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The Effect Of A Nursing Knowledge Practice Improvement Project For ICU Acquired Weakness (ICUAW) and Mobility Protocols To Increase Knowledge and Self-Confidence In ICU Nurses

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The Effect Of A Nursing Knowledge Practice Improvement Project For ICU Acquired Weakness
(ICUAW) and Mobility Protocols To Increase Knowledge and Self-Confidence In ICU Nurses

Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Nursing
Practice at the University of Kentucky

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Lexington KY

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Abstract

Objective: The purpose of this project is to conduct a knowledge improvement program about ICU acquired weakness (ICUAW), mobility protocols, and self-confidence for ICU nurses at the University of Kentucky's Trauma & Surgical service.

Aim: The aim of this project is to improve the ICU nurses' knowledge about ICUAW, mobility protocols/charting, and nursing self-confidence performing the knowledge within clinical practice. As well as assess if there is any correlation between the years of nursing experience and ICU location on knowledge and self-confidence.

Background: A condition that is under recognized in critical care, is ICU acquired weakness (ICUAW), which is muscle weakness that occurs in critically ill patients admitted into an intensive care unit (ICU). Nurses are an important part of the mobility team. They are the primary participants providing mobility to patients. Lack of nursing knowledge results in increased risk of complications from ICUAW. There is a gap in nursing educational interventions to improve nursing knowledge and low confidence about ICUAW, current mobility protocols and practices, and mobility score charting.

Design: This is a quasi-experimental study, with a single group, using a pre/post test design to measure nursing knowledge and nursing confidence following an educational intervention. The participants are ICU nurses from both tower 1 and 2 of the Trauma & Surgical service.

Methods: The program for this project is designed for nurses to complete a pretest, receive educational materials, and then a posttest. SurveyMonkey was used to create the pretest and

posttest. Two-sample t-test were used to compare knowledge subscales between the pre- and post-education groups, and baseline knowledge between ICU locations. Spearman's correlation coefficient was used to test for an association between baseline knowledge scores and nursing years of experience. All data analysis was conducted in SPSS, version 25.

Conclusions: Addressing the gap in nursing knowledge and confidence involving ICUAW and mobility practices and protocols could reduce the complications of ICUAW and improve patients outcomes. Implementing an educational improvement project with a pretest/posttest evaluations can show the statistical significance of knowledge and confidence improvement. This project which was conducted at the University of Kentucky's Trauma & Surgical ICUs showed improvement of both nursing knowledge and confidence.

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Dedication

I would like thank my family for their continuous love, encouragement, and support through my three year journey. I would have never made it through this program and achieved my degree without them. Also, I would like to thank my friends, coworkers, and fellow students who have always cheered me on and kept me laughing during the stressful times. Special thanks to Amy Salyer who has been my DNP program yoda. I would not have survived or made it to the end without you. I am so thankful for the many people who have supported me and I know will continue to do in the next stages of my journey.

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Background

A condition that is under recognized in critical care, is ICU acquired weakness (ICUAW), which can occur within the first 24-48 hours of admission. ICUAW is muscle weakness that occurs in critically ill patients admitted into an intensive care unit (ICU). It affects the structures and functions of the muscles and nerves in proximal limbs and respiratory muscles. (Hermans & Van den Berghe, 2015). ICUAW can be induced by critical illness polyneuropathy (CIP) and critical illness myopathy (CIM). CIP is axonal degeneration caused by edema and mitochondrial dysfunction. Neural edema makes it possible for toxins to destroy nerve endings and corrupt energy exchange. (Hermans & Van den Berghe, 2015). The end result is axonal death of sensorimotor axons (Nordon-Craft, Moss, Quan, & Schenkman, 2012). CIM is caused by the alteration and breakdown of muscle structure and function. Muscle atrophy can be caused by inflammation, endocrine stress response, electrolyte imbalances, immobilization, decreased nutrition, denervation, and altered circulation. (Hermans & Van den Berghe, 2015).

Important risk factors for ICUAW are immobilization, multi-system organ failure, systemic inflammatory respiratory syndrome (SIRS), hyperglycemia, high dose corticosteroids, neuromuscular blocking agents, and old age. (Hermans & Van den Berghe, 2015; Schefold et al., 2010). These contribute to the ICUAW complications of, prolonged mechanical ventilation time, increased days in the ICU, higher incidence of ICU delirium, increased risk of aspiration, elevated mortality rate, and long term disability. (Hermans & Van den Berghe, 2015). Also, ICUAW can extend beyond the hospital. Long term weakness and fatigue has been reported to last as short as a few weeks to as long as 5 years. (Callahan & Supinski, 2009; Zorowitz, 2016). The economic impact after discharge from the ICU can be as much as \$300,000/patient/year (Wollersheim et al., 2014). Early recognition and implementation of preventive interventions can

decrease the incidence and improve patient outcomes (Hermans & Van den Berghe, 2015). Current preventive interventions and treatments include early mobilization, insulin treatment, and early nutrition. (Rodriguez et al., 2012; Zorowitz, 2016).

Early mobilization reduces the ICUAW complications of prolonged mechanical ventilation time, increased days in the ICU, higher incidence of ICU delirium, and long term weakness and fatigue. (Nordon-Craft et al., 2012). Patients participating in early mobilization can be on or off the ventilator, or on or off sedation. (Morris et al., 2008; Schweickert et al., 2009). Early mobilization has been researched to be safe and feasible in the ICU setting (Bailey et al., 2007). Medical professionals that play one of the largest roles in patient mobilization are nurses. (Morris et al., 2008). Mobility therapies that may be used to improve ICUAW are active or passive range of motion, ambulation in and out of bed, completing simple daily tasks, and respiratory physiotherapy. (Burtin et al., 2009; Nordon-Craft, Schenkman, Ridgeway, Benson, & Moss, 2011; Schweickert et al., 2009).

Nurses are an important part of the mobility team. They are the primary participants providing mobility to patients. Lack of nursing knowledge results in increased risk of complications from ICUAW. There is a gap in nursing educational interventions to improve nursing knowledge and low confidence about ICUAW, current mobility protocols and practices, and mobility score charting. (Hassan, Rajamani, & Fitzsimons, 2017). The purpose of this project is to conduct an education intervention for ICU nurses at the University of Kentucky's Trauma & Surgical service. This is a quasi-experimental study, with a single group, using a pre/post test design to measure nursing knowledge and nursing confidence following an educational intervention. As well as assess if there is any correlation between the years of nursing experience or ICU location to the pretest and posttest results.

Review of Literature

The University of Kentucky EBSCO host was used as the research data base for this project. There were 133 articles reviewed and 12 main articles found to fit the inclusion and exclusion criteria. The articles reviewed included randomized controlled studies, systemic reviews, meta-analysis, and cohort studies. Also, the publications involved were Pubmed, Elsevier, New England Journal of Medicine, Lippincott Williams & Wilkins Journal, and the British Medical Journal. Lastly, the focused search terms used to find sources used were ICUAW, early mobility, nursing knowledge & mobility, nursing confidence, mobility team, AROM, and PROM.

The evidence synthesis gathered shows that early mobility has been proven to improve the different complications associated with ICUAW. Complications identified were prolonged mechanical ventilation time, increased days in the ICU, higher incidence of ICU delirium, increased risk of aspiration, elevated mortality rate, extended hospital stay, and long term disability. (Hermans & Van den Berghe, 2015). Preventing and reducing the risks of ICUAW complications is why nursing education is important. The research supports nurses as mobility leaders and a key factor in the mobility team. (Hunter et al., 2017). There is still a need for more nurse driven mobility programs. (Krupp et al. 2018). The implementation of a nursing practice improvement, has been shown to increase mobility protocol compliance, as well as patient mobility rates. This type of practice improvement study was conducted with a pre/posttest with an educational implementation. Providing evidence for use of the pre/posttest study format. (Bakhru et al., 2015; Hunter et al., 2017).

Furthermore, research studies provided evidence of the type of education that is important for nursing staff. This education includes the different types mobility that nurses can use for their patients. (Hassan et al., 2017). The mobility includes passive range of motion, active range of motion, in or out of bed, respiratory physiotherapy, and completing simple daily tasks.

(Norton-Craft et al., 2011; Wahab et al., 2016). Nurses can even use a patient's own body weight as resistance training. (Stiller et al., 2013). The evidence shows that early mobility interventions that include passive and active range of motion activities reduce and prevent the complications from ICUAW. (Balas et al., 2014; Morris et al. 2008; Nickels et al., 2017; Schaller et al., 2016). Patients who participated in early mobility had a greater functional capacity and recovered faster. (Burtin et al. 2009). The most important piece of evidence, is that early mobility is safe and feasible for patients. (Bailey et al. 2007; Hodgson et al., 2016; Laurent et al., 2016; Norton-Craft et al., 2011). There are low occurrences of adverse events. (Eggmann et al., 2015). Also, barrier factors such as a patient age, sedation, or mechanical ventilation does not interfere with being able to provide mobility. (Engel et al., 2015; Hassan et al., 2017; Schweickert et al., 2009). Mobility intervention can be adapted to different patient circumstances. (Li et al., 2013; Schaller et al., 2016). In conclusion, the evidence synthesis proves that increasing nursing knowledge about mobility protocols, scoring, and interventions are important and improve patient outcomes.

Objectives

Objective 1: Improvement of nursing knowledge for ICUAW after an education intervention. This is assessed through the correct and incorrect answers chosen during the pretest before the education intervention and the post-test after the intervention.

Objective 2: Improvement of nursing knowledge for current mobility protocol, Mobility scoring, and practices after an education intervention. This is assessed through the correct and incorrect answers chosen during the pretest before the education intervention and the post-test after the intervention.

Objective 3: Enhancement of nurse confidence while performing mobility interventions in nursing practice after an education intervention. This is assessed through the yes or no

confidence questions on the pretest before education intervention and the post-test after the intervention.

Objective 4: Assess any correlation between years of nursing experience and ICU location to the pretest and posttest results

Theoretical and Conceptual Framework

Integrating new knowledge and reviewing current knowledge and practices can cause difficulty when it comes to deciding how to approach it with the best benefits for all of the learners involved. The goal is for the education to make an impact in learners knowledge and show improvement that will be long lasting instead of just memorized for a short time and then forgotten. David Ausubel's Meaningful Learning Theory focuses on creating true knowledge that will lead to significant change. It combines pieces of the concept, idea, theory, and argument together so that they all make sense and are stored in long-term memory. The Meaningful Learning Theory uses active learning techniques and links new knowledge to existing knowledge and experiences. As well as making the learner feel that that knowledge is useful and has meaning to a part of their lives. (Exploringyourmind, 2018). This theory is important to the project because the approach for this project was to convince and show the participants how important nursing knowledge and confidence about ICUAW and mobility practices and protocols is to their current practice. The pretest challenged the participants and showed them what they did not know. It encouraged them to want to do better on the posttest, which made them embrace the educational materials. Also, this knowledge improvement project is important to current nursing practice and could make a positive impact in patient outcomes.

Agency Description

Setting:

The project was conducted at the University of Kentucky (UK) Chandler Hospital in Lexington, Kentucky. The two Trauma & Surgical intensive care units (TSICU) located in pavilion A. The TSICUs' patient population is diverse with trauma and general surgery patients. Combined, there are 24 ICU beds between both towers. Average nursing staff is 6-7 nurses per shift, which is based on unit acuity.

Target Population:

Goal of 50 ICU nurses from Tower 1 & 2 Trauma & Surgical ICUs. Night shift and dayshift nurses. Recruitment of nursing staff will be facilitated by collaborating with the nursing care managers from both units. Inclusion criteria is nurses who work currently in the Trauma & Surgical ICUs. Exclusion criteria encompasses any nurses who work on any other service line ICU. There were 44 participants for the pretest and 38 for the posttest. Tower 1 ICU had the highest number of participants for both tests. Based on years of experience, nurses with 3-5 years had the highest participation, and nurses with 6-8 years had the least. Table 3 shows the breakdown of participants from ICU Tower location and years of nursing experience for both pretest and posttest.

Organizations Mission, Goals, and Strategic Plan:

The UK hospital's mission is to be committed to academic healthcare, education, research, and clinical care. UK strives to provide the best patient care to the community by offering the most advanced patient care through continuing research and education in the services they provide. (UK HealthCare, 2019). This nursing knowledge practice improvement project is in congruence with UK's mission because the focus is improving patient care through education improvement of nursing staff.

Description of Stakeholders:

The nurses are the primary stakeholders for this project. Other stakeholders involved are the ICU patients, physicians, chief hospital and nursing executives, and insurance companies. The nurses are the primary stakeholder because their role directly effects patient care. Nurses are on the frontlines performing interventions and advocating for patients. They are the focus of nurse-driven mobility. Patients are another stakeholder because ICUAW and early mobility interventions directly affect their short term and long term outcomes. Physicians count as important stakeholders because they work alongside nurses to support interventions to improve patient outcomes. Next, chief hospital and nursing executives are stakeholders because they are invested in good patient outcomes equaling high hospital rankings and hospital reimbursement. Lastly, insurance companies play a role as stakeholders because better patient outcomes, shorter hospital stays, and reduced incidence of long term disability equates to less cost. (Gruessner, 2017).

Site-specific Facilitators:

Nursing care managers and service line clinical nurse specialist (CNS) will facilitate providing staffing information for distribution of tests, education, and surveys. The managers and CNSs' can provide advice on modes of education that would be best for the nursing staff of their units.

Project Design

Quasi-experimental study formatted with a pretest, education implementation period, and post-project. Project was conducted from November 2019 to February 2020.

Project Methods

Procedure:

The application for project approval was submitted to the University of Kentucky Institutional Review Board (IRB). Participants were recruited by ICU nursing managers sending out emails with the information, consent form, and links to the nursing staff members of Trauma & Surgical ICUs. Inclusion criteria was participants who were nurses on either Tower 1 or 2 ICUs on the Trauma & Surgical service line. Exclusion criteria was nurses who were not staff members in the ICUs on the Trauma & Surgical service line.

SurveyMonkey.com was used to create both pretest and posttest, as well as an anonymous link that was sent out to the participants. Participants were given one month to complete the pretest, one month for the education material, and one month to complete the posttest. Informed consent was attached to the introduction email that was initially sent out to participants, as well as at the beginning of the pretest and posttest. The pretest consisted of 20 questions and the posttest had 21 questions. The extra question added to the posttest asked participants to list any pros or cons about their experience with the project. Educational materials were distributed by email as well as posted on both ICUs. An infographic and PowerPoint presentation was created and posted in the staff bathrooms and breakrooms. Staff reminders were sent out by email every week through the staffing end of the week note that is regularly sent out by the nursing managers at the end of every week. Lastly, the investigator visited both ICUs on dayshift and nightshift to answer any questions from participants.

Data Analysis

Three subscales reflecting knowledge were created. Indicator (yes/no) variable was created for each item of the survey and then items were summed to create subscale scores. Questions focused on ICUAW were 3-7, mobility were 8-15, and nursing confidence were 16-20. Two-sample t-test were used to compare knowledge subscales between the pre- and post-education groups, and baseline knowledge between ICU locations. Spearman's correlation coefficient was used to test for an association between baseline knowledge scores and nursing years of experience. All data analysis was conducted in SPSS, version 25, with an alpha of .05.

Results

There was statistical significant of ICUAW knowledge, mobility knowledge, and nursing confidence between the pretest and posttest results as shown in Table 1 with a $p < .001$. This means that the implementation of the education was successful because there was a significant improvement between the pretest scores of all three subscales and the posttest scores. This was assessed through the correct and incorrect answers chosen during the pretest before the education intervention and the post-test after the intervention. Two-sample t-tests compared the three knowledge and confidence subscales between the pre- and post-education groups. The Spearman's correlation coefficient (Table 4) revealed a significant positive association between years of nursing experience and ICUAW knowledge ($\rho = .48, p = .001$). The results revealed no association between years of nursing experience and mobility knowledge or nursing confidence. As well as, no association between ICU location and ICUAW knowledge, mobility knowledge, and nursing confidence results.

Discussion

The statistical significance was shown for objectives 1-3, which means that the educational implementation was successful with the Trauma & Surgical ICU nurses. Objectives 1-2 assessed the improvement of nursing knowledge for ICUAW and mobility protocol, scoring, and practices after an education intervention. Objective three assessed enhancement of nurse confidence while performing mobility interventions in nursing practice after an education intervention. Both the knowledge and confidence regarding ICUAW and mobility of the participants improved from the pretest to the posttest. The fourth objective assessed any correlation between years of nursing experience and ICU location to the pretest and posttest results. Only the years of nursing experience and ICUAW knowledge had a positive correlation, and none was seen with the mobility knowledge, nurse confidence, or ICU location. Participants listed a pro of the educational implementation in the posttest was that they liked the format of the infographic and where it was posted on their units. Participants stated that the infographic was easy to read and remember. Also, that the staff bathroom location was the most effective for them to notice it. The success of the educational implementation was aided by use of the Meaningful Learning Theory by the pretest challenging the participants and showing them what they did not know. Lack of knowledge could have encouraged them to want to do better on the posttest, which may have made them embrace the educational materials. Finally, the majority of participants' nursing experience was 3-5 years and least was 6-8 years of experience. It is unknown if lack of participation with nurses 6-8 years of experience is due to a problem with not being engaged to participate or if it is due to less staff within that category. The results of this project show that the projects format and methods were successful in the Trauma & Surgical service line ICU nurses, and may possibly be used for future studies.

Limitations

Limitations for this project include the pretest and posttest anonymous link, instead of using an individual link for each participants which makes impossible to know if the same people took the pretest and posttest. Also, it makes it possible to see if individuals did better between the pretest and posttest. It was decided on to use an anonymous link to maintain a minimal risk for participants. Next, noncompliance and no participation with the tests and education is a limitation for this project. The same amount of people who took that pretest was greater than those who took the posttest and the goal of 50 participants for each test was not achieved. This could be explained by test fatigue from participants, because the 7th floor participates in a lot of studies. This may be improved by showing participants why learning the education is vital for their clinical practice and patient outcomes. Other limitations are that the educational materials were not taught directly to the participants and required them to self-teach themselves. This made it impossible to know if the educational materials were reviewed or not. Next time, education sessions could be held during unit meetings or in person education sessions could be offered on the units. Also, the small sample sizes and focus on only one type of ICU are other limitations. Due to this we cannot generalize that this would be successful for all ICU nurses or in any type of ICU location. Broadening the types of ICUs involved and a larger sample size could help to show if this project could be successful on a larger scale.

Implications for Future Practice

Although there were limitations, the project results showed that there was a significance in nursing knowledge improvement and confidence. This implies that future practice could be impacted by the improvement of nursing knowledge and confidence. The project could be expanded to all ICUs and a larger number of ICU nurses. As well as adding other disciplines such as physical therapy, respiratory therapy, and occupational therapy for a possible greater

benefit for patients. This could expand to implications of how improved knowledge of ICUAW and mobility effects the complications of ICUAW. Previous retrospective studies done by other DNP students reviewed the medical record of mobility charting and mobility assessment. A future retrospective study could look at if there was a significant change in nursing mobility charting or the complications from ICUAW to see if there were was a direct impact on patient care and patient outcomes from improved nursing knowledge and confidence. Also, there could be future implications for new nursing orientation and yearly competency. Since there was a correlation between years of nursing experience and the ICUAW results, nursing orientation programs can provide new nurses or new staff with sufficient education. As well as education reviews during nurse yearly competency renewals so that all years of experience are covered.

Conclusion

A condition that is under recognized in critical care, is ICU acquired weakness (ICUAW) and mobility can help to reduce the impact or prevent the complications from this condition from occurring. Lack of nursing knowledge and confidence performing mobility activities may result in increased risk of complications from ICUAW. There is a gap in nursing educational interventions to improve nursing knowledge and low confidence about ICUAW, current mobility protocols and practices, and mobility score charting. Nurses are the primary members of the mobility team. (Hassan, Rajamani, & Fitzsimons, 2017). Understanding how to improve nursing knowledge and enhance nursing confidence could help to reduce patient complications and produce positive patient outcomes.

This project was designed to conduct an education intervention for ICU nurses at the University of Kentucky's Trauma & Surgical service. This was a quasi-experimental study, with a single group, using a pre/post test design to measure nursing knowledge and nursing

confidence following an educational intervention. As well as assess if there is any correlation between the years of nursing experience or ICU location to the pretest and posttest results. This knowledge improvement project was successful due to statistical significance shown in all main objectives. The project design and implementation of education was shown to successfully improve the ICU participants scores from the pretest and posttest. This could lead to future practice improvements using this format for multiple ICUs and other specialties within the interdisciplinary team. As well as expanding to a larger study revealing if patient outcomes were affected by the nurses knowledge and confidence improvement.

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Appendix A

Informed Consent

INFORMED CONSENT TO PARTICIPATE IN A RESEARCH SURVEY

Study Title: The Effect Of A Nursing Knowledge Practice Improvement Project For Mobility Protocol To Increase Knowledge And Self-Confidence In ICU Nurses

Principle Investigator: Renée Rogers BSN, RN

Faculty Advisors:

Dr. Melanie Hardin-Pierce DNP, RN, APRN, ACNP-BC

Dear Respondent,

I am inviting you to participate in a research project to study. You are being asked to participate because you are an ICU nurse working in tower 1&2 Trauma & Surgical ICUs. The procedure involves completing a survey that will take approximately 5-10 minutes. The survey questions will be about nursing knowledge about mobility protocol and charting. Through your participation I hope to understand the current education status and self-confidence of the ICU nurses involving patient mobility and mobility charting. You must be at least 18 years old to participate.

Your information and responses to the survey will be confidential. To help protect your confidentiality, I will be asking demographic information but will not ask for your name. Examples of demographic information will be sex, age, ethnicity, and nursing degree. All information collected in this study will be kept completely confidential to the extent permitted by law.

Data is collected via the Internet, through SurveyMonkey.com. Please note that absolute confidentiality cannot be guaranteed due to the limited protections of Internet access. Your participation in this online survey involves risks similar to a person's everyday use of the Internet.

Your email address will be requested for the emailing all surveys for this study. However, it will not be connected to your answers and data collected in the study.

This project has been reviewed by the Institutional Review Board (IRB) at University of Kentucky.

Your participation is voluntary and there is no penalty if you do not participate. You may stop the survey at any time or skip any questions you do not wish to answer.

"If you have questions about the study, please feel free to ask; my contact information is given below. If you have complaints, suggestions, or questions about your rights as a research volunteer, contact the staff in the University of Kentucky Office of Research Integrity at 859-257-9428 or toll-free at 1-866-400-9428."

By completing this survey, you are indicating that you at least 18 years old, have read this document, have had any questions answered, and voluntarily agree to take part in this research study. You may print a copy of this consent agreement for your records.]

Sincerely,

Renée Rogers

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Appendix B

UK Mobility Protocol

University of Kentucky / UK HealthCare Nursing Guideline	Guideline # gNU-51
Title/Description: Nurse Driven Mobility for Adult Patients	
Purpose: Early Progression of Best Possible Mobility.	

[Introduction](#)

[Procedure](#)

[Persons and Sites Affected](#)

[Guidelines Replaced](#)

[Effective Date](#)

[Review/Revision Dates](#)

Introduction

Early progressive mobility in hospitalized patients including those in critical care, acute and progressive areas has been shown to reduce morbidity and mortality, reduce the incidence of and shorten the duration of delirium, shorten length of stay and reduce the risk of disability post hospitalization.

Education of the patient and family should begin on admission with the expectation that mobility activities will begin immediately with the goal being that the patient mobilizes to their physical limit a minimum of twice daily. If the provider doesn't place mobility orders/restrictions, he/she should be notified and orders requested as soon as possible.

Procedure

The patient's mobility score should be evaluated throughout every shift and documented every 12 hours, near the end of the shift. The score should reflect the best mobility achieved during the shift.

Mobility activities from the scale should be documented as done, including patient tolerance, assistance needed and distance/time reached.

This guideline applies to all adult patients.

UK HealthCare Mobility Scale

Our Goal: Early progression to the patient's best possible mobility

Please reference General Mobility and Ortho/Trauma/Spine guidelines and order set for specific instructions.

Score	Assessment Criteria	Goals	Considerations	Nursing Interventions** (Document all)
Significantly Reduced Mobility				
1 Total Assistance	Patient is unable to tolerate sitting supported with HOB at 45° for >10 min.	Increasing hemodynamic stability. Tolerates sitting upright for 10 minutes (supported).	Patient ordered/ condition dictated bedrest and HOB less than 30 degrees, completely immobilized or prone positioning. Unless orders prohibit, all patients should be verticalized via reverse Trendelenburg or HOB elevation in order to maintain vascular tone. Maintain HOB elevation/Reverse Trendelenburg as high as orders/condition permit. Turning is essential for pulmonary perfusion and vascular tone. Hemodynamically unstable patients should be turned slowly/gradually and given approximately 5 minutes to equilibrate.	ROM exercise 3 x daily. Turn a minimum of every two hours. Reassess for progression to level 2 and document each shift. Attempt and document upright supported sitting each shift if orders permit and medically feasible.
Bedrest				
2 Partial Assistance	Patient is able to tolerate sitting supported with HOB at 45° for >10 min.	Ability to move arms against gravity to shoulder height. Trunk control in upright sitting, supported.	HOB elevated 30-45 degrees at all times if possible, especially of receiving tube feedings. Pay special attention to offload coccyx. Reposition in the chair every 30 minutes to 1 hour. (USE THIS SCORE FOR PATIENTS LIFTED WITH A MECHANICAL LIFT)	Sitting in chair 2 hours maximum at a time 2-3 x day. Reassess for progression to level 3 and document each shift. Turn a minimum of every 2 hours, and reposition every hour while in the chair. ROM exercises 3 x daily.
Patient Sitting/Standing ** Consider having at least 2 people to assist with scores/activities 3-5				
3 Partial Assistance	Patient can lift arms to shoulder height and sit unsupported.	Ability to move legs against gravity Trunk control in upright sitting	** Pay special attention to offload coccyx.	Patient positioned at edge of bed(EOB), legs dangling with assistance present for balance and safety. Reassess for progression to level 4 and document each shift. Increase incrementally as patient tolerates. (Document time)

		(unsupported).		2-3 times per day
4 Partial Assistance	Patient can kick each leg in a sitting position and scoot side to side in bed.	Out of bed to chair Standing and pivoting with assistance.	** Reposition in the chair every 30 minutes to 1 hour.	Increase incrementally as patient tolerates. (Document time standing and in chair). Reassess for progression to level 5 and document each shift. Stand at the bedside. Stand and pivot to chair as tolerated. 2 hours maximum in chair at a time, turning once an hour while in chair 2-3x daily 2-3 x daily
5 Minimal assist or independent	Patient can mobilize independently or with minimal assistance.	Ambulation in room or hallway with assist as needed. Intensity= Mild shortness of breath	** Ambulation in room or hallway with assist as needed.	Document distance ambulated, patient response and assist needed. 2-3 x daily

****** Consider having at least 2 people to assist with scores/activities 3-5

Appendix C

ICUAW & Early Mobility Infographic

ICUAW & Early Mobility

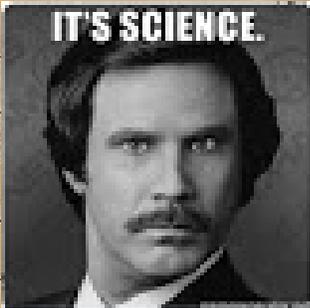
First 24-48 hours

ICU acquired weakness: Muscle weakness that occurs in critically ill patients admitted into an intensive care unit (ICU).

Neuropathy & Myopathy

4% muscle strength lost in first week

Nurses are mobility leaders!



Risk Factors:

- Immobilization
- Multi-system organ failure
- SIRS
- Hyperglycemia
- High dose corticosteroids
- Neuromuscular blocking agents
- Old age

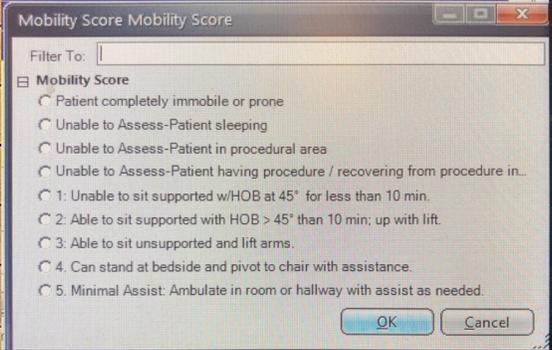
Complications:

- Prolonged ventilation
- Increased day in ICU
- Higher risk of ICU delirium
- Increased risk of aspiration
- Elevated mortality rate
- Long term disability

PROM & AROM equally help prevent the risks & reduce the complications from ICUAW

Early Mobility can be done on/off vent or on/off sedation

Check out our mobility protocol in CareWeb or hanging up inside your patients room!



Mobility Score Mobility Score

Filter To:

Mobility Score

- Patient completely immobile or prone
- Unable to Assess-Patient sleeping
- Unable to Assess-Patient in procedural area
- Unable to Assess-Patient having procedure / recovering from procedure in...
- 1: Unable to sit supported w/HOB at 45° for less than 10 min.
- 2: Able to sit supported with HOB > 45° than 10 min; up with lift.
- 3: Able to sit unsupported and lift arms.
- 4: Can stand at bedside and pivot to chair with assistance.
- 5: Minimal Assist: Ambulate in room or hallway with assist as needed.

OK Cancel

Appendix D

Pretest & Post-test

1- Number of Years of Experience

-0-2

-2-4

-4-6

-6-8

-greater than 10 years

2- Trauma & Surgical ICU Location

-Tower 1

-Tower 2

3- Onset of ICU Acquired Weakness (ICUAW)?

-72 hours

-48 hours

-96 hours

-120 hours

4- What are the 2 main complications of ICU acquired weakness?

-Sepsis & mechanical ventilation

-Neuropathy & weight loss

-Neuropathy & myopathy

-Sepsis & myopathy

5- Mr. Y was admitted to ICU 27 hours ago following a motor vehicle accident. He is sedated, physiologically and hemodynamically stable. He has been administered a neuromuscular block in conjunction with mechanical ventilation. Which intervention strategy would you recommend for Mr. Y at this point in time?

-Electromuscular stimulation

-Passive bedside cycle ergometry with passive stretching

-Patient is not ready for intervention at this point

-Interferential current therapy

6- After spending one week in the ICU, how much muscle strength would you expect Mr. Y to have lost?

-1.5%

-3%

-4%

-7%

7- Complications caused by ICUAW? (Select all that apply)

-Prolonged mechanical ventilation

-Long term weakness and fatigue

- Sepsis
- Pulmonary embolism
- Prolonged ICU admission
- Deep vein thrombosis
- Increased risk for delirium

8- Early mobilization cannot occur when the patient is sedated and mechanically ventilated. (True/False)

9- Where are the UK mobility protocols/practices guides located in the Trauma & Surgical ICUs?

- Careweb
- Outside of each patient room
- Inside of each patient room
- Clerk's station
- All of the above
- Answers A & C

10- Passive range of motion (PROM) can prevent ICUAW equally to active range of motion (AROM). (True/False)

11- Mrs. R is a new trauma alert who was in an MCC that has just been admitted from the ED. She is a RASS -2, on sedation, has spinal fractures, and is wearing a c-collar. She is currently a logroll. Off sedation Mrs. R can follow commands and move her perform small movements of her extremities. She is hemodynamically stable and tolerates reverse Trendelenburg. What is Mrs. R's mobility score?

- 1
- 2
- 3
- 4
- 5

12- Mrs. M was a pedestrian vs car three days ago. She suffered a tib/fib fracture to her left leg, bilateral rib fractures, and a small bowel injury . Her small bowel injury is fixed and her incision is closed. Ortho has fixed her leg and cleared her for weight bearing as tolerated mobility for her leg. She is weak and is unable to ambulate on her own. Mrs. M is able to stand and pivot with assistance. What is Mrs. M's mobility score?

- 1
- 2
- 3
- 4
- 5

13- Your patient's mobility score is a level 1 and they are on continuous sedation. The patient is hemodynamically unstable and has a RASS of -2. What is the appropriate mobility for this patient? (Select all that apply)

- Q2 turning
- Q4 AROM
- Q4 PROM
- Q2 AFO brace rotation
- Feet dangling on side of bed
- Transfer to chair via lift

14- For patients with a mobility level of 2-3, how often should AROM be performed?

- Q8 hours
- Q2 hours
- Q4 hours
- Q shift

15- Patients who require total assistance should receive range of motion (ROM) how many times a day?

- 1
- 2
- 3
- 4

16- I feel confident performing PROM on my patients. (Yes/No)

17- I feel confident performing AROM on my patients. (Yes/No)

18- I feel confident assessing and correctly charting my patient's mobility score. (Yes/No)

19- I feel know all of the resources available to me that can help me to provide an adequate assessment and mobility for my patients. (Yes/No)

20- I have received plenty of education on ICUAW, patient mobility, mobility tools, and mobility charting before this test. (True/False)

Table 1:**Results Overview**

	Potential range	Pre-education (n=44) Mean (SD)	Post-education(n=38) Mean (SD)	<i>p</i>
ICUAW	0-7	4.30 (1.29)	6.58 (0.83)	<.001
Mobility	0-7	2.57 (1.34)	4.42 (1.20)	<.001
Confidence	0-7	3.52 (1.50)	4.92 (.27)	<.001

Table 2:**Years of RN Experience**

Number of Years as a RN	Pretest (Mean)	Posttest (Mean)	Total
0-2	11 (25)	14 (36.8)	25
3-5	23 (52.2)	16 (42.11)	39
6-8	4 (9)	4 (10.5)	8
9 or greater	6 (13.6)	4 (10.5)	10
Total	44	38	82

Table 3:**ICU Location**

Trauma & Surgical ICU Location	Pretest (Mean)	Posttest (Mean)	Total
Tower 1	30 (68.2)	21 (55.3)	51
Tower 2	14 (31.8)	17 (44.7)	31
Total	44	38	82

Table 4:**Objective 1**

	Pre-education (n=44) Mean (SD)	Post-education (n=38) Mean (SD)	Sig. (2- tailed) p-value
ICUAW	4.30 (1.29)	6.58 (0.83)	<.001

Table 5:**Objective 2**

	Pre-education (n=44) Mean (SD)	Post-education (n=38) Mean (SD)	Sig. (2-tailed) p-value
Mobility	2.57 (1.34)	4.42 (1.20)	<.0001

Table 6:**Objective 3**

	Pre-education (n=44) Mean (SD)	Post-education (n=38) Mean (SD)	Sig. (2- tailed) p-value
Confidence	3.52 (1.50)	4.92 (.27)	<.001

Table 7:**Objective 4**

Spearman's Coefficient Correlation	ICUAW <i>rho</i> (<i>p</i>)	Mobility <i>rho</i> (<i>p</i>)	Confidence <i>rho</i> (<i>p</i>)
Number of years as a registered nurse	.48 (.001)	<.01 (.99)	.02 (.89)