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Promoting Patient Mobility to Decrease Hospital Length of Stay

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Abstract

Practice Problem: Promoting patient mobility may reduce hospital-acquired complications and length of stay (LOS). Evidence-based studies have established that there is a correlation between immobility and an increased length of stay in the hospital. How can nurse-driven mobility interventions effectively increase patient mobility and reduce the risk of complications and length of hospital stay?

PICOT: The PICOT question that guided this project was: For veteran patients in the Progressive Care unit (PCU) of a medical center (P), will using the Johns Hopkins Highest Level of Mobility tool (JH-HLM) (I) compared to not using a mobility tool (C) decrease hospital length of stay (O) in 8 weeks (T).

Evidence: Evidence supported the implementation of an early mobility protocol to reduce length of stay, as well as the PICOT intervention in terms of adopting an evidence-based mobility instrument with demonstrated validity and reliability.

Intervention: To implement and monitor the effectiveness of a nurse-led mobility intervention with the aim of decreasing patient length of stay, through the integration of the Johns Hopkins mobility tool (JH-HLM).

Outcome: The outcome showed that the average LOS prior to the use of the tool was 6.39 days and decreased to 4.27 days after its implementation for the patients who received mobility interventions. This shows a significant decrease in the length of stay for the MOB category between the two months of August (pre-implementation) and September (implementation).

Conclusion: The intended outcome for this EBP project was a decrease in length of patient stay. Statistical analysis showed that the mean of LOS was statistically significant and decreased between pre-intervention, Jun/July and post-intervention, Aug/Sep time periods.

Promoting Patient Mobility to Decrease Hospital Length of Stay

Decreased patient mobility during hospitalization may cause poor patient outcomes (Schujmann et al., 2018) and increase patient length of stay. A patient's length of stay (LOS) in a hospital is determined by many factors such as functional ability, medical complications, surgical intervention, and social factors such as lack of community resources to discharge. Encouraging early patient mobility is an evidence-based intervention that has been shown to improve patient outcomes by decreasing complications related to immobilization (Castelino et al., 2016).

Patient complications associated with hospitalization impact the length of stay. Studies show that hospital length of stay decreases in patients who receive early mobilization screening (Klein et al., 2018; Schallom et al., 2020). Mobility tools like the Johns Hopkins Highest Level Mobility (JH-HLM) have been used to improve patient outcomes related to functional mobility (Teodoro, 2016). Early mobility screening with targeted interventions prevents complications and decreases patient length of stay. The purpose of this quality improvement project was to determine if incorporating the (JH-HLM) tool to promote early mobility screening for patients would reduce their hospital length of stay (LOS) compared to standard care.

Significance of the Practice Problem

Identification of the Practice Problem

Promoting a patient’s mobility can decrease hospital-acquired complications and reduce the length of stay (Klein et al., 2018). More than thirty-five million patients are hospitalized in the United States, and many suffer from hospital-acquired complications and mobility impairment (Hoyer et al., 2016). Studies show a link between immobility and increased risk for complications. However, the opposite is true as earlier mobility for hospitalized patients results in a shorter stay and a lower risk of comorbidities such as pneumonia, pressure ulcers, and falls

(Schujmann et al., 2018). Furthermore, individuals who are less functional and mobile after discharge have a higher risk of readmission (Galloway et al., 2016).

Population and Societal Level Significance

Improving patients' mobility after injury prevents the risk of further complications, decreases the length of hospital stay, and improves their quality of life (Gabbe et al., 2017). Early mobility screening for patients to promote ambulation and other movement decreases complications and length of stay (Klein et al., 2018). A randomized study (Schaller et al., 2016) to determine whether early mobility screening and interventions decrease length of stay for ICU patients confirmed the benefits of this intervention. Not only did the length of stay decrease from 10 to 7 days, but the patients also saw an improvement in their functional mobility.

Studies have also shown that nurse-driven mobility interventions are effective and can increase the frequency of patient ambulation compared to other therapy protocols (Young et al., 2019). Implementing an interdisciplinary, nurse-led early mobility program that promotes early mobility using a standardized tool such as the JH-HLM improves patient outcomes, reduces complications, shortens hospital stays, and reduces hospital costs for both the patient and the organization (Hoyer et al., 2016; Klein et al., 2018).

Facility Level Significance

An increased length of stay can lead to patient complications and increased hospital costs for the patient and the organization.(Rohas et al., 2018). Interventions promoting patient mobility while hospitalized can prevent falls and align with the Veterans Health Administration (VHA) mission of providing quality and patient centered care, while maintaining costs. A study conducted at the Veterans Health Administration (VHA) by Rogers et al., (2022) to determine

ways to decrease patient length of stay confirms that assessing for microenvironmental organizational factors unique to each organization can help reduce patient length of stay.

Currently, there is no validated and evidence-based tool for mobility promotion, resulting in inconsistency in methods used to set patient mobility goals. As a result, implementing an early mobility screening process using the JH-HLM tool, which has been shown to improve patient outcomes (Young et al., 2019).This is a validated and dependable tool for assessing and setting mobility goals (Hoyer et al., 2018). In addition, the VHA discovered considerable evidence of improved patient outcomes after the introduction of a similar mobility initiative, in which the Safe Patient Handling Mobility Program (SPHMP) (Mellilo et al., 2022).

PICOT Question

For the veteran patients' in the Progressive Care Unit (PCU) of a medical center (P), will early utilization of the Johns Hopkins Highest Level of Mobility tool (JH-HLM) (I) compared to not using a mobility tool (C) decrease hospital length of stay (O) in 8 weeks (T)?

P: The PCU unit was chosen because, according to SAIL (Strategic Analytics for Improvement and Learning) data from the previous quarter, it had a high number of post-acute care events, such as patient falls. SAIL is a system developed by the Veteran Health Administration (VHA) to measure and track performance across its healthcare facilities. (SAIL, 2022).

I: The practice site lacks a mobility promotion tool to enhance early patient mobility. The intervention was to adopt use of the JH-HLM tool. It is a validated tool and can be used for this evidence-based quality improvement project (Hoyer et al., 2018; Kappel et al., 2018). The JH-HLM tool was developed from recommendations from multiple disciplines including nurses, doctors, physical and occupational therapists.(Johns Hopkins, 2020).

C: The comparison was the current practice of using no tool, compared to the length of stay (LOS) after using the JHHLM tool. Data was extracted from electronic health records (EHR). The past quarter data was compared to LOS after implementation of the JH-HLM mobility tool. Current practice did not include a mobility promotion tool.

O: Intended outcome was decreased patient length of stay. The main goal was to promote earlier patient mobility, hence reducing patient duration of stay, by applying the validated instrument JHHLM tool. Studies show early mobility improves patient outcomes (Hoyer et al., 2016; Klein et al., 2018) and this positively impacts length of hospital stay by decreasing hospitalization days.

T: Timeline proposed is a ten-week period. Although the average length of stay in the PCU is 3-5 days (Buck et al., 2018), reviewing data for the last quarter would provide more data for analysis.

Evidence-Based Practice Framework & Change Theory

Johns Hopkins Evidence Based Practice Framework

Among the various evidence-based practice (EBP) frameworks employed in transferring evidence-based research efforts into nursing practice, the John Hopkins Evidence-Based Practice (JHEBP) framework is one of them. The essential components of this model are research (identifying clinical questions to be answered), finding supporting or relevant evidence best practices for the clinical questions, and making decisions to guide improvements in practice (Dang & Dearholt, 2018). This quality improvement project aimed to determine if incorporating the Johns Hopkins Highest level Mobility (JH-HLM) tool to promote early patient mobility would reduce their hospital length of stay, compared to standard care.

The clinical question was the impact of an early mobility program on the health outcomes of patients. Evidence supported the idea that implementing an early mobility protocol decreases adverse patient outcomes (Schallom et al., 2020). As nurses would implement this process improvement project, it was essential to note that a significant percentage of nurse leaders reported encouraging the use of an EBP framework in implementing evidence-based clinical practice (Speroni et al., 2020). Utilizing an EBP framework for this project would provide the needed buy-in from leadership, to ensure the success of the project.

Evidence Search Strategy

The search strategy aimed to identify peer-reviewed articles about the PICOT question that seeks to understand a mobility tool's effect in promoting early patient mobility and decreasing hospital length of stay. Relevant literature was first identified through an electronic search of databases to ensure a thorough search for robust evidence. The leading search began in the University of St. Augustine for Health Sciences (USAHS) library. The primary databases in the library are CINAHL Complete, DynaMed, ERIC, ProQuest Central, and PubMed. The search utilized all databases to yield more expansive results. The search included the following subject terms: length of hospital stay and early patient mobility.

A basic search using keywords early patient mobility and length of hospital stay and a publication date range from 2016 through 2023 yielded 9,144 articles. When the search was narrowed down to only peer reviewed journals, there were 3,422, and when only full text journals were added to this search, this yielded 3,196 articles. An advanced search using multiple databases, seeking to find all the search terms yielded 2,297 articles. The limits in this search were full text, peer-reviewed academic journals, and the date range was 2017 through the

present. Duplicate articles were removed, and this narrowed the search to 2,286. These were then screened further to narrow the PICOT's area of focus.

The inclusion criteria were articles in English, based in the United States, and peer-reviewed, and this narrowed the search to 490 articles. The following terms were added to further narrow down the main topics of the PICOT, for the subject material. Early ambulation, walking, physical mobility, length of stay, patient discharge, activities of daily living, and healthcare outcomes. The exclusion criteria were articles that referenced critical care or critically ill patients. The final number of nine was established utilizing inclusion and exclusion criteria. Articles referring to other specialties, such as cardiology, surgery, or conditions unrelated to mobility, were also removed.

MeSH is a database of articles from biomedical journals in which MeSH words are designated to an article to describe what it is about (Bauman, 2016). The MeSH builder in PubMed found no terms that matched early patient mobility. This term will be one of the key terms as well as length of stay. When the term length of stay was input, another term identified that can be interchangeable was hospital stay. This term was added to the search builder to be used in future searches.

Evidence Search Results

The initial 2,297 advanced literature search results were subjected to the following inclusion criteria: (1) keywords early patient mobility and length of hospital stay, (2) full text, peer-reviewed academic journals (3) a date range from 2017 through 2023. With a further narrowing of search results to the United States, and English language, the search yielded 490 articles. These articles were then subjected to the inclusion and exclusion criteria to add relevant terms for the PICOT. They were early ambulation, walking, physical mobility, length of stay, patient discharge, activities of daily living, and healthcare outcomes. The exclusion criteria were

articles referencing specific areas e.g., critical care or critically ill patients. This yielded nine articles that are presented in Appendix A: Review of Primary Research and Appendix B: Summary of systematic reviews of literature.

Figure 1 shows a Prisma table created to depict the topic search results. The study synthesis excluded four hundred and eighty-one articles. These articles focused on specialty areas e.g., ICU (intensive care unit) or (operating room) which would not be relevant to the PICOT identified areas. Of the nine remaining articles, three (Gnanakumaran et al., 2017; Calthorpe et al., 2021 and Castelino et al., 2016) were research studies with level I quality grade, per Johns Hopkins rating (Dang et al., 2022). Five articles (Hoyer et al., 2016; Hoyer et al., 2018; Schaller et al., 2016; Schujmann et al., 2018 and Teodoro et al., 2016) were level II quality using the same rating and only one article (Klein et al., 2018) was a level III prospective, longitudinal comparative study.

Themes with Practice Recommendations

Synthesizing the evidence based on the reviewed studies reveals common themes that support the hypothesis that early patient mobility not only influences patient outcomes but can also reduce patient length of stay. The themes for practice recommendations that emerged from the evidence synthesis were summarized in this section. These themes sought to support the PICOT statement. Four themes are evident in the research synthesis. First, early patient mobility and hospital length of stay are associated with the PICOT outcome, improved mobility function and a decreased hospital length of stay. The third theme, reliability of mobility assessment tools is related to the PICOT's intervention which aims to identify if the Johns Hopkins Highest Level of Mobility tool (JH-HLM) would lead to the desired outcome. The fourth theme, use of educational instruction video in addition to regular routines, is associated with the intervention,

although not utilizing the recommended tool. Refer to appendix A and appendix B for more information on the identified studies.

Early Patient Mobility and Length of Hospital Stay

The Hoyer et al., (2016) study was the most relevant to the PICOT presented. It sought to ascertain whether a multidisciplinary quality improvement project utilizing the identified intervention tool, the Johns Hopkins Highest Level of Mobility (JH-HLM), would result in improved patient mobility and reduced length of stay, as desired by the PICOT. According to the findings, there is a link between enhanced mobility and quality improvement interventions, which contributes to a shorter hospital stay, especially in patients who have complex hospitalizations. As a quality improvement, quasi-experimental study, this study strongly supports the proposed PICOT.

Three other studies (Klein et al., 2018; Schaller et al., 2016 and Schujmann et al., 2018) sought to answer the PICOT intervention, such as, promote early patient mobility. This was their main similarity but none of these studies utilized the proposed JH-HLM mobility tool. Klein et al., (2018) sought to determine if a nurse-led early mobility program would improve patient mobility and clinical outcomes. Similarly, Schaller et al., (2016) sought to determine if an early and targeted mobility program would impact length of stay and patient's functional ability. The study by Schujmann et al., (2018) was slightly different in that in addition to identifying if a mobility protocol would impact functional and physical ability, the study added an element of the use of technology. All these studies support the proposed PICOT that an early mobility intervention does indeed impact hospital length of stay.

Reliability of Mobility Tools

The study by Hoyer et al., (2020) sought to evaluate the reliability of the proposed intervention tool, JH-HLM and the Activity Measure for Post-Acute Care (AM-PAC). This is related to the proposed PICOT intervention. This study was significant because the JH-HLM had never been formally evaluated for reliability and construct validity. This study verified the validity and reliability of both tools, making the use of the JH-HLM tool for the proposed PICOT intervention an evidence-based, validated intervention.

Another systematic review study, (Calthorpe et al., 2021) was conducted to review the instruments used to assess the mobility and physical function of patients. The main goal was to determine not only reliability and validity, but also assess their clinical utility. This study supports the PICOT intervention regarding adopting an evidence-based mobility measurement. It is even more critical as the organization currently lacks such a tool and is also adopting a standardized measure across disciplines.

Practice Recommendations

The studies above supported the PICOT statement that implementing an evidence-based tool to improve patient mobility will result in shorter patient stays and better patient outcomes. The studies cited not only support the validity and reliability of the JH-HLM tool, but also demonstrate that using this tool results in a standardized method of measuring patient mobility. Whether nurse-led or interdisciplinary, this intervention has also been shown to be related to early mobility and improved patient outcomes. The proposed PICOT for using the JH-HLM tool and incorporating evidence-based practice, such as, an interdisciplinary EBP project to promote patient mobility, was well supported by research and evidence-based practice and would result in the desired outcomes.

Settings, Stakeholders and Systems

Setting

The proposed evidence-based project occurred in a federal government hospital in western America. This acute medical hospital's selected implementation unit is an 18-bed Progressive Care unit (PCU). Male and female patients are served, but the patient demographic is predominantly male, with an average age of sixty-five. This unit provides care for veterans who require a higher level of monitoring and medical care compared to regular medical care. The average length of stay is 3-5 days. The proposal begun in a microenvironment, one unit initially, and then a planned scale up, to the larger organization.

Organizational Culture and Readiness for Change

This micro-level practice change was implemented in the PCU unit at a VHA healthcare facility. The mission of this organization is to “honor America’s veterans by providing exceptional healthcare that improves their health and well-being” (U.S. Department of Veterans Affairs, n.d.). This EBP project aligned with the organizational mission. The organization's executive leadership were key stakeholders for this project because it would impact the hospital’s length of stay. Nurses were also vital to the success because this EBP is a nurse-driven initiative, physical therapy, and occupational therapy because they were the team involved with patient mobility. Patients must also be considered since their buy-in and participation will ensure the project's success.

Stakeholders and Organizational Support

Nursing leadership, hospital executive leadership, staff nurses, and the interdisciplinary team involved with patient mobility were the main stakeholders. Nurses, physical therapists, occupational therapists, and patients make up the core team. The value that the proposed change

offers to the organization must be defined in order for key stakeholders to support the DNP initiative. The purpose of this quality improvement project is to determine whether adding the Johns Hopkins Highest Level Mobility (JH-HLM) tool to promote early patient mobility reduces hospital length of stay when compared to standard care.

The most compelling determinant of the value of this practice change is that the selected EBP site lacks a mobility promotion tool, and the staff additionally do not use a universal mobility scale to assess and set goals for patient mobility. This EBP project focused on implementing and monitoring the effectiveness of a nurse-led mobility intervention, with the aim of decreasing patient length of stay. A shared decision-making process also allowed patients to participate in this EBP project. The proposed project further encouraged interdisciplinary collaboration, as the project members were interdisciplinary.

SWOT Analysis

A SWOT analysis (strength, weakness, opportunities, and threat) is a process that can be applied to the implementation of the DNP capstone project. It analyzes existing strengths, weaknesses, opportunities, and threats to a project and the project implementation process (Hollingsworth & Reynolds, 2020). For example, weaknesses were the lack of an existing tool to promote patient mobility at the organization and the potential for patients and staff not buying in, i.e., adopting a completely new workflow process that will alter the current organizational workflow. Threats to this process were the time it takes to comply post-implementation due to the tool and practice change. Furthermore, the facility, unlike similar VHA facilities, lacked a standardized process for documenting mobility status and goals, so additional time would be required to implement.

The following were the organization's strengths and opportunities for this EBP project: resources available to the organization, i.e., this facility would adopt a validated tool, JHHJM mobility tool that was already being championed across other similar VHA (Veterans Health Administration) facilities, and a high-reliability organization (HRO) culture that exists in this organization. One of the main pillars of VHA HRO principles is sustaining process improvement and ensuring patient safety (Merchant et al., 2022). Therefore, this EBP provided an opportunity for the organization to meet the VHA initiative of preventing patient harm and improving patient outcomes associated with early mobility and can lead to a shortened hospital stay, which had financial implications for the organization. Refer to Table 1 for the SWOT diagram.

Implementation Plan, Timeline and Budget

The acronym SMART stands for specified, measurable, achievable, relevant, and time-bound (Doran, 1981). The SMART goal of this project was to address the PICOT of this EBP, which was the adoption of a nurse-driven, early mobility program to reduce patient length of stay by 10% in PCU unit over a 10-week period. This objective was consistent with the hospital's mission and vision. Project objectives were established based on the phases of project implementation.

Objectives

Eight weeks before the project's implementation, a multidisciplinary team comprised of nurses, physiotherapists, occupational therapists, and the safe patient handling team met. Given that patient mobility was important, this team was essential for the project's success. Employees were trained four weeks before the project's implementation on how to use the JHHLM mobility tool and incorporate mobility evaluation and documentation into daily practice. Another SMART

goal was to discover an adequate sample of patients, at least 90% of whom were eligible for the initiative, two weeks before implementation. Finally, for 10 weeks, the major goal was to lower the patient's LOS from pre-intervention to post-intervention by 10%.

Implementation Plan

According to Dang et al. (2022), project implementation is part of Johns Hopkins' Practice Evidence and Translation (PET) translation phase (Table 3). The first critical step is to develop an action plan outlining roles and responsibilities. Important milestones must also be specified. The action plan is implemented after obtaining the necessary support and resources. The Johns Hopkins Evidence Based PET process outlines four P's for the implementation phase: Purpose (outlining changes), Picture (allowing time for the impacted areas to process change), Plan (implementing the plan) and Participation (consistent involvement of impacted team and stakeholders) (Dang et al., 2022).

The JHHLM tool is considered part of the nurses' daily patient interventions, i.e., during bedside care. The nurses were responsible for using the tool to determine patient mobility status and documenting it in the EHR. An interdisciplinary team, including PT and OT, used the same tool for daily patient ambulation activities and track progress toward goals. Day shift nurses evaluated patient mobility at the beginning of their shift, and any staff who assisted with mobility documented mobility scores at the end of the day. As patients ambulated less at night, the night shift had a goal for one assessment. This was also documented in the patient's EHR.

Project Manager Role

The project manager was essential in ensuring success when implementing this DNP project. This process begun with a project timeline. The monitoring and evaluation framework

required several components. This process included, but is not limited to, researching the evidence-based problem, gathering data, assessing the quality of evidence to ensure its validity and reliability, identifying each team member's role, and assigning tasks to each team member (Hande & Phillippi, 2018). Qualities such as interdisciplinary collaboration were also necessary to meet project goals. The goal was that the DNP project demonstrate the proposed EBP change. To facilitate participation and support of the organization's stakeholders, proposed change must have had positive patient outcomes and met the organization's goals.

Timeline and Budget

The planned project timeline was for 10 weeks for implementation. See Gantt Chart representation of project timeline in (Appendix C). There would be four phases in the plan. Planning and assessment, training and data collection, implementation, and evaluation. Mobility assessment was already an identified assessment for nurses therefore, utilizing the JHHLM tool would not be considered an additional duty. The project was conducted during routine work assignments; thus, staffing costs were minimal and would only be incurred by the hours the project manager was on-site. The organization supported all other costs, as there was a logistics team that produced posters and other documents. Refer to (Table 2) for the project budget.

Lewin’s Change Theory For Implementation Phase

Unfreezing

Lewin's change theory served as the foundation for this evidence-based practice implementation. Behavior needs to be altered in order for change to occur, according to Lewin (1951). Unfreezing, change, and refreezing are the three processes of Lewin's Change theory for project execution (Lewin, 1951). During the unfreezing step, the team developed an

implementation plan, described how the EBP project would impact work processes, assigned roles for various stages, and garnered support from key stakeholders. The initial stage in implementation was to educate nurses about the project's value and the impact of early mobility on patient outcomes.

A two-step approach to learning was implemented, with nurses receiving in-person training through unit-based presentations and web-based education modules from Elsevier Clinical Skills (ECS). ECS was chosen because it was already used at this facility to deliver an audiovisual learning platform, but it also had evidence-based checklists to assess competence (Salinas et al., 2021). Nurses were trained on how to use the JHHLM tool (Figure 2) to assess mobility levels prior to and after intervention implementation. Using Elsevier helped standardize the information nurses received, was easily accessible, and was also used to assess nurses' knowledge. Completing the five-question posttest with an 80% or higher would validate tool knowledge.

Change

This is the stage at which the proposed practice change was implemented, and everyone on the team was working toward the same goals. Communication of project goals and implementation plan phases was critical to project success. The team worked with informatics to collect data prior to implementation. Nurses had already been trained and were expected to document patient mobility scores twice per shift. At the start of their shift, to establish baseline mobility scores, and facilitate setting mobility goals, and again at the end of the shift, to assess patient progress toward the set mobility goal. Physical and occupational therapists were essential in facilitating nurses in scoring patient mobility levels and identifying any barriers to using the JHHLM tool (Figure 2).

Audits of the EHR were performed to ensure ongoing compliance during the intervention phase. At the start of this phase, weekly meetings occurred in the PCU unit to evaluate progress toward desired goals. Nurse feedback was considered, and any barriers identified, so that necessary interventions to improve the process could be implemented. An interdisciplinary team provided continuous, ongoing nursing support. Day and night shift unit champions were also identified. Once the nurses had adopted use of the tool, bi-monthly meetings with unit-based leadership, the project core group, and the project manager occurred to review progress towards desired goals.

Refreezing

Refreezing was the last step. The project manager (PM) collaborated with the workgroup and the informatics team to ensure consistent and dependable data collection. Once the project's implementation of the JHHLM tool begun, mobility data was compared to data collected before intervention implementation. The desired outcomes were evaluated after ten weeks to see if there was a reduction in length of stay. Evaluation factors included whether defined outcomes were met, and whether this practice change could be implemented in other departments throughout the system.

Results

The aim of this nurse led EBP initiative was to reduce patient length of stay by implementing the validated JHHLM tool (Hoyer et al., 2018; Kappel et al., 2018). This initiative resulted in a 10% decrease in patients' duration of stay over a 10-week period. Nurses were instructed to record patient mobility scores with the JH-HLM tool twice daily, at the start and

end of their shifts. Documentation took place in the patient's electronic health record (EHR) and reflected their mobility scores based on the JH-HLM tool.

IRB facility approval was obtained in July 2023 and the project was initiated during the week of July 24th. To establish the average length of stay for patients in the PCU prior to project implementation, the organization's informatics team collected data for 60 days using facility software that tracks patient length of stay. Initially, efforts focused on educating the staff about the JH-HLM tool and creating visual aids for every patient room and the unit. The nurses' documentation for patient mobility already included the JH-HLM mobility scoring and goal setting. Permission to use the tool was obtained prior to project implementation (see appendix F).

Data Collection

Implementation data was collected for a period of 8 weeks from August 1st through September 30th. The goal for this 18-bed ARU unit was to include all eligible patients, with a target of at least 90% of the unit population, or 16 patients. Prior to project implementation, a nursing specialist from the Informatics department collected data on average length of stay (LOS) of patients. Staff compliance to determine if staff were using the JHHLM tool was done via chart audits of the EHR (refer to appendix D). Data integrity was maintained by using facility software and was run by an internal informatics staff. HIPAA was maintained because all patient records were confidential, and data was run by aggregate totals rather than individual patient records. Patients that were excluded were those that were ICU level patients but boarding in the PCU during this period.

A decrease in LOS was measured by comparing patients on the PCU unit two months prior to similar patients after the 8-week QI project implementation. To assess the effectiveness of using the JHHLM tool during the implementation phase, aggregate data on patient mobility

scores was collected on admission and discharge day (see Appendix E). Patients with no mobility factors (no documentation for mobility present) and those with mobility factors present (documentation for mobility). For the category of no mobility factors, there were 95 observations in pre-intervention date range of June/July and 58 observations in the post-intervention date range of August/September. The average LOS in June/July was 3.91 days, while in August/ September, it decreased to 3.40 days. (Refer to figure 3). This indicates a slight decrease in the length of stay for this category between the two months.

On the other hand, for the mobility factors category, there were 70 observations in pre-intervention date range of June/July and 64 observations in the post-intervention date range of August/September. The average LOS in June/July was 9.93 days, whereas in August/ September, it decreased to 5.78 days. (Refer to figure 3). This shows a significant decrease in the average length of stay for the mobility category between the two months. In summary, both the no mobility factors, and mobility categories experienced a decrease in the average length of stay from August to September, but the decrease was more pronounced for the mobility factors present category.

Statistical Analysis

Data analysis was conducted through a statistical analysis software, Intellectus (Intellectus, 2023), with consultation of a statistician. As the intention for this EBP was incorporating the JHHLM tool to promote mobility, data analysis to determine statistical significance focused on patients who had at least one mobility factor documented. A two-tailed independent samples *t*-test was conducted to examine whether the mean of LOS was significantly different between the Jun/July and Aug/Sep categories of this time periods.

The result of the two-tailed independent samples *t*-test was significant based on an alpha value of .05, $t(132) = 2.61$, $p = .010$, indicating the null hypothesis can be rejected. This finding suggests the mean of LOS was statistically significantly between the Jun/July and Aug/Sep categories of time periods. A bar plot of the means is presented in Figure 4. Overall, the results demonstrate both clinical and statistical significance in reducing patient length of stay through the implementation of the JHHLM tool and promoting earlier patient mobility.

Outcome Measures

There were two outcome measures. The main outcome was to determine whether the intervention (JH-HLM tool) would shorten patient length of stay. This was the functional outcome. The outcome would be achieved if the patient LOS is reduced by 10% following the intervention compared to the previous average length of stay. Staff compliance was also monitored as a process measure to determine whether the JHHLM tool was used consistently to make an impact on the desired outcome. It was essential to assess whether staff compliance was a variable that influenced the desired outcome. Staff compliance to determine if staff were using the JHHLM tool was done via chart audits of the EHR. (refer to appendix D). The goal for compliance was 100% compliance.

Impact

The intended outcome for this EBP project was to decrease patient length of stay by promoting earlier patient mobility by using a validated mobility instrument, the JHHLM tool. Studies have highlighted the positive effects of early mobility on patient outcomes (Klein et al., 2018), and cost reduction for the organization associated with lengthy hospitalization (Hoyer et al., 2016; Klein et al., 2018).

The project addressed the practice problem as results showed a reduction in patients' length of stay during the eight-week period. The clinical significance of this project was demonstrating the importance of implementing evidence-based practices, such as utilizing the JHHLM tool, to improve patient outcomes. By promoting earlier patient mobility, the project was able to reduce the length of stay, which can lead to improved patient satisfaction and lower healthcare costs.

Nursing practice was altered through incorporating the use of the JHHLM tool into the nurses' documentation for patient mobility. This was achieved by requiring nurses to document patient mobility scores using the JH-HLM tool twice daily, at the beginning and end of their shift. This increased awareness of the importance of promoting early patient mobility and results also showed an increase in documentation compliance. Additionally, staff reported being empowered to be part of this EBP due to the positive impact on patient outcomes, which impacts staff satisfaction.

Sustainability and Ongoing Evaluation

The goal was to incorporate the JHHLM tool in all inpatient hospital units, This project proved sustainable as all data required can be derived from the same source, for each respective unit. A similar team comprised of informatics staff, a project lead or educator, and unit-based staff can duplicate similar efforts to ensure utilization of the JH-HLM tool, as part of the daily nursing documentation in order to promote earlier mobility.

Ongoing evaluation entails involving the informatics team to pull data to determine average length of stay in respective units, then a comparison post -implementation to evaluate a decrease in length of patient stay. Unit based educators can assist with staff education and monitoring for compliance with tool utilization via documentation.

Barriers and Limitations

Due to a lengthy timeline for IRB approval, the EBP project implementation was only approximately 8 weeks. This meant that the number of patients included in the EBP was potentially smaller than anticipated and this could impact overall timeline in evaluation for length of stay. Another limitation was that there were ICU boarding patients in the PCU, during this time. This meant fewer patients than the expected eighteen total for this unit for the EBP. Although the ICU patients were omitted for the evaluation and statistical analysis, this may also impact the findings of this EBP.

Dissemination Plan

The results of the EBP project and outcomes were presented to the organization's NLC (Nursing Leadership Committee) at their monthly meeting. This is an organizational meeting attended by the hospital's Executive Nursing Leadership team, Nursing Chiefs, Nursing Managers, and Nursing Education department members. The presentation was delivered via a web-based PowerPoint presentation, with an opportunity for peers or management to ask questions or provide feedback. EBP project outcomes, tools used in the implementation phase, evaluation, clinical significance, future practice recommendations, team acknowledgments, and supporting media such as images, graphs, and relevant tables were exhibited in the monthly safe patient handling meeting as this EBP promoted patient mobility.

The results of this EBP project were also be shared as a final proposal to University of St. Augustine (USAHS) faculty for a review, prior to submission for publication to SOAR. Doctoral peers will also be given the opportunity to review and make suggestions of the proposal. The *American Journal of Nursing*, the *Journal of Military and Veterans*, which focuses on veterans and mental health, and the *Journal of Doctoral Nursing Practice* were some journals where the

project can be submitted for review and publication. The project's publication will encourage expert collaboration, which will lead to the implementation of new policies and improved patient outcomes.

Conclusion

The purpose of this evidence-based quality improvement project was to see if using the JH-HLM tool to promote early mobility screening for patients reduces their hospital length of stay (LOS) when compared to standard care. This EBP's focus as a nurse-driven mobility project is supported by research, which indicates that nursing interventions were effective and can increase patient ambulation frequency when compared to other therapy protocols (Young et al., 2019). The chosen intervention tool was supported by research. Using a standardized tool like the JH-HLM improves patient outcomes, decreases complications, reduces hospital stays, and lowers hospital costs for both the patient and the organization (Hoyer et al., 2016; Klein et al., 2018).

The expected outcomes were a shorter patient length of stay and an increase in the patient's mobility level, as measured by improved scores. This was used to assess clinical significance. There is evidence to support the proposed EBP project. Hoyer et al., (2016) developed a similar EBP project that is remarkably similar to the PICOT presented. It sought to determine if a multidisciplinary quality improvement project using the JH-HLM tool would result in improved patient mobility and a shorter length of stay. According to the findings, there is a link between a quality improvement intervention and increased mobility, which contributes to a shorter hospital stay. As a result, it was expected that this EBP would demonstrate that, when compared to standard care, incorporating the (JH-HLM) tool to promote early mobility for patients would improve clinical outcomes and reduce hospital length of stay (LOS).

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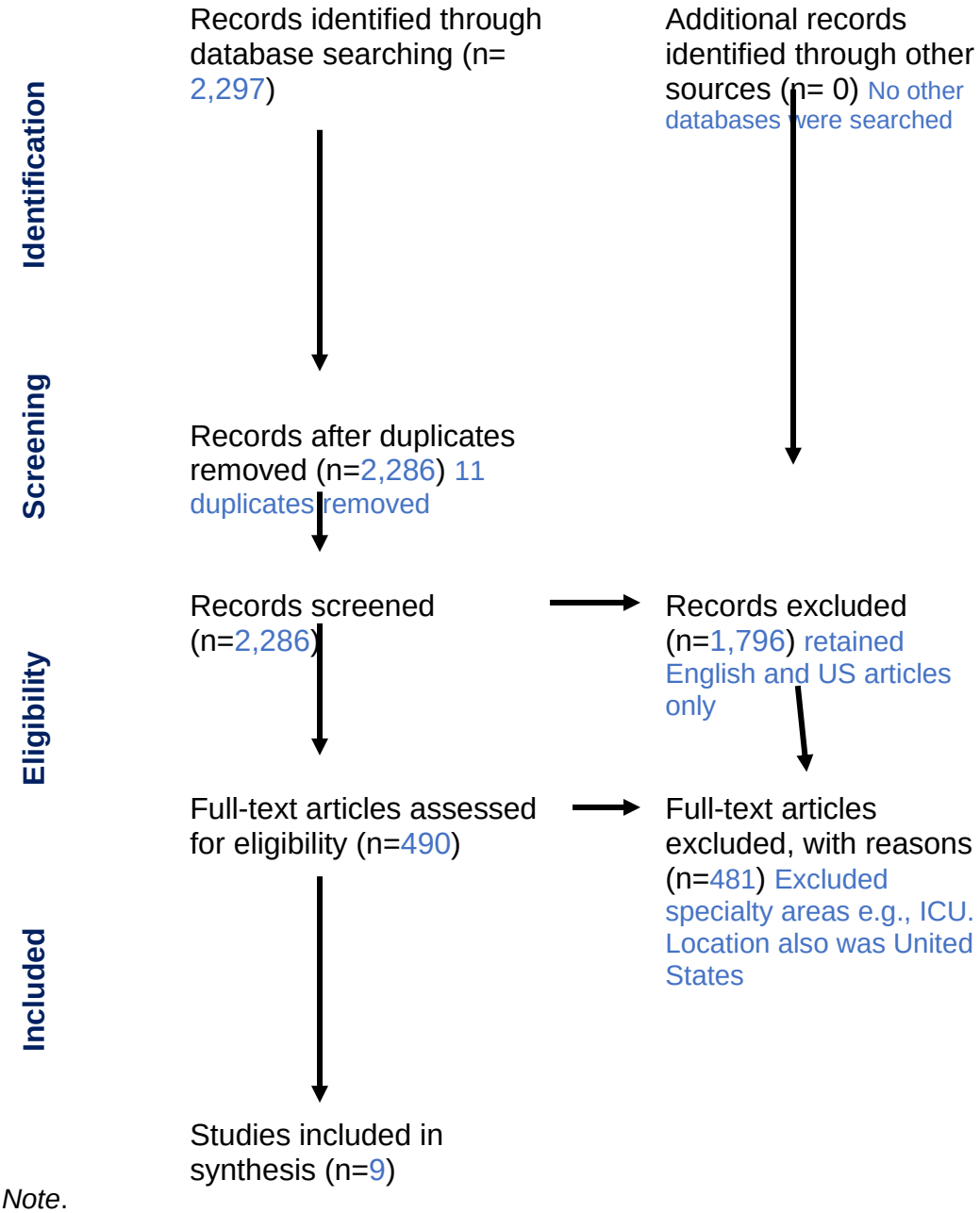
Figure 1

PRISMA Flowchart



Note.

Prisma flow chart diagram from "Preferred Reporting Items for Systematic Reviews and Meta-analyses: The PRISMA Statement," by D. Moher, A. Liberati, J. Tetzlaff, & D.G. Altman, 2009, *Annals of Internal Medicine*, 151(4), p.267 (http://dx.doi.org/10.7326/0003-4819-151-4-200908180-00135). Copyright 2009 by The American College of Physicians.

Figure 2

Johns Hopkins Highest Level of Mobility Scale (JH-HLM)

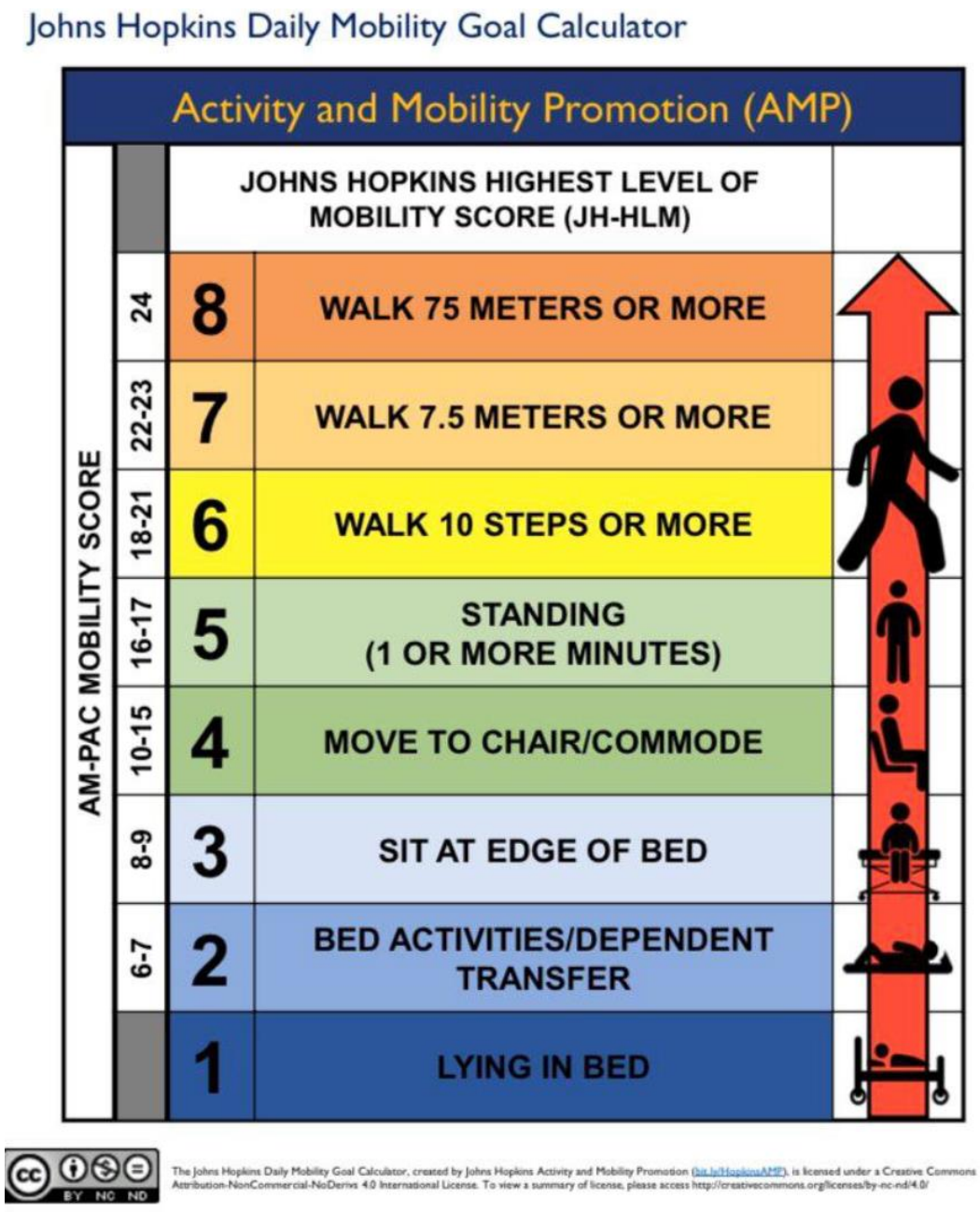
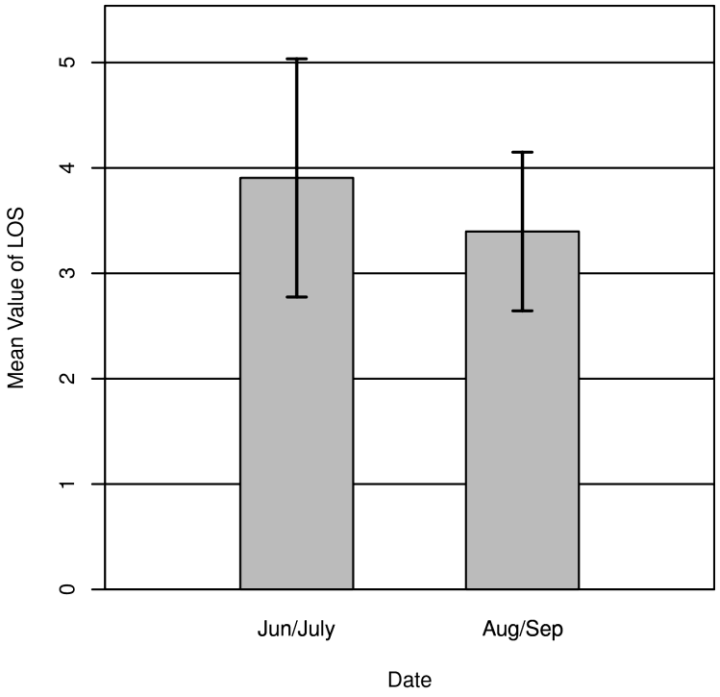


Figure 3

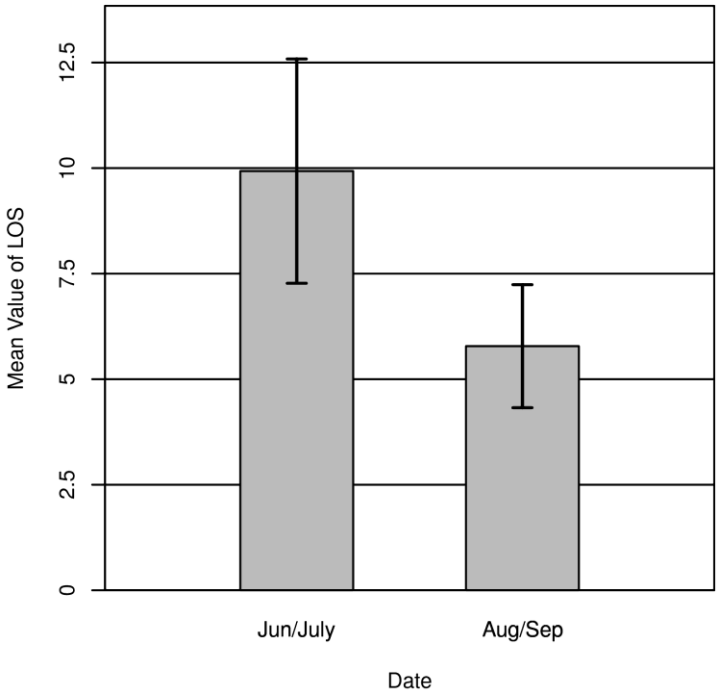
The mean of LOS by levels of Date with 95.00% CI Error Bars



Filtered By: Mobility_HF_Recode (No mobility factor)

Figure 4

The mean of LOS by levels of Date with 95.00% CI Error Bars



Filtered By: Mobility_HF_Recode (At least one mobility factor)

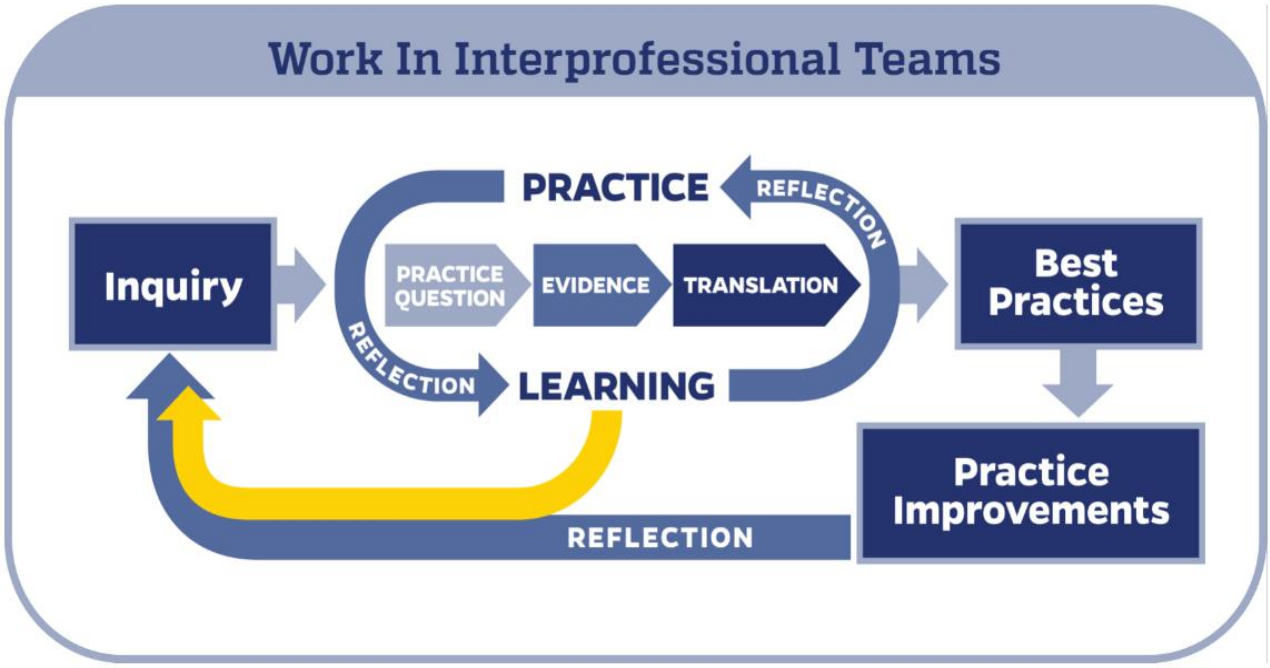
Table 1

SWOT diagram

Strengths • JHHLM tool: The facility will adopt a validated tool, JHHJM mobility tool that is already being championed across other similar VHA (Veterans Health Administration) • HRO: A high reliability organization (HRO) culture already exists in this organization	**Weaknesses** • Validated tool lacking: Lack of an existing tool to promote patient mobility at the organization. • Buy in potential for patients and staff not buying-in, such as, the adoption of a completely new workflow process that will alter the current organizational workflow
Opportunities • Improved patient outcomes associated with early mobility • Provides an opportunity for the organization to meet the VHA initiative of preventing patient harm • Shortened patient hospital stay which has financial implications for the organization.	**Threats** • Timeline: The time it takes to comply post-implementation, due to the tool and practice change • Documentation: Facility lacks a standardized process for documenting mobility status and goals, additional time will be required to implement this as well

Table 2

Johns Hopkins Nursing Evidence Based Practice Model



Dang, D., Dearholt, S., Bissett, K., Ascenzi, J., & Whalen, M. (2022). *Johns Hopkins evidence-based practice for nurses and healthcare professionals: model and guidelines.* 4th ed. Indianapolis, IN: Sigma Theta Tau International

Appendix A

Summary of Primary Research Evidence

Citation	Purpose & Hypothesis	Design	Level	Intervention	Definition of Outcome	Key Findings & Results
Gnanakumaran, S., Li, F., White, M., Shiel, N., Walker, P., & Rappo, T. (2017). The effect of early mobility in patients after Total Knee Replacement on hospital length of stay, pain and function: A randomized control trial. *Physiotherapy Practice & Research*, *38*(2), 121–125. https://doi.org/10.3233/PPR-170093	The study aimed to assess the effectiveness of an early mobilization program for patients following total knee replacement surgery.	This is a randomized controlled study	Level I. Experimental, randomized control	The intervention patients were assigned to an early mobilization group that mobilized within 4-6 hours of surgery, and another y patients were assigned to a control group that followed a standard protocol.	The length of hospital stay, and pain scores were the primary outcome measures. The active knee range and the timed up and go (TUG) test as a functional measure were secondary outcomes.	In terms of length of stay, pain, or knee range of motion, mobilizing within 4-6 hours of total knee replacement provides no significant advantage over the current standard protocol of mobilizing within 24 hours of surgery.
Hoyer, E. H., Friedman, M., Lavezza, A., Wagner-Kosmakos, K., Lewis-Cherry, R., Skolnik, J. L., Byers, S. P., Atanelov, L., Colantuoni, E., Brotman, D. J., & Needham, D. M. (2016). Promoting mobility and reducing length of stay in hospitalized general medicine patients: A quality-improvement project. *Journal of Hospital Medicine*, *11*(5), 341–347. https://doi.org/10.1002/jhm.2546	Aimed to determine if a multidisciplinary mobility promotion quality-improvement (QI) project would increase patient mobility and shorten hospital stays (LOS)	Quality Improvement study	Level II. Quasi-experimental QI project.	Developed a structured QI model that utilized the Johns Hopkins Highest Level of Mobility (JH-HLM) tool to get baseline mobility and set goals for mobility during the Qi intervention phase.	Improved mobility scores, where earlier ambulation impacts patients length of stay.	This quality improvement study found an associated between improved mobility with a QI intervention, and this can contribute to a reduction in hospital stay, particularly for more complex patients with longer expected hospital stay.
Hoyer, E. H., Young, D. L., & Klein, L. M. (2018). Toward a common language for measuring patient mobility in the hospital: Reliability and construct validity of interprofessional mobility measures. *Physical Therapy*, *98*(2), 133–142. https://doi.org/10.1093/ptj/pzx110	Researchers aimed to evaluate the reliability of two scales that measure patient mobility. The Activity Measure for Post-Acute Care (AM-PAC) Inpatient Mobility Short Form (IMSF) and the Johns Hopkins Highest Level of Mobility (JH-HLM)	A prospective analysis using a convenience sample	Level II	One tool, the JH-HLM had never been formally evaluated reliability and construct validity and the AM-PAC IMSF been studied for reliability and validity when used by physical therapists. had only	Confirming the validity and reliability of both tools, The AM-PAC IMSF and JH-HLM when used by nurses and physical therapists.	With validity and reliability established, the team developed a methodical approach to interprofessional standardized measurement for patient mobility that describes and quantifies patient functional outcomes.

Klein, K. E., Bena, J. F., Mulkey, M., & Albert, N. M. (2018). Sustainability of a nurse-driven early progressive mobility protocol and patient clinical and psychological health outcomes in a neurological intensive care unit. *Intensive and Critical Care Nursing*, *45*,11–17. https://doi.org/10.1016/j.iccn.2018.01.005	To investigate the long-term viability of a nurse-led early progressive mobility program implemented over a specific period by comparing mobility levels over time	A prospective longitudinal comparative study	Level III	Research created early mobility program algorithm was used for the intervention. For the two control groups, mobility was encouraged via use of safe patient handling equipment and the facility's lift team.	Early mobility program was assessed for sustainability and specifically measured four patient mobility milestones. Clinical outcomes related to functional status and hospital length of stay were also evaluated.	Early mobility levels were higher in the intervention group than in the control group. Furthermore, the length of stay in the neurological intensive care unit and the hospital were reduced. patient reports of depression, anxiety, and hostility were lower than before the intervention.
Schaller, S. J., Anstey, M., Blobner, M., Edrich, T., Grabitz, S. D., Gradwohl-Matis, I., Heim, M., Houle, T., Kurth, T., Latronico, N., Lee, J., Meyer, M. J., Peponis, T., Talmor, D., Velmahos, G. C., Waak, K., Walz, J. M., Zafonte, R., & Eikermann, M. (2016). Early, goal directed mobilization in the surgical intensive care unit: a randomised controlled trial. *The Lancet*, *388*(10052), 1377–1388. https://doi.org/10.1016/S0140-6736(16)31637-3	To determine if earlier and targeted mobilization improves patient mobility status in SICU, reduced hospital length of stay in the SICU, and improved patients' functional mobility at hospital discharge.	A randomized control trial	Level II	Randomized patient assignment to an early, goal-oriented mobilization intervention.	Functional mobility at discharge was improved and this influenced length of stay in SICU compared to no intervention.	Patients in the intervention group mobilized sooner in their SICU stay compared to no intervention (control). Additionally, the intervention group's length of stay was significantly shorter than the control groups in SICU.
Schujmann, D. S., Lunardi, C. A., & Fu, C. (2018). Progressive mobility program and technology to increase the level of physical activity and its benefits in respiratory, muscular system, and functionality of ICU patients: study protocol for a randomized controlled trial. Trials, 19(1), 1–10. https://doi.org/10.1186/s13063-018-2641-4	In the ICU, a progressive mobilization protocol and the use of technology are superior to traditional physiotherapy in promoting activity levels and delivering greater functional capacity at ICU discharge.	A randomized control trial	Level II	The intervention group will go through an early and progressive mobilization program. This program is developed with research that found that maintaining functionality appears to be dependent on the muscular and cardiorespiratory systems. The program is a rehabilitation focused on these systems	The main outcome will be the functional ability of patients at discharge. Secondary outcomes are level of physical activity, respiratory pressures, handgrip and lower limb muscle strength.	An early and progressive rehabilitation program will result in increased physical activity during ICU patient stay, as well as improved functional performance, and improved muscle and respiratory functions upon ICU discharge.
Teodoro, C. R. (2016). STEP-UP: Study of the effectiveness of a patient	To determine if a formal ambulation	A randomized control trial	Level II	Patients in the intervention group	The primary anticipated outcome	A formal ambulation program that is clinician led,

ambulation protocol. *MEDSURG Nursing*, *25*(2), 111–116.	program that included videotaped patient instruction and daily patient reminders about ambulation goals would improve ambulation in hospitalized patients.			received the ambulation program instructions and daily ambulation goals.	was improved patient ambulation status	while performing routine care and encourages patient ambulation leads to improved patient ambulation. There was a decrease in patient ambulation status when no formal emphasis was provided.

Appendix B

Summary of Systematic Reviews

Citation	Quality Grade	Search Strategy	Inclusion/ exclusion criteria	Data Extraction/ Analysis	Key Findings	Recommendations/ Implications
Calthorpe, S., Kimmel, L. A., Fitzgerald, M. C., Webb, M. J., & Holland, A. E. (2021). Reliability, validity, clinical utility, and responsiveness of measures for assessing mobility and physical function in patients with traumatic injury in the acute care hospital setting: A prospective study. *PTJ: Physical Therapy & Rehabilitation Journal*, *101*(11), 1c. https://doi.org/10.1093/ptj/pzab183	Level I- Systematic review	A systematic review of instruments used to assess mobility and physical function of patients following traumatic injury through direct observation in an acute hospital setting.	To be included, an instrument must be applicable to a wide range of patients, be reliable, have construct and predictive validity, be sensitive to change with intervention, and exhibit minimal floor and ceiling effects.	Data analysis was performed using SPSS 25.0. for the analysis. For data that was not normally distributed, means and standard deviations are presented, or medians and interquartile ranges. If more than 15% achieved the highest or lowest possible score, floor or ceiling effects were present.	The reliability, validity, and responsiveness of all four measures were high; however, their clinical utility varied, and ceiling effects were common at physical therapy discharge.	The study is an important step toward achieving evidence-based measurement in acute trauma physical therapy care. It provides critical information to guide the assessment of mobility and physical function in acute trauma physical therapy, furthering the EBP for patients receiving physical therapy after traumatic injury.
Castelino, T., Fiore, J. J. F., Niculiseanu, P., Landry, T., Augustin, B., & Feldman, L. S. (2016). The effect of early mobilization protocols on postoperative outcomes following abdominal and thoracic surgery: A systematic review. *Surgery*, *159*(4), 991–1003. https://doi.org/10.1016/j.surg.2015.11.029	Level I- systematic review and meta-analyses	A detailed and systematic literature search in three databases, MEDLINE, EMBASE, and PEDRO were searched for randomized controlled trials and observational studies comparing postoperative respiratory and mobilization interventions with standard care in abdominal surgery patients.	A hand search of the reference lists of the included studies supplemented the literature search (snowball-search) Moreover, a search for potentially relevant trials was executed on the WHO trial registration website, and if a relevant trial was registered as completed, the study's record was sought. Replicas and non-English records	Two researchers independently screened the title and abstract based on the eligibility criteria in the online platform Covidence. Data extracted was: 1). Data from the study include the following: title, author, year, study design, and number of participants. 2). Patient demographics include age, gender, operation type, duration of surgery, BMI (body	This meta-analysis discovered a scarcity of published data on postoperative physiotherapy to reduce postoperative surgical complications, medical complications, and mortality, which clarifies why no conclusions can be made on these subjects. Furthermore, the required	However, it appears that postoperative physiotherapy has the potential to reduce the length of hospital stay following surgery, which is consistent with previous research in ERAS (Enhanced Recovery After Surgery) settings.

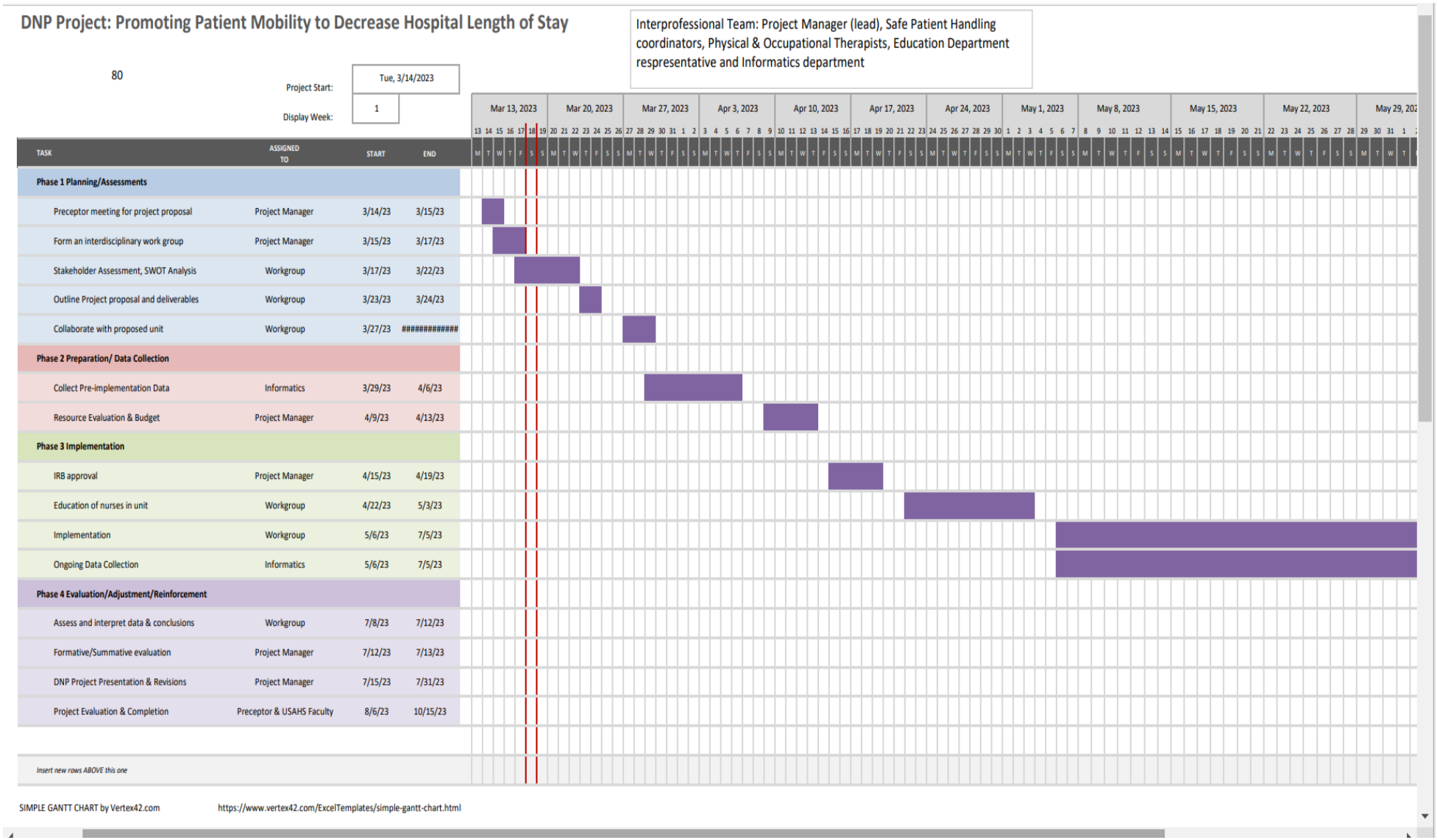
			were removed after the prospective eligible records were imported into Endnote.	mass index), ASA classification, comorbidities, and smoking. 3). Data on interventions include the type of respiratory or mobilization intervention used, as well as the frequency with which it was used. 4). Data on outcomes include the following: type of postoperative complication, frequency of postoperative complication, length of hospital stay, and mortality.	information measurements were not met in all trial sequential analyses. Since the length of hospital stay varies by country due to cultural factors and reimbursement, no final conclusions on the effect of postoperative physiotherapy on LOS were drawn in this study.	

PSS: Statistics for Windows (Computer software)
ERAS: Enhanced Recovery After Surgery

Appendix C

Project Schedule

GANTT CHART -PDF-2.xlsx



Appendix D

Nurse Compliance of JH-HLM Tool Audit

Patient Data	Date	Mobility Score documented in EHR	Mobility Score NOT documented in EHR

Appendix E

JH-HLM Patient Mobility Scores for duration of EBP Project.

Mobility Progress Data Collection

Patient Name	Admit datetime	Discharge datetime	Ward/ location name	LOS	MOB Health Factor	Total HF
	6/1/2023 15:32	6/2/2023 21:08	5WEST PCU	1		0
	6/2/2023 1:54	6/4/2023 1:53	5WEST PCU	2		0
	6/3/2023 9:07	6/8/2023 15:03	5WEST PCU	5		0
	6/3/2023 17:29	6/8/2023 21:05	5WEST PCU	5		0
	6/3/2023 18:50	6/16/2023 17:34	5WEST PCU	13	2023-06-07 VA-VAAES MOB GS 2 TURNED SELF	1
	6/3/2023 21:20	6/8/2023 18:02	5WEST PCU	5	2023-06-05 VA-VAAES MOB GS 6 WALK 10 STEPS*** 2023-06-05 VA-VAAES MOB GS 7 WALK 25 FT	2
	6/3/2023 22:31	6/5/2023 14:40	5WEST PCU	2		0
	6/4/2023 9:56	6/6/2023 13:23	5WEST PCU	2		0
	6/4/2023 22:58	6/6/2023 13:10	5WEST PCU	2		0
	6/5/2023 0:37	6/21/2023 23:56	5WEST PCU	16		0
	6/5/2023 20:56	6/8/2023 11:23	5WEST PCU	3		0
	6/6/2023 1:28	6/6/2023 12:57	5WEST PCU	0		0
	6/6/2023 10:13	6/12/2023 18:26	5WEST PCU	6	2023-06-08 VA-VAAES MOB GS 4 TRANSFERRED*** 2023-06-09 VA-VAAES MOB GS 6 WALK 10 STEPS	2
	6/6/2023 16:47	6/18/2023 10:33	5WEST PCU	12		0

Appendix F

From: HopkinsAMP <HopkinsAMP@jhmi.edu>
Sent: Monday, July 10, 2023 1:54 PM
To: Kinuthia, Saira N. <Saira.Kinuthia@va.gov>
Subject: [EXTERNAL] RE: JH-AMP Tools

Hi Saira,

You have permission to utilize the JH-AMP tools downloaded from the HopkinsAMP.org/tools site. The tools can be used without modification. Any write-up, poster, presentation resulting should appropriately reference the tools.

Holly

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