferring to the general inpatient floor or discharge?</p> <p><i>Clinical Bottom Line:</i> Early mobilization in the ICU results in better mobility during transfer to the general inpatient floor and when discharged. Early mobilization such as bed, chair, and walking activity in the ICU results in shorter hospitalization and better patient outcomes.</p>
Your Lay Summary	<p>This study found that it is better to get as much activity as possible when an adult is recovering in the intensive care unit. It shows that if a patient practices walking in the intensive care unit, then they will have an easier time continuing to walk when they go to the general hospital floor or when they go home. It is important for adults in the intensive care unit to progress their activity, so they can continue to be active when they go home. The study shows that an adult who has more activity sooner during hospitalization, usually has a shorter stay and better outcomes. The study also shows that adults who walk in the intensive care unit usually were able to walk on the day of discharge compared to if they only did bed or chair activities.</p> <p>It is important to remember that this study was done in 2015 and the information that was gathered was from 2013. This means that new information might have come out in the last 8 years about this topic. The study also only looked at one hospital’s information, so results could be different if they looked at other hospitals.</p>

<p>Your Professional Summary</p>	<p>This retrospective cohort study examined 182 critically ill adults in the intensive care unit. They looked at how early mobilization in the intensive care unit impacted the transition to the general inpatient floor and discharge. A group of medical professionals reviewed patient charts from 2013 with inclusion criteria and characteristics related to the purpose of the study. They used the Johns Hopkins Highest Level of Mobility scale when exploring transitions throughout the hospital. They found that early ambulation and activity in the intensive care unit can lead to better mobility in the general inpatient floor and on the day of discharge. Failure of ambulation during the intensive care unit stay can lead to longer hospitalization.</p> <p>Strengths of this study include the amount of information they were able to obtain about the patients. This was useful when examining correlations between variables. The weaknesses of this study include the fact that the study is based on chart reviews. Some of the documentation could have been inconsistent or not in-depth enough to make assumptions. The fact that the researchers only collected data from one hospital is also a weakness.</p> <p>Although this study brought insight to how early mobilization can impact transitions throughout the hospital, there are some cautions that should be taken when using this study for practice. It is important to take the age of the study into consideration as there might be more recent research that is more relevant. It is also important to note that the sample size may not be large enough to generalize the conclusions of the study.</p>
	<p>Critical Appraisal</p>
<p>Stated Purpose or Research Question</p>	<p>“The main goal of this study is to examine whether or not levels of functional mobility achieved in the ICU are maintained after transitions to post-ICU care locations in the hospital, specifically during the move from the ICU to general inpatient floors and on the day of hospital discharge.” (pp. 1238-1239)</p>
<p>Background Literature</p>	<p><i>Key points of the intro section:</i></p> <p>Critical care patients tend to survive more frequently but that does not mean there are not long term consequences. (p. 1238)</p> <p>“Prolonged immobility in the intensive care unit (ICU) can lead to cognitive, psychological, and physical impairments. Such impairments can result in medical complications and can decrease patients' quality of life after hospitalization.” (p. 1238)</p> <p>ICU patients should be as active as they can (p. 1238).</p> <p>“Progressive mobility is a series of ambulatory protocols aimed at mobilizing critically ill patients early in their hospital course, with the ultimate goal of returning patients to baseline functional status.” (p. 1238)</p> <p>“Early mobility has been shown to decrease ICU and hospital lengths of stay, decrease mechanical ventilation days, reduce sedation, mitigate delirium, and prevent physical deconditioning.” (p. 1238)</p>

	<p>“However, little is known about how well these gains are maintained in the transition from ICU to general inpatient care or how long it takes to regain or exceed mobility levels achieved in the ICU.” (p. 1238)</p> <p><i>Theoretical perspective:</i> Not reported</p>
Research Design	<p><i>Research design:</i> Retrospective cohort study</p> <p><i>Rationale for the design:</i> Not reported</p> <p><i>For quantitative primary research, AOTA Level of Evidence:</i> Level 3</p>
Sampling	<p><i>Sampling method used and the rationale (if given).</i></p> <p>“A retrospective study was performed at a tertiary hospital with a 24-bed adult ICU. The hospital serves a medium-sized city, as well as rural populations in the surrounding area. Subjects were identified prospectively through daily monitoring of the ICU census...” (p. 1239)</p> <p><i>Inclusion criteria:</i></p> <p>Admitted to the ICU in the second quarter of 2013 Age 18 years or older ICU length of stay of at least 48 hours Discharged from the ICU to a post-acute inpatient floor</p> <p><i>Exclusion criteria:</i> If the patient was discharged from the hospital directly from the ICU.</p> <p><i>Power/sample size estimate:</i> Not reported</p>
Sample	<p><i>Number of Participants (Total and Subgroups):</i> 182 participants (Medical, surgical, and trauma patients, patients that transferred from ICU to general inpatient floor)</p> <p><i>Characteristics of the Sample (Gender, Race/Ethnicity, Diagnosis/Disability):</i></p> <p>Age = 65 years old Male = 99, Female = 83 White = 163, nonwhite = 19 Lived with family prior to admission = 115 Lived in private home prior to admission = 155 DNR = 45 PT/OT involvement = 147 Total ICU hours = 93 Total post-ICU hours = 137 Total hospital hours = 320 People with comorbidity = 172 BMI = 29.5 Initial Morse Fall score = 50 (anything higher than 45 is a high fall risk)</p> <p><i>Dropouts:</i> NA</p>
Groups	<p><i>Types of groups: (e.g., intervention, sample characteristic):</i></p> <p>Study variables (characteristics) -> all of these were examined when doing chart reviews</p>

	<p><u>Demographic variables</u> (age, sex, race, if patient lived with family member prior to admission, residence prior to admission, DNR status, and if the patient died in the hospital or was discharged to hospice)</p> <p><u>Discharge disposition</u> (discharge to home, or discharge to facility)</p> <p><u>Role of therapy in patient care</u> (PT, OT, cardiac rehab)</p> <p><u>Key dates</u> (times of transfer within hospital, admission to ICU, transfer from ICU to the floor, discharge from hospital, and activities during these times)</p> <p><u>Medical history</u> (admission notes, consultation notes, and discharge summaries)</p> <p><u>Comorbid health conditions</u> (chronic pain: fibromyalgia, arthritis, back pain, or generalized pain; current smoker or substance abuse; dementia/Alzhiemers; depression; respiratory disease: COPD, chronic bronchitis, emphysema; hypertension; diabetes; and stroke)</p> <p><u>Fall risk</u> (looked at Morse fall score)</p> <p><u>Mobility levels during hospitalization</u> (reviewed nursing and therapy documentation)</p> <p>Bed</p> <p>Chair</p> <p>Ambulation</p> <p><u>Hours between time of transfer from ICU to first regain of activity on the floor</u> (being the activity that achieved equal or higher level of mobilization than in the ICU, was calculated)</p>
Method	<p><i>Primary methods to answer research question (e.g., intervention, interview, survey, chart review)</i></p> <p><u>Chart review</u></p> <p>“Chart reviews of the electronic medical record were conducted for important data components. Two critical care nurses, 1 physical therapist, 1 respiratory therapist, and 1 critical care physician reviewed the records for data extraction. Interrater reliability was assessed for 10% of the records to ensure consistency in abstraction. The study was approved by the institutional review board at the hospital. The requirement of subject consent was waived because chart review occurred retrospectively after patient discharge.” (p. 1239)</p>
Measurement and Outcomes	<p><i>Measure: name, construct, reliability/validity, frequency</i></p> <p><u>Johns Hopkins Highest Level of Mobility Scale (JH-HLM)</u></p> <p>Standardize the description of mobility levels:</p> <p>“bed, which included lying in bed, turning self, or dangling at the edge of the bed”</p> <p>“chair, which included transfer to a chair (including geriatric recliner and commode)”</p> <p>“Walk (hereafter referred to as ambulation), which included ambulation of 10 steps or more.”</p> <p>“The JH-HLM includes a fourth category (stand) between "chair" and “walk,” but this level was excluded from our analysis because it was recorded inconsistently at our hospital.”</p> <p>(p. 1239)</p> <p>Validity/reliability and frequency was not reported (they provided a link to the Johns Hopkins website but it might be old because it says the page is not found)</p>

Results	<p><i>Description of the sample:</i> “There were 182 patients who spent at least 48 hours in the ICU and discharged from the ICU to a general inpatient floor.” (p. 1239) Median age is 65 years old. 54% of patients were male. 85% lived in a private home before admission and 45% returned home after hospitalization. 25% were DNR and 13% of the patients died in the hospital or were discharged to hospice. Patients stayed in the ICU for an average of 4 days and in the hospital an average of 13 days. 95% had at least one comorbidity. The most common being diabetes, hypertension, and respiratory disease. The median BMI was 30 and the median initial fall score was 50. (pp. 1239-1240)</p> <p><i>Analysis/theme one: <u>Mobility activity during hospitalization</u></i> “Although there were no significant differences in the lengths of stay in the ICU among the 3 groups, patients who ambulated in the ICU were younger, had shorter post-ICU stays, and had shorter hospital LOS compared with patients who did not ambulate in the ICU.” (p. 1240)</p> <p><i>Analysis/theme two: <u>Mobilization activity after transfer to inpatient floor</u></i> “When patients transferred out of the ICU to a general inpatient floor, the transfer-regain time was 2.5 hours for patients regaining bed activity, 16 hours for patients regaining chair activity, and 7 hours for patients regaining ambulation activity” (p. 1240) Being male and the Morse Fall Score were weakly but significantly correlated to transfer-regain time. (p. 1240)</p> <p><i>Analysis/theme three: <u>Mobilization activity on the day of discharge</u></i> “Patients who ambulated in the ICU were much more likely to ambulate on the day of discharge (59.7%) as compared with patients who only achieved the level of bed (18%) or chair (42%) activity in the ICU” (p. 1240)</p>
Authors’ Discussion and Conclusion	<p><i>Idea one:</i> “Study results confirm previous knowledge as to the beneficial effect of early mobility on hospital LOS, but also describe how mobility achievement in the ICU affects the post-ICU course.” (p. 1240)</p> <p><i>Idea two:</i> “However, an initial lapse in mobility activity may indicate the existence of barriers that prevent patients from promptly continuing their mobility trajectory from their achievements in the ICU.” (1240)</p> <p><i>Idea three:</i> “In order to provide maximal opportunity for patients to achieve higher levels of mobility during their hospital stay, it is important to identify the patient- and institutional-level barriers that exist during the transition from ICU to the floor.” (p. 1241)</p> <p><i>Idea four:</i> “Post hoc analyses revealed that timing of the transfer also may play a very significant role in how quickly a patient regains or exceeds mobility on the floor.” (p. 1241)</p> <p><i>Idea five:</i> “It should be noted that although one- third of patients ambulated in the ICU, nearly three-quarters of patients ambulated at some point during hospitalization. Fifty percent of patients who only achieved a bed level of activity in the ICU went on to ambulate before discharge from the hospital. Conversely, failure</p>

	<p>to achieve higher levels of mobility in the ICU was correlated with longer post-ICU and hospital stays.” (p. 1241)</p> <p><i>Idea six:</i> “Interestingly, the delay to regain mobility was longer for patients with an ICU HLM of chair (16 hours) than it was for patients with an ICU HLM of ambulation (7 hours).” (p. 1241)</p> <p><i>Idea seven:</i> “Although three-quarters of all patients ambulated at some time during hospitalization, only 41% ambulated on the day of hospital discharge.”(p. 1241)</p> <p><i>Conclusion:</i> “Early mobilization of patients in the ICU has been shown to have a positive impact on patient outcomes; it is therefore imperative to maintain mobility efforts during the crucial transition from the ICU to the inpatient floor.” (p. 1242)</p>
<p>Authors’ Limitations</p>	<p>“First, mobility activity was abstracted from the chart retrospectively. Some activity was recorded inconsistently or not recorded at all, especially as patients progressed to higher levels of mobility and were more independent on the floor...In a similar way, mobility activity may not have been well documented on the day of discharge, especially if a patient had already achieved a high level of independent functionality. However, because most patients had mobility documentation on the day of discharge(93%), we conclude that the documented activities are a fair representation of mobility on the day of discharge. Second, we recorded an overall summary of whether or not physical therapy, occupational therapy, or cardiac rehabilitation was involved inpatient care but did not ascertain their role or level of involvement... Third, the patient population is heterogeneous in nature; therefore, it includes a variety of patient diagnoses and medical specialties.” (p. 1241)</p> <p>Chart review never assesses the patient’s pre-hospital functional status (they look at fall risk score but not functional mobility)</p> <p>Small sample size for one institution</p>
<p>Authors’ Implications For Practice and Future Research</p>	<p>“They also demonstrate that work remains in mobilizing more patients in both the ICU and on the floor... improvements must be made to ensure that staff on the floor are ready with the appropriate resources and personnel to accomplish mobility goals. This includes improving communication between the ICU and floor nurses at the time of transfer, as well as increasing personnel availability in the evening hours.” (p. 1242)</p>

	Summary
APA Reference	Tipping, C. J., Harrold, M., Holland, A., Romero, L., Nisbet, T., & Hodgson, C. L. (2017). The effects of active mobilisation and rehabilitation in ICU on mortality and function: a systematic review. <i>Intensive care medicine</i> , 43(2), 171–183. https://doi-org.pearl.stkate.edu/10.1007/s00134-016-4612-0
Abstract	<p>“Purpose: Early active mobilisation and rehabilitation in the intensive care unit (ICU) is being used to prevent the long-term functional consequences of critical illness. This review aimed to determine the effect of active mobilisation and rehabilitation in the ICU on mortality, function, mobility, muscle strength, quality of life, days alive and out of hospital to 180 days, ICU and hospital lengths of stay, duration of mechanical ventilation and discharge destination, linking outcomes with the World Health Organization International Classification of Function Framework. Methods: A PRISMA checklist-guided systematic review and meta-analysis of randomised and controlled clinical trials. Results: Fourteen studies of varying quality including a total of 1753 patients were reviewed. Active mobilisation and rehabilitation had no impact on short- or long-term mortality ($p > 0.05$). Meta-analysis showed that active mobilisation and rehabilitation led to greater muscle strength (body function) at ICU discharge as measured using the Medical Research Council Sum Score (mean difference 8.62 points, 95% confidence interval (CI) 1.39–15.86), greater probability of walking without assistance (activity limitation) at hospital discharge (odds ratio 2.13, 95% CI 1.19–3.83), and more days alive and out of hospital to day 180 (participation restriction) (mean difference 9.69, 95% CI 1.7–17.66). There were no consistent effects on function, quality of life, ICU or hospital length of stay, duration of mechanical ventilation or discharge destination. Conclusion: Active mobilisation and rehabilitation in the ICU has no impact on short- and long-term mortality, but may improve mobility status, muscle strength and days alive and out of hospital to 180 days. Registration of protocol number: CRD42015029836. Keywords: Intensive care units, Critical illness, Early mobility, Rehabilitation, Mortality” (p.171).</p>
Your Focused Question and Clinical Bottom Line	<p>EBP Question: What is the current evidence regarding the benefits of mobilization and activity for functional mobility in adult clientele within an intensive care unit?</p> <p>Question: How does early mobilization and rehabilitation help adult clientele in an ICU setting increase their independence?</p> <p>Clinical Bottom Line: According to the authors of this systematic review, early mobilization and rehabilitation, compared to standard care, could help patients increase their independence through improving their muscle strength, ability to walk, and ability to get out of the hospital and participate in activities. However, more research should be conducted to confirm these results as the heterogeneity of the methodology as well as biases limited the conclusions that could be drawn from this systematic review.</p>

<p>Your Lay Summary</p>	<p>The authors of this study reviewed thousands of articles and decided that only fourteen of the articles met their standards. They looked at articles that examined people who were really sick in the hospital. More specifically, they looked at the answers of those articles to determine if those people were less likely to die and more likely to live longer and in a healthier, more active way if they received treatment early or if they received treatment at the normal time. The authors used mathematical formulas to determine if the answers from the articles were correct. After examining all fourteen articles, the authors concluded that getting treatment early could help people who are really sick in the hospital to be stronger, be able to walk, and be able to stay alive and do more things after they leave the hospital. This helps doctors and therapists understand when to start treatment and the effects that their treatment can have on people. Ultimately, this article does not guarantee that the answers found are completely true. Importantly, this article helps doctors and therapists understand what they can look into next in order to know if those answers from the articles are true. This will help them understand how to be better at providing their treatments.</p>
<p>Your Professional Summary</p>	<p>The objective of this study was to examine the available research on the impact of early rehabilitation and mobilization versus standard care on physical and psychological states for those in the ICU. Specifically, the researchers looked at the impact of early rehabilitation and mobilization on the following variables: mortality; body functions such as strength; activity limitation and participation such as walking, activities of daily living, and quality of life; and days in the hospital as well as days out of the hospital. The researchers decided to include fourteen articles in their systematic review from databases such as MEDLINE, CINAHL, EMBASE, LILACS, Scopus and Web of Science as well as clinical trials websites after an extensive screening process performed by two different people. The researchers performed pooled and subgroup analyses to determine if the the results of the primary research studies were significant. Although the researchers followed PRISMA guidelines, assessed the bias of each study, and performed extensive statistical analyses, the results of the systematic review were limited by the heterogeneity of the methods, interventions for both rehabilitation groups and control groups, outcome measures and time frames of the primary studies. Furthermore, the sample sizes were small. Based on their analysis, the researchers determined that early mobilization and rehabilitation has the potential to positively impact muscle strength, walking ability, and participation in activities through increased days out of the hospital for patients in the ICU setting. This review provided helpful insight on the available research regarding the impact of early mobilization and rehabilitation in order for clinicians to understand what next steps in the research process are needed in order to gain greater insight into the potential impact and safety of these interventions.</p>
	<p>Critical Appraisal</p>

<p>Stated Purpose or Research Question</p>	<p>“The aims of this systematic review and meta-analysis were to determine the impact of active mobilisation and rehabilitation in the ICU on (1) patient mortality (measured at ICU discharge, hospital discharge, 3 and 6 months) compared to standard care; (2) patient’s functional status, mobility status, muscle strength, quality of life, number of days alive and out of hospital to 180 days, duration of mechanical ventilation, ICU and hospital length of stay and discharge destination compared to standard care” (p. 172).</p>
<p>Background Literature</p>	<p>Key points of the intro section:</p> <p>“Patients admitted to intensive care units (ICUs) often require multiple treatments that result in immobility and bed rest [1]. One of the consequences of bed rest in critically ill patients is profound muscle weakness, termed ICU acquired weakness (ICU-AW) which occurs within 24 h and continues to progress [2]” (p. 171).</p> <p>“Patients at ICU discharge have significant muscle weakness and decreased functional status [5] and it can take 1–2 years to reach peak functional recovery [6] and in some cases patients never fully recover [7]” (p. 171).</p> <p>“A previous meta-analysis found that there was no significant association between mobilisation in the ICU and improvements in functional status, muscle strength, quality of life or healthcare utilization [14]. However mobility in the ICU was associated with improved walking ability compared to usual care at hospital discharge [14]” (p. 172).</p> <p>“Although the mechanism by which rehabilitation in ICU might impact on mortality and morbidity is not clear, it is important to establish whether rehabilitation during critical illness results in beneficial or harmful effects and whether it differs for interventions commenced early or later during the ICU stay or in higher or lower doses” (p. 172).</p> <p>Theoretical perspective: They did not include a statement that specified any theoretical perspective. They did, however, follow PRISMA Guidelines.</p>
<p>Research Design</p>	<p>Research design: Systematic review & meta-analysis involving 14 studies.</p> <p>Rationale for the design: It is somewhat implicitly described in the following sentence regarding the purpose of the review, “The aims of this systematic review and meta-analysis were to determine the impact of active mobilisation and rehabilitation in the ICU on (1) patient mortality (measured at ICU discharge, hospital discharge, 3 and 6 months) compared to standard care; (2) patient’s functional status, mobility status, muscle strength, quality of life, number of days alive and out of hospital to 180 days, duration of mechanical ventilation, ICU and hospital length of stay and discharge destination compared to standard care” (p. 172). In other words, they chose a systematic review and meta-analysis because they wanted to examine the evidence regarding those variables comparing early interventions to standard care.</p> <p>Additionally, their rationale is stated in the discussion section when they explain the strengths of their review, “The strengths of this study stem from a comprehensive search strategy, clear and targeted inclusion and exclusion criteria and rigour in the data</p>

	<p>extraction and risk of bias assessment. The results of this review are highly generalisable owing to nine countries being represented and detailed patient demographic data presented. This review specified studies that included patients during acute critical illness and ICU stay, as we wanted the results to be relevant to the care provided and the challenges associated with managing an acutely unwell patient population chose to follow” (p. 181).</p> <p>For reviews of research, AOTA Level of Evidence: This counts as level I evidence since it is a systematic review and meta-analysis. The authors included 14 studies that were, “randomised or controlled clinical trials written in English” (p. 172).</p>
Method	<p>Primary methods to answer research question: “The PRISMA guidelines for systematic reviews and meta-analysis [16] (Electronic Supplementary Material (ESM) 1, Table 1) and the Cochrane Handbook [17] were followed and the protocol was registered [18]” (p. 172).</p> <p>Variables: Active mobilisation and rehabilitation; patient mortality; patient’s functional status; patient’s mobility status, patient’s muscle strength, patient’s quality of life, patient’s number of days alive and out of hospital to 180 days, patient’s duration of mechanical ventilation, patient’s ICU and hospital length of stay; patient’s discharge destination; & standard care.</p> <p>Keywords: “Intensive care units, Critical illness, Early mobility, Rehabilitation, Mortality” (p. 171).</p> <p>Databases: MEDLINE, CINAHL, EMBASE, LILACS, Scopus and Web of Science, and Clinical trials websites.</p> <p>Procedures: “All resources were searched from inception to June 2016. The reference list of included articles and systematic reviews were searched for additional studies. Authors of eligible studies were contacted for clarification of methodology and results in the case of unpublished or missing data” (p. 172).</p>
Filters	<p>Research Designs included and not included: “Studies were included if they were randomised or controlled clinical trials written in English” (p. 172).</p> <p>Inclusion and exclusion criteria: Type of patients: “Adult patients admitted to the ICU for greater than 24 h” (p. 172).</p> <p>Interventions: “Active mobilisation and rehabilitation delivered in the ICU by any members of the ICU team. This could include any combination of active exercises in bed, bed mobility practice, progression of mobility from sitting, to standing and ambulation, tilt table therapy or hoisting to a chair” (p.172).</p>

“Studies were excluded if they investigated passive therapies only, started rehabilitation after discharge from the ICU, or were conducted in long-term weaning centres or rehabilitation facilities” (p. 172).

“Cycle ergometry and functional electrical muscle stimulation used as the sole rehabilitation therapy were not included, as they do not involve the same complexities surrounding sedation and cardiovascular and respiratory stability that are encountered with out-of-bed active exercise” (p. 172).

Control:

“For studies to be eligible the control group needed to be receiving standard physical therapy as determined by the treating centre during the ICU admission and standard medical and nursing care”

Types of outcome measure:

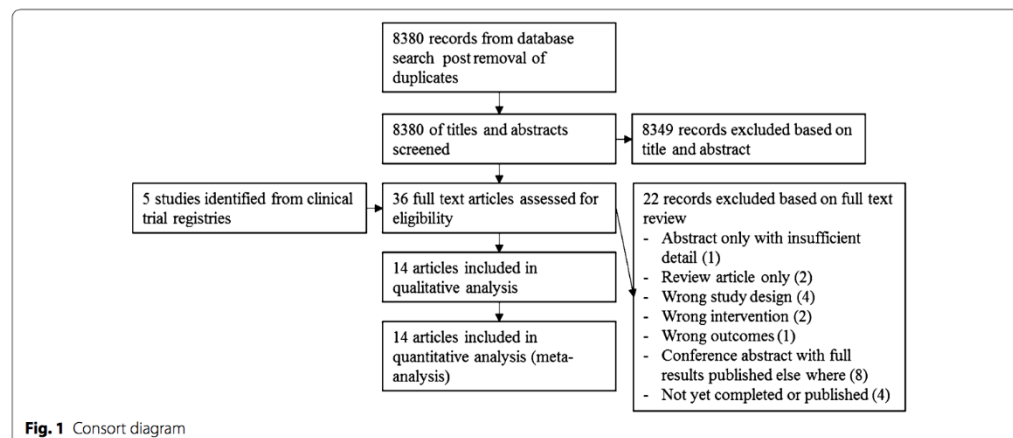
“Outcomes were categorised using the World Health Organization International Classification of Functioning, Disability and Health (WHO ICF) components into Body Functions (b1-8), Activity Limitation (d1-4) and Participation Restriction (d5-9) [21]” (p. 172).

Total references found:

“The search of all databases resulted in 8380 articles, of which 13 studies of active mobilisation and rehabilitation in the ICU were included (Fig. 1) [12, 23, 25–35]. There were five studies identified from clinical trials registries; one of these studies was completed prior to publication of this systematic review and therefore was included [36] (ESM 2, Table 2)” (p. 173).

Process for eliminating references:

Selection of studies: “Titles and abstracts were screened by two independent reviewers (CT, TN). Disagreements were resolved by consensus. Covidence was used to manage and review citations [22]. The full text of eligible and uncertain references were then reviewed (CT, TN), with a third reviewer (CH) as necessary” (p. 172).



(Tipping et al., 2017)

Results

Description of the articles:

“The search of all databases resulted in 8380 articles, of which 13 studies of active mobilisation and rehabilitation in the ICU were included (Fig. 1) [12, 23, 25–35]. There

were five studies identified from clinical trials registries; one of these studies was completed prior to publication of this systematic review and therefore was included [36] (ESM 2, Table 2). No further articles were found from hand searches” (p. 173).

“Three studies were of low quality with four or five sources of bias [28, 31, 32], two studies were controlled clinical trials and therefore had a high risk of bias for many of the criteria [29, 35], four studies were of moderate quality with three sources of bias [25, 33, 34, 36], and the remaining studies had minimal sources of bias [12, 23, 26, 27, 30]” (p. 173).

Analysis/theme one:

Effects of Intervention- Mortality: “In a pooled analysis no significant difference was found in mortality at any time point (Fig. 3). Subgroup analysis showed that early mobilisation and high dose rehabilitation had no significant effect on mortality (ESM 2, Table 4)” (p. 174).

Analysis/theme two:

Effects of intervention- Measures of body function: “Analysis of the three studies demonstrated an improvement in muscle strength favouring rehabilitation in the ICU (pooled mean difference (MD) 8.62, 95% CI 1.39–15.86, $p = 0.02$, $I^2 = 73\%$, three studies, $n = 120$) [23, 25, 32]. When one study of high risk of bias was removed the I^2 decreased to 0% and the result was still significant (ESM 2, Fig. 1)” (p. 175).

Analysis/theme three:

Effects of intervention- Measures of activity limitation:

Reported ability to walk independently: “In a pooled analysis, patients in the rehabilitation group had a higher probability of mobilising without assistance at hospital discharge (OR 2.13, 95% CI 1.19–3.83, $p = 0.01$, $I^2 = 0\%$, two studies, $n = 189$)” (p. 175).

Reported PFIT at ICU discharge: “Three studies reported the PFIT at ICU discharge. Pooled analysis demonstrated no significant difference between the intervention and control group (MD -0.19 , 95% CI -0.69 to 0.32 , $I^2 = 0\%$, three studies, $n = 207$) [23, 25, 27]” (p. 175).

Reported TUG at hospital discharge: “The pooled analysis at 6 months showed no difference between the rehabilitation and standard care groups (MD 0.11, 95% CI -5.96 to 6.19 , $I^2 = 66\%$, two studies, $n = 146$) [27, 30]” (p. 175).

Analysis/theme four:

Effects of intervention- measures of participation restriction:

“Four studies reported the SF-36 at 6 months...” (p. 175). “The pooled analysis of the four studies showed no significant difference between the intervention and control groups (ESM 2, Table 8) [25, 27, 30, 34]” (p. 175).

Regarding the social functioning domain: “The subgroup analysis of three studies ($n = 177$) showed significantly higher SF-36 results favouring the intervention group in the role physical and role emotional domains for high dose rehabilitation [25, 30], compared to low dose rehabilitation (ESM 2, Table 8)” (pp. 175- 179).

	<p>SF-36 results at 6 months had large statistical heterogeneity for the physical functioning, role physical, social functioning and role emotional domains.</p> <p>“Five studies reported days alive and out of hospital to 6 months [23, 25, 29, 30, 37]” (p. 179). “Therefore a pooled analysis was also completed for the remaining four studies, demonstrating a significant MD of 9.69 (Fig. 4) favouring the rehabilitation group [23, 29, 30, 37]” (p. 179).</p> <p>Analysis/theme five: Effects of intervention- Length of stay, mechanical ventilation duration and discharge destination:</p> <p>“Because the majority of the length of stay and duration of mechanical ventilation data were significantly skewed, a meta-analysis was not able to be performed” (p. 179).</p> <p>“Two studies had no deaths in ICU and reported significantly shorter ICU length of stay in the rehabilitation group compared to the standard care group (ESM Table 9) [28, 31]” (p. 179).</p> <p>“No difference was found in the pooled analysis of discharge destination (proportion of patients discharged home, OR 1.35, 95% CI 0.98–1.87, p = 0.07 I² = 40%, eight studies, n = 1255) [12, 23, 26, 27, 30, 34–36]” (pp. 179- 180).</p>
<p>Authors’ Discussion and Conclusion</p>	<p>Idea one: “This meta-analysis found that active mobilisation and rehabilitation in the ICU had no effect on patient mortality [12, 23, 25–37]. However, the intervention improved body function (muscle strength) at ICU discharge [23, 25, 32], reduced activity limitations (walking ability) at hospital discharge [12, 29] and reduced participation restriction (days alive and out of hospital) at 6 months [23, 29, 30, 37]” (p. 180).</p> <p>Idea two: “Studies of high dose rehabilitation showed that rehabilitation in the ICU may lead to improved quality of life at 6 months in the role physical and role emotional domain [25, 30]” (p. 180).</p> <p>Idea three: “Meta-analysis showed no difference in function at ICU discharge or discharge destination” (p. 180).</p> <p>Consistent findings: “This review showed that mobilisation and rehabilitation in ICU does not increase short- or long-term mortality but has shown promising improvements in patient-centred outcomes across three components of the WHO ICF framework [21]; however, its full impact is not yet understood, particularly in regards to long-term outcomes” (p. 180).</p> <p>Inconsistent findings: “As a result of the complexity of acute and critical illness it is possible that there may be adverse outcomes of rehabilitation commenced in the ICU, and large RCTs need to be completed in the ICU setting to appropriately determine the impact of active mobilisation and rehabilitation in this patient population” (p. 180).</p> <p>The heterogeneity of the intervention methods and outcome measures within the primary research studies made it more difficult to compare the results of the studies.</p>

	<p>Additionally, the Electronic Supplementary Information page showed the significant p-values for some of the results within each theme, but I don't see how they determined which study/outcome measure/time point to include within all of the ones that had significant differences.</p>
<p>Authors' Limitations</p>	<p>“There was very limited information available regarding the dosage provided in many of the studies and this limited the meta-analysis” (p. 180).</p> <p>“However there was only one study in the low dose subgroup and therefore it may have been underpowered [27]” (p. 180).</p> <p>“Whilst the studies included in this review did not measure frailty, six of the studies only included patients who had independent mobility prior to ICU admission [12, 23, 30– 32, 34, 36] and therefore may have been more responsive Fig. 4 Forest plot for days alive and out of hospital to 180 days 181 to rehabilitation, thereby influencing the results” (pp. 180-181).</p> <p>“Weaknesses include the small sample size of the included studies ($n \leq 50$ in five of the studies [23, 25, 26, 31, 32]) and heterogeneity was present with a range of outcome measures collected at varying time points, limiting the ability to complete meta-analysis” (p. 181).</p> <p>“Subgroup analysis in this systematic review was limited as the timing, amount and intensity of therapy received by both the intervention and control groups across the studies were varied and in some cases details were unavailable” (p. 181).</p> <p>“The range of admission diagnoses represented across the studies could limit the validity of the results as particular patient populations may have a different likelihood and trajectories of recovery” (p. 181).</p> <p>“Mortality collected at 6 months may have been affected by loss to follow-up in some studies; however, the primary outcome was not affected by loss to follow-up” (p. 181).</p> <p>“Length of stay data were highly skewed and not always reported for both survivors and non-survivors, making it difficult to interpret, as death can influence the results” (p. 181).</p>
<p>Authors' Implications For Practice and Future Research</p>	<p>“This meta-analysis demonstrates that active mobilisation and rehabilitation in the ICU does not increase mortality in a research setting. However, there is still not enough evidence to determine long-term morbidity. In clinical practice active mobilisation and rehabilitation in the ICU may be an appropriate treatment strategy, when safety consensus guidelines are followed and a team approach is used to ensure safety [39]” (p. 180).</p> <p>“More studies are needed to specifically assess appropriate dosages and timing of therapy. This information will better inform clinicians and assist in prescribing therapy in clinical practice” (p. 180).</p> <p>“Ideally a well-designed large multi-centre RCT needs to be conducted, with appropriate sample size to determine the effect of active mobilisation and rehabilitation in the ICU on long-term patient-centred outcomes” (p. 181).</p> <p>“In order for better comparison of results across studies, future trials would benefit from a core set of outcome measures [42] collected at consistent time points” (p. 181).</p>

<p>APA Reference</p>	<p>Zang, K., Chen, B., Wang, M., Chen, D., Hui, L., Gui, S., Ji, T., & Shang, F. (2019). The effect of early mobilization in critically ill patients: A meta-analysis. <i>Nursing in Critical Care</i>, 25(6), 360-367. doi: 10.1111/nicc.12455</p>
<p>Abstract</p>	<p>“Abstract</p> <p>Background The aim of this meta-analysis was to assess if early mobilization and rehabilitation in the intensive care unit (ICU) could reduce ICU-acquired weakness (ICU-AW), improve functional recovery, improve muscle strength, shorten the length of ICU and hospital stays, and reduce the mortality rate.</p> <p>Methods A comprehensive literature search in PubMed, Embase, Web of Science, SinoMed (Chinese BioMedical Literature Service System, China), and National Knowledge Infrastructure, China (CNKI) was performed. Results were expressed as a risk ratio (RR) with 95% confidence intervals (95% CIs) or weight mean difference (WMD) with 95% CIs. Pooled estimates were calculated using a fixed-effects or random-effects model according to the heterogeneity among studies.</p> <p>Results Fifteen randomized controlled trials involving a total of 1941 patients were included in this meta-analysis. Pooled estimates suggested that early mobilization significantly reduced the incidence of ICU-AW (RR = 0.49, 95% CI: 0.26, 0.91; P = .025), shortened the length of ICU (WMD = -1.82 days, 95% CI: -2.88, -0.76; P = .001) and hospital (WMD = -3.90 days, 95% CI: -5.94, -1.85; P < .001) stays, and improved the Medical Research Council score (WMD = 4.47, 95% CI: 1.43, 7.52; P = .004) and Barthel Index score at hospital discharge (WMD = 21.44, 95% CI: 10.97, 31.91; P < .001). Moreover, early mobilization also decreased complications such as deep vein thrombosis (RR = 0.16, 95% CI: 0.04, 0.59; P = .006), ventilator-associated pneumonia (RR = 0.26, 95% CI: 0.11, 0.63; P = .003), and pressure sores (RR = 0.14, 95% CI: 0.04, 0.44; P = .001). However, early mobilization did not reduce the ICU mortality rate (RR = 1.31, 95% CI: 0.97, 1.76; P = .074), improve the handgrip strength (WMD = 4.03 kg, 95% CI: -0.68, 8.74; P = .094), and shorten the duration of mechanical ventilation (WMD = 0.20 days, 95% CI: -0.10, 0.50; P = .194).</p> <p>Conclusion This study indicated that early mobilization was effective in preventing the occurrence of ICU-AW, shortening the length of ICU and hospital stay, and improving the functional mobility. However, it had no effect on the ICU mortality rate and ventilator-free days.</p> <p>Relevance to clinical practice</p>

	<p>ICU-AW is a common neuromuscular complication of critical illness, and it is predictive of adverse outcomes. Early mobilization of critically ill patients is a candidate intervention to reduce the incidence and severity of ICU-AW. Some clinical studies have demonstrated this, whereas others found opposite results. The aim of our study is to assess if early mobilization and rehabilitation in the ICU could reduce the ICU-AW, improve functional recovery, improve muscle strength, shorten length of ICU and hospital stay, and reduce the mortality rate.” (p. 360)</p>
<p>Your Focused Question and Clinical Bottom Line</p>	<p><i>Question:</i> What does the current research say about the effects of early mobilization in the ICU?</p> <p><i>Clinical Bottom Line:</i> Early mobilization has been shown to help lower the incidence of ICU-AW, improve functional outcomes, and improve overall functional mobility. However, there were some limitations to this meta-analysis and more large-scale RCTs need to be conducted to help confirm these findings.</p>
<p>Your Lay Summary</p>	<p>Researchers examined the effect early mobilization has in an intensive care setting. They found that early mobilization can benefit patients in a few different ways. The first benefit they found from early mobilization was that it helped reduce muscle weakness that people in the intensive care setting would typically experience. They also found it to help with a patient’s mobility and functional outcomes. However, they did find some conflicting information. Some studies found early mobilization to decrease a patient’s length of stay in the hospital. However, other studies found it did not make a difference. More trials need to be conducted in order to help verify these findings. There were some limitations and additional studies would address these. Occupational therapists should be aware of these results. However, they also need to be aware of other research available. It is their duty to carefully review the evidence before making an official recommendation. It is important to be aware of what the evidence finds before using an intervention.</p>

<p>Your Professional Summary</p>	<p>The researcher’s objective was to review 15 randomized control trials and examine and summarize their results looking at the effect of early mobilization in the critically ill. This article was a level one meta-analysis who’s initial search resulted in 12,615 publications but was narrowed down to include the 15 strongest using inclusion and exclusion criteria. This article clearly laid out their method, process, and data analysis, which added to the strength of the article. They assessed the risk of bias in the trials using the Cochrane risk-of-bias tool. They also used the Cochrane Q χ^2 test and I^2 statistic to pool data. All of these things added to the strength of this meta-analysis. A few of the limitations from this study were that two of the studies they looked at had a relatively small sample size. Another limitation was that a few of the trials included were of a lower quality. There was also substantial heterogeneity between the studies that were analyzed. However, sensitivity analyses were conducted in order to address this. Some things such as the definition of early mobilization, the timing early mobilization was implemented, and differences in the critically ill patients may have differed throughout the studies. The implications of this meta-analysis suggest that early mobilization could have a positive effect on certain outcomes in critically ill patients such as lowering ICU-AW and improving functional mobility and functional outcomes. However, larger scale randomized control trials are needed in order to verify these findings.</p>
	<p>Critical Appraisal</p>
<p>Stated Purpose or Research Question</p>	<p>“In order to provide adequately powered information to detect the effect of early mobilization on ICU-AW, length of ICU and hospital stays, and functional recovery in critical ill patients, we summarized the published RCTs to conduct this meta-analysis.” (p. 361)</p>
<p>Background Literature</p>	<p><i>Key points of the intro section:</i></p> <p>“More than 5.7 million patients in the United States and more than 2 million patients in Germany are treated annually in intensive care units (ICUs). Among them, approximately 50% may develop debilitation muscle wasting.” (p. 361)</p> <p>“ICU-acquired weakness (ICU-AW) is a common neuromuscular complication of critical illness, and it is predictive of adverse outcomes.” (p. 361)</p> <p>“Early mobilization of critically ill patients is a candidate intervention to reduce the incidence and severity of ICU-AW. Some clinical studies have demonstrated that early mobilization could shorten ICU and hospital stays, decrease the duration of mechanical ventilation, improve long-term functional independence, and reduce mortality.” (p. 361)</p> <p>“In a prospective cohort study, Morris et al reported that early mobilization was effective in improving physical therapy for medical ICU</p>

	<p>patients with respiratory failure, and it also shortened ICU and hospital stays.⁸ However, in another randomized controlled trial (RCT) with 120 acute respiratory failure patients, the authors found opposite results, in which the length of ICU and hospital stays was not shorter in intervention group than in the control group.” (p. 361)</p> <p><i>Theoretical perspective:</i> Cochrane Handbook for Systematic Reviews of Interventions Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement guidelines</p>
<p>Research Design</p>	<p><i>Research design: meta-analysis</i> <i>Rationale for the design:</i> “In order to provide adequately powered information to detect the effect of early mobilization on ICU-AW, length of ICU and hospital stays, and functional recovery in critical ill patients, we summarized the published RCTs to conduct this meta-analysis.” (p. 361) <i>For reviews of research, AOTA Level of Evidence:</i> Level 1 Evidence, it’s a meta-analysis</p>

<p>Method</p>	<p><i>Primary methods to answer research question</i></p> <p><i>Variables:</i> early mobilization and how it affects ICU-acquired weakness, functional recovery, muscle strength, length of ICU and hospital stays, and mortality</p> <p><i>Keywords:</i> “The search terms were listed as follows: (“early mobilisation”[All Fields] OR “early ambulation”[MeSH Terms] OR (“early”[All Fields] AND “ambulation”[All Fields]) OR “early ambulation”[All Fields] OR (“early”[All Fields] AND “mobilisation”[All Fields]) OR “early mobilisation”[All Fields]) OR (early[All Fields] AND (“exercise”[MeSH Terms] OR “exercise”[All Fields])) OR (early[All Fields] AND (“motor activity”[MeSH Terms] OR (“motor”[All Fields] AND “activity”[All Fields]) OR “motor activity”[All Fields] OR “activity”[All Fields])) OR (early[All Fields] AND (“motion”[MeSH Terms] OR “motion”[All Fields])) OR (“early mobilisation”[All Fields] OR “early ambulation”[MeSH Terms] OR (“early”[All Fields] AND “ambulation”[All Fields]) OR “early ambulation”[All Fields] OR (“early”[All Fields] AND “mobilisation”[All Fields]) OR “early mobilisation”[All Fields])) AND (((“intensive care units”[MeSH Terms] OR (“intensive”[All Fields] AND “care”[All Fields] AND “units”[All Fields]) OR “intensive care units”[All Fields] OR (“intensive”[All Fields] AND “care”[All Fields] AND “unit”[All Fields]) OR “intensive care unit”[All Fields]) AND acquired[All Fields] AND weakness[All Fields]) OR (“polyneuropathies”[MeSH Terms] OR “polyneuropathies”[All Fields] OR (“critical”[All Fields] AND “illness”[All Fields] AND “polyneuropathy”[All Fields]) OR “critical illness polyneuropathy”[All Fields]) OR (“critical illness”[MeSH Terms] OR (“critical”[All Fields] AND “illness”[All Fields]) OR “critical illness”[All Fields]) AND (“muscular diseases”[MeSH Terms] OR (“muscular”[All Fields] AND “diseases”[All Fields]) OR “muscular diseases”[All Fields] OR “myopathy”[All Fields])) OR (“polyneuropathies”[MeSH Terms] OR “polyneuropathies”[All Fields] OR (“critical”[All Fields] AND “illness”[All Fields] AND “polyneuropathy”[All Fields]) OR “critical illness polyneuropathy”[All Fields]) OR icu-aw[All Fields] OR icuap[All Fields]).” (pp. 361-362)</p> <p><i>Databases:</i> PubMed, Embase, Web of Science, SinoMed (Chinese Biomedical Literature Service System, China), and CNKI</p> <p><i>Procedures:</i> “We performed this meta-analysis in accordance with the recommendations of the Cochrane Handbook for Systematic Reviews of Interventions and reported it in compliance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement guidelines” (p. 361) “A comprehensive literature search was conducted on 18 September 2018 using PubMed, Embase, Web of Science, SinoMed (Chinese Biomedical Literature Service System, China), and CNKI databases to identify relevant RCTs. The search terms were listed as follows...” (p 361)</p>
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<p>Filters</p>	<p>Research Designs included and not included: randomized control trials only included</p> <p><i>Inclusion and exclusion criteria:</i> “Published RCTs meeting the following criteria were included: (a) population: adult patients admitted to the ICU; (b) intervention: early mobilization and rehabilitation; (c) control: standard physical care or daily nursing care; and (d) outcomes: ICU-AW, mortality rate, length of ICU stay, length of hospital stay, MRC score, Barthel Index score, ventilator-free days, handgrip strength, deep vein thrombosis, ventilator-associated pneumonia (VAP), and pressure sores. (p. 362)</p> <p>Total references found: 12,615</p> <p>Process for eliminating references: “11,094 were excluded because of duplicate records” (p. 362) “After reviewing the title/abstract, 1501 were excluded because they were reviews or irrelevant to our topics” (pp. 362-363) “After reviewing full-text information, five were excluded because two were single-arm studies, two were study protocols, and one was a cohort study” (p. 363)</p>
<p>Results</p>	<p>Description of the articles: There were 15 RCTs used in this meta-analysis. “These trials were published between 2009 and 2018. The number of patients in each study ranged from 50 to 312 with a total of 1914 patients. Among these studies 10 were published in an international English journal and the remaining 5 in a Chinese core journal.” (pp. 363-364) “The inclusion criteria for patients across the included studies varied greatly, some requiring mechanical ventilation for <48 hours and some requiring an ICU stay of at least 5 days.” (p. 364)</p> <p>Analysis/theme one (ICU-acquired weakness): “Seven studies reported the data of the ICU-AW.” (p. 364) “Pooled estimates suggested that early mobilization significantly reduced the incidence of ICU-AW compared with control (RR = 0.49, 95% CI: 0.26, 0.91; P = .025)” (p. 364) Bottom Line: early mobilization reduced incidence of ICU-AW</p> <p>Analysis/theme two (ICU mortality rate): “Seven studies reported ICU mortality rate data” (p. 364) “The mortality rate in the early mobilization and control groups was 24.5% and 22.9%, respectively. The aggregated result suggested that early mobilization was associated with a similar ICU mortality rate as the control (RR = 1.31, 95% CI: 0.97, 1.76; P = .074)” (p. 364) Bottom Line: early mobilization did not affect mortality rate</p> <p>Analysis/theme three (Length of ICU stay): “Eleven studies reported length of ICU stay data” (p. 364)</p>

“The mean duration of ICU stay in the early mobilization and control groups was 11.72 ± 3.65 days and 12.91 ± 3.51 days, respectively. Pooled result showed that early mobilization significantly reduced the length of ICU stay compared with control (WMD = -1.82 days, 95% CI: $-2.88, -0.76$; $P = .001$)” (p. 364)

Bottom Line: early mobilization reduced length of ICU stay

Analysis/theme four (Length of hospital stay):

“Eleven studies reported length of hospital stay data.” (p. 364)

“The mean duration of hospital stay in the early mobilization and control groups was 19.64 ± 6.55 days and 23.64 ± 10.49 days, respectively. Pooled estimated showed that early mobilization was associated with a shorter length of hospital stay (WMD = -3.90 days, 95% CI: $-5.94, -1.85$; $P < .001$).” (p. 364)

Bottom Line: early mobilization reduced length of hospital stay

Analysis/theme five (Handgrip strength):

“Four studies reported the data of handgrip strength.” (p. 364)

“The mean handgrip strength in the early mobilization and control groups was 42.79 ± 9.35 kg and 39.29 ± 7.91 kg, respectively. Pooled estimates showed that there was no significant difference in handgrip strength between the two groups (WMD = 4.03 kg, 95% CI: $-0.68, 8.74$; $P = .094$).” (p. 364)

Bottom Line: early mobilization did not affect handgrip strength

Analysis/theme six (MRC score):

“Five studies reported the data of MRC score.” (p. 364)

“The mean MRC score in the early mobilization and control groups was 52.92 ± 5.83 and 48.97 ± 13.12 , respectively. Pooled result showed that early mobilization was associated with a significantly higher MRC score than control (WMD = 4.47 , 95% CI: $1.43, 7.52$; $P = .004$), which indicated that patients who underwent early rehabilitation had better muscle strength.” (p. 364)

Bottom Line: early mobilization helped increase MRC score (increased muscle strength)

Analysis/theme seven (Barthel Index score at hospital discharge):

“Four studies reported Barthel Index score at hospital discharge data.” (p. 365)

“The mean Barthel Index score at hospital discharge was 80.32 ± 10.68 for early mobilization and 58.93 ± 10.41 for control. The summarized data showed that early mobilization had a significantly higher Barthel Index score at hospital discharge than control (WMD = 21.44 , 95% CI: $10.97, 31.91$; $P < .001$)” (p. 365)

Bottom Line: early mobilization led to higher Barthel Index score

Analysis/theme eight (Ventilator-free days):

“Five studies reported ventilator-free days’ data.” (p. 365)

“The mean ventilator-free days were 21.94 ± 4.29 days in the early mobilization group and 21.14 ± 4.98 days in the control group. Pooled estimates suggested that patients in the early mobilization group had similar ventilator-free days as those in the control group (WMD = 0.20 days, 95% CI: -0.10, 0.50; P = .194).” (p. 365)

Bottom Line: early mobilization did not affect the number of days on a ventilator

Analysis/theme nine (Ventilator-associated pneumonia):

“Four studies reported VAP data.” (p. 365)

“The incidence of VAP in the early mobilization group and control group was 3.2% and 12.3%, respectively. Pooled estimates suggested that early mobilization significantly reduced the incidence of VAP compared with control (RR = 0.26, 95% CI: 0.11, 0.63; P = .003).” (p. 365)

Bottom Line: early mobilization reduced the occurrence of VAP

Analysis/theme ten (Deep vein thrombosis):

“Four studies reported deep vein thrombosis data.” (p. 365)

“The incidence of deep vein thrombosis in the early rehabilitation group and control group was 0.5% and 7.6%, respectively. The aggregated result showed that early rehabilitation was associated with a significantly lower incidence of deep vein thrombosis than control (RR = 0.16, 95% CI: 0.04, 0.59; P = .006).” (p. 365)

Bottom Line: early mobilization decreased the likelihood of deep vein thrombosis

Analysis/theme eleven (Pressure sores):

“Four studies reported pressure sores’ data.” (p. 365)

“The incidence of a pressure sore in the early rehabilitation group and control group was 0.5% and 11.1%, respectively. Early rehabilitation was associated with a significantly lower incidence of pressure sores than control (RR = 0.14, 95% CI: 0.04, 0.44; P = .001).” (p. 365)

Bottom Line: early mobilization decreased the likelihood of pressure sores

Analysis/theme twelve (Publication bias):

“For the meta-analysis of early rehabilitation on ICU-AW, the Egger and Begg test showed that there was no evidence of significant publication bias among the included studies (Egger test, P = .318; Begg test, P = .295).” (p. 365)

Analysis/theme thirteen (Risk-of-bias assessment):

“Overall, only 1 trial was classified as being at low risk of bias, 4 as being unclear risk of bias, and 10 as being at high risk of bias. The main reason of the studies with a high risk of bias was that they did not perform the blinding of participants and personnel.” (p. 364)

“Blinding of participants and personnel was reported in only two studies, whereas the blinding of outcome assessment was presented in half of the included studies.” (p. 364)

<p>Authors’ Discussion and Conclusion</p>	<p><i>Idea one:</i> “The analysis showed that early mobilization significantly reduced the incidence of ICU-AW, shortened the length of ICU and hospital stays, and improved the MRC score and Barthel Index score at hospital discharge, as well as shortened the duration of mechanical ventilation.” (p. 365)</p> <p><i>Idea two:</i> “Moreover, it also decreased complications such as deep vein thrombosis, VAP, and pressure sores.” (p. 365)</p> <p><i>Idea three:</i> “However, it had no effect on mortality rate, ventilator-free days, and handgrip strength.” (p. 365)</p> <p>Consistent findings:</p> <ul style="list-style-type: none"> - mortality rate “In the present study, we found that early mobilization resulted in a similar mortality rate with control, and this was in line with the previous studies. Schaller et al performed a multicentre RCT to test whether early, goal-directed mobilization could improve mobility, reduce the ICU length of stay, and increase functional independence of patients. Before hospital discharge, there were more patients who died in the intervention group (16%) than in the control group (8%); however, difference was not significant. Three months after hospital discharge, the mortality rate in the two groups was 22% and 17%, respectively, which was also not significant (P = .35).³³ Similarly, Schweickert et al found no significant difference between the two Groups.” (p. 365) - ICU-AW “In the present study, our result indicated that early mobilization significantly reduced the incidence of ICU-AW compared with the control.” “Huang, et al performed an RCT to evaluate the effect of early rehabilitation on patients who had mechanical ventilation in the ICU. They reported that patients in the intervention group (2/50, 4%) had a significantly lower incidence of ICU-AW than those in the control group (20/50, 40%). Similar results were found in another RCT of sedated patients who had been on mechanical ventilation for less than 72 hours. In that study, patients in the intervention group had undergone early exercise and mobilization (physical and occupational therapy) during periods of daily interruption of sedation. The incidence of ICU-AW was significantly lower in intervention group (30.6%) than in the control group (49.1%). These two trials demonstrated that early mobilization had a benefit in reducing the risk of ICU-AW in mechanically ventilated, critically ill patients.” (p. 365) - mortality rate “In the present study, we found that early mobilization resulted in a similar mortality rate with control, and this was in line with the previous studies.” (p. 366) <p>Inconsistent findings</p> <ul style="list-style-type: none"> - Despite most of the published trials finding that early mobilization was effective, some other studies reported opposite results. Moss et al conducted an RCT in patients who required mechanical ventilation for ≥ 4 days for acute respiratory failure. At the end of follow up, the intensive physical therapy did not improve patient
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	<p>outcomes (Physical Functional Performance Test score, ICU hospital-free days) compared with the standard care. This might be explained by the late start of mobilization.” (p. 366)</p> <p>- length of ICU and hospital stays “There is growing evidence that early mobilization in ICU could reduce the length of ICU and hospital stays.” (p. 366)</p> <p>“Schaller et al reported that the length of ICU/hospital stay was 7/15 days in the intervention group and 10/21.5 days in the control group, respectively. The authors described that the time difference between the groups was significant. Similarly, Hodgson et al showed reductions in length of ICU and hospital stay after an early goal-directed mobilization in patients with mechanical ventilation for greater than 24 hours. The length of ICU and hospital stay in the intervention group was 9 and 19 days and 11 and 29 days in the control group, respectively.” (p. 366)</p> <p>“In contrast with the results of Schaller and Hodgson, some other trials did not identify the effects of early rehabilitation on length of ICU stay compared with control group. Schweickert et al performed an RCT on 104 sedated, adult, medical ICU patients who had been on mechanical ventilation for less than 72 hours, and they assessed the effect of combined strategy of daily interruption of sedation with physical and occupation therapy in ICU patients. The authors reported that patients in the intervention group had 13.5 (8.0-23.1) days of hospital stay, which was longer than that in the control group (12.9 [8.9-19.8] days).” (p. 366)</p> <p>“Elliott et al carried out an RCT of home-based physical rehabilitation in patients who had a length of stay of at least 48 hours and were mechanically ventilated for 24 hours or more. The length of ICU/hospital stay in the intervention group (9.4/24.8 days) was longer than that in the control group (8.6/23.2 days).³⁹ The difference between them was not significant.” (p. 366)</p> <p>“In contrast with the short stay in the ICU (7-10 days), Gruther et al reported a longer ICU stay (20-23 days) than the previously published trials. The authors postulated that early rehabilitation would have a great effect on ICU patients with expected prolonged ICU stay. Thus, they only included critically ill patients who had a minimum stay of 5 days in medical and surgical ICUs. However, the length of ICU stay in that study was longer in the intervention group (23 days [12-36]) than the control group (20 days [11-33]), indicating that early rehabilitation was unable to exhibit its effect in shortening the length of ICU stay if it was not started early in ICU patients.” (p. 366)</p> <p>- some studies showed that early mobilization reduced the number of days in the ICU and hospital, however other studies showed that it did not affect it (however, for the studies that showed it didn’t affect it there were other possible reasons that could explain the results; eg: mobilization was started later)</p>
<p>Authors’ Limitations</p>	<p>“There were several potential limitations in this meta-analysis that should be acknowledged. First, two of the included studies had a relatively small sample size (n < 50). Small trials were more likely to result in an overestimation effect compared with larger trials. Second, some of the included RCTs had a relatively low quality, and our</p>

	<p>conclusion may be limited by this point. Third, substantial heterogeneity was identified across the included trials, which made the findings complicated to interpret. However, we have conducted sensitivity analysis to identify the major sources of heterogeneity. As some studies were not designed to test the effect of early mobilization on ICU-AW and function improvement, these outcomes were seldom reported. Likewise, some confounding factors, such as the definition of early mobilization, timing of early mobilization, and the differences in critically ill patients, may not be consistent across the included studies and account for the heterogeneity. Fourth, the definition of mortality varied between the studies: some reported the ICU mortality, while some reported the hospital mortality; some reported the 28-day mortality, while some reported the 3-month mortality. Finally, we were unable to perform subgroup analysis based on the performance timing of physical therapy to identify the appropriate time to conduct early mobilization in critically ill patients.” (p. 366)</p>
<p>Authors’ Implications For Practice and Future Research</p>	<p>“In conclusion, the present study suggested that early mobilization was effective in reducing the incidence of ICU-AW, shortening the length of ICU/hospital stay, and improving the MRC and Barthel Index scores. Moreover, it also prevented the occurrences of vein thrombosis, VAP, and pressure sores. However, considering the potential limitations of this study, more large-scale, well-performed RCTs are needed to verify our findings” (p. 366)</p>