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University of Nebraska Medical Center

College of Nursing

DOCTOR OF NURSING PRACTICE (DNP)

PERCEIVED BARRIERS OF EARLY MOBILIZATION IN THE INTENSIVE CARE UNIT

By

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Abstract

Purpose

Early mobilization of Intensive Care Unit (ICU) patients can improve patient outcomes but also includes barriers to implementation. Nebraska Medicine has continued to have ongoing quality improvement initiatives like the ABCDEF liberation bundles and early mobilization that have been attempted but have never fully come to fruition. This project surveys Nebraska Medicines ICUs staff to better understand attitudes, knowledge and behavior regarding early mobilization using a validated tool. The aim was to identify barriers, so the organization could better understand the needs of ICU staff for future implementations of early mobility and related assessment tools.

Materials and Methods

A systematic literature was conducted in MEDLINE, EMBASE, and CINHALL for systematic reviews, meta-analysis, and randomized control trials (RCTs) related to early mobilization of ICU patients. The literature review included data on interventions, improved outcomes, mobility tools used, and surveys to identify existing barriers. A survey created by Johns Hopkins Medicine, Patient Mobilization Attitudes and Beliefs in the ICU (PMABS-ICU) was selected for this project. An invitation to participate in this survey was sent out through email to ICU register nurses (RNs) and patient care technicians (PCTs) in all five ICUs at Nebraska Medicine. Additionally, informational fliers were posted throughout each unit. The survey included 27 questions and an open-ended free text portion for comments. Using SPSS 28.0, the survey results were examined for total score and subscales of knowledge, attitudes, and behaviors. Differences in scores by years of work experience and assigned ICU were examined.

Results

The survey had a response rate of 18.5% (70/378). Of the 70 respondents, 61 were RNs and 9 were PCTs. The survey showed validity and internal consistency with Cronbach α of 0.845 for the total score and subscales being 0.610 for the knowledge subscale, 0.752 for attitudes, and 0.713 for behaviors. One-way ANOVA testing revealed no significant difference in total or any subscale score based on years of experience. There were no significant differences in knowledge subscale scores between units. However, there were significant differences for total score, attitude, and behavioral subscale scores when responses were grouped by unit. The Bonferroni Post Hoc test showed there was no difference between the total scores and subscales in the Cardiovascular Intensive Care Unit (CVICU) and Werner Intensive Care Unit (WICU), whereas Medical Intensive Care Unit (MICU), Neuroscience Intensive Care Unit (NSICU), and Surgical Intensive Care Unit (SICU) had no difference from one another in the total scores nor in the subscales. Both CVICU and WICU were significantly different when each was compared to MICU, NSICU or SICU for attitude subscale scores. The common themes from the qualitative responses include patient safety concerns, staffing constraints, and time and complexity of patients.

Conclusion

The survey results can be summed up into 3 different themes: Concerns about patient safety, staffing, and time needed with the complexity of ICU patients. Each unit has its own identity, expectations, and challenges. The results of the survey indicate that there was no

difference between units when it comes to knowledge, but prior to implementing an early mobility protocol, the units need to address potential barriers related to attitudes and behaviors as well as the specific barriers identified in free text comments. Addressing perceived barriers now with evidence-based strategies will facilitate implementation of the early mobilization protocols in ICUs.

Introduction

The Intensive Care Unit (ICU) is a place where patients are at their most vulnerable and rely on healthcare staff to make sure their basic needs are met with the hope of achieving the best outcome possible following their ICU stay. Admission to the ICU comes with many potential adverse effects, such as delirium, neuralgia, pressure injuries, delayed healing, infections, pressure injuries, and significant functional decline (Zhang, et al., 2019). The ICU Liberation Bundle (also known as the ABCDEF bundle or PADIS Guideline) was created by the Society of Critical Care Medicine to address various aspects of the critical care stay that contribute to these adverse long-term effects (Society of Critical Care Medicine, 2022). Nebraska Medicine has implemented components of the ABCDEF protocol including early awakening/breathing trials; choice of analgesics and sedation; and delirium assessment, prevention and management but lacks an early mobility and exercise protocol. Family engagement and empowerment is an ongoing initiative.

In the ICUs at Nebraska Medicine, there is currently no assessment tool or coexisting protocol to guide early mobilization. Within the ICU Liberation Bundle, there are multiple protocols for bedside staff to follow with the overarching goal of achieving the best outcomes for the patient. As part of the ICU Liberation Bundle, early mobilization in the ICU setting has been identified as a key factor in achieving positive patient outcomes. The long-term goal of this Nebraska Medicine initiative is to implement an early mobility assessment tool, which outlines how to safely mobilize patients based on an assessment score.

Realizing the complexity of implementing an early mobilization/exercise protocol in ICU with interdisciplinary collaboration, Nebraska Medicine elected to implement this component of the ABCDEF protocol last and conduct a pre-assessment of staff perceptions and potential

barriers to implementation of an early mobilization/exercise protocol in critical care units. Pre-assessment can provide valuable information in designing an early mobilization/exercise protocol that is most likely to succeed in this setting.

Once current knowledge, attitudes, and beliefs of staff members are identified through data collection and analysis of a pre-assessment survey (phase one), perceived barriers can be addressed when developing an early mobilization protocol. Thus, paving the way for the next phase, a successful protocol implementation. With an increase in staff participation during phase one of a predicted two-phase project, there is hope that this will create an increase in staff compliance with protocol adaptation and adoption. A protocol designed for staff compliance, adaptation and adoption, will more likely result in a successful implementation of an early mobility protocol at the end of phase two.

Problem Statement

ICUs provide life-saving interventions to millions of Americans every year. While saving the patient's life is the priority, there is growing recognition that survivors of critical care often face a myriad of long-term complications that persist long after hospital discharge. Collectively known as "Post Intensive Care Syndrome (PICS)", PICS includes impairments of cognitive, physical and psychological function. Many ICU survivors never regain pre-illness levels of function and well-being while facing new challenges such as delirium, neuralgia, delayed healing, pressure injuries and significant functional decline (Vrettou, et al., 2022). Dos Santos et al. (2016) found that after just seven days in the ICU, it took up to 6 months for patients to regain strength back to baseline functional level. In a sample of 186 COVID-19 patients treated on ventilators in the ICU, Nanwani and colleagues (2022) found that 75% of these patients met criteria for PCIS 90-days after discharge.

While the human costs of PICS are incalculable, the financial costs to the healthcare system are enormous. Per the American Hospital Association 2019 health survey, there were 36,241,815 hospital admissions with total expenses for all U.S. hospitals amounting to \$1,161,032,419,000. Per the Society of Critical Care Medicine (n.d.) five million of these admissions were to critical care units. Healthcare Acquired Pressure Injuries (HAPI) alone cost the United States healthcare system \$26.8 billion dollars in 2016 (Padula & Delarmente, 2019). It is critical to find ways within healthcare to help reduce costs and improve outcomes for patients and the hospital.

The goal with early mobilization is to improve patient outcomes, reduce costs, and shorten length of stay. Bognar et al. (2015) found that with the implementation of early mobility programs (EMPs) generated cost savings of approximately \$2.3 million over 7 years, with a cost-of-care savings of \$927,00 by reducing the number of days on the ventilator.

Purpose Statement

In the ICUs at Nebraska Medicine, there is no assessment tool or coexisting protocol to guide early mobilization. Within the ICU Liberation Bundle, there are multiple protocols for bedside staff to follow with the overarching goal of achieving the best outcomes for the patient. As part of the ICU Liberation Bundle, early mobilization in the ICU setting has been identified as a key factor in achieving positive patient outcomes. The long-term goal of this Nebraska Medicine initiative is to implement an early mobility assessment tool, which outlines how to safely mobilize their patient based on an assessment score.

The purpose of this DNP scholarly project was to conduct a pre-assessment of staff perceptions and perceived barriers to implementation of an early mobility/exercise protocol in the critical care units at Nebraska Medicine using a validated tool. This project constitutes one

phase of a multi-phase initiative to start mobilizing patients as soon as they are medically stable to help prevent functional decline. This DNP project will allow for barriers to be addressed prior to implementation and gives staff a way to buy-in to early mobilization and proactively shape the future protocol. It will serve as a mechanism for staff to be involved in creating an early mobility protocol that they are proud of, will adhere to and adopt on a long-term basis.

Specific Aims

The specific aims of this DNP project are:

1. To identify nursing staff knowledge, attitudes, beliefs and perceived barriers prior to implementation of an Early Mobilization Program in the intensive care units at Nebraska Medicine using a validated tool.
2. To examine relevant research literature and summarize the most effective evidence-based strategies for implementation of early mobilization programs in critical care and approaches to special high risk subpopulations (e.g., patients on ECMO, ventilators).
3. To discuss the results of Aims 1 and 2 with the Early Mobilization Implementation Team and proactively address educational needs and strategies to reduce barriers.

PICO Question

In nurses developing an early mobilization program or protocol for critical care (**P**), does a pre-assessment with a validated tool on knowledge, attitudes, beliefs and perceived barriers to early mobilization of critically ill patients (**I**) as compared to no survey (**C**) enhance planning and results in a more effective early mobilization implementation strategy (**O**).

Review of the Literature

Since the creation of the ABCDEF Liberation Bundle, a substantial body of research has been published supporting its implementation and the positive effects it can have on patients.

Sosnowski et al. (2022) found in their systematic review 18 studies involving 29,576 patients and meta-analysis of 6 studies involving 2,000 patients that the ABCDEF protocol in critical care units resulted in improved patient outcomes when compared to current standard practices particularly in relation to delirium mitigation. The review did identify that further research needs to be conducted surrounding the implementation of the bundle as a whole and not just certain aspects.

Balas et al. (2022) found that full bundle implementation rates are low with early mobilization presenting a unique challenge. It was found that the utilization of staff surveys to determine knowledge, attitudes, beliefs, and perceptions of potential barriers have been helpful in guiding education and implementation strategies (Dikkema et al., 2021). Hsieh and colleagues (2019) recommend a staged implementation plan due to the complexity of the bundle.

Regarding early mobilization particularly, Chen et al. (2021), Monsees et al. (2022), and Zang et al. (2020) all found in their systematic reviews and meta-analyses that early mobilization programs in critical care units have resulted in improved patient outcomes. The studies found that those who received early mobilization had a shorter length of stays in the ICU and in the hospital, decreased ICU weakness, and maintained/improved functional ability (Chen et al., 2021; Monsees et al., 2022; Zang et al., 2020L Yang, et al., 2021).

To successfully implement early mobilization in critically ill patients, a protocol should be in place to ensure safety and positive outcomes. The literature identifies that a key characteristic of a successful implementation of mobilization programs is using an interdisciplinary team (Mukpradab et al., 2022). The literature also identifies common barriers as being organizational, individual, or patient-related barriers (Popoola et al., 2022). Organizational barriers are things such as lacking staffing resources and time. Individual barriers are things such

as concerns about personal or team safety, concerns about early mobilization, and knowledge and training. Patient-related barriers include medical instability of the patient. Other areas of the literature discuss strategies to mobilize high-risk patients such as those on extracorporeal membrane oxygenation (ECMO), continuous renal replacement therapy (CRRT) and safety precautions.

The current literature supports the idea that early mobilization in critical care improves patient outcomes. That pre-assessment of staff knowledge, attitudes, beliefs, and perceptions of barriers can guide program implementation and education. Finally, there is a rich body of literature to guide evidence-based strategies for early mobilization in critical care that could be informative in the design of the new early mobilization programs.

Conceptual/ Theoretical Framework

This project followed the *Iowa Model of Evidence-Based Practice to Promote Quality Care*. (Titler, et al., 2001). See Figure 1. In applying the model to this project, it was clear that there were both *problem focused and knowledge focused triggers* driving this evidence-based change in practice. Nebraska Medicine identified the problem as the lack of an early mobility assessment tool and protocol specific to the ICU population. This topic was *considered a top priority for the organization* and an *interdisciplinary team (i.e., the Liberation Task Force) was formed*. This DNP student research group worked closely with the ICU Liberation Task Force at Nebraska Medicine. A review of current literature has been conducted to better understand the impact of early mobility on patients and the impact of the ICU liberation bundle. DNP team members *assembled, critiqued and synthesized the research most appropriate for use in practice*. It was determined that there was a *sufficient research base* to begin *pilot testing changes in practice*.

Phase 1 Pilot

This DNP project is the first in a series of pilots to implement early mobilization protocols in critical care. The specific purpose of this DNP project was to identify the barriers and perceived attitudes toward early mobility prior to implementing an early mobility assessment tool. A survey assessing attitudes, beliefs and perceived barriers to early mobilization in critical care was made available to all staff members caring for patients at the bedside within the various ICUs at Nebraska Medicine. There are many potential barriers that could interfere with mobilizing patients including patient stability, staffing, and equipment. These barriers can best be assessed by surveying staff members that work directly with these patients at the bedside. Participation in the study by taking the survey was voluntary and anonymous. Participants were given a survey with various types of questions with an optional opportunity to include any further statements. Once barriers are identified through the survey process, they can offer data and input from staff members. These types of results can be taken into consideration when forming the early mobility assessment tool and protocol. With input from staff taken into consideration during the development of new protocols and tools, the research team is able to offer greater support to not only the staff, but also patients.

Survey results can provide commonalities in the various types of ICUs and specific differences to unique patient populations. Offering a wide range of information, from several types of ICU care, it can highlight perceived barriers, and bring forward problems that may arise in more than one unit that could prevent an overall successful implementation of an early mobilization assessment tool and protocol. In addition to providing this broad view of staff perceptions, the survey may also focus attention on common safety concerns in specific populations (e.g., patients requiring assistance from ECMO and LVADs). These results can be

taken to the ICU Liberation Task Force and incorporated while forming the early mobility assessment tool and protocol based on staff concerns (Krupp, et al., 2018; Krupp, et al., 2019), safety considerations (R. Yang, et al., 2021) and available literature (Kourek, et al., 2022; Lippi, et al., 2022; Mayer, et al., 2020; Klem, et al., 2021; Vollenweider, et al. 2022; Worrapphen, et al., 2020).

Phase 2 Pilot

A pilot of the developed early mobility assessment tool and protocol will then be implemented in one of the ICUs at Nebraska Medicine. Staff nurses will be educated prior to implementation. After the pilot is completed, data collection will occur by looking at patient outcomes after the early mobility protocol implementation. Staff participating in this pilot unit will also be surveyed after implementation to get their views on processes that went well and those that can be improved. Once any necessary changes are made, the pilot results will be disseminated to the other ICUs along with education about the new protocol.

Methodology

Design

The overarching design is evidence-based quality improvement, with the end results showing improved patient outcomes. This DNP project addresses one phase of a multi-phased long-term quality improvement initiative at Nebraska Medicine. The design of this DNP project can best be characterized as a one-group descriptive study using a validated tool.

Subjects

Potential subjects included all RNs and PCTs providing bedside care in the critical care units at Nebraska Medicine. The tool was available online through an internet link and QR code for a period of three weeks. Participation in the survey was, again, voluntary and anonymous.

Other non-nursing health care professionals were excluded from the study to focus more specifically on implementation needs of the bedside nursing staff.

Setting

Nebraska Medicine is a 700-bed tertiary care facility affiliated with an academic medical center. The specific setting(s) for this portion of the Nebraska Medicine Liberation/Early Mobilization initiative were all Intensive Care Units at the Nebraska Medicine Hospital.

Tools and Measures

The tool selected for this phase of the early mobilization initiative was the Johns Hopkins Survey tool, “Patient Mobilization Attitudes & Beliefs Survey for the ICU (PMABS ICU)”. (Hoyer & Needham, 2018). See Figure 2 for a copy of the tool and scoring instructions. Dikkema and colleagues (2021) conducted a systematic review of tools designed to assess facilitators and barriers of early mobilization in critical care. This tool demonstrated good reliability and validity and the Liberation Task Force at Nebraska Medicine considered it appropriate to their setting and needs. Goodson et al., (2018) tested the psychometric properties of the tool in a sample of 163 nurses, clinical technicians, respiratory therapists, attending and fellow physicians, nurse practitioners and physician assistants in a medical ICU. They reported acceptable discriminant validity and acceptable internal consistency for the overall scores (Cronbach $\alpha = 0.82$, 95% CI = 0.76-0.85).

Psychometric Performance of Tool

As mentioned previously, Goodson et al., (2018) tested the psychometric properties of the PMABS ICU and found the Cronbach $\alpha = 0.82$, 95% CI= 0.76-0.85, with subscales being 0.62 (CI= 0.61-0.76) for knowledge, 0.69 (CI= 0.61-0.76) for attitude, and 0.66 (CI= 0.55-0.74)

for behaviors subscale. This study found the overall Cronbach α to be 0.845 with the subscales being 0.610, 0.752, and 0.713 respectively.

Perceived barriers to mobility varied depending on the professional's role with attending physicians perceiving the fewest variables. Those with greater experience across all professions perceived fewer barriers to mobility than less experienced colleagues. In using this survey tool for this project, investigators tailored the tool demographics and findings of perceived barriers to a specific group, (i.e., RNs and PCT), as opposed to the various groups that were previously surveyed and discussed by Goodson, et al in 2018.

This survey tool uses a 5-point Likert scale (0 = not applicable; 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree) to distinguish ratings regarding knowledge, attitudes, beliefs, and perceived barriers to early mobilization in the ICU. The tool contains some reversed scoring requirements; the accompanying instructions for analysis were followed carefully. Raw scores were converted to an overall scale of 0 to 100, with higher scores indicating greater perceived barriers. Two questions were asked at the beginning of the survey to assess the surveyor's role and years of experience. The survey tool contains a free-text comment portion at the end for any additional feedback. Additional feedback was also reviewed and summarized during the data analysis. This tool addresses specific concerns about mobilization of the ICU population, so it is not necessary nor advisable to make changes to the items within this validated tool. The Demographic information was modified to align with professional roles and units at Nebraska Medicine.

Data Analysis

Data was analyzed using IBM SPSS Statistics, Version 28.0. Descriptive statistics were run to characterize the sample in terms of role, years of experience, unit designation and time to

complete the survey. Pearson product-moment correlations were conducted to determine if there were any correlations between years of experience or time to take the survey and PMABS ICU scores. As described above, reverse scoring was conducted as specified by tool developers and raw scores were converted to a 0-100 scale. A one-way ANOVA with Bonferroni post hoc tests were completed to determine if PMABS ICU total and subscale scores differed by unit. Open ended comments about perceived barriers were categorized thematically.

Results

Demographics

There were 70 participants out of 378 potential ICU RNs and PCTs, resulting in a response rate of 18.5%. Of those 70, there were 61 (87.1%) RNs and 9 (12.9%) PCTs. There were 12 participants from CVICU (12.1%), 13 from MICU (18.6%), 10 from NSICU (14.3%), 21 from SICU (30%), and 14 from WICU (20%).

The mean years of experience of those who participated in the survey was 7.22 ($SD = 6.27$). The mean years of experience by unit are as follows: CVICU 6.88 years ($SD = 2.78$), MICU 7.69 years ($SD = 9.97$), NSICU 6.45 years ($SD = 5.35$), SICU 8.95 years ($SD = 6.46$), and WICU 5.02 years ($SD = 3.93$) as seen in Figure 3. A Pearson's product-moment correlation was run to assess the relationship between years of experience and PMABS ICU scores. There were no statistically significant correlations between years of experience and PMABS ICU total ($r = .073, p = .547$) or subscale scores for knowledge ($r = .037, p = .763$), attitudes ($r = .007, p = .953$) or behaviors ($r = .151, p = .211$). A one-way ANOVA did not detect significant differences in years of experience between units, $F(4,65) = 0.893, p = .474$.

The median time to complete the survey was three minutes and 25 seconds. There were no significant differences in the time to complete the survey based on unit nor was there a

statistically significant correlations between time to complete the survey with the overall PMABS ICU scores or scores for knowledge, attitudes or behaviors.

PMABS ICU Converted Scores by Unit

The mean PMABS ICU total score (converted to a 0 – 100 scale) was 67.30 ($SD = 8.45$, $CI = 65.28-69.31$). For the subscale of knowledge, a mean converted score of 78.43 ($SD = 12.14$, $CI = 75.53-81.32$) was found. For the subscale of attitude, a mean converted score of 63.38 ($SD = 9.74$, $CI = 61.06-65.71$) was found. Lastly, for the subscale of behavior, a mean converted score of 68.0 ($SD = 9.83$, $CI = 65.66-70.34$) was found.

A series of one-way ANOVAs were performed to determine if there were any statistically significant differences between groups (i.e., critical care units) for PMABS ICU total or subscale scores. In situations where the ANOVA was significant, Bonferroni post hoc tests were conducted to identify specific group differences. See Table 1.

PMABS ICU total scores. A one-way ANOVA detected between group differences, $F(4,65) = 6.365$, $p < .001$. On post hoc testing, there were no statistically significant differences between CVICU ($M = 74.01$, $SD = 7.28$) and WICU ($M = 71.87$, $SD = 6.02$). There were also no significant differences among MICU ($M = 63.02$, $SD = 7.52$), NSICU ($M = 62.80$, $SD = 7.31$) and SICU ($M = 65.16$, $SD = 8.14$). However, statistical significance was noted for mean differences between CVICU and MICU (11.08, $p = .004$), CVICU and NSICU (11.33, $p = .006$) and CVICU and SICU (8.94, $p = .014$) with CVICU scores higher than those of the three comparison units. WICU scores were significantly higher when compared to MICU (8.85, $p = .027$) and NSICU (9.10, $p = .041$) but not SICU (6.70, $p = .106$).

Knowledge subscale scores. A one-way ANOVA did not detect significant differences between groups for knowledge subscale scores, $F(4,65) = 0.763$, $p = 0.553$. Therefore post hoc testing was not necessary.

Attitude subscale scores. A one-way ANOVA detected between group differences, $F(4,65) = 7.049$, $p < .001$. Attitude subscale scores followed a similar pattern with both CVICU and WICU scores significantly higher when compared to MICU, NSICU, or SICU. See Table 1 for details.

Behavior subscale scores. A one-way ANOVA detected between group differences, $F(4,65) = 4.805$, $p = .002$. CVICU scores were significantly higher than MICU, NSICU and SICU, but not WICU. There were no significant differences between WICU scores and those of any other unit. See Table 1 for details.

Raw Scores by Item

Descriptive statistics of raw scores based on 1-5 Likert Scale responses were provided to the Nebraska Medicine Liberation Task Force for the combined sample and for each unit. These scores reflected the respondents' ratings for each item before reverse scoring and conversion to a 1-100 scale. This allowed unit managers to examine the collective responses of their staff more closely. The data can be used to inform unit specific implementation planning with an enhanced understanding of staff knowledge, attitudes, behaviors and expressed concerns about early mobilization of their patients. See Table 2.

Review of Comments

Out of the 70 participants, 17 (24%) left additional comments regarding early mobility of ICU patients. The common themes from the qualitative data reflected concerns regarding patient

safety, inadequate staffing to safely mobilize patients, and adequate time to move complex patients within the workday.

Stakeholder Feedback

The results of this study were presented to the interdisciplinary Liberation Task Force at Nebraska Medicine, as well as critical care unit managers and educators. In situations where the DNP students' review of literature provided insights relevant to stakeholder concerns, key methods and findings were summarized for possible adoption or adaptation at Nebraska Medicine.

Discussion

The objective of this study was to gain knowledge of the staff members working at the bedside with patients, perceived barriers towards early ambulation, as well as their attitudes, behaviors and beliefs. These results will provide guidance for interventions to be put into place to increase patient ambulation within the ICU setting. By gaining this type of knowledge directly from the bedside staff members, barriers can be addressed prior to implementation of early mobility protocols. Additionally, the results can be tailored to unit specific needs based on the results, if Nebraska Medicine desires. By providing this type of information, each ICU has the opportunity to implement unit specific interventions based on the feedback the survey provided. The survey's main themes were that staff are concerned about patient safety, staffing safety, and time constraints with complex patients. These results are beneficial because when barriers are addressed prior to implementation there is less likelihood of resistance to new interventions. With an overarching end goal of increasing early mobility, the hope is that there will be a decrease in adverse patient outcomes.

When comparing the results to the study published by Goodson et al (2018), this study found an overall Cronbach α to be 0.845 which is similar to that of the comparable study with a Cronbach $\alpha=0.82$. Internal consistency within this study displayed higher results when compared to the Goodson et al (2018) study. Thus, making this data collection reliable and valid, with scores to support information. When comparing the sample scores of Goodson et al. (2018) to Nebraska Medicine, it demonstrated that Nebraska Medicine had a higher median score, thus there are more perceived barriers compared to Goodson et al. (2018) study.

Bonferroni post hoc test results demonstrated that CVICU and WICU were closely related with p values equaling 1 (p -value=1). While MICU, NSICU, and SICU had subscales that were relatively clustered together, regarding behaviors and attitudes. ANOVA results of the knowledge subscale were insignificant across all ICUs although the variance for each measure in each unit was relatively high indicating that there may be a broad range of educational needs within any given unit. "More education" is often offered as a universal panacea for implementation barriers. The results of this study indicate that while education is important (particularly in regard to new equipment and new protocols), attitudes and behaviors should also be addressed as part of the implementation plan.

Throughout the quantitative data analysis, there were no significant findings that provide explanation to the relation between the CVICU and the WICU attitude and behaviors scores. While the other ICUs (MICU, SICU and NSICU) displayed no significant findings nor explanations, to further explain their relations to each other in the attitudes and behaviors subscales, with scores closely grouped together. The qualitative data gathered offer some insights for critical care unit managers to consider. Feedback within the qualitative data displayed common themes throughout describing concerns for safety, inadequate staffing, insufficient time

to complete the task and/or a decreased amount of available space for ambulation when combined with required medical equipment for patient care.

Potential limitations of this study include having a limited population and sample size. The Goodson et al. (2018), study included several clinical roles within a single ICU for 155 participants at a 96% response rate. While this study was conducted across five ICUs with various specialties with two clinical roles surveyed, the response rate was only 18.5%. This could be a potential reason for the difference in results between the studies, but this does not make this study unreliable or invalid based on the quantitative data analysis. With a limited sample size, there is the question of whether this is an appropriate representation of the population of staff members surveyed. Leading to unknown knowledge if there are barriers experienced by staff members and not identified in the qualitative data findings.

Conclusion

In conclusion, administration of the PMABS ICU provided results that were valid and reliable within the study and are currently being evaluated for generalizability to the setting. The qualitative data results provided feedback that would provide potential correlation reasoning but there was not enough qualitative data for the study to be considered mixed data. This survey tool has provided valuable and useful information to the participating ICUs and the action teams, by identifying beliefs, knowledge, attitudes and potential barriers that the bedside staff experiences during their workflow. With this information, special considerations can be taken when developing and implementing early mobilization protocols in the ICU.

Significance/implications

Results show that staff have a good foundational knowledge about early mobility, but there are opportunities to enhance attitudes and behaviors regarding early mobility. Additionally, the qualitative feedback highlights the common themes of lack of/ the need for additional staffing to mobilize patients, clarification as to which patients are okay to mobilize, and availability of time for staff. These findings were shared with the early mobility committee at Nebraska Medicine with the hope that the early mobility protocol can be adapted to meet the ICUs needs. Additionally, unit specific findings and comments were shared with ICU managers to guide unit specific protocol development and implementation.

Recommendations

It is recommended that when developing an ICU Early Mobilization protocol, there should be a generalized protocol to be used across various types of ICUs. After a generalized ICU mobilization protocol is developed and implemented across all ICUs, each specialty ICU can further tailor the protocol so that it applies to their specific patient populations. By doing this, specific barriers that an ICU experiences can be addressed with less occurrences of adverse outcomes.

Based on the most common theme of inadequate staffing within the qualitative data results, additional staffing should be included in the action plan. This can alleviate the staff burden to mobilize patients in the ICU when appropriate. Further input from current bedside staff can be included to gather a better understanding of staffing needs. An allowance for what type of additional staffing would still need to be determined and approved by the task force team and a budget analysis.

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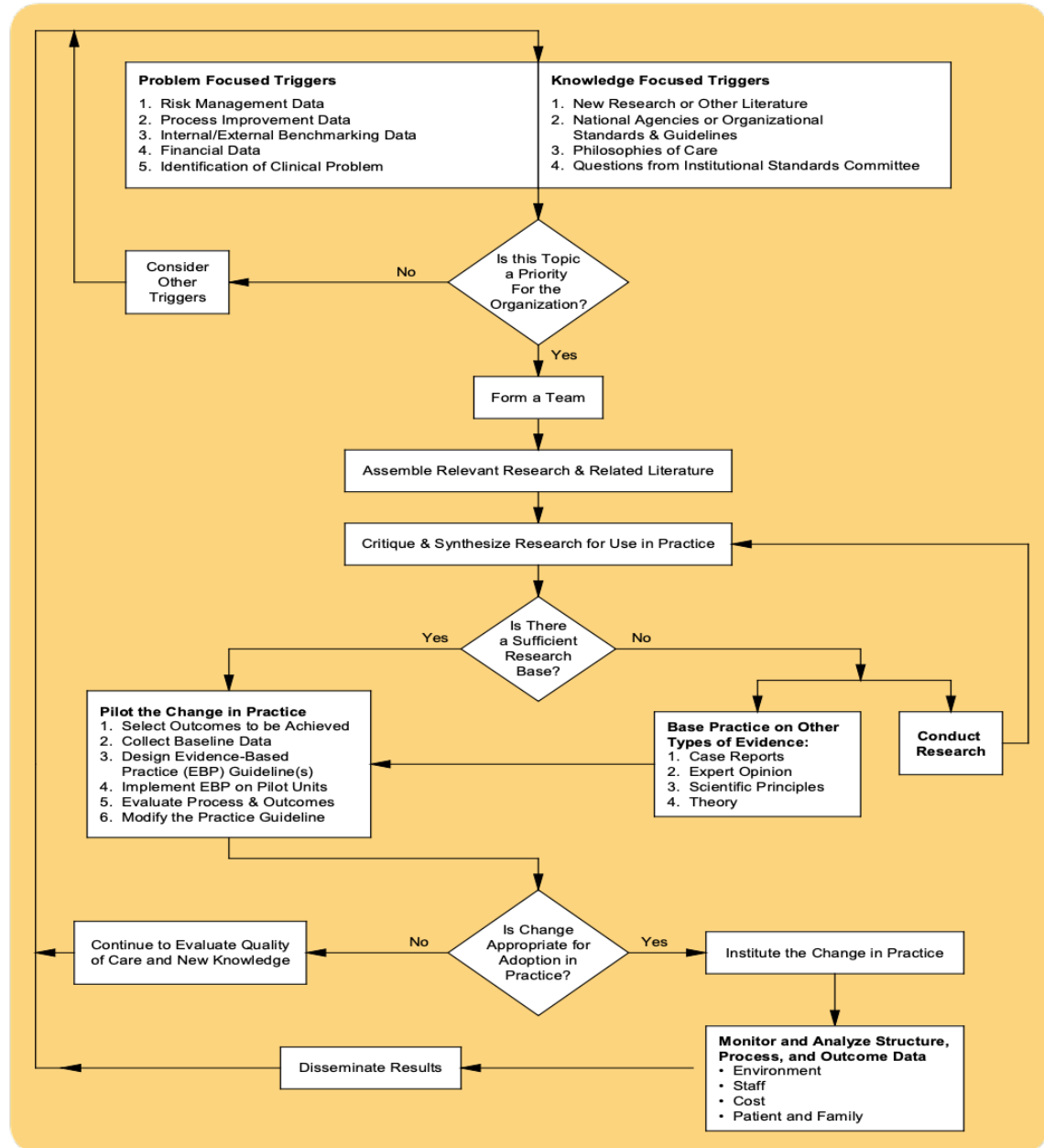
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Figure 1

The Iowa Model of Evidence-Based Practice to Promote Quality Care

◇ = a decision point


Titler, M.G., Kleiber, C., Steelman, V.J., Rakel, B. A., Budreau, G., Everett, L.Q., Buckwalter, K.C., Tripp-Reimer, T., & Goode C. (2001). The Iowa Model Of Evidence-Based Practice to Promote Quality Care. *Critical Care Nursing Clinics of North America*, 13(4), 497-509.

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Figure 2

Patient Mobilization, Attitudes & Beliefs Survey for the ICU with Scoring Instructions


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Page 1 of 3

Patient Mobilization Attitudes & Beliefs Survey for the ICU

In this survey we would like to know about your opinions regarding mobilization of hospitalized patients in the intensive care unit (ICU) setting.

A. Today's Date: / /

(mm / dd / yyyy format)

B. What is your clinical role?

Nurse [] Physician [] Nurse [] Physician [] Clinical [] Respiratory []
 Practitioner Assistant Technician Therapist

Other []
 Indicate: _____

C. If physician, please note your training level:

Intern [] Resident [] Fellow [] Attending []

E. Specify the number of years you have spent caring for hospitalized patients. _____

INSTRUCTIONS:

- Please answer questions for patients in the ICU.
- For purposes of this survey, "mobilizing" patients means getting them out of bed or ambulating.
- For each statement below, please fill in only ONE response (mark with X) that most accurately reflects your opinion based on experience over the past 1 – 2 weeks.

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. My patients are too sick to be mobilized.	[]	[]	[]	[]	[]
2. I have received training on how to safely mobilize my patients.	[]	[]	[]	[]	[]
3. Increasing mobilization of my patients will be harmful to them (e.g., falls, IV line removal)	[]	[]	[]	[]	[]
4. A physical therapist or occupational therapist should be the primary care provider to mobilize my patients.	[]	[]	[]	[]	[]



Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
5. I understand which patients are appropriate to refer to Physical Therapy .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I understand which patients are appropriate to refer to Occupational Therapy .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. We don't have the proper equipment and/or furnishings to mobilize my patients.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. The physical functioning of my patients is regularly discussed between the patient's healthcare providers (nurses, physicians, physical therapists, occupational therapists).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Nurse-to-patient staffing is adequate to mobilize patients on my unit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. My patients often have contraindications to be mobilized.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Unless there is a contraindication, my patients are mobilized at least once daily by Nurses .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Increasing mobilization of my patients will be more work for Nurses .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Increasing mobilization of my patients will be more work for Physical and/or Occupational Therapists .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. My leadership is very supportive of patient mobilization.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Increasing the frequency of mobilizing my patients increases my risk for injury.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Patients who can be mobilized usually have appropriate physician orders to do so.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
17. My patients are resistant to being mobilized.	[]	[]	[]	[]	[]
18. I believe that my patients who are mobilized at least once daily (if there is no contraindication) will have better outcomes.	[]	[]	[]	[]	[]
19. I am not sure when it is safe to mobilize my patients.	[]	[]	[]	[]	[]
20. Family members of my patients are frequently interested to help mobilize them.	[]	[]	[]	[]	[]
21. I do not feel confident in my ability to mobilize my patients.	[]	[]	[]	[]	[]
22. I document the physical functioning status of my patients during my shift/work day.	[]	[]	[]	[]	[]
23. I do not have time to mobilize my patients during my shift/work day.	[]	[]	[]	[]	[]
24. Unless there is a contraindication, I mobilize my patients at least once during my shift/work day.	[]	[]	[]	[]	[]
25. Unless there is a contraindication, I educate my patients to exercise or increase their physical activity while on my hospital unit.	[]	[]	[]	[]	[]
26. My patients have time during their day to be mobilized at least once daily.	[]	[]	[]	[]	[]

Do you believe there are other issues related to mobility that were not covered in this survey? If yes, specify below.



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Scoring the Patient Mobilization Attitudes & Beliefs Survey for the ICU (PMABS-ICU)

Score all the individual items as follows:

Strongly agree=5
 Agree=4
 Neutral=3
 Disagree=2
 Strong disagree=1
 (No score if response is missing)

For items 1, 3, 4, 7, 10, 12, 13, 15, 17, 19, 21 and 23, reverse the scores (i.e., score of 5 becomes 1, 1 becomes 5, 4 becomes 2, 2 becomes 4).

Calculate the scores as follows:

Total score

Sum=sum items 1 to 26

Missing=number of missing items (range: 0 to 26)

Total possible score = 130 – (5 x missing)

Total score = (total possible score – sum) ÷ total possible score x 100

Knowledge subscale

Sum=sum items 2, 5, 6 and 25

Missing=number of missing items (range: 0 to 4)

Knowledge possible score = 20 – (5 x missing)

Knowledge score = (knowledge possible score – sum) ÷ knowledge possible score x 100

Attitudes subscale

Sum=sum items 7, 8, 9, 10, 11, 14, 15, 16, 17, 20, 22, 23 and 24

Missing=number of missing items (range: 0 to 13)

Attitudes possible score = 65 – (5 x missing)

Attitudes score = (attitudes possible score – sum) ÷ attitudes possible score x 100

Behaviors subscale

Sum=sum items 1, 3, 4, 12, 13, 18, 19, 21 and 26

Missing=number of missing items (range: 0 to 9)

Behaviors possible score = 45 – (5 x missing)

Behaviors score = (behaviors possible score – sum) ÷ behaviors possible score x 100

Example calculation knowledge subscale score: Suppose 3 of 4 questions answered, and score is 2 on all three answered questions. Total knowledge possible score is 20-5=15. Sum of score is 3 x 2=6. Knowledge subscale score is (15-6) ÷ 15 x 100 = 60.

Note that a higher score indicates a greater level of barriers.



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Figure 3

Years of Experience and Number of Respondents by Unit

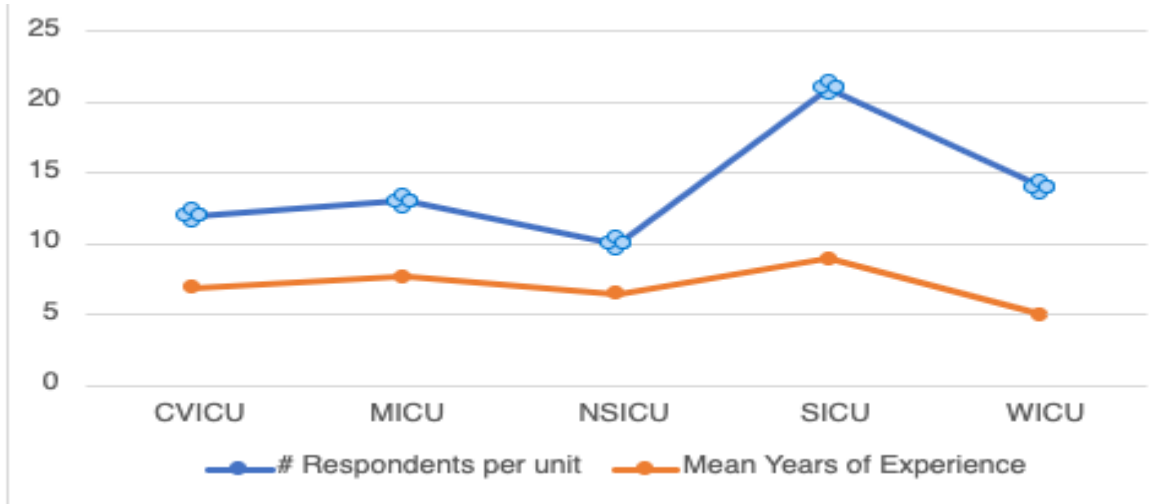
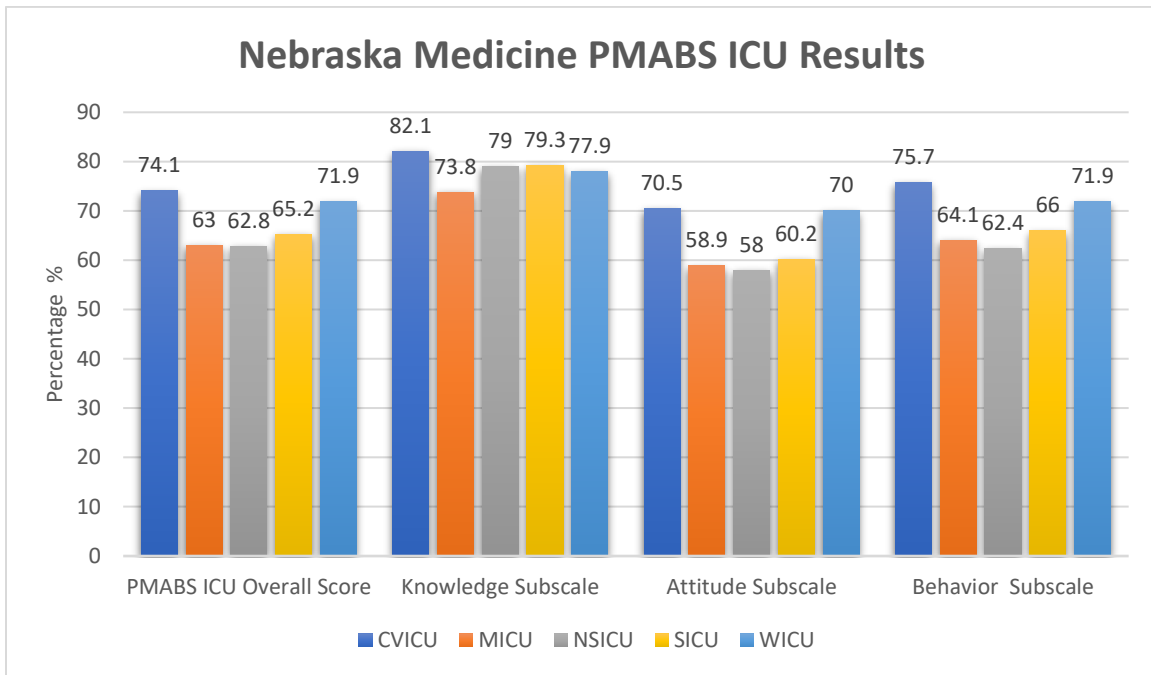


Figure 4

BMABS¹ Total Score and Subscale Score Results by ICU Unit



¹*Patient Mobilization, Attitudes & Beliefs Survey for the ICU*

Note: Results are reverse coded and converted to a 1-100 scale. Higher scores indicate greater perception of barriers that need to be addressed before program implementation.

Table 1*PMABS Comparisons Between Units: One-way ANOVA with Bonferroni Post Hoc Results*

MEASURE	UNIT	CVICU	MICU	NSICU	SICU	WICU
PMABS ICU Total Score ANOVA $F(4,65) = 6.365,$ $p < .001$	CVICU	X	11.08, $p = .004$	11.33, $p = .006$	8.94, $p = .014$	$p = 1.0$
	MICU	-11.08 $p = .04$	X	$p = 1.0$	$p = 1.0$	-8.85, $p = .027$
	NSICU	-11.33, $p = .006$	$p = 1.0$	X	$p = 1.0$	-9.10, $p = .041$
	SICU	-8.94 $p = .014$	$p = 1.0$	$p = 1.0$	X	$p = .106$
	WICU	1.0	8.85, $p = .027$	9.10 $p = .041$	$p = .106$	X
Knowledge Subscale ANOVA: $F(4,65)$ $= 0.763, p = 0.553$	CVICU	X	$p = 1.0$	$p = 1.0$	$p = 1.0$	$p = 1.0$
	MICU	$p = 1.0$	X	$p = 1.0$	$p = 1.0$	$p = 1.0$
	NSICU	$p = 1.0$	$p = 1.0$	X	$p = 1.0$	$p = 1.0$
	SICU	$p = 1.0$	$p = 1.0$	$p = 1.0$	X	$p = 1.0$
	WICU	$p = 1.0$	$p = 1.0$	$p = 1.0$	$p = 1.0$	X
Attitude Subscale ANOVA $F(4,65) = 7.049,$ $p < .001$	CVICU	X	11.58, $p = .01$	12.51, $p = .009$	10.29, $p = .012$	$p = 1.0$
	MICU	-11.58, $p = .010$	X	$p = 1.0$	$p = 1.0$	-11.07, $p = .011$
	NSICU	-12.51 $p = .009$	$p = 1.0$	X	$p = 1.0$	-12.00, $p = .010$
	SICU	-10.29 $p = .012$	$p = 1.0$	$p = 1.0$	X	-9.78, $p = .012$
	WICU	$p = 1.0$	11.07 $p = .011$	12.00, $p = .010$	9.78, $p = .012$	X
Behavior Subscale ANOVA $F(4,65) = 4.805,$ $p = .002$	CVICU	X	11.64, $p = .017$	13.30, $p = .009$	9.71, $p = .036$	$p = 1.0$
	MICU	-11.64, $p = .017$	X	$p = 1.0$	$p = 1.0$	$p = .26$
	NSICU	-13.30 $p = .009$	$p = 1.0$	X	$p = 1.0$	$p = .26$
	SICU	-9.71, $p = .036$	$p = 1.0$	$p = 1.0$	X	$p = .6$
	WICU	$p = 1.0$	$p = .26$	$p = .125$	$p = 0.125$	X

Bonferroni post hoc tests reported as mean difference (p value). Level of significance was set at $p < .05$

Table 2*Likert Scale Responses to All Items for All Subjects.*

Item No.	N	Minimum	Maximum	Mean	SD	Item Statement (<i>subscale</i>)
1	70	1	5	3.13	0.962	My patients are too sick to be mobilized. (<i>behavior</i>)
2	70	1	5	3.77	1.079	I have received training on how to safely mobilize my patients. (<i>knowledge</i>)
3	70	1	5	2.31	0.971	Increasing mobilization of my patients will be harmful to them (e.g., falls, IV-line removal). (<i>behavior</i>)
4	70	1	5	2.91	1.060	A physical therapist or occupational therapist should be the primary care provider to mobilize my patient. (<i>behavior</i>)
5	70	2	5	4.09	0.756	I understand which patients are appropriate to refer to Physical Therapy. (<i>knowledge</i>)
6	70	1	5	3.90	0.903	I understand which patients are appropriate to refer to Occupational Therapy. (<i>knowledge</i>)
7	70	1	5	3.03	1.049	We don't have the proper equipment and/or furnishings to mobilize my patients. (<i>attitude</i>)
8	70	1	5	3.61	1.133	The physical functioning of my patients is regularly discussed between the patient's healthcare providers (nurses, physicians, physical therapists, occupational therapists). (<i>attitude</i>)
9	70	1	5	2.36	1.104	Nurse-to-patient staffing is adequate to mobilize patients on my unit. (<i>attitude</i>)
10	70	2	5	3.50	0.897	My patients often have contraindications to be mobilized. (<i>attitude</i>)
11	70	1	5	3.44	1.125	Unless there is a contraindication, my patients are mobilized at least once daily by Nurses. (<i>attitude</i>)

Item No.	N	Minimum	Maximum	Mean	SD	Item Statement (<i>subscale</i>)
12	70	2	5	4.10	0.764	Increasing mobilization of my patients will be more work for Nurses. (<i>behavior</i>)
13	70	1	5	3.09	0.989	Increasing mobilization of my patients will be more work for Physical and/or Occupational Therapists. (<i>behavior</i>)
14	70	2	5	4.04	0.751	My leadership is very supportive of patient mobilization. (<i>attitude</i>)
15	70	1	5	3.13	1.076	Increasing the frequency of mobilizing my patients increases my risk for injury. (<i>attitude</i>)
16	70	1	5	3.63	0.854	Patients who can be mobilized usually have appropriate physician orders to do so. (<i>attitude</i>)
17	70	2	5	3.53	0.847	My patients are resistant to being mobilized. (<i>attitude</i>)
18	70	3	5	4.59	0.551	I believe that my patients who are mobilized at least once daily (if there is no contraindication) will have better outcomes. (<i>behavior</i>)
19	70	1	5	2.13	0.883	I am not sure when it is safe to mobilize my patients. (<i>behavior</i>)
20	70	1	5	2.91	0.989	Family members of my patients are frequently interested to help mobilize them. (<i>attitude</i>)
21	70	1	5	2.19	0.967	I do not feel confident in my ability to mobilize my patients. (<i>behavior</i>)
22	70	2	5	4.00	0.681	I document the physical functioning status of my patients during my shift/workday. (<i>attitude</i>)
23	70	2	5	3.27	1.034	I do not have time to mobilize my patients during my shift/workday. (<i>attitude</i>)
24	70	1	5	3.66	0.961	Unless there is a contraindication, I mobilize my patients at least once during my shift/workday. (<i>attitude</i>)

Item No.	N	Minimum	Maximum	Mean	SD	Item Statement (<i>subscale</i>)
25	70	1	5	3.93	0.804	Unless there is a contraindication, I educate my patients to exercise or increase their physical activity while on my hospital unit. (<i>knowledge</i>)
26	70	1	5	3.87	0.760	My patients have time during their day to be mobilized at least once daily. (<i>behavior</i>)

Descriptive statistics are based on Likert Scale responses for each item. 5 = Strongly Agree. 4 = Agree. 3 = Neutral. 2 = Disagree. 1 = Strongly Disagree.