IMPROVING NURSING KNOWLEDGE OF EARLY MOBILIZATION

IN THE INTENSIVE CARE UNIT

by

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As members of the DNP Project Committee, we certify that we have read the DNP project prepared by Isabella Ama Charway, titled Improving Nursing Knowledge of Early Mobilization in the Intensive Care Unit and recommend that it be accepted as fulfilling the DNP project requirement for the Degree of Doctor of Nursing Practice.

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ABSTRACT

**Purpose.** The purpose of this quality improvement (QI) project is to improve nursing knowledge and attitudes related to the early mobilization of patients in the ICU by using the “E” element of the ICU liberation bundle developed by the Society of Critical Care Medicine (SCCM).

**Background.** Intensive care unit acquired weakness (ICUAW) is common in those hospitalized for critical illness. When critical illness and bedrest are combined, patients are more likely to develop muscle weakness and delayed healing. Bedrest is often the standard of care for patients in the ICU but can have devastating effects on the nervous, musculoskeletal, and respiratory systems. With the more than five million people treated in the ICU annually, implementing an early mobilization protocol would reduce the incidence and severity of ICUAW (SCCM, 2016). With evidence-based early mobility interventions and provider education, barriers to mobility can be overcome to preserve the quality of life for those fortunate enough to survive critical illness.

**Methods.** The project employed a virtual provider education session via PowerPoint presentation and retrospective post-then-pre survey using Google Forms. Participants included eight MSICU nurses at Banner Desert Medical Center in Mesa, Arizona. The investigator posted flyers in the breakroom and sent out an email containing surveys and mobility education. Participants were given two weeks to watch the presentation and complete surveys. Data was then analyzed to determine if nursing knowledge and attitudes related to the early mobilization of patients in the ICU improved after viewing the mobility PowerPoint. Microsoft Excel and Google forms were used to perform all data analysis.
Results. The project introduced the nursing staff to ICUAW and early mobilization practices. Participants viewed the “Let’s Keep Our Patients Moving” PowerPoint presentation positively and believed that their knowledge and attitudes related to early mobilization of ICU was improved post-completion.

Conclusions. It has been proven through this project that MSICU nursing staff benefited from additional education on ICUAW and early mobilization. Future studies should be done at the same site with greater nursing participation to show sustainability and efficacy.
INTRODUCTION

Prolonged bed rest periods, mechanical ventilation, and sedation can leave patients with functional deficits long after discharge (Adler & Malone, 2012). Unfortunately, immobility is the standard of care for most patients admitted to the intensive care unit (ICU) despite the knowledge of its adverse effects on multiple body systems (Adler & Malone, 2012). Early mobilization among patients in the ICU is associated with improved muscle strength, physical function, and quality of life (Parker & Needham, 2018). Early mobility is defined as physical activity that is usually implemented within 24 to 48 hours of admission. Depending on the patient’s abilities, this could range from passive in-bed exercises to standing or walking (Marach, 2019). The early mobilization of patients in the ICU has positive outcomes when completed in a controlled environment and with a multidisciplinary team. The ICU Liberation Bundle (A-F) developed by the Society of Critical Care Medicine (SCCM) is a comprehensive set of strategies to improve patient outcomes in the ICU. When early mobility is part of the ICU protocol, the hospital survival rate for critically ill patients increases by 12% (Medtronic, 2019). With evidence-based early mobility interventions and provider education, we can overcome barriers to mobility and help preserve the quality of life for those fortunate enough to survive critical illness.

Background Knowledge and Significance

Intensive care unit acquired weakness (ICUAW) is common in those hospitalized for critical illness. When critical illness and bedrest are combined, patients are more likely to develop muscle weakness and delayed healing. Bedrest is often the standard of care for patients in the ICU but can have devastating effects on the nervous, musculoskeletal, and respiratory systems. These impairments last for months or years after their initial hospitalization. Some 23%
of ICU patients have functional deficits one year after discharge (Medtronic, 2019). ICUAW is associated with increased healthcare costs, reduced quality of life, and prolonged unemployment (Jolley, Bunnell & Hough, 2016). Incidences of ICUAW appear in 25% to 100% of patients admitted to the ICU (Zorowitz, 2016). Many of those patients carry diagnoses such as multiorgan failure, sepsis, and persistent systemic inflammation. In those cases, 47% to 70% of those patients have shown evidence of neuromuscular impairment (Zorowitz, 2016).

Early mobility and physical therapy reduce the incidence of ICUAW and the adverse reactions it can bring. Clinical studies have shown that early mobilization can decrease mechanical ventilation duration, reduce ventilator acquired illness, reduce mortality, shorten hospital stay, help patients return to walking unaided sooner, and improve long-term functional independence (Adler & Malone, 2012). By shortening the length of hospital and ICU stay, early mobility can reduce healthcare costs. According to Medtronic, early movement can save patients an average of $4,119 (Medtronic, 2019). Early mobility programs have also shown a positive effect on ICU-acquired delirium, reducing it by 50% (Medtronic, 2019). The onset of ICUAW can be seen four to seven days after admission (Medtronic, 2019). Muscles need to move, and early mobility is an integral part of patient care. With the more than 5 million people treated in the ICU annually, implementing an early mobilization protocol would reduce the incidence and severity of ICUAW (SCCM, 2016).

The SCCM developed the ICU liberation bundle (A-F) to minimize the harmful effects of delirium, pain, immobility, agitation, sedation, and sleep disturbances seen by patients in the ICU (SCCM, 2016). The ICU liberation bundle uses a multidisciplinary team to set daily goals and reassess goals based on the patients evolving clinical status. With its initiation, the long-term
consequences of ICU stays are reduced, and patient outcomes improved. The “E” element is centered around understanding the physical deficits ICU patients face related to early mobility and exercise. The “E” aspect considers the patient's pulmonary, cardiac, and neurologic status as well as risk versus benefit (SCCM, 2016). The bundle encourages the healthcare team members to ask, “Did the patient achieve maximum mobility or exercise today?” and, if not, determine factors that are impeding patient mobility (SCCM, 2016). Based on provider evaluation, patients are assigned mobility levels from one to four. Level 1 includes activities such as passive range of motion, passive bed cycling, and turning every two hours. Level 4 introduces ambulation, gait training, and strength building (Medtronic, 2019). There is a growing amount of literature showing success with the use of the ICU liberation bundle. A prospective cohort study by Morris et al. (2008) reported that patients using an ICU liberation bundle similar to the one developed by the SCCM were out of bed earlier (5 vs. 11 days, p < .001), had physical therapy initiated more frequently (91% vs. 13%, p < .001), saw a reduced ICU length of stay (5.5 vs. 6.9 days, p=.025), and reduced length of hospital stay (11.2 vs. 14.5 days, p= .006) when compared to usual care (Morris et al., 2008). Early mobilization has great significance in health care and advanced practice nursing because ICUAW is preventable when the appropriate interventions are implemented promptly using a multidisciplinary approach.

**Local Problem**

ICUAW is both a local and national problem. Due to advances in medical care, more patients admitted to the ICU survive critical illness. ICUAW places a strain on the healthcare system by prolonging hospital stay, mechanical ventilation, and increased mortality. Banner Health currently uses the Banner Mobility Assessment Tool (BMAT) to classify a patient’s
mobility level. The BMAT is like the mobility part of the ICU liberation bundle. It places patients at one of four levels of mobility based on an assessment completed once per shift. Only the RN can complete the mobility assessment; the patient’s mobility level should be posted outside the door, and a fall risk or yellow armband placed on those most at risk. Clinical nursing staff has the option to complete a 45-minute digital course entitled “Fall Prevention and Safe Patient Handling and Mobility (SPHM) for Clinical Nursing Staff.” The course was created as part of the education roll out of BMAT and focuses on fall prevention, risk factors for falling, protecting patients from falls, and mobility assessment. Banner policy 13202 entitled “Safe patient handling and mobility” also addresses fall prevention. Unfortunately, it is not tailored towards patients in the ICU that have different mobility capabilities. It does not mention ICUAW, prevalence, risk factors, immobility complications, benefits of early mobility protocols, barriers, and the role ICU nurses play in promoting early mobilization. The SPHM course educates the nursing staff on the mobility basics but does not address the mobility difficulties faced by ICU patients exclusively. The COVID pandemic also created an influx of ICU patients requiring manual proning and a rotoprone bed, making it even more difficult for patients to take part in early mobility. Due to the above, it was determined that MSICU nursing staff might be lacking education on early mobilization in the ICU and ICUAW.

According to the American Thoracic Society, between 13 to 20 million people annually require life support in the ICU (Fan et al., 2014). More than 750,000 people in the United States (US) will require mechanical ventilation annually (Fan et al., 2014). With increasing numbers of patients in the ICU comes the chance for them to develop ICUAW. Global physical impairment in the form of ICUAW will affect more than 75,000 patients in the United States and 1 million
worldwide (Fan et al., 2014). Early mobilization and physical activity are patient-centered interventions that are feasible, safe, and have a low potential for adverse events.

Despite the evidence-based literature supporting the benefits of early mobility and physical therapy, bed rest continues to be the standard of care at many hospitals. According to the SCCM, understanding barriers to early mobility implementation will help develop the solution strategies (SCCM, 2016). Identified barriers to early mobilization in the ICU include lack of staffing or equipment, lack of knowledge, lack of training, lack of leadership, delirium, oversedation, safety concerns, lack of mobility culture, and patient tolerance (SCCM, 2016). Stakeholders involved in early mobilization in the ICU include nurses, mobility therapists, respiratory therapists, intensivists, and hospital administrators. Nurses play a role in advocacy, assessing pain, assessing sedation, and determining readiness for movement. Mobility therapists help determine the type of mobility exercise that would be appropriate for the patient. Respiratory therapist protects the airway. Intensivists oversee patient care and make referrals for physical therapy. Hospital administrators are involved in establishing mobility programs behind the scenes role (Medtronic, 2019).

**Intended Improvement**

**Project Purpose**

The purpose of this quality improvement (QI) project was to improve nursing knowledge and attitudes related to the early mobilization of patients in the ICU by using the “E” element of the ICU liberation bundle developed by the SCCM.
**Project Question**

The following problem, intervention, comparison, and outcome (PICO) question was designed to investigate the association between education using the ICU liberation bundle and the improvement of nursing knowledge and attitudes related to the early mobilization of ICU patients: For critical care nurses working in the ICU (P), will education using the “E” element of the ICU liberation bundle (I) compared to usual care (C), improve nursing knowledge and attitudes related to the early mobilization of patients (O)?

**Project Objectives**

Project objectives based on the project purpose are the following:

1. Implement an educational PowerPoint presentation for nursing staff detailing the “E” element of the ICU liberation bundle
2. Implement a Google Forms survey using a retrospective post-then-pre design to evaluate nursing knowledge and attitudes related to the early mobilization of ICU patients after viewing the PowerPoint presentation

**Theoretical Framework**

The healthcare system is continuously changing to meet the needs of a more diverse patient population. Change through evidence-based practices ensures that patients receive the highest level of care backed by research and quality improvement. The theoretical framework used to guide the planning, implementation, and evaluation of early mobility education in the ICU was Lewin’s *Change Theory*. Kurt Lewin is often considered the founding father of the change movement and introduced the three-step model for change in 1951 (Kritsonis, 2005). Lewin believed that behavior is guided by the balance of forces working in opposite directions.
Driving forces guide individuals or groups involved in change in the desired direction. Restraining forces obstruct change by pushing participants in the opposite direction. Lewin’s change theory believed that change is met at an equilibrium where driving and restraining forces are balanced (Kritsonis, 2005). Applying the unfreezing processes, movement, and refreezing to the “E” element of the ABCDEF bundle will increase nursing knowledge and change attitudes related to early mobility in the ICU.

The first step in changing behavior is unfreezing. Unfreezing involves the process of getting ready for change. Before change can occur, we must recognize that there is a problem or a need for change. The next step is to motivate or encourage others to adopt the change and a new perspective by showing them that the current situation can be improved (Ting-Ting, 2006). Strategies are then formulated to strengthen the driving forces in support of change and to weaken the restraining forces opposing change (Ting-Ting, 2006). The unfreezing phase involves identifying current practice related to the early mobilization of ICU patients as well as barriers to patient mobilization as perceived by hospital staff. The post-then-pre survey will find gaps in knowledge, attitudes, and behaviors related to patient mobility and illustrate discrepancies between the current and desired state.

The next step in changing behavior is movement or transition. Change is a process, not an event (Shirey, 2013). Movement or transitioning involves creating a plan of action and engaging those who will be part of the proposed change. This stage can often be difficult due to the uncertainty and fear associated with change. Open communication and participation in developing the new process will make individuals feel actively involved and more likely to support the project (Shirey, 2013). Providing evidence-based education on the benefits of
mobility will give hospital staff a fresh perspective on the problem and encourage the use of the ABCDEF bundle to move us towards the desired target. With the use of the “E” element of the ABCDEF bundle, more ICU nursing staff will learn the importance of patient mobility and the consequence of immobility. Transitioning will move those involved in the change to a new equilibrium level, being every ICU nurse participating in early mobility education using the “E” element of the ICU liberation bundle developed by SCCM (SCCM, 2016).

The last step in the change model is refreezing. Refreezing establishes the change as a new habit and the standard operating procedure. This step keeps providers from going back to the old ways. After an amendment is implemented, a new equilibrium must be reached, rebalancing driving, and restraining forces (Kritsonis, 2005). If this is not done, the change will be short-lived, and employees will revert to prior behaviors (Kritsonis, 2005). To reinforce the mobility protocol, annual education and training will be supplied to help sustain new patterns. Daily huddles, provider rounding, and bedside coaching will educate medical staff on the importance of mobilization and its inclusion into unit policies and procedures. The ICU nursing team completed post-then-pre implementation to assess their knowledge, attitude, and behaviors related to early mobilization after viewing the mobility PowerPoint presentation. With Lewin’s change theory framework as a guide, as outlined in Appendix G, early mobility in the ICU will be embedded into the unit culture and become the performance expectation (Shirey, 2013).

**Literature Synthesis**

**Evidence Search**

A literature search was conducted of all English language and peer-reviewed studies related to the early mobilization of critically ill patients in the ICU. PubMed and CINAHL were
searched using the key phrases “early mobilization intensive care,” “early mobilization and intensive care,” “early mobilization and functional mobility,” “early mobilization and critical care,” and “early mobilization and outcomes.” Utilizing the PubMed and CINAHL databases with the above search strings and obtaining additional records from other sources yielded 1298 results. The following search term filters were applied to narrow the journals further: full text available, English language, peer-reviewed, and published within the last 10 years. As outlined in Appendix G, the removal of duplications refined the results to 1059 articles. Publications on early mobility were further eliminated due to the inclusion of participants under 18, relevance, and edition exceeding 10 years. The final seven articles within this literature synthesis were utilized because they demonstrated the feasibility of early mobilization protocols in the ICU and demonstrated positive physical function and hospital outcomes (Appendix F).

**Comprehensive Appraisal of Evidence**

Two out of the seven articles were randomized controlled trials (RCT), four were systematic reviews, and one was a meta-analysis. Studies were completed in various ICUs across the world and included patients that did and did not require mechanical ventilation. All articles compared the intervention of early mobilization, active exercise, or rehabilitation to a standard of care, which is often bedrest or no mobilization. Several themes were noted in the final seven articles. Strengths of evidence were seen when reporting on muscle strength, adverse events, feasibly of early mobilization program implementation, and an increase in the frequency of early mobilization. Weaknesses in the lack of evidence were seen with literature supporting a reduction in the length of hospital and ICU stay and mechanical ventilation duration with the introduction of early mobility protocols.
**Strengths of Evidence**

Muscle weakness acquired from prolonged periods of bed rest in the ICU is predictive of critically ill adverse outcomes (Schaller et al., 2016). That being said, many of the articles included in the literature synthesis looked at measuring the effect of early, goal direction mobilization therapy on muscle strength. In the systematic review by Li et al. (2013), six studies measured muscle strength, including upper and lower limb muscle force and respiratory muscle force. Four of those studies reported pre and posttest improvements in maximal inspiratory pressure for those within the mobilization group (Li et al., 2013). Pre and posttest differences in upper limb muscle force were notable in two studies, but other studies did not find a significant difference between groups (Li et al., 2013). The systematic review by Adler and Malone (2012) measured extremity muscle strength using hand-held dynamometry or manual muscle testing. It was determined that those in the intervention group showed an increase in quadriceps muscle force at the time of hospital discharge compared to those not receiving therapy (Adler & Malone, 2012).

Patient safety and mobility of the critically ill go hand in hand. The increased likelihood of adverse events seen when mobilizing patients in the ICU often deter providers from implementing mobility protocols. When assessing safety, Adler and Malone (2012) determined that the critically ill’s mobilization can be done safely when in a controlled environment with minimal risk to the patient. Schaller et al. (2016) determined that within 2164 ICU days, 35 adverse events related to mobilization were reported. The most frequently reported adverse reactions are hypotension, change in heart rate, oxygen desaturation, and accidental removal of support equipment (Schaller et al., 2016; Li et al., 2013). An increase in patient’ frequency and
duration of receiving active exercises each day was also achieved for those in the intervention
group versus the control group (Hodgson et al., 2016).

**Weaknesses of Evidence**

Weakness in evidence came in the form of conflicting reports related to a reduction in the
length of hospital and ICU stay and mechanical ventilation duration with the introduction of an
early mobilization program. Schaller et al. (2016) reported that the length of stay in the
intervention group was significantly shorter than the control group (7 days vs. 10 days, 95% CI,
p=0.0054). The systematic review by Doiron, Hoffmann, and Beller (2018) also reported that
participants in the intervention group spent less time in the hospital in two of the studies
involving 260 participants. Still, the evidence was reported as low quality, and thus the results
cannot be fully trusted. The meta-analysis by Zang et al. (2019) also looked at ventilator-free
days. Ventilator free days data was reported in five studies. The mean ventilator-free days in the
early mobilization group were 21.94 +/- 4.29 days and 21.14 +/- 4.98 days in the control (Zang et
al., 2019). This would suggest that patients in the therapy group and the control group had
similar outcomes.

**Gaps and Limitations**

Present study availability suggests potential weaknesses and limitations of data related to
early mobilization protocols in the ICU. Many of the studies included within the RCTs,
systematic reviews, and meta-analysis have used a small sample. Studies that use smaller sample
sizes are more likely to create an overestimation effect than more extensive trials. It was reported
that some of the articles included in RCTs had low quality and therefore limited the conclusion
drawn. There was also substantial heterogeneity identified across many of the mobilization trials,
making the findings problematic to interpret (Zang et al., 2019). The body of evidence studying the implementation of early mobility programs in the ICU is small, limiting the evidence’s strength. To address these gaps, more large-scale and well-performed RCTs are needed to verify the findings (Zang et al., 2019).

**METHODS**

**Project Design**

The purpose of this quality improvement (QI) project was to improve nursing knowledge and attitudes related to patient mobilization using the “E” element of the ICU liberation bundle. The project employed a virtual provider education session and retrospective post-then-pre study design survey to evaluate nursing knowledge and attitudes related to ICU patients’ early mobilization. It began by gathering the work email addresses of ICU nurses at BDMC. All ICU nursing staff were sent an email that contains a link to the early mobilization PowerPoint presentation and retrospective post-then-pre survey. Nursing staff were asked to watch the presentation and complete surveys within two weeks. After this, data was analyzed to determine if nursing knowledge and attitudes related to the early mobilization of patients in the ICU improved after viewing the mobility PowerPoint. The early mobilization presentation entitled “Let’s Keep Our Patients Moving” (Appendix D) was guided by the “E” element of the ICU liberation bundle developed by the SCCM (Appendix G).

**Model for Implementation**

Education using the “E” element of the ICU liberation bundle was guided by the plan-do-study-act (PDSA) developed by the Institute for Healthcare Improvement (IHI) (IHI, 2020). PDSA is a framework that can be used to accelerate improvement work (Appendix G). Quality
improvement (QI) requires participants first to set aims, establish measures, and select changes. Afterward, the PDSA cycle tests the difference in the real work setting by planning for it, trying it, observing the results, and acting on what is learned. This is done with the hope of refining the change and implementing it on a broader scale, and disseminating the results to other organizations (IHI, 2020).

1. What are we trying to accomplish?
   - Increase nursing knowledge and attitudes about early mobilization

2. How will we know that a change is an improvement?
   - Retrospective post-then-pre surveys completed by nursing staff

3. What changes can we test that will result in an improvement?
   - Increase provider education via PowerPoint presentation guided by the "E" element of the ICU liberation bundle

**Plan.** Planning for this mobility QI project will began by having a nursing leadership department member obtain the work email addresses of staff working in the ICU at BDMC. Nursing staff received an email introducing the “E” element of the ICU liberation bundle and its use in guiding the successful implementation of early mobilization programs in critical care units around the world. The email explained the QI project, project timeline, and when to expect a follow-up email containing links to view a PowerPoint presentation and complete necessary Google Forms surveys. Education was provided with a 10-minute PowerPoint presentation (Appendix D) walking staff through the four levels of patient mobility as determined by the bedside assessment, complications seen with immobility, benefits of patient mobilization, ICUAW, and how to safely mobilize ICU patients.
**Do.** Completing the QI project begin by sending an email to ICU nursing staff that contained the early mobilization PowerPoint presentation entitled “Let’s Keep Our Patients Moving” (Appendix D). The email instructed participants to watch the presentation and complete the Google Forms survey using the post-then-pre method. Nursing staff had two weeks to watch the presentation and complete the Google Forms survey. One week after project implementation, another email was sent to nursing staff, reminding them to watch the PowerPoint presentation and complete the surveys.

**Study.** Data gathered from the Google Forms survey using a retrospective post-then-pre design was compared to determine if there was an improvement in nursing knowledge and attitudes related to the early mobilization of patients in the ICU after viewing the “Let’s Keep Our Patients Moving” PowerPoint presentation (Appendix D). Retrospective post-then-pre design was used to assess learners self-reported changes in skills, attitudes, behaviors, awareness, and knowledge (Klatt & Taylor-Powell, 2015). It can be used to avoid pretest sensitivity and response shift bias that results from overestimation or underestimation. With a retrospective post-then-pre design, before and after information is collected at the same time (Klatt & Taylor-Powell, 2015). Learners are asked to rate their current knowledge, attitudes, skills, and behaviors now or after as a result of the program. They are then asked to reflect and rate those same thoughts before participating in the program. Post-then-pre design results are focused on participant responses based on two different frames of reference (Klatt & Taylor-Powell, 2015).

**Act.** Studying the result allows us to determine if predictions were correct and reflect upon what was learned. After becoming aware of improvement areas, the QI mobility protocol
can be refined and made to plan for the next test. Results will be discussed with stakeholders to aid in the development of educational training for staff.

**Setting and Stakeholders**

This QI project’s setting was the medical/surgical ICU (MSICU) at BDMC in Mesa, Arizona. Mesa has a little over 500,000 people, with the median age being 35 years (Data USA, 2020). About 15% of Mesa residents live in poverty, and the mean household income reported in 2018 was $58,247. Per capita, personal healthcare spending in Mesa was $6,452 in 2014. The ethnic composition of Mesa is 61% white, 5% Hispanic, 4% African American, 1% Asian, and 2% Native American (Data USA, 2020). BDMC is a 699-bed hospital that provides care to patients in Mesa and surrounding areas and prides itself on providing safe and high-quality healthcare (Practice Link, 2019). The MSICU that was utilized for this project specializes in critically ill patients with various medical, surgical, and neurological diagnoses. The MICU is staffed by multiple intensivists that provide care for those who are critically ill. This 22-bed medical-surgical unit has a nurse-to-patient ratio of 1:2 or 1:1 depending on patient acuity (Practice Link, 2019). Nurses staffing this unit have received specialized training in critical care medicine and can care for patients requiring the highest care levels.

Stakeholders involved in the early mobilization protocol included nurses, mobility therapists, respiratory therapists, intensivists, hospital administrators, patients, and families. Nurses play a role in advocacy, assessing pain, assessing sedation, and determining readiness for movement. Mobility therapists help determine the type of mobility exercise that would be appropriate for the patient. Respiratory therapist protects the airway. Intensivists oversee patient care and make referrals for physical therapy. Hospital administrators participate in behind-the-
scenes role in establishing mobility programs (Medtronic, 2019). Cooperation and support from all patient care team members are necessary for an implementation to be successful.

**Planning the Intervention**

The proposed study used quantitative data to determine if providing education to nursing staff will improve knowledge and attitudes related to patients’ early mobilization in the ICU. Upon receiving institutional review board (IRB) approval, the email addresses of RN’s in the MSICU at BDMC were obtained by a member of nursing leadership. Staff received an email containing pre-project information and timelines. Staff were educated on the "E" element of the ICU liberation bundle developed to aid in implementing early mobilization programs in the ICU. One week later, the nursing staff was sent an email containing the “Let’s Keep Our Patients Moving” PowerPoint presentation and accompanying Google Forms surveys. Nursing staff had two weeks to complete the Google Forms surveys, and a reminder email was sent one week into project implementation to encourage participation.

At the end of the two weeks, participants were notified of mobilization project completion. Data from retrospective post-then-pre surveys competed by nursing staff were reviewed to determine if the prediction was correct. It was predicted that implementing a nursing targeting mobility education program would improve provider knowledge and attitudes related to the early mobilization of patients in the ICU by using the “E” element of the ICU liberation bundle developed by the SCCM. Findings were summarized, and reflections on what was learned could be done differently for the next implementation. Post project data was shared with staff via email and posted for viewing on the unit.
Participants and Recruitment

Subjects taking part in the QI mobility project were nurses working in the MSICU at BDMC. Mobility education was based on the “E” element of the ICU liberation bundle. The bedside mobility assessment tool places patients in one of four activity levels (Appendix G). Level 1 is for subjects who are unconscious or require medication for sedation. For those subjects, staff will implement Q2 hour turning and a passive range of motion three times per day. Level 4 is for subjects that are conscious and able to sit on the side of the bed and actively transfer to a chair. As the subject advances in level, the level of mobility and exercise increases.

Nursing recruitment was completed by emailing MSICU nursing staff at BDMC and inviting them to participate in the early mobility QI project. An informational email was also sent a week before project implementation, the week of implementation, and one week before completion encouraging stakeholder attendance and participation.

Consent and Ethical Considerations

Consent from nursing staff was obtained in an email sent one week before project implementation (Appendix A). Participants received a disclosure form in the pre-project implementation email, and the use of a retrospective post-then-pre survey was explained (Appendix B). As stated in the disclosure, consent was to be implied if they continued and chose to complete Google Forms surveys. Nursing staff did have the right to refuse to take part without penalty. All information acquired by Google Forms surveys during data analyses was be kept on a password-protected computer that was located in a locked office that was only accessible to the principal investigator. An Application of Human subjects was submitted, and permission to proceed was obtained before implementation.
Ethics is an integral part of healthcare delivery and was applied to this QI project. Healthcare professionals have a moral duty to do what is right and cause no harm. An ethical issue that arose during this early mobility program was nursing staff refusing to take part in the mobility education. Even though early mobility education was being completed to improve nursing knowledge and attitudes, it was also conflicting with the participant’s wishes during that time. In such situations, the nursing staff still received mobility information by email and reviewed early mobility information at their convenience.

**Timeline**

See Appendix E for the project timeline.

**Data Collection**

Data collection occurred with the use of a retrospective post-then-pre survey. Post-then-pre surveys completed by nursing staff had 12 multiple-choice questions (Appendix C). The survey assesses knowledge and beliefs related to early mobilization before and after viewing the “Let’s Keep Our Patients Moving” PowerPoint presentation (Appendix D). Project surveys supplied ordinal and categorical data. All information acquired during data analyses was kept on a password-protected computer located in a locked office that was only accessible to the principal investigator.

**Data Analysis**

Data analysis was completed with the use of a retrospective post-then-pre survey (Appendix C). For categorical, data frequencies and relative frequencies were used to provide numerical displays using a bar-chart or pie-chart. Ordinal data used frequencies, relative frequencies, mode, median, min, or max. Ordinal data used a bar chart to produce a graphic
display. Surveys and assessment tools were deleted upon input into Microsoft Excel. Excel spreadsheets containing QI project data were stored in a password-protected computer and a secured area at all times. Bias were seen with nursing staff not wanting to participate in the virtual early mobility informational session.

RESULTS

Outcomes

The QI mobility project used a PowerPoint presentation (Appendix D) and an accompanying retrospective post-then-pre survey (Appendix C) to evaluate nursing knowledge and attitudes related to the early mobilization of patients in the ICU. The “Let’s Keep Our Patients Moving” informational session was presented over two weeks between November 8, 2020, and November 22, 2020. During that time, participants were asked to view the presentation that educated nursing staff on ICUAW, prevalence, risk factors, immobility complications, benefits of early mobility protocols, and barriers to patient mobility. Afterward, they completed a 12 question post-then-pre survey using the Likert scale to express how much they agreed or disagreed with the statements relating to patient mobility. Google Forms was used to obtain the survey results from participants. The results were then exported to Microsoft Excel for further analysis. During the two-weeks, eight members of the MSICU nursing staff at BDMC viewed the PowerPoint presentation and completed the post-then-pre survey in its entirety. Nursing demographics were excluded from the study due to Banner Non-Research Determination Use Committee (NRDUC) restrictions.

Most participants considered the “Let’s Keep Our Patients Moving” PowerPoint presentation valuable and believed that their knowledge and attitudes related to early
mobilization improved post-completion. When viewing the retrospective survey results, 75% of participants strongly agreed that they could identify the benefits of early mobility programs post-survey compared to 25% pre-survey. After viewing the presentation, 63% of participants strongly agreed with the provided definition of “early mobility” compared to 25% pre-survey. After the presentation, 75% of participants strongly believed that mobilization is as essential as other aspects of care, compared to 63% before the presentation. In addition, 63% strongly believed post-presentation that early mobility should be the standard of care compared to 37% pre-presentation.

Table 1

After Participating in the Let’s Keep Our Patients Moving PowerPoint Presentation

<table>
<thead>
<tr>
<th>Questions</th>
<th>Total (N)</th>
<th>Strongly Agree (%)</th>
<th>Agree (%)</th>
<th>Neutral (%)</th>
<th>Disagree (%)</th>
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<tbody>
<tr>
<td>Bedrest can increase the risk of hospital-associated complications such as falls, delirium, and pressure ulcers</td>
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<td>25%</td>
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<td>0%</td>
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<tr>
<td>I have received training on how to safely mobilize my patients</td>
<td>8</td>
<td>50%</td>
<td>37%</td>
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<tr>
<td>Mobilization is as essential as other aspects of care</td>
<td>8</td>
<td>75%</td>
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Table 2

Before Participating in the Let’s Keep Our Patients Moving PowerPoint Presentation

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The purpose of the QI project was to improve nursing knowledge and attitudes related to the early mobilization of patients in the ICU at BDMC. Results show that most participants believed that the education provided increased their knowledge and changed their beliefs on early mobilization implementation in the ICU. The “Let’s Keep Our Patients Moving” PowerPoint presented nursing staff at BDMC with ICU specific mobility information that was different from the standard of care, being no education on ICUAW. The project questions and aims were completed to formulate an education tool for nursing staff detailing mobility practices and their benefits using the “E” element of the ICU liberation bundle. Google Forms was then used to generate the survey using a retrospective post-then-pre design to evaluate nursing knowledge and attitudes related to ICU patients’ early mobilization after viewing the PowerPoint presentation completing the project aims.
DISCUSSION

Summary

The local and national problem of ICUAW was identified with a literature search and assessment of current educational practices at BDMC. When critical illness and bedrest are combined, patients are more likely to develop muscle weakness and delayed healing. Bedrest is often the standard of care for patients in the ICU but can have devastating effects on the nervous, musculoskeletal, and respiratory systems. Research has shown that early mobility can reduce the incidence of ICUAW and the adverse reactions it can bring. The SCCM developed the ICU liberation bundle (A-F) to minimize the harmful effects of delirium, pain, immobility, agitation, sedation, and sleep disturbances seen by patients in the ICU (SCCM, 2016). The ICU liberation bundle uses a multidisciplinary team to set daily mobility goals and reassess goals based on the patients evolving clinical status.

The clinical nursing staff at Banner currently have the option to complete a 45-minute digital course entitled “Fall Prevention and Safe Patient Handling and Mobility (SPHM) for Clinical Nursing Staff.” Unfortunately, it is not tailored towards patients in the ICU who have different mobility capabilities than those in less critical units. It does not mention ICUAW, prevalence, risk factors, complications of immobility, benefits of early mobility protocols, barriers, and the role ICU nurses play in promoting early mobilization. The SPHM course educates the nursing staff on the mobility basics but does not address the mobility difficulties faced by ICU patients exclusively. For that reason, it was determined that MSICU nursing staff may be lacking education on early mobilization in the ICU, ICUAW, and would benefit from further training. The “Let’s Keep Our Patients Moving” PowerPoint provided staff with the new
tools needed to mobilize their patients in a safe and supported manner. Retrospective post-then-pre survey results support the hypothesis that ICU nursing-specific education could improve knowledge and attitudes related to ICUAW and early mobilization.

Interpretation

Project implementation and data analysis revealed ICU nursing staff viewed the “Let’s Keep Our Patients Moving” PowerPoint presented positively and believed that it increased their knowledge about ICUAW and its effect on the critically ill. Most (75%) of participants strongly agreed in feeling as if they received adequate training on how to safely mobilize their patients in the ICU after viewing the PowerPoint compared to only 12.5% before. When it came to defining the “E” element of the ICU liberation bundle, 37.5% of the nursing staff strongly agreed compared to only 12% before. These findings mean that the “Let’s Keep Our Patients Moving” PowerPoint presented to the nursing staff at BDMC did help to bridge a knowledge gap that was present. It was interesting to note that after completion, 50% of the nursing staff strongly disagreed that a physical therapist or occupational therapist should be the primary provider mobilizing patients compared to 37% before. This is in line with the ICU liberation bundles multidisciplinary team approach to patient mobility. Project results support the use of evidence-based early mobility interventions and provider education in overcoming barriers to mobility and helping to preserve the quality of life for those fortunate enough to survive critical illness.

Implications

The study raises questions about the current standard of mobility education provided hospital-wide and to ICU nursing staff. The majority of participants felt like they were better educated on early mobilization, ICU specific mobility practices, and ICUAW after viewing the
“Let’s Keep Our Patients Moving” PowerPoint presentation. To further practice, ICU specific patient mobility education should be developed and required for nursing staff in critical care areas across the Banner Health system. Most participants strongly agree that early mobilization in the ICU should be the standard of care. Before viewing the mobility education, most participants stated they were unable to define the four levels of early mobility therapy as determined by the SCCM. The majority of nurses were also unable to define the “E” element of the ICU Liberation bundle. This indicates that the current educational preparation related to early mobility is not adequate. Nursing staff would benefit from education similar to the one provided in the “Let’s Keep Our Patients Moving” PowerPoint presentation. Based on the results, providing ICU nursing staff at Banner Health with further education on ICUAW and mobility practices could improve patient outcomes. Policy changes should include the introduction of ICU-specific mobility education, similar to the one developed for this QI project. Due to the small sample size, further research should be replicated on a larger scale to address limitations in participation caused by the COVID-19 pandemic.

**Limitations**

Project implementation was met with limitations that may have influenced the results obtained. The COVID-19 pandemic required the implementation site to be changed as well as the project design. The original project design was built around in-person mobility information sessions where surveys could be completed by nursing staff right after the presentation. Doing so may have encouraged staff participation and increased the number of nurses who participated in the survey. The mobility presentation and surveys were sent out via email. They could have easily been overlooked by nursing staff even though a follow-up email was sent out one week
into implementation. The electronic approach also relied on the use of shift huddles and break room flyers to recruit participants. It should also be noted that a week after implementation, a mobility flyer had been covered in the break room by another unit memo. The ICU where the project was implemented has also been the COVID-ICU unit since February of this year. The nursing staff’s willingness to take part in non-mandatory projects may have been further limited by provider burnout and the increasing number of critically ill COVID patients, which increased workload. There was also a delay in receiving NRDUC approval from Banner Health, which shortened the implementation time from the four weeks planned initially to two weeks, restricting the time participants had to view the education and complete accompanying surveys.

**DNP Essential Addressed**

In 2006, the American Association of Colleges of Nursing (AACN) developed the *DNP Essentials*, which outlines the foundational competencies that are core to all advanced nursing practice roles. The DNP curriculum must include components of DNP Essentials I through VIII and specialty competencies and content to prepare the graduate for practice in specialty areas (AACN, 2006). This project focused on educating nursing staff on the effects of ICUAW, prevalence, risk factors, immobility complications, benefits of early mobility protocols, barriers, and the role ICU nurses play in promoting early mobilization. The “Let’s Keep Our Patients Moving” PowerPoint presentation was also guided by the ICU liberation bundle (A-F), which was developed to help minimize the harmful effects of delirium, pain, immobility, agitation, sedation, and sleep disturbances seen by patients in the ICU. This aligns with *DNP Essential I: Scientific Underpinnings for Practice* because science-based theories and concepts were used to describe the actions and advanced strategies used to enhance, alleviate, and improve health and
health care delivery (AACN, 2006). This project also determined that the Banner policy 13202 entitled “Safe patient handling and mobility” addressed fall prevention but was not tailored towards patients in the ICU with different mobility capabilities. In that case, MSICU nursing staff may be lacking education on early mobilization in the ICU and ICUAW. This aligns with DNP Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice, in which information technology and research methods were used to find gaps in evidence for practice (AACN, 2006).

Conclusions

Plan for Sustainability

If the Banner Health organization chooses to implement nursing education on ICUAW, this QI project could be used as the blueprint for further developments. Investigation at the local and hospital-level revealed that the current optional digital course related to safe patient handling and mobility is not tailored to patients in the ICU. It does not mention ICUAW and does not address the mobility difficulties faced by ICU patients exclusively, such as oversedation, delirium, patient intolerance, and a lack of staffing. The COVID pandemic also created an influx of ICU patients requiring manual proning and a rotoprone bed, making early mobility promotion even more critical. Banner Health administrators may also want to consider making the ICUAW nursing education mandatory for ICU nursing staff if added to the current program to encourage its adoption as the standard of care.
Plan for Dissemination

Project outcomes and findings will be discussed with the unit manager, nursing staff, and the EBP specialist at Banner Health. A presentation will be completed for stakeholders via Zoom, but there are no formal meeting times in place. Results of the study will also be included in the ICU newsletter that is released monthly. Due to project completion being towards the end of the month, the QI project results will be included in the January 2021 ICU briefing sent via email.
APPENDIX A:

BANNER DESERT MEDICAL CENTER SITE APPROVAL
July 8, 2020

University of Arizona Institutional Review Board
c/o Office of Human Subjects
1618 E Helen St
Tucson, AZ 85721

Please note that Isabella Charway, UA Doctor of Nursing Practice student, has permission of the BDMC to conduct a quality improvement project at our facility for her project, “Improving Nursing Knowledge of Early Mobilization in the Intensive Care Unit.”

Ms. Charway will conduct a survey of health care providers at BDMC. She will recruit providers through email. The email will provide a description of the project, what they will be asked to do, the time involved, and a link to the online survey. Ms. Charway’s activities will be completed by October 1, 2020.

Ms. Charway has agreed to provide to my office a copy of the University of Arizona Determination before she recruits participants. She will also will present aggregate results to the providers at their monthly staff meeting.

If there are any questions, please contact my office.

Signed,

Alana Schmitt
Alana Schmitt MHA, BSN, NEA-BC, RNC-OB
Director of Professional Practice
Banner Desert Medical Center
APPENDIX B:

RECRUITMENT MATERIAL (RECRUITMENT FLYER / RECRUITMENT EMAIL)
Let’s Keep Our Patients Moving

Improving Nursing Knowledge of Early Mobilization in the Intensive Care Unit

Please join me for a virtual education session on improving nursing knowledge of early mobilization practices in the ICU. As part of my DNP project, I am recruiting nursing staff to attend a virtual mobility in service and complete a post-then-pre implementation survey. The post-then-pre surveys were created to assess understanding of early mobility and will be completed anonymously. If you have any questions please contact me. Participation will entail watching a 10 minute video and completing two Qualtrics surveys within a two week period. Video and surveys will be sent through Banner Health email and can be completed at work or home.

Isabella Charway RN BSN, AGACNP Student, lcharway@email.arizona.edu, 845-325-1636
Hey 2D,

As part of my DNP project through the University of Arizona, I created a PowerPoint presentation entitled "Let's Keep Our Patients Moving." The PowerPoint focuses on educating nursing staff on intensive care unit acquired weakness (ICUAW), immobility, and the role nurses play as patient advocates in the promotion of early mobilization programs. Due to advances in medical care, more and more of our patients admitted to the ICU are surviving critical illness. ICUAW places a strain on the healthcare system by prolonging hospital stay, mechanical ventilation, and increased mortality. Banner Health currently utilizes the Banner Mobility Assessment Tool (BMAT) to classify a patient's mobility level. Clinical nursing staff also have the option to complete a 45-minute digital course entitled "Fall Prevention and Safe Patient Handling and Mobility (SPHM) for Clinical Nursing Staff." The course was created as part of the education roll out of BMAT and focuses on fall prevention, risk factors for falling, protecting patients from falls, and the mobility assessment. Unfortunately, it is not tailored towards patients in the ICU that have different mobility capabilities. It fails to mention ICUAW, prevalence, risk factors, complications of immobility, benefits of early mobility protocols, and barriers to patient mobility. The SPHM course educates the nursing staff on the mobility basics but does not address the mobility difficulties faced by ICU patients exclusively, such as over sedation, delirium, patient intolerance, and a lack of staffing. The COVID pandemic also created an influx of ICU patients that required manual proning and the use of Rotoprone beds, making it even more difficult for patients to participate in early mobility. Due to the above, it was determined that D2 nursing staff may benefit from early mobilization and ICUAW education.

Attached to this email is the "Let's Keep Our Patients Moving" PowerPoint and a link to the Google Forms post-then-pre survey. The post-then-pre survey utilizes a Likert Scale that uses a five-point scale to express how much participants agree or disagree with the particular statement. Nursing staff will have two weeks to view the PowerPoint presentation and complete Google Forms surveys. Learners are asked to rate their knowledge after and before the presentation. It is predicted that implementing an ICU targeted mobility education program will improve nursing knowledge related to the early mobilization of patients. Participation is voluntary and will not affect your current or future employment at Banner Health.

Feel free to reach out to me if you have any questions and thank you in advance for your participation in my DNP project.

Isabella Charway RN, BSN
U of A AGACNP Student
APPENDIX C:

EVALUATION INSTRUMENTS (PRE-TEST AND POST-TEST SURVEY)
**Post-then-Pre test**

Changes in your knowledge and attitudes BEFORE and AFTER the viewing the Let’s Keep Our Patients Moving PowerPoint presentation

Please indicate changes in knowledge and attitudes by indicating the extent to which you agree that each statement below reflects you both before and after viewing the Let’s Keep Our Patients Moving PowerPoint presentation. You must provide a response in both the BLUE and GREEN columns.

In the **BLUE** columns indicate what you think your knowledge and attitudes related to patient mobility in the ICU were like **BEFORE** viewing the Let’s Keep Our Patients Moving PowerPoint presentation

In the **GREEN** columns indicate what your knowledge and attitudes related to patient mobility in the ICU are like now, **AFTER** viewing the Let’s Keep Our Patients Moving PowerPoint presentation

Responses are:
SD= Strongly Disagree
D = Disagree
N = Neutral or neither agree nor disagree
A = Agree
SA = Strongly Agree

<table>
<thead>
<tr>
<th></th>
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<tr>
<td><strong>3.</strong> Mobilization is as essential as other aspects of care</td>
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11. I am able to define the 4 levels of early mobility therapy as determined by the Society of Critical Care Medicine

12. I believe that early mobility should be the standard of care
APPENDIX D:

PARTICIPANT MATERIAL (POWERPOINT PRESENTATION)
Let's Keep Our Patients Moving

Isabella Charway RN, BSN
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What is intensive care unit acquired weakness?

- Intensive care unit acquired weakness (ICUAW) is weakness that becomes apparent following the onset of critical illness
- Classified into 3 component conditions: critical illness polyneuropathy (CIP), critical illness myopathy (CIM), and critical illness neuromyopathy (CINM)
Prevalence

- ICUAW occurs in 25% to 100% of patients admitted to the ICU
- Many of those patients carry diagnoses such as multiorgan failure, sepsis, and persistent systemic inflammation
- Most common in mechanically ventilated patients requiring sedation

Risk Factors

- Sepsis
- Systemic inflammation
- Hyperglycemia
- Steroids
- Neuromuscular blocking agents
- Immobility
- Malnutrition
- Female sex
- Pre-existing sarcopenia
Immobility

- Prolonged periods of bedrest, mechanical ventilation, and sedation can leave patients with functional deficits long after discharge.
- Immobility is the standard of care for most patients admitted to the intensive care unit (ICU) despite the knowledge of its adverse effects on multiple body systems.
- When critical illness and bedrest are combined, patients are more likely to develop muscle weakness and delayed healing.

Early Mobility

- Defined as physical activity that is usually implemented within 24 to 48 hours of admission.
- Depending on the abilities of the patient, this could range from passive in-bed exercises to standing or walking.
- The early mobilization of patients in the ICU has positive outcomes when completed in a controlled environment and with the use of a multidisciplinary team.
Benefits of Early Mobility Programs

- Decreased duration of mechanical ventilation
- Reduced ventilator acquired illness and events
- Reduced mortality
- Shortened length of hospital stay
- Patients return to walking unaided sooner
- Improved long-term functional independence
- Reduced healthcare costs
- Shorter periods of delirium

The ICU Liberation Bundle (A-F)

Developed by the Society of Critical Care Medicine
Minimizes the harmful effects of delirium, pain, immobility, agitation, sedation, and sleep disturbances seen by patients in the ICU
E element refers to early mobility and exercise
E = Early Mobility and Exercise

- The E Element focuses on understanding the physical deficits that ICU survivors face, and identifying strategies for successful implementation of early mobilization programs
- The liberation bundle uses a multidisciplinary team to set daily goals and reassess goals based on the patients evolving clinical status
- With its initiation, the long-term consequences of ICU stays are reduced, and patient outcomes improved

Multidisciplinary Team

The bundle encourages members of the healthcare team to ask...
- "Did the patient achieve maximum mobility or exercise today?"
- And, if not, determine factors that are impeding patient mobility

Also considers the following aspects before mobilizing a patient in the ICU:
- Neurologic (level of alertness)
- Cardiac (hemodynamic stability and vasoactive medications)
- Pulmonary (ventilation/oxygenation needs)
- Risk vs benefit
- Guidelines vs protocols
Early ICU Mobility Therapy

Mobility Steps

Step 1: Unravel and create slack on the lines. Secure the lines. Connect the portable monitor.

Step 2: Initiate bed exercise. Watch the patient, watch the monitor, and watch the notes.

Step 3: Sit the patient on the edge of the bed. Assess for pain and orthostatic blood pressure.

Step 4: Assist seated patient to standing.

Step 5: Initiate walking. Keep a chair close to the patient. Utilize aids, volunteers, and students to push chair and ambulatory poles.

Step 6: Seat and rest the patient as needed.
Considerations

- Determine whether the level of activity is therapeutic
- Identify the available equipment
- Schedule a time to work on physical activity with the patient, family, nurse and respiratory therapist
- Assess and manage the patient's pain before, during and after mobility activity
- Optimize the work of breathing and patient level of alertness to make treatment beneficial
- Create activities that are goal-oriented for the patient
- Do not delay or defer physical activity and rehabilitation even if the patient is to be extubated that day
- Do not delay or defer physical activity because of agitation if it can be safely managed by the nurse and therapist. For patients who are agitated or experiencing disorganized thinking and delirium, a focused task provides an opportunity for reorienting conversation
Nurses

- Nurses are on the front lines of critical care and can be powerful patient advocates in the promotion of early mobilization
- Nurses play a role in advocacy, assessing pain, assessing sedation, and determining readiness for movement

Barriers

- Lack of staffing or equipment
- Lack of knowledge
- Lack of training
- Lack of leadership
- Lack of mobility culture
- Oversedation
- Safety concerns
- Delirium
- Patient intolerance
Mobility As The Standard of Care

- Nurses play a role in changing ICU practice and creating a culture of mobility
- Shared vision for early mobility
- Together we can overcome many of the barriers that prevent early mobility, including lack of time, resources, and education

References

APPENDIX E:

PROJECT TIMELINE
<table>
<thead>
<tr>
<th>Completion Date</th>
<th>Planning</th>
<th>Pre-Implementation</th>
<th>Implementation</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/4/2020</td>
<td>Receive IRB approval for QI mobility project from U of A and Banner Health</td>
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<tr>
<td>11/7/2020</td>
<td>Finalize mobility PowerPoint presentation and Google Forms survey</td>
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<tr>
<td>11/8/2020-11/22/2020</td>
<td>Send out &quot;Let's Keep Our Patients Moving&quot; email, including mobility PowerPoint and Google Forms survey</td>
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<tr>
<td>11/15/2020</td>
<td>Send out reminder email one week before project completion encouraging nursing staff to view PowerPoint presentation and complete Google Forms survey</td>
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<tr>
<td>11/22/2020</td>
<td>Project completion of post-then-pre Google Forms survey</td>
<td></td>
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<tr>
<td>11/23/2020-11/27/2020</td>
<td>Data analysis of post-then-pre Google Forms survey</td>
<td></td>
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<tr>
<td>12/1/2020-12/31/2020</td>
<td>Discuss results and debrief with stakeholders</td>
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<td></td>
<td>Summarize findings and reflect on what could be done differently for the next implementation</td>
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APPENDIX F:

LITERATURE REVIEW GRID
Project Question: *For critical care nurses working in the ICU (P), will education using the “E” element of the ICU liberation bundle (I) compared to usual care (C), improve nursing knowledge and attitudes related to the early mobilization of patients (O)?*

<table>
<thead>
<tr>
<th>Pub. Year; Author’s Last Name</th>
<th>Title of Publication</th>
<th>Type of Study</th>
<th>Main Outcomes of Findings</th>
<th>Support for and or Link to Project</th>
</tr>
</thead>
</table>
| Adler & Malone (2012)         | Early mobilization in the intensive care unit: A systematic review | Systematic review | Studies in the systematic review showed:  
- Increased muscle strength/force at the time of hospital discharge  
- Mobility milestones accomplished earlier in the intervention group  
Greater ambulation distance and frequency at the time of hospital discharge for the intervention group | The systematic review determined that the literature supports improvement in the functional mobility of patients following early and progressive physical and occupational therapy in the ICU. |
| Arias-Fernandez et al. (2018) | Rehabilitation and early mobilization in the critical patient: Systematic review | Systematic review | Studies in the systematic review showed that early mobilization and rehabilitation had a significant effect on:  
- Functional status  
- Muscle strength  
- Mechanical ventilation duration  
- Walking ability at discharge  
Health quality of life | The systematic review demonstrated that early mobilization is a safe and effective intervention that can be used to combat ICU acquired muscle weakness, which can lead to adverse outcomes for critically ill patients. Muscles weakness can result from extended periods immobilization or bedrest, which often times is the standard of care for patients in the ICU. |
<p>| Doiron, Hoffmann, &amp; Beller (2018) | Early intervention (mobilization or active) | Systematic review | The 4 studies included in the systematic review showed: | The systematic review determined that even with |</p>
<table>
<thead>
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</table>
| Hodgson et al. (2016)         | A binational multicenter pilot feasibility randomized controlled trial of early goal-directed mobilization in the ICU | Randomized controlled trial | • That there were mixed reviews for the effect of early mobilization or active exercise on the primary outcome of physical function or performance  
• Benefits were found for return to independent functional status at hospital discharge | the mixed reviews, there is evidence for the effectiveness of early mobilization of mechanically ventilated and critically ill patients in the ICU. There is still insufficiencies in high-quality evidence studies. |
| Li et al. (2013)              | Active mobilization for mechanically ventilated patients: A systematic review. | Systematic review | Studies in the systematic review showed:  
• Patients in mobilization groups were able to walk | This study demonstrates that early active mobilization during mechanical ventilation is possible. Patients receiving the early mobilization intervention had an increase in achieved mobility milestones during their hospital stay. |
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</table>
| Schaller et al. (2016)       | Early, goal-directed mobilization in the surgical intensive care unit: A randomized controlled trial | Randomized controlled trial | * Patients that received the intervention (early, goal-directed mobilization) showed improved mobilization levels  
  Patients that received the intervention (early, goal-directed mobilization) also had improved functional mobility at hospital discharge | Muscle strength was considerably better in patients receiving early mobilization when control.  
  This could be due to partial prevention of muscle atrophy, an increase in muscle force used, or better muscle coordination. |
| Zang et al. (2019)           | The effect of early mobilization in critically ill patients: A meta-analysis | Meta-analysis | The 15 studies included in the meta-analysis showed that early mobilization  
  * Reduced the incidence of ICU acquired weakness  
  * Shortened the length of stay in the ICU and hospital | The meta-analysis demonstrated that early mobilization had a positive effect on patients with critical illness. It showed that early mobilization significantly reduced the incidence of ICU acquired weakness. |
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</table>
|                               |                      |               | • Improved the Barthel Index score at hospital discharge  
• Decreased complications such as deep vein thrombosis, ventilator associated pneumonia, and pressure sores | weakness when compared to the control. It did however show that it has not effect on ICU mortality rate or ventilator free days which conflicted with other studies reviewed |
APPENDIX G:

OTHER DOCUMENTS AS APPLICABLE TO THE PROJECT (2009 PRISMA GROUP
FLOW DIAGRAM / KURT LEWIN THEORY OF CHANGE / PDSA MODEL FOR
IMPROVEMENT / MOBILITY PROTOCOL)
Records identified through database searching (n = 1296)

Additional records identified through other sources (n = 2)

Records after duplicates removed (n = 1059)

Records screened (n = 20)

Records excluded (n = 5)

Three full-text articles were excluded due to the studies being completed in a pediatric intensive care unit and five were excluded due to relevance and date of publication exceeding 10 years (n = 8)

Full-text articles assessed for eligibility (n = 15)

Studies included in qualitative synthesis (n = 7)

Studies included in quantitative synthesis (meta-analysis) (n = 7)

Kurt Lewin Theory of Change

I. Planning Phase: Unfreezing
- Identify current practices and barriers to patient mobilization
- Research benefits and risks of early mobilization
- Create educational mobility PowerPoint for nursing staff using the "E" element of the ICU liberation bundle

II. Implementation Phase: Movement
- Email ICU nursing staff "Let's Keep Our Patients Moving" PowerPoint presentation
- Have nursing staff complete Qualtrics surveys
- Determine if knowledge and attitudes related to patient mobility in the ICU improved after viewing mobility PowerPoint

III. Sustainability: Refreezing
- Unit huddles
- Interdisciplinary rounds
- Annual mobility education and training
PDSA Model for Improvement

**Plan**
- Create informational "Let's Keep Our Patients Moving" handout to be emailed to ICU nursing staff providing education on patient mobilization and introducing the ICU liberation bundle
- Create "Let's Keep Our Patients Moving" powerpoint presentation providing education on early mobilization in the ICU
- Email ICU nursing staff "Let's Keep Our Patients Moving" powerpoint presentation and Google Forms survey to complete

**Do**
- Email nursing staff one week into QI implementation to remind them to view the powerpoint presentation and complete Google Forms survey
- Complete trial within a two week period

**Study**
- Discuss results and debrief with stakeholders and staff
- Analyze data from Google Forms survey using a retrospective post-then-pre design to determine if nursing knowledge and attitudes related to the early mobilization of ICU patients improved after viewing the educational powerpoint presentation
- Discuss results with nursing staff and other stakeholders

**Act**
- Continue the analysis of data and summarize findings
- Reflect on what was learned and could be done differently for the next implementation
- Aid in the development of educational training for staff
Mobility Protocol

- **LEVEL I**
  - Unconscious
  - **MT:** Passive ROM 3x/d
  - **MT:** q2Hr turning

- **LEVEL II**
  - Conscious
  - Passive ROM 3x/d
  - q2Hr turning
  - **Active Resistance PT**

- **LEVEL III**
  - Conscious
  - Passive ROM 3x/d
  - q2Hr turning
  - **ActiveResistance PT**
  - Sitting Position Minimum 20 minutes 3x/d

- **LEVEL IV**
  - Conscious
  - Passive ROM 3x/d
  - q2Hr turning
  - **Active Resistance PT**
  - Sitting Position Minimum 20 minutes 3x/d

**Key notes:**
- **PT:** Physical Therapy
- **MT:** Mobility Team
- Sitting on edge of bed
- **PT + MT**
- Can move arm against gravity
- Can move leg against gravity
- Active Transfer to Chair (OQB)
- **PT + MT**
- Minimum 20 minutes/d

**Transition:**
- Discharge to Floor Bed
REFERENCES


Data USA. (2020). Data USA: Mesa, AZ. Retrieved from https://datausa.io/profile/geo/mesa-az


Hodgson, C. L., Bailey, M. J., Bellomo, R., Berney, S., Buhr, H., Denehy, L., ... Webb, S. (2016). A binational multicenter pilot feasibility randomized controlled trial of early goal-directed mobilization in the ICU. *Critical Care Medicine, 44*(6), 1145-1152


