IMPROVING AMBULATION AND RELATED DOCUMENTATION FOR TOTAL KNEE ARTHROSCOY PATIENTS

by

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Abstract

Ambulation is an evidence-based element to improve overall recovery and discharge from the hospital (Hoyer et al., 2023). This quality improvement project's purpose is to create a process to improve the patient's mobility status and ambulation distance on Post Op Day (POD) 0 after total knee arthroscopy (TKA) surgery. The aims of the project were to lengthen distance patients ambulate on POD 0, increase the percentage of patients who ambulate on POD 0, and improve the documentation of patient ambulation distances.

Most patients are capable of ambulating on POD 0 after a TKA. Improving ambulation on POD 0 increases the patient's recovery after TKA surgery. Motivating both the patient to ambulate and the staff to help ambulate are equally important (Zhong, et al., 2021). A bundled approach of staff education as well as monitoring progress using standardized assessment tools will guide patient's ambulation needs and standardize the documentation around the distances ambulated on POD 0. The aim is to improve the patient's overall recovery outcomes following TKA surgery.
Keywords: ambulation, post-operative, nursing, total knee arthroscopy, TKA

Improving Ambulation and Related Documentation for Total Knee Arthroscopy Patients

Joint surgeries including total knee arthroplasty (TKA) and total knee replacement (TKR) have increased exponentially over the last several years, becoming standardized procedures in the United States. Slower patient recovery may result from the varied recovery approaches (Li et al., 2024; Osundolire et al., 2024). Rapid recovery programs are utilized to reduce stress on the body following surgery. Looking at enhanced mobilization post procedure has shown decreased stress, improved safe and timely discharge (Fiani et al., 2022; Hoyer et al., 2023), and a decreased length of stay (Hoyer et al., 2023). Ambulation is an evidence-based element to improve overall recovery and discharge from the hospital (Hoyer et al., 2023). Instituting a standardized method to screen patients' ambulation needs by using the AM-PAC mobility score in conjunction with the Johns Hopkins Mobility Guide Calculator (JH-MGC) and the Johns Hopkins Safe Patient Handling Mobility (JH-SPHM) guide, to appropriately educate staff on patient's ambulation needs and distance ambulated while standardizing the electronic documentation form to capture the patients' total distances ambulated on POD 0 and beyond the initial post-surgical period will improve the patients overall recovery outcomes.

Background

Institution X is a 336-bed magnet designated trauma level one hospital located in south-central Montana. This institution has a comprehensive team of orthopedic physicians, nurses, and therapists, who provide a team approach to care. Onsite physical and occupational therapists help with early mobilization programs alongside the nursing staff. This hospital meets the certification guidelines with the joint commission for total knee replacements resulting in better patient outcomes (Institution X, n.d.). The following is a microsystem analysis to share details on

the purpose, patients, professionals, processes, and patterns that make up the microsystem of this orthopedic neurology unit.

Purpose

Optimal rehabilitation programs for orthopedic knee replacement patients ensure faster return to function, earlier discharge from hospital, and improved patient satisfaction. Improving mobility for total knee surgery patients decreases their length of stay while enhancing overall clinical and functional outcomes (Kumble et al., 2024). This project proposes to increase patient mobility by increasing the staff's comfort and knowledge on safely moving patients, using reference tools for consistency of distance measurement, and consistently documenting the distance the patient can ambulate starting on post op day 0 (POD 0) until discharge. Encouraging staff to ambulate patients timelier will improve patients' outcomes in meeting post-op goals. Ambulation distance is not widely tracked and is valuable in assessing the patient's readiness for discharge (Hoyer et al., 2023). Improving the staff's knowledge of the benefits and challenges of early ambulation, meeting the recommended distance the patient ambulates on POD 0, having a standardized charting form to document the distance patients achieve, and enhancing the staff's mindfulness to improve the patient's outcomes can all impact the patient's stay and throughput while at the hospital.

Patients

This unit in Institution X sees a variety of patients, including but not limited to orthopedic patients (total hip arthroplasty (THA), total knee arthroplasty (TKA), shoulder surgery, ankle surgery, and orthopedic trauma), neurology patients (cerebral vascular accident (CVA), subdural hematoma (SDH), traumatic brain injuries (TBI), seizure disorders, and encephalopathy), and neurosurgery patients (fusions, kyphoplasty, craniotomies, VP shunt placement, and instrumentation) (S. Baker, Personal Communication, September 9, 2024).

Institution X performs between fifty and sixty total knee surgeries per month. Patients come to this hospital from Montana, Northern Wyoming, Western North Dakota, and Northwestern South Dakota. This unit receives most of the TKA patients who stay overnight for observation before discharge to home or other rehab facilities. Patients stay overnight due to late surgical times, lack of support at home, not meeting therapy requirements, and managing increased pain (S. Miller, Personal Communication, September 9, 2024).

Professionals

The ortho neuro unit where joint replacement patients go post-surgery consists of thirty-five patient beds. Forty-two registered nurses are on staff with varying day and night shifts. This unit currently has five travelers with contracts ending in the fall of 2024, with no current plans to replace them. For the day shift, there are eleven nurses scheduled with a typical patient to nurse ratio of 4:1. Occasionally, day nurses may have a 5:1 ratio depending on available staff. The night shift usually has eight nurses on staff including their charge nurse. The night patient ratios are typically 5:1, with an occasional 6:1 ratio staff depending. The charge nurse remains out of staffing during the day, rarely taking a couple of patients during the night shift (S. Baker, Personal Communication, September 9, 2024).

Certified nursing assistants (CNA) are hard to come by. This unit has only six CNAs on both shifts currently. The unit calls for five CNAs needed per day shift and evening shift, and staff down to 3 CNAs throughout the night. This staffing issue leaves the unit utilizing float staff to help fill the gaps. The floor also assigns nurses as primary caregivers for their patients without having CNAs to assist with patient care (S. Baker, Personal Communication, September 9, 2024).

With the broad array of ortho and neuro patients this floor manages, they have many different specialty providers consisting of medical doctors, physician assistants, and nurse

practitioners. These providers are primarily from General Surgery, General Surgery Trauma, Orthopedic, Orthopedic Trauma, Neurology, Neuro-Hospitalists, Neurosurgery, Pain Management and Rehab (PM&R), Internal Medicine Residents (IMR), and Hospitalists.

Ancillary staff includes two-unit clerks who work twelve-hour shifts round each other's schedules. An admit, discharge, transfer (ADT) nurse is available to help with discharges Monday through Friday 8-430pm (S. Baker, Personal Communication, September 9, 2024). During the week, the unit also receives support from two social workers and a case manager. Speech (ST), physical (PT), and occupational therapy (OT) share a workspace and patient gym on the unit accessible to staff and patients. Phlebotomy, respiratory therapy (RT), x-ray techs, EKG techs, environmental services, dietary, and other specialists come and go as patients' needs change.

This unit's manager is a nurse who has been with Institution X for over 10 years. She works alongside the clinical coordinator who has worked with orthopedic and surgical patients for over 20 years at Institution X. The manager and clinical coordinator work closely with the floor educator who helps track potential issues, educate on the latest evidence-based practice, and helps guide inexperienced staff to follow the set policies and procedures. This team turns to the Director of Orthopedics, Director of Med/Surg, the administrator on duty (AOD), total joint coordinator, and the behind-the-scenes information technologists when questions, concerns, or interdisciplinary meetings are needed (S. Baker, Personal Communication, September 9, 2024).

Processes

The current system includes an order in the patient's chart for the nurse to ambulate the patient on POD 0, once the patient is admitted to the inpatient unit from the post anesthesia care unit (PACU). The patient also has orders for physical and occupational therapy. Nursing usually refers to the therapists to get the patient up for the first time. This order process is in the patient's

chart under the registered nurses task lists as a PRN task. No time period is assigned to the task. Problems are discovered within this process due to nurses not seeing the task and therefore not completing the early ambulation (S. Miller, Personal Communication, September 9, 2024).

When the staff documents the ambulation, they do not document the distance in a measurable amount (S. Miller, Personal Communication, September 9, 2024). The staff documents the distance based on landmarks throughout the unit. For example, the staff might document the following ambulation distances: to the nurse's station and back, or down the hallway to the elevator and back. Some staff do not document the patient's ambulation at all. Many times, the chart reflects the patient was discharged home without any ambulation documentation present.

The total joint coordinator and the quality improvement (QI) team working on this issue recently changed where in the patient's chart the task is located. The improvement consisted of modifying the frequency to be scheduled twice a day and adding a visual reminder to the staff to address patients' ambulation if the ambulation had not been completed. In a two-week period, after the change, they noticed a slight increase in ambulating patients on POD 0 (S. Miller, Personal Communication, September 9, 2024).

The joint coordinator reported that nursing is still not reporting distances in measurable and trackable amounts (S. Miller, Personal Communication, September 9, 2024). Leadership continues to encourage staff to focus on ambulating TKA patients on POD 0 to maximize the patient health benefits related to early ambulation.

Patterns

Upon assessing the inpatient microsystem and the current process with the total joint coordinator, the data gathered showed the TKA patients ambulated 79.13% of the time on POD 0. This statistical pattern shows a need to improve patients ambulating on POD 0 and review the

documentation process related to ambulation (S. Miller Personal Communication, September 9, 2024).

The total joint committee also assesses the knee and hip patient's length of stay (LOS) in the hospital. The reported inpatient LOS for the hospitalized TKA patients reports at 2.86 days compared to the outpatient TKA patients LOS at 1.23 days, and the same day surgery LOS for the TKA patients at 0.7 days (S. Miller Personal Communication, September 9, 2024). Assessing the difference in the LOS for patients with TKA varies within the same organization depending on patient needs. The patient may experience many benefits and/or challenges that influence the recovery period. Some benefits and challenges may include prevention of related medical risks, patient engagement, staff engagement, patient comorbidities, and the effects of pain management.

Problem

Patients are not meeting POD 0 ambulation goals after having a TKA, which lengthens their hospital stay, increasing the costs for the hospital, decreases patients' mobility outcomes, and potentially decreasing patient satisfaction.

Significance

Length of Stay

Decreased mobility leads to increased time required to have the post-operative knee patient return to their pre-surgical ambulation state. Conventional practices from nurses around mobilization post-operatively show an increase in stay length and increased cost for the patient and the hospital (Liu et al., 2023). Many hospitals have developed early recovery after surgery (ERAS) protocols for TKA surgeries to help relieve the hospitals' financial burdens related to other patient conditions, by being able to decrease the length of stay related to the improved mobility milestones the TKA patients are achieving (Didden et al., 2019; Kaye et al., 2019; Liu

et al., 2023; Mazzei et al., 2020). Early ambulation demonstrates a reduction on the length of stay in the hospital, which has shown to impact the economic burden for patients and hospitals equally (Lei et al., 2021; Lisevick et al., 2020; Vaudreuil et al., 2021). Over the last decade, early ambulation implemented through early recovery protocols has reported a decrease in hospitalization of TKA patients (Didden et al., 2019).

Patient Engagement

Health outcomes rely on positive emotional and social support from families, friends, peers, and health care providers (Gillis et al., 2021). Patients may face negative outcomes related to their immobility if health care providers lack the motivation to convince the patient to ambulate (McLaughlin et al., 2022). Poor engagement from patients to follow ambulation goals can decrease the quality and retention of the intervention leading to decreased patient outcomes and satisfaction. Empowering patients to manage their health condition effectively by providing support and resources to encourage ambulation in the initial period post-operatively will lead to a faster recovery (Gillis et al., 2021). Encouraging shared responsibility with the patient regarding their healthcare decisions can reduce costs and patient needs, improving the quality of interventions which enhance the patient's satisfaction and outcomes. Patients may report decreased engagement to ambulation due to ineffective pain management, unexpected discharge plans, and failed ambulation goals (Kumble et al., 2024; Liu et al., 2023).

Immobility increases the risk of “hospitalization-associated disability (HAD), impairing patients’ independent living skills, and increasing their risk for complication” (Kumble et al., 2024, pg. 1). Immobilization is preventable when addressed appropriately by the post-operative nursing team.

Purpose and Aims

This quality improvement project's purpose is to create a process to improve the patient's mobility status and ambulation distance on POD 0. The aims of the project are:

- Lengthen distance patients ambulate on POD 0.
- Increase the percentage of patients who ambulate on POD 0.
- Improving documentation of patient ambulation distances.

Definitions

1. Rapid Rehabilitation Surgery (RRS) protocol, an enhanced recovery after surgery (ERAS) approach, for TKA to achieve a decrease in the body's stress response to surgery and improve discharge times (Li et al., 2024; Fiani et al., 2022).
2. Total Knee Arthroplasty (TKA)- Surgical procedure that decreases tissue trauma by using several small incisions versus a larger incision. This surgery has been shown to “shorten postoperative recovery time and reduce complications” (Li et al., 2024, pg. 1).
3. Total Knee Replacement (TKR)- Surgical procedure to replace the worn surface of the knee (Institution X, n.d.).

Chapter 2 Literature Review

This chapter discusses the strategies used to support the total knee arthroscopy (TKA) patients who are not meeting POD 0 ambulation goals, examines the literature regarding the distance ambulated on POD 0, evaluates the reasons affecting the patient's ambulation on POD 0, and reviews the importance of improving nursing documentation related to the ambulation distances achieved by patients. Examination of the methods in which the data was collected, including the search databases, key words, and inclusion and exclusion criteria that led to the literature's synthesis are described. The IHI Quality Improvement Essentials Toolkit was chosen to be used to organize and strengthen the project. The components of the framework and how they work together to support early ambulation for TKA patients on POD 0 are described in detail later in this chapter.

While reviewing the search results to support the purpose and aim of the problem, four main themes developed while focusing on early ambulation for TKA patients. Two of the themes found include the benefits and challenges of early ambulation for TKA patients on POD 0. These two sections look over a wide range of findings that can influence patients' outcomes. The benefits and challenges discussed include prevention of related risks, staff engagement, patient comorbidities, and pain management. The next theme focuses on the distance the patient ambulates, looking at the use of guides and scales shown to be effective through research, to improve the TKA patients' ambulation on POD 0. The literature emphasizes the importance of standardization of care, which helps set expectations and distance goals that are achievable for all TKA patients. The final theme discussed is documentation. Having a standardized way to document the ambulation distance helps direct the future care of the patient's needs while in the hospital through post-discharge. Developing an adequate way to chart with ease and consistency from shift to shift, patient to patient, and staff to staff creates better continuity among the team.

Identifying key themes which affect early ambulation helped guide the search strategy for this project.

Search Strategy

Databases and Keywords

Web of Science, Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, ProQuest, and Cochrane were searched using the Montana State University Library Search Engine with the help of two MSU research librarians. The following key terms used for the search include: Total Knee Arthroscopy, Total Hip Arthroscopy, Total Knee Replacement, Total Hip Replacement, Joint Rehabilitation, Enhanced Recovery After Surgery (ERAS), Rapid Recovery Time (RRT), Nursing Care, Nursing, Range of Motion (ROM), Fast Recovery, Length of Stay (LOS), Hospitalization, Length in Hospital, and Post-Op Course.

Inclusion and Exclusion Criteria

Initially, the investigation team looked at peer reviewed literature from the past five years (2019-2024) published in English. Excluding articles greater than five years helped narrow the search, while keeping the most recent evidence-based practices at the forefront of the literature review. The initial search resulted in 211,233,575 articles referencing both hip and knee arthroplasty-related research. Many articles were excluded due to their focus on pre-operative education, post-discharge literature, and advancements related to provider or anesthesia recommendations. With enough data related to the initial post-op care of TKA surgeries, hip arthroplasty-related articles were lastly excluded from the search.

Screening and Data Extraction

Upon combining the keywords and the inclusion criteria, the investigators narrowed the article search to forty-eight articles. An additional 15 articles were found through looking at the qualifying article's citations. These added articles helped gain access and knowledge to more

specific data related to the literature review. All articles were reviewed for eligibility fulfilling the data requirements for this literature search. The final twenty-two articles were reviewed and entered into an evidence table (see Appendix) for comparison for the final literature review.

Synthesis and Evaluation

Research articles evaluated consisted of systemic reviews, quality improvement/explorative descriptive design articles, a meta-analysis randomized control trial, retrospective cohort studies, prospective observational studies, and a randomized clinical trial. These articles were helpful in providing insight into the QI project this paper focuses on.

It was difficult to find information from a nursing perspective when looking at early mobilization for post-operative TKA patients. Most of the literature around mobilization was related to physical therapy instead of nursing. With increased review, more data about ambulation routines by nurses was discovered deeper in the literature.

Conceptual/Theoretical Framework

The IHI Quality Improvement Essentials Toolkit was selected for the framework to guide this project. The following three initial questions were asked to guide the QI efforts.

- "What are we trying to accomplish?
- How will we know that change is an improvement?
- What change can we make that will result in improvement?" (Ogrinc et al., 2022, pg. 38).

Quality improvement tools available to use in this project include the driver diagram, cause-and-effect diagram, scatter diagram, run charts, and the PDSA cycle. Utilizing these questions, tools, and templates will help launch a successful improvement project.

Tools

The driver diagram can be used to gather information, help to organize, and display information visually through the steps in the theory. The cause-and-effect diagram used in this project looks at contributing factors related to the delay in ambulating TKA patients on POD 0 (Fig. 2.1). Scatter diagrams and run charts can be utilized to monitor and graph the distance patients ambulate, the number of patients who ambulate on POD 0, and the improved performance of the nursing staff in documenting ambulation distances in the electronic medical record (EMR).

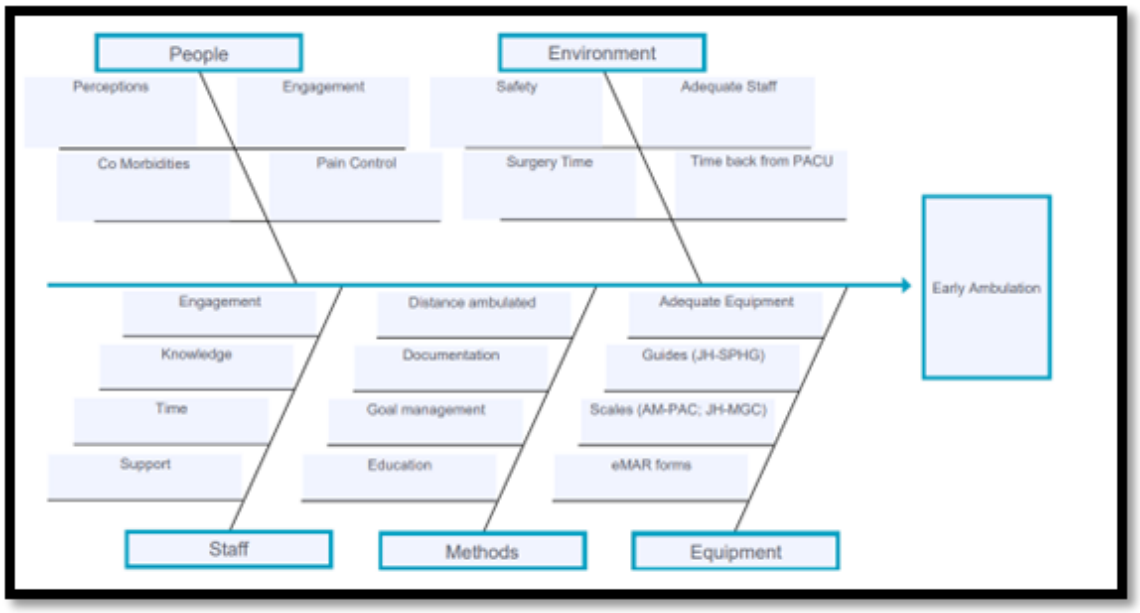

Figure 2.1- Cause and Effect Diagram-Impacting Early Ambulation

Improving ambulation using Plan-Do-Study-Act (PDSA) model helps guide the implementation of early ambulation efforts (Fig. 2.2). “Anywhere systems and processes exist, they can be improved, and identifying opportunities to improve is an important first step” (Ogrinc et al., 2022, pg. 39). The PDSA model for improvement helps guide the team toward making feasible changes, learning from the changes made, and evaluating the findings to continue to make the improvement. After the first step, an evaluation of the change is conducted to determine if an improvement was made. Next, the team looks deeper at the change to assess if

there is any further adjustment needed to accomplish the goal (Ogrinc et al., 2022).

Figure 2.2- Plan, Do, Study, Act Cycle. (Paushter & Thomas, 2016)

After answering the first three questions in the Model for Improvement, implementing the small change and testing the improvement using the PDSA cycle is next. “While all changes do not lead to improvement, all improvement requires change” (Ogrinc et al., 2022, pg. 113). The PDSA model consists of a cyclic four step process to test and assess changes. (P)lan is the first step of the process. In this phase, the team members state the goal of the change. The goal focuses on specific steps as to what is carried out and who is accomplishing each task. The (D)o phase is the next step in the process. This phase completes the change, tests the change, and documents observations. During the (S)tudy phase, the team evaluates and analyzes the data comparing the observed outcome against the predicted outcome. (A)ct is the final phase where the results are evaluated and help guide the direction as to what is next. Given the intervention outcomes will the improvement spread to a larger system, does it need to be adjusted and retested, or abandoned? The implementation of the improvement is evaluated and the PDSA cycle can be repeated until the desired outcome is achieved (Ogrinc et al., 2022). Each PDSA

cycle continues to build on one another as it generates new knowledge and increases the system's complexity. Regular review of any system develops good practice and helps the system grow and change with the changing times. All these steps and the guidance provided will assist in the

Application

The selected framework helps conduct changes in the current education and implementation process when ambulating TKA patients on POD 0. The PDSA model helps guide the focus of the team's goals and predicts how improved ambulation will impact the patients, identifies who is responsible for different tasks, identifies the specific steps as they are accomplished, and knows who is responsible for ambulation and documentation. The QI toolkit and PDSA model help the team standardize the documentation process and allow observations and analysis of the data gathered to compare the observed outcomes to the predicted outcomes.

Education related to staff and patient knowledge of ambulation importance and accurate documentation of the ambulation on POD 0 need to be evaluated for consistency. Strengths and weaknesses of the observed outcomes are reviewed, potential changes are determined to build on the progress of desired outcomes, related to the improvement of early ambulation and standardized documentation (Ogrinc et al., 2022). Once the QI project flows smoothly and shows the success of the TKA patients' achievements, the program can be spread to other surgery specialties. Using the knowledge gained by the staff, the steps could benefit other hospital units and patients using similar education and ambulation techniques to improve outcomes for other procedures in the hospital.

Synthesis of the Literature

Ambulation is defined as a weight-bearing activity, either partial or full weight-bearing, with or without assistance (Lei et al., 2021). The goal for post-operative TKA patients is to ambulate as soon as able and within the first twenty-four hours after surgery. Early ambulation

improves clinical outcomes and is a safe intervention for nurses to perform without adding an additional cost to the patient or hospital (Lei et al., 2021; Tazreean et al., 2022). The following sections will review the literature on the benefits and challenges of early ambulation for TKA patients while in the hospital post-operatively, staff tools and guidelines to measure ambulation, and proper documentation tools for nurses to record ambulation distances.

Benefits of Early Ambulation

Functional Outcomes

Ambulation is a modifiable factor for post-operative TKA patients and has long-term effects related to clinical outcomes. Mazzei et al. (2020) found patients who were ambulated on POD 0 had a shorter length of stay compared to those patients ambulated on POD 1. Significant improvements in the patient's overall functional outcome six months post-operation were shown with the use of standardized protocols, consideration of the patient's pre-surgical mobility status, focus on early aggressive ambulation, and setting of adequate pain management goals post-operatively (Mori & Ribsam, 2018; Vaudreuil et al., 2021). Developing early ambulation protocols for TKA patients is imperative in the initial post-op period to follow evidence-based practice. Successful recovery from surgery is a result of a well-organized efficient care pathway (Didden et al., 2019; Lisevick et al., 2020).

Prevention of Related Risks

Early ambulation improves patients "blood circulation, muscle strength, and joint and respiratory function" (Liu et al., 2023, pg. 4). Timely post-operative ambulation reduces the risk of blood clots (Kaye et al., 2019; Lei et al., 2021; Lisevick et al., 2020; Liu et al., 2023), joint stiffness (Liu et al., 2023), muscle atrophy (Liu et al., 2023), insulin resistance, delayed wound healing (Kaye et al., 2019), pressure injuries (McLaughlin et al., 2022), urinary retention (Lei et al., 2021; Lisevick et al., 2020), gastrointestinal issues (Lisevick et al., 2020), and pulmonary

infections such as pneumonia and pulmonary embolisms (Kaye et al., 2019; Lei et al., 2021; Lisevick et al., 2020; Liu et al., 2023). As listed above, there are many detrimental effects that could result from decreased ambulation during the immediate post-operative period.

Recovery times are shortened and reduced complications are reported when ambulation occurs early post-operatively (Didden et al., 2019; Li et al., 2024; Tazreean et al., 2022). Prolonged bed rest increases patients' risks for developing adverse events as described above (Kaye et al., 2019). Maximizing patients' mobility on POD 0 is crucial for TKA patients post-operatively to prevent these complications (McLaughlin et al., 2022). By employing early ambulation post-surgery, the muscle mass and strength lost from decreased knee mobility will be regained more quickly, improving the patient's overall function (Tazreean et al., 2022).

Challenges of Early Ambulation

Staff Engagement

There are several challenges that can affect a patient's ability to consistently receive early ambulation (Lisevick et al., 2020). Understanding the various challenges that impact this population could improve the desired outcomes of the TKA patients.

Effective coordination and communication between the multidisciplinary team provides individualized, comprehensive patient care (Liu et al., 2023). Utilizing the knowledge of the individuals on the team, education can be evaluated and disseminated equally from the staff to the patients. Communicating clearly ensures consistent education and support is given to all TKA patients and their families. Collaboration amongst the team improves patient satisfaction and ensures the same quality is delivered to the patient to remain compliant with the protocols and expectations post-surgery (Didden et al., 2019; Liu et al., 2023).

Providers need to promote ambulation goals and expectations for the patient by encouraging the patient to prioritize early ambulation during daily rounds. Additionally,

providers can minimize the barriers of early ambulation by minimizing unnecessary intravenous lines and other medical devices (McLaughlin et al., 2022).

The initial evaluation of the patient post-operatively helps determine the patient's needs, establish goals, and discuss expectations of ambulation (Mazzei et al., 2020). Collaboration between the nursing team to ambulate a patient is especially beneficial when the staff is balancing competing nursing duties. Ambulation opportunities can be missed because of time constraints, despite evidence stating the benefits of early ambulation (Mazzei et al., 2020).

It was found that departmental culture and policies limited patients being ambulated by anyone other than the physical therapist (Parkes et al., 2021). This practice restricted ambulation to a limited number of patients, due to the physical therapist's working hours. Educating frontline nursing staff to ambulate patients helped ease the unnecessary dependence on the physical therapist. Nurse-led ambulation promoted increased confidence in the TKA patients which created more independence and was adopted as the unit's culture thereafter (Parkes et al., 2021).

Ambulation benchmarks with physical therapists were recorded at greater distances, especially with the more critically ill patients, compared to the ambulation with nurses (Tazreean et al., 2022). This finding is related to the comfort of the physical therapist in ambulating the weaker and less motivated patients compared to the nurses in this study. The nursing team plays a significant role in ambulating patients, providing symptom management, and supporting them emotionally, physically, and socially through their recovery (Tazreean et al., 2022). Every member of the care team has a key role in early ambulation.

Patient Comorbidities

Patients who have multiple comorbidities need to be proactive and focus on their individualized ambulation routine (Mori & Ribsam, 2018). Patient-related comorbidities are known to increase the patient's length of stay post-operatively. Nursing staff promoting this

population to engage in healthy self-care habits improves early ambulation outcomes (Pulkkinen et al., 2020). Evidence has been found that elderly patients with comorbidities can tolerate early ambulation post-TKA (Vaudreuil et al., 2021).

Pain Management

Challenges related to pain when ambulating a patient post-operatively can delay adequate POD 0 ambulation. Several techniques are used to reduce post-operative pain while being mindful of the importance of ambulating. Side effects of medications and anesthesia protocols can delay ambulation when regional anesthesia or certain types of nerve blocks are used (Kaye et al., 2019).

Local anesthesia when used intra-operatively can spread into adjacent tissue and impact muscle groups unintentionally. When muscle groups are unintentionally impacted, the patient may experience a temporary decrease in muscle function and sensation. Local anesthesia increases the risk of falls and could delay the patient's ambulation (Mori & Ribsam, 2018). Evidence-based techniques around ERAS protocols have decreased post-operative pain scores and muscle weakness, improving patients' POD 0 ambulation and discharge goals (Heligman, 2021; Parkes et al., 2021; Tazreean et al., 2022).

Recent evidence has been discovered with respect to the use of adductor canal blocks. These blocks target sensory nerves around the knee. An adductor canal block maintains the strength of the quadricep muscle allowing ambulation with a lessened risk of falling (Mori & Ribsam, 2018).

Post-operative pain control can reduce swelling and increase range of motion, improving patient satisfaction. Early pain control allows ambulation to occur within the first twenty-four hours after TKA surgery and strengthens outcomes for this population (Lei et al., 2021). Patients whose pain is not managed may not be capable of completing recommended ambulation goals

which lead to increased risk of developing complications (Zhong, et al., 2021). Delayed ambulation and poor pain control results in prolonged length of stay for TKA patients.

Recording Distance Ambulated

Staff Tools

Many scales, guidelines, and calculators are available to help set ambulation goals. One such scale that has been shown effective is the AM-PAC 6 Clicks Scale. Using this scale daily with each nursing assessment helps promote ambulation goals that can be integrated into the patient's daily plan of care (Kumble et al., 2024). Implementing the AM-PAC 6 and Johns Hopkins Mobility Goal Calculator (JH-MGC) together have been associated with increased ambulation in hospitalized patients (McLaughlin et al., 2022; Stewart et al., 2024).

Johns Hopkins Safe Patient Handling Mobility Guide (JH-SPHG) provides staff with guidelines for determining necessary equipment to ensure patient safety during ambulation. Staff report discomfort with ambulating patients due to a lack of understanding specific patients' needs. This guide helps the staff select safe and effective equipment used to keep the patient and themselves safe (Kumble et al., 2024). Having a guide that helps improve patient and staff safety is beneficial when the patient has not been observed ambulating. Utilizing past scores reported by therapists and other nursing staff helps improve the confidence in ambulating the patients with the correct safety equipment (Kumble et al., 2024; Parkes et al., 2021).

Addressing and reducing the barriers to patient ambulation related to lack of time, insufficient training, and low patient motivation can improve the overall goal of ambulating patients on POD 0 (McLaughlin et al., 2022). Barriers related to staff awareness also exist. Being able to provide staff with evidence-based benefits of early ambulation versus the harms of prolonged immobility can improve staff knowledge. Promoting and providing education on setting patient goals daily while using the JH-MGC and assessing the JH-HLM builds increased

familiarity among the staff and therefore, improves patient ambulation (McLaughlin et al., 2022). Stewart et al. (2024) reported that hospital units which have performed high levels of compliance with the use of a standardized process have shown higher levels of ambulation goal achievement.

Goal Directed Ambulation

Encouraging patients to participate in self-directed rehabilitation promotes increased knowledge, confidence, and independence during ambulation (Zhang et al., 2024). Setting goal-directed outcomes with the patient helps encourage and promote ambulation while patients are hospitalized, improving the TKA patients' recovery outcomes (Kumble et al., 2024; Mori & Ribsam, 2018; Tazreean et al., 2022).

Patients who continually refuse to ambulate based on pain or other factors can have individualized goals evaluated using the JH-SPHG combined with the AM-PAC 6. Setting a targeted goal and using the right equipment allows staff to mobilize patients safely to achieve individualized daily ambulation goals (Kumble, et al., 2024; McLaughlin et al., 2022). Promoting individualized early ambulation goals decreases patient length of stay and decreased hospital costs following surgery.

Lei et al. (2021) found in earlier studies that more than 90% of the patients' post-TKA ambulated in the first 24 hours, when given the opportunity. Motivating both the patient to ambulate and the staff to help ambulate are equally important (Zhong, et al., 2021). Using teach-back techniques with the patient helps encourage the importance of ambulation and meet ambulation daily goals while in the hospital (McLaughlin et al., 2022). Motivating patients to participate in their care will facilitate an earlier discharge from the hospital and improve their quality of life (Pulkkinen et al., 2020; Tazreean et al., 2022).

Expectations for Ambulation

Completing the JH-SPHG post-operatively creates a baseline for helping set achievable goals on POD 0 based on patients' stability and pain control (Kaye et al., 2019). Using effective scoring systems and guides helps identify patients' needs early to guide rehabilitation and improve ambulation goals (Kaye et al., 2019; Stewart et al., 2024; Sutton, et al., 2022). Using the provided guidance from the scales and guides the nursing staff can set clear, measurable, and achievable individualized goals with the patient.

Kumble et al. (2024) reported 83.3% of patients felt that early ambulation improved their overall recovery from their TKA procedure. These patients strongly agreed that early ambulation should be routinely completed. “Exercise is critical for patients to achieve their personal goals after surgery” (Mori & Ribsam, 2018, pg. 23).

Unit specific multidisciplinary teams communicating and engaging with patients about their care post-operatively help guide and achieve goals to be met by discharge (Pulkkinen et al., 2020). Ambulation is an important milestone to reach post-operatively prior to discharge, however the exact “distances have not been firmly established in the literature” (Vaudreuil et al., 2021, pg. 1). Validation criteria to discharge home after surgery includes functional assessments and distance milestones. Some studies reported using 10 feet, 100 feet, and even 500 feet for ambulation goals prior to discharge (Vaudreuil et al., 2021). Capturing the ambulation distance, ambulation frequency on POD 0, and overall ambulation distances throughout the patient's hospital stay helps prove the significance of early ambulation through documentation (Stewart et al., 2024). TKA patient desired outcomes improve when early ambulation and individualized, patient-focused, goal-directed care is achieved.

Summary

Early ambulation continues to affect TKA patients' short-term and long-term recovery outcomes. Focusing on increasing the patient's distance ambulated, number of TKA patients

ambulated on POD 0, and standardizing the documentation process has shown a significant impact on the outcomes for this population. Taking the knowledge gained from the literature review and using the IHI Quality Improvement Essentials Toolkit will guide the QI project forward. Utilizing the PDSA cycle and the various tools can lead to standardized care and documentation, and improved outcomes for TKA patients.

Many different tools and guidelines were displayed throughout the literature reviewed. The scales and guidelines used in the methods section to improve ambulation in the TKA patients on POD 0 will include the AM-PAC mobility score, JH-HLM, JH-MGC, and the JH-SPHM guide. These scales have been shown to be effective for other hospitals and patients. Finding peer-reviewed evidence-based tools to help guide the nursing team to ambulate the patients safely and with confidence is essential in advancing the patients' overall outcomes.

Chapter 3 Quality Improvement Methods

Overview

This quality improvement (QI) project's purpose is to create a process to improve the patient's mobility status and ambulation distance on post-operative day 0 (POD 0) for Institution X's TKA patients. The frontline staff would be educated on the importance of ambulating the patients on POD 0 by introducing new standardized screening tools to promote both staff and patient safety. The next step includes educating the staff on ways to safely ambulate patients to improve both staff and patient safety concerns. This step in the project improves the number of patients ambulated on POD 0 and the distance ambulated. Lastly, standardizing the documentation process and improving consistency of the distance ambulated by the patient reflects the overall goals of this project.

Design of the Quality Improvement Initiative

Project Design

The proposed QI project begins with an educationally based survey used to gather data from the nursing staff on barriers that impact ambulation for TKA patients on POD 0. An educational in-service used to support the learning needs of the nursing staff will help staff become more comfortable to safely ambulate TKA patients. Using this approach allows the project team to examine the increase in distance ambulated by the patient and the number of patients ambulated on POD 0. This reflects the increased knowledge and comfort of the staff when ambulating the patients post-operatively. The IHI Quality Improvement Essentials Toolkit and PDSA cycle are effective because of the pre- and post-data that can be gathered and assessed. Chapter two describes in detail the components of the framework and how they work together to support early ambulation for TKA patients on POD 0.

Setting, Sample, Target Population, and Stakeholders

The QI project will be conducted within Institution X on the ortho-neuro unit (ONU). A microsystem assessment conducted and outlined by the investigator in chapter one discusses the project setting on ONU at Institution X in greater detail. The target population for this project involves TKA patients who are admitted to ONU. The sample size of patients for this study would depend on the total number of TKA patients admitted to ONU over the months being monitored. The current number of TKA surgeries per month ranges between fifty and sixty patients. This sample represents a sample of convenience due to the timing of their surgeries compared to the intervention period. The sample would include non-gender specific, English-speaking patients ranging from 18-90 years old without significant underlying immobility restrictions. Exclusions include individuals who are incarcerated, mentally disabled, and any patients who have had previous surgery on the operative knee. The key stakeholders for this project include the TKA patients, ONU nurses, certified nursing assistants (CNA's), physical

therapists (PT), the ONU educator, the ONU leadership, and the total joint committee. More details are described in chapter one regarding the professionals who are involved in the implementation of the quality improvement process.

Planning the Quality Improvement Intervention

Problem and Intervention Statement

The data previously assessed has shown decreased ambulation for the TKA patients on POD 0 as evidenced by the missing documentation from the nursing staff. Initially, the proposed ambulation interventions were presented to the total joint committee coordinator to gain more insight into the gaps being observed. Involving and surveying the frontline unit staff will introduce an increased understanding of the current process, confidence with ambulation, and an understanding of barriers present. Reviewing the microsystem assessment addressed in chapter one would help evaluate the overall culture of the unit caring for the TKA patients. Involving the unit's leadership would provide guidance, support, and oversight to engage the staff nurses to ambulate and document their patients' ambulation more effectively.

The need for the interventions planned was evident from the previous monthly data gathered by the total joint coordinator. The coordinator monitored the number of patients ambulated on POD 0, the various preventable risk factors discussed in chapter 1, and the documentation regarding ambulation distances. The interventions were also observed as a necessary change by the investigator of this project when the registered nurse would float to the ONU unit and the patients had not yet been ambulated post-operatively. The lack of ambulation was observed both in the afternoons on POD 0 and the mornings of POD 1 during nurse handoff.

Theoretical Framework

Using the IHI Quality Improvement Essentials Toolkit and PDSA cycle the team can use the following three questions to initiate the process. The first question asks: “What are we trying to accomplish?” (Ogrinc et al., 2022, pg. 38). This QI project hopes to improve the number of patients ambulated on POD 0 following TKA surgery, improve the distance the TKA patient ambulates on POD 0, and lastly improve the documentation of the nursing staff to show the distance ambulated.

The second question asks: “How will we know that change is an improvement?” (Ogrinc et al., 2022, pg. 38). Utilizing the PDSA cycle initially to (P)lan the improvement process, looking at the individuals needing to be involved with the process change, the location of the change, what the changes entail, and when the change is scheduled to occur, we can follow the QI process into the next step. The (D)o phase of the project will be implemented as planned. During this phase staff will begin gathering data on what worked well, what needs improvement, and any unexpected consequences. The next step of the cycle (S)tudies and completes the data analysis. The team evaluates the data and compares it to the predicted outcomes and summarizes the takeaways from the project so far.

The last question in the IHI Quality Improvement Essentials Toolkit looks at the changes that can be made that will result in improvement (Ogrinc et al., 2022, pg. 38). This question closely resembles the (A)ct portion of the PDSA cycle. During this period, the team looks at what is needed next. Is change still needed to improve the process to get to the end goal? If the answer remains positive the team will come together again to begin the PDSA cycle once again to get closer to the desired outcome. The PDSA cycle can be repeated many times until the desired outcome is achieved.

Utilizing the different tools discussed in chapter 2, the team can review, analyze, and decide where the change is needed. This allows the team to improve the process for the staff

personnel involved in ambulating and documenting the distance ambulated by the TKA patients on POD 0 with more accuracy.

Possible Challenges or Complications

The possible challenges or complications are largely due to the staff and patient motivation and barriers to knowledge. Addressing the barriers that lead to decreased ambulation can greatly affect the overall outcomes. These barriers can include the lack of training in safely moving patients post-operatively, assessing and addressing the various post-operative complications related to nausea, pain control, numbness in the operative leg, or the patient's overall desire to ambulate. Many patients are of the mindset that limited activity, or bedrest is necessary for them to recover after surgery. Encouraging and motivating both the nurse and the patient to mobilize is essential to improve post-surgical outcomes (Tazreean et al., 2022).

Ensuring that the patients receive pre-operative instructions regarding the care and recommendations in the post-operative phase is essential to helping patients meet timely ambulation outcomes. Providing patients with adequate education can help motivate the patient in the post-operative phase to meet the preset expectations. Incorporating education and explanations on the procedures and expectations prior to the surgery can ensure that the patient understands what will be expected of them, which includes ambulating on POD 0. Improving patient knowledge and expectations can guide staff to be held accountable for ambulating patients on POD 0 even more. Congruent teamwork between pre- and post-operative education will decrease the confusion and lack of motivation to ambulate patients on POD 0.

Another potential challenge includes the current patient population and the needs of those patients being cared for on the ONU unit. Not all the patients on this unit are TKA patients, and some of these patients may have had strokes or traumatic brain injuries and may require other

important tasks taking more time from their nursing staff. Caring for an increased acuity population without adequate staffing can impact the availability of the staff to help assist with ambulation on POD 0. Providing the staff with adequate tools, resources, and knowledge will help decrease the overall challenges being faced. To have successful QI outcomes, appropriate support is necessary when staff are juggling competing priorities among their day-to-day workloads (McLaughlin et al., 2022).

Implementation

The nursing staff plays an important role in the ambulation of patients on POD 0. These pivotal staff members need support through training, adequate staffing assignments, and time to help patients with symptom management, which in turn will help form a new routine when caring for TKA patients (Tazreean et al., 2022). Creating a multidisciplinary ambulation team on ONU, consisting of the unit leadership, nurse educator, and a few frontline nursing staff, who are identified as unit ambulation advocates, can help guide the change in the ambulation process for the TKA patients.

The unit's nursing leadership disseminates feedback about the unit performance to the staff and identifies and addresses unit level barriers found through the PDSA cycle. These barriers will be addressed and evaluated to continue improvement towards the expected increase in ambulation goals. The nurse leaders can monitor the unit performance and see which patients are meeting the mobility goals. The educator can continue to provide training as needed to all staff, including new hires, on the various tools and techniques used to ambulate and document ambulation for the TKA patients in the electronic medical record (EMR).

The frontline nursing staff who volunteered to be ambulation advocates will serve as real time resources at the bedside for all unit staff. These frontline staff members also serve as a direct line to nursing leadership to bring barriers and concerns forward. The frontline nursing

staff can include both nurses, CNAs, and unit clerks. Over time the number of ambulation advocates on the unit should be equivalent to at least 10% of the daily nursing staff scheduled (McLaughlin et al., 2022). This estimate allows the ambulation advocates to be available across the varying shifts. Integrating efforts to promote safety among the team helps achieve the ambulation goals for the individual patients. The initial ambulation advocates will be given a small stipend for the first two weeks of the project to incentivize the importance and consistency of the advocates.

Therapy staff will be utilized as content-area experts regarding the patient's ambulation status. They will support the ambulation advocates and frontline staff as needed through additional training and consultations. This allows the nursing staff to ambulate high-functioning patients, which gives more time for the therapist to focus their resources on the patients with greater functional impairment (McLaughlin et al., 2022).

Following data analysis from the survey, the team will hold four, one hour long in-person mandatory in-services within a 2-week period. These in-services would be outside their normally scheduled work shift. The staff will receive their normal base rate pay to attend the in-services. These in-services will educate staff on the potential barriers, discuss the results of the pre-survey, teach the appropriate location and measurement for documentation of the ambulated distance by the patient, and finally provide education and hands-on learning (See Appendix H). This education is led by physical therapists and the frontline ambulation team to build confidence within the staff on their abilities to ambulate patients on POD 0 prior to a physical therapy evaluation. The extended time allows all staff members to practice and become comfortable with the techniques and forms while help and supervision is available. Facilitating a culture shift to prioritize ambulation on POD 0 with all staff members will improve the overall ambulation and

patient outcomes. This can be done by having open discussion regarding the barriers and tools to be used through a team approach (Tazreean et al., 2022).

Educating staff and implementing the following tools as part of standardized patient care and job orientation will improve staff's confidence in ambulating patients. The staff, both nurses and CNA's, will complete training in assessing and scoring the Johns Hopkins Highest Level of Mobility Guide (JH-HLM) (See Appendix E), engage in an activity to measure for post-acute care (AM-PAC) Inpatient Basic Mobility Short Form '6-clicks' (See Appendix C) outcomes, apply the Johns Hopkins Mobility Guide Calculator (JH-MGC) (See Appendix D) to the patient's assessed level of mobility, and learn how to utilize the Johns Hopkins Safe Patient Handling Guide (JH-SPHG)(See Appendix E) to safely ambulate patients on POD 0 with the appropriate techniques and equipment. Simple interventions providing appropriate standardized education and decision-making tools can steadily improve ambulation goals on POD 0 and beyond (Tazreean et al., 2022). A common goal among all healthcare providers and the patient can accelerate the motivation to reach the patient's functional recovery level (Didden et al., 2019).

The training in-service will include addressing the patient's refusals to ambulate, and "using teach-back methods to communicate the importance of hospital activity and mobility" (McLaughlin et al., 2022). Concluding the training, all staff members "must complete a mobility advocate skills competency" checkoff (McLaughlin et al., 2022).

During the go-live week, extra ambulation advocates will be present on the unit to accompany the staff to ensure the forms were completed correctly and to provide support for the frontline ONU staff. A documentation team will also be available to assist in making sure the staff has all the correct forms and tools needed, including the appropriate computer filters set up

to provide an easier transition to the new process. All staff members with questions can also contact the coordinator during the rollout period.

Implementing and using the JH-MGC serves as the standardized measuring tool for the patient's mobility across the care team. Including the AM-PAC daily and the JH-HLM during each shift will become the new standardized workflow for assessing ambulation at Institution X. The patient's daily mobility goal can be calculated using the data gathered from this documentation (Stewart et al., 2024). Communicating the patient's mobility goals and ambulation performance should be a staff priority during patient handoff, no different than fall risks, lab values, and wound care.

The PDSA cycle can be used to reevaluate the barriers, concerns, and problems that were not adequately addressed during the first cycle. Two months following the go-live day of the previously discussed interventions a post-test will be sent out to all frontline ONU staff. The post-test will be identical to the pre-test. Evaluating the survey results for the overall effectiveness of the education and the new intervention processes can then be studied to see if further implementation is still needed to meet the desired outcome. A nursing educational presentation will conclude the intervention. This presentation is open to anyone affiliated with Institution X. Sharing the process and outcomes of this quality improvement project by improving ambulation for the TKA patients could then be utilized for other surgical patients' ambulation needs.

Data Analysis

Outcomes

The project outcomes will be measured monthly starting after the go-live date. The data will be gathered from the EMR by the total joint coordinator and unit ambulation team. The data

will look to see if TKA patients were ambulated on POD 0. If the records indicate that the patient was not ambulated, the charting will be evaluated and assessed to understand the reasons why ambulation was not completed. The team also will evaluate the documentation to see if the total distance ambulated was documented in feet. The intervention team will also evaluate the consistency of the staff documenting the standardized screening tools prior to ambulation. These benchmarks will be set and compared to the previous month's data by the total joint coordinator. The intervention outcomes will also be collected two months post go-live date comparing the pre- and post- survey results to assess the staff's thoughts regarding ambulating patients.

Timeline

The project initiation timeline (See Appendix G) for improving ambulation in the TKA patients on POD 0 occurs over a month's time. Upon completion of research, the stakeholders will be identified and included in the intervention/support team. Once all the necessary individuals are identified the planned interventions to improve the gap are discussed. The interventions, education, and agreed upon tools can be finalized to share with the entire ONU team during the planned project execution.

The execution timeline of the intervention implementation will occur three weeks prior to the predetermined go-live date. Three weeks prior to go-live the pre-survey (See Appendix B) will be sent out to all frontline nurses, CNAs, and other floor staff to complete. Two weeks prior to the go-live date the team will hold mandatory staff educational in-services to help improve ambulation knowledge and charting gaps within the nursing staff.

During the first two weeks after the go-live date there will be ambulation advocates available and unassigned to patients to help complete forms, navigate the tools, and answer any questions that arise. Leadership will provide email follow-up with clarifying information about

any questions and concerns raised. After a month of implementing the new ambulation tools and interventions the project will enter the monitoring phase.

The project group will monitor the implementation of the interventions for two months before making any significant changes. The team will check in with the frontline staff to evaluate how the implementation has impacted their workflow and documentation. A post-survey (See Appendix B) will be sent to all ONU staff. The survey results will be compared to the pre-survey results to see how the staff comfort level has changed post-education and implementation. At this time, the team can reevaluate the needs of further PDSA cycles around the ambulation interventions to reach the desired outcomes.

Once the desired outcomes have been achieved the project is approaching project closure. The committee can meet less often, with the recommended frequency being quarterly. Looking at the quarterly benchmarks and documented data the total joint coordinator can continue to check the overall progress of the ambulation interventions for the TKA patients. If the desired outcomes begin to fall lower than the benchmark rating, the team can reconvene and return to the planning and execution phase.

Budget

The largest cost to the organization to implement the above process improvement is the time needed to train the staff. Giving the staff adequate resources to hear, understand, learn, and practice the new tools takes time. Some staff may need more time to feel comfortable than others. The staffing expenses were calculated by taking the average wage of the staff and multiplying it by the number of staff needing to attend the in-service. No overtime pay was calculated into the in-service cost, being that the in-service is only an hour long, which should

prevent the staff from accruing any overtime. The educator's time is factored into their normal workflow.

The next big expense comes from having the extra ambulation advocates available on the unit during the two weeks following the go-live. Each ambulation advocate will receive a $250 stipend each week for the first two weeks of the project. If the ambulation assistants are not needed during the second week of the go-live this could decrease the project's expenses. The staff surveys will be sent online via employee email, not adding any added cost. The third expense comes from the laminated tools and scales seen in Appendix C- F and Appendix H. Appendix F can be used as a tool to help document and encourage the patient to meet their set ambulation goal.

The estimated cost for the roll out of this ambulation education project is around $8200. The budget breakdown for the proposed interventions can be seen in Appendix I. This added cost to educate the staff and provide tools needed is marginally low when looking at the benefits it can have on the patient's length of stay and overall recovery post-TKA. This saves Institution X the costs associated with an increased length of stay. The presence of this cost-efficient project may alleviate some of the pressures placed on the therapy and nursing staff, allowing them to more properly prioritize their duties (Mazzei et al., 2020).

Evaluation Tools and Outcome Measures

The first PDSA cycle and a comparison between the pre-test and the post-test will be used to evaluate the initial project goals' effectiveness. Comparing the staff's knowledge prior to the educational in-service through a pre-test and allowing the staff to use the introduced PDSA cycle for two months, followed by the post-test, should allow the staff time to learn and be comfortable with the ambulation process introduced. Evaluating the survey results can determine

the effectiveness of the change after the intervention. These results would be a preliminary evaluation of the outcomes measured after the initial intervention implementation.

Chart reviews of all TKA patients will be needed to assess if they met the ambulation goals on POD 0 after the implementation starts. The total joint coordinator would complete the chart reviews. The coordinator would document, in an organized system if the patients had been ambulated on POD 0, any complications that resulted in not being ambulated, and the distance in feet the staff ambulated the patient. Reviewing the staff's documentation using a standardized form will also improve the standardization of the ambulation being reported.

The results of the survey data and the chart reviews will be evaluated and studied by the total joint committee and the ONU leadership team. The data will continue to be gathered and evaluated over the following 6 months until no further changes are identified. The team at Institution X will be able to identify any shortcomings based on the data gathered and reviewed to create the next PDSA cycle as improvement ideas are identified.

Following the project implementation of any added cycles, the outcome measures can be evaluated quarterly to monitor the continued sustainability of the improvements from the project interventions. Improvement for this project will be indicated by an increase in TKA patients being ambulated on POD 0, improved charting of the distance the TKA patients ambulated in the EMR, the standardization in charting the distance ambulated in feet by the patient, and the improved confidence of the staff ambulating their TKA patients. Receiving feedback from the staff will continue to be necessary to assist in the improved patient recovery outcomes.

Summary

Chapter 3 examined the microsystem and discussed the application of the IHI Quality Improvement Essentials Toolkit and PDSA cycle related to the proposed interventions. This framework guided the information gathered to be evaluated between the ambulation QI project

members. Improving ambulation for TKA patients on POD 0, standardizing the methods in which it occurs, and standardizing the documentation are key components of this quality improvement project.

The low cost of this project, compared to similar projects, provides adequate training for the frontline staff. With this added education and comfort comes an increase in patients ambulating on POD 0, decreasing the overall patient length of stay. This change in comfort with ambulating patients on POD 0 can be evaluated from the data gathered from the pre- and post-intervention survey data. Allowing the staff to assist the patient in setting individualized ambulation goals and watching their progress during their initial hospital recovery builds a stronger routine for the patient to continue to recover appropriately at home. Chapter 4 will summarize the project's findings and discuss the anticipated impact for the ONU staff and patients.

Chapter 4

Introduction

This quality improvement (QI) process's purpose was to increase the number of total knee arthroscopy (TKA) patients who ambulated on post-operative day zero (POD 0), increase staff knowledge to ambulate patients safely, and improve the documentation standardization when ambulating patients. Chapter 4 discusses a summary of the project outcomes. These outcomes include looking at the significant findings within the literature review that surprised the investigator, a reflection on the IHI framework and the PDSA cycle utilized, the implementation and evaluation of challenges, and the overall impact the project had on nursing practice and the patients. The investigator reflected on the role of the Certified Nurse Leader (CNL) during this QI project's development. The CNL competencies will also be discussed relating them to the project's outcomes.

QI Project Summary

The findings within the microsystem and the literature reviewed around early ambulation for POD 0 TKA patients helped the investigator focus the QI project on improving ambulation and standardization for both the patients and the staff at Institution X. The review of the microsystem and literature guided the investigator in the direction taken to recommend the suggested improvement project. The focus was to educate the staff to improve their confidence in safely ambulating patients, to provide and educate staff on effective tools to use to safely evaluate and ambulate patients, and to create a standardized method to educate and document the distances ambulated by the patient on POD 0.

Focusing the QI project's effort on the above discussed education meets the gaps found in the microsystem as well as through the literature reviews found in Chapter 1. Didden et al., (2019) found that over the last decade, early ambulation implemented through early recovery

protocols has reported a decrease in hospitalization of TKA patients. Early ambulation techniques and a focus on reducing the length of stay TKA patients have in the hospital, improve the impacts on the patient's recovery and the economic burden for the hospitals and patients (Lei et al., 2021; Lisevick et al., 2020; Vaudreuil et al., 2021).

Providing the staff with the necessary education and tools improves the staff's willingness and confidence to ambulate patients on POD 0 without having a physical therapist see the patient first. Improving the staff's confidence helps the staff to be more likely to motivate and assist patients in ambulating sooner after surgery, improving patient outcomes and discharge goals. Empowering the patient to ambulate on POD 0 leads to a faster recovery (Gillis et al., 2021). Sharing the responsibility with the patient to ambulate by using the tools suggested in this QI project will enhance the patient's satisfaction and outcomes. Providing the staff with the correct knowledge to handle the challenges and obstacles allows them to safely continue to motivate the patient to meet their ambulation goals (Kumble et al., 2024; Liu et al., 2023). These milestones for the patients can improve the ambulation goals for both the patient and the facility and provide a more standardized process.

The use of the IHI Improvement Essentials Toolkit and the PDSA cycle would help the team identify problems and/or potential problems and would be used to help adjust to the changes identified. Using the above framework to guide the project would help organize the change in a manageable way and provide support to reach the desired outcome. Evaluating the process with staff surveys and chart reviews allows the QI project team to analyze the effectiveness of the change and decide if more change is needed to meet the desired goals.

As with most projects, getting the staff to buy into the improvement project and process continues to be a possible barrier. Involving the key stakeholders and listening to their concerns and ideas can improve the outcomes for the patient, staff, and organization. We will know the

project is a success when the number of TKA patients ambulated on POD 0 increases to an acceptable level, the ambulation documentation improves, and the processes to ambulate patients, educate staff, and document distances become standardized.

Discussion

The literature review reported shorter length of stays when patients were ambulated on POD 0 compared to those patients who were not ambulated until POD 1 (Mazzei et al., 2020). Early ambulation improves the patients' risks for developing related complications. The literature review conducted found surprisingly more detrimental effects that result from decreased ambulation during the immediate post-operative period than anticipated. These effects are crucial for TKA patients post-operatively showing the importance of maximizing patients' mobility on POD 0 to prevent these complications (McLaughlin et al., 2022).

The literature reviewed showed no contradiction to improving patients' ambulation on POD 0. In fact, more than 90% of the patients' post-TKA ambulated in the first 24 hours, when given the opportunity (Lei et al., 2021). This statistic relates to the purpose of the QI project to show the importance of staff being confident, educated, and competent in using tools to help encourage early ambulation in the TKA patient population. Motivating both the patient to ambulate and the staff to help ambulate are equally important (Zhong, et al., 2021). Guiding the staff to improve their knowledge of ambulating patients and standardizing their documentation of the ambulation improves the patients' recovery outcomes.

When reviewing the different methods used to improve the ambulation outcome in the literature, it was difficult to find how researchers motivated or engaged the stakeholders other than using ambulation guides and tools. Looking at different ways to motivate the staff to buy into the importance of ambulation would benefit the projects' desired outcomes. With little

guidance or findings through the literature review, this avenue was not covered in detail. The implementation and evaluation of the project is driven by the willingness of the staff to use their knowledge to engage the patient to ambulate on POD 0. These details would be observed and evaluated during the PDSA cycle.

Framework Alignment

The IHI Improvement Essentials Toolkit and the PDSA cycle aligned well with the chosen project. The framework would help guide the team to question the process, interventions, tools, and implementation of the project. The framework would also help guide the team in evaluating the changes and challenges faced while implementing the new ambulation education, tools, and processes post-TKA. Once the evaluation of the improvement has been studied changes could then be implemented through a new PDSA cycle. Utilizing the feedback from the patients, staff, and stakeholders offers valuable insight in improving the change process. The PDSA cycle could be repeated until the desired outcome of improved ambulation on POD 0 was standardized and successful.

Potential Benefits and Challenges

Benefits of this project would include improving ambulation on POD 0 for the TKA patients. This benefit leads to shorter and less potential for complications during the recovery period. Improved ambulation can decrease the length of stay for TKA patients. A decrease in the TKA patients' length of stay helps benefit the organization's bottom line accommodating more surgeries and/or patients impacts the organization's budget.

The upfront cost and time needed to standardize the training for staff may be seen as a challenge. The added cost of the in-service may seem like a deficit for the organization at first. After the improved outcomes and decreased length of stays from the TKA patients the upfront

cost will see minor compared to the revenue that it improves. The time needed to successfully standardize the training can be a challenge if adequate support is not present. By providing additional ambulation advocates, the project should run smoother and be more successful in standardizing the improvement process.

Another challenge could result from the lack of implementation of the PDSA cycle. Without knowledgeable individuals to guide and conduct the improvement process the entire project may not succeed. Building a strong and passionate team to help guide the important and necessary changes in practice is essential for success for the patient, project, and the organization.

Implications & Recommendations

Ambulation is an evidence-based element to improve patient outcomes and decrease the length of stay from the hospital (Hoyer et al., 2023). Instituting a standardized method to screen patients' ambulation needs and standardizing the electronic documentation will improve the patients' overall recovery outcome. This will occur by using standardized evidence-based tools and guides to help the staff assess the patients' ambulation needs. Impacting and improving the nursing staff's knowledge will lead to improved safety outcomes for the staff and patients.

The QI project can improve the gaps found within the microsystem. Standardized education and training for all new employees and students will ensure that all caregivers helping TKA patients will be knowledgeable to safely help with ambulation. Biannual and/or annual education reviews can assess the need for continued education.

Once the education, confidence, and knowledge levels have been standardized to educate the TKA patient population, the interventions can be implemented on other patient populations to improve ambulation across medical conditions. Over time with more staff utilizing the same tools, guides, and education the organization can improve the ambulation of their overall

patients, decreasing the risk for complications and the added cost that is associated with such complications or delays in recovery.

Another topic of interest in improving the overall functional patient education would be to assess the microsystem's culture. Over the past decade nurses have been leaving the workforce at an alarming pace. Research into ways to retain and strengthen the workforce, improve working conditions, and improve the safety of the work environment could improve a more sustainable investment in training a more resilient and safer workforce. Educating nurse leaders and executive members of healthcare on the struggles that frontline healthcare workers face can help staff feel more supported (Rodriguez, et al., 2022). This added support can impact and create a more positive culture for both the unit and the organization.

Conclusion

CNL Role

Clinical Nurse Leaders practice in all healthcare settings. The CNL role is not a role of administration or management. The CNL "assumes accountability for patient-care outcomes through the assimilation and application of evidence-based information to design, implement, and evaluate patient-care processes and models of care delivery" (Abraham et al., 2013). The CNL provides and manages care anywhere healthcare is delivered.

The CNL white paper from the American Association of Colleges of Nursing (AACN) guided the investigator to identify a meaningful change to nursing practice related to improving ambulation on POD 0 for TKA patients (Abraham et al., 2013). These white pages govern the expectations of the CNL role. The AACN details nine CNL competencies with core components that reflect the expected knowledge and scope of practice for CNL's. During this project, the investigator learned and utilized many CNL skills. These skills included: selecting a topic population and conducting a microsystem assessment on select population; identifying data,

trends, patterns, and stakeholders within the system; evaluating the care of a population and identifying risks associated within the chosen population; designing and implementing evidence-based practice(s); evaluating and promoting improvement for outcomes related to data and evidence found to achieve best practice; collaborating with healthcare teams and stakeholders; and advocating for patients, populations, and the healthcare organization (Abraham et al., 2013). The CNL's role is essential to help lead change and facilitate evidence-based interventions which focus on improving quality outcomes for patients, nursing staff, and organizations.

Summary

This QI project examined the lack of ambulation on POD 0 for TKA patients, addressed healthcare risks, and provided interventions to improve ambulation in this population. As discussed, improving ambulation for the TKA patients on POD 0 can improve recovery outcomes, decrease the length of stay at the hospital, and promote increased confidence in ambulation. Meaningful and substantive changes in nursing practice are provided by the proposed in-services to educate frontline staff on standardized techniques, tools, and guides to ambulate patients safely for everyone involved. In addition to ambulating the patient, standardized documentation is essential to track the ambulation time, distance, and tolerance of the TKA patient when planning a safe discharge. The data and knowledge gained can help improve the number of patients ambulated on POD 0, improve the documented distance the patients ambulated, and increase the confidence gained while ambulating, both for the patient and the staff, prior to discharge.

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Appendix A

Full citation	**Theoretical basis**	**RCT? Meta Analysis? hypothesis/ question?**	**Number, Characteristics,** Attrition rate & why?	**Independent variables/ Dependent variables**	**What scales were used to measure the outcome variables**	**What stats were used to answer the clinical question**	**Statistical findings or qualitative findings**	**Strengths and limitations of the study**
Didden, A., Punt, I., Feczko, P., & Lenssen, A. (2019). Enhanced recovery in usual health care improves functional recovery after total knee arthroplasty. International Journal of Orthopaedic and Trauma Nursing. 34. https://doi.org/10.1016/j.ijotn.2019.03.003	NA	Observational Cohort Study---- - Lean Six Sigma (LSS)	Maastricht University Medical Center, the Netherlands. Between April-Nov 2016, Feb 2015- April 2016 (old clinical care pathway), separated into two periods: from Feb - June 2015 and from Feb- April 2016; 170 patients	IV= TKA DV=old clinical care pathway DV= new clinical care pathway	modified Iowa Level of Assistance Scale; Mann–Whitney & Chi-Square tests to evaluate group differences; pathway was redesigned using LSS-methods	functional recovery and reducing LOS	median time to functional recovery improved from 4 (2–5) to 2 days (1–8) ($P < 0.001$) and LOS from 7 (5–11) to 4 days (3–12) ($P < 0.001$), joint-related readmission declined (3.5–2.4%) ($P = 0.65$)	Decreased LOS, small sample size
Gillis, C., Gill, M., Grämlich, L., Culos-Reed, N. S., Nelson, G., Ljungqvist, O., Carli, F., & Fenton, T. (2021). Patients' perspectives of prehabilitation as an extension of enhanced recovery after surgery protocols. Canadian Journal of Surgery, 64(6), E578–E587. https://doi.org/10.1503/cjs.014420	NA	Systematic Review of 11 Qualitative Study	20 pts colorectal surgery under ERAS within last 3 months Between April 2018 and June 2019 >18yo, English speaking; Six declined to participate; Mean age 62	IV= How pt prepared for surgery, & pt views on prehabilitation. how to best met the pt needs DV= Colorectal Patient	Interviews analyzed with a reflexive form of inductive thematic analysis Coding and theme development of answers. Inductive approach	Interview questions- 1. How spend your time while you wait for your surgery date? 2. How did you get ready for surgery? 3. What are thoughts on offering future pts prehab program? 4. Would you have participated in prehab program if it had been offered? 5. What do you think a prehabilitation program should look like?	Waiting for surgery fearful & anxiety-inducing; Praised preop ERAS edu group class-- Postop period too late to receive info Integrating pt-identified priorities within ERAS and rehab could improve pt satisfaction, experiences, & outcomes	Waiting passively for surgery was associated with negative feelings & a perceived deterioration in their physical and mental states

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Heligman, J. (2021) The effect of a discharge disposition algorithm on patient outcomes and satisfaction. *Orthopaedic Nursing. 40 (3).* DOI: 10.1097/NOR.0000000000000753	NA	retrospective review PICO- pts undergoing TJA effect of a DC algorithm with DC preintervention 30-day postop complications & pt readiness @ DC?	22 articles: 17 were retrospective cohort studies, one observational study, two prospective cohort studies, one comparative cohort study, and a systematic review	IV= THA/TKA DV= Discharge Disposition algorithm DV= Discharge preintervention	Risk Assessment Predictor Tool MOS-SSS (Medical Outcomes Study Social Support Expectation Score) scale;	(a) identify the safest discharge disposition for patients following TJA; (b) determine the rate of complications & readmissions among those DC to SNF, Rehab, & home; and (c) explore how care pathways affect pt expectations & outcomes.	18% decrease in LOS ($p < .001$) & home DC increased from 54.1% to 63.1% ($p = .01$) LOS, able to maintain rates of DC home > 94% for both TKA &THA & decreased LOS TKA from 1.91 to 1.33 days and for THA from 1.92 to 1.13 days ($p < .01$).	significant cost savings in both increased rates of DC home and the use of a care pathway to guide patient DC
Kaye, A. D., Urman, R. D., Cornett, E. M., Hart, B. M., Chami, A., Gayle, J. A., & Fox, C. J. (2019). Enhanced recovery pathways in orthopedic surgery. Journal of Anesthesiology, clinical pharmacology, 35(Suppl 1), S35–S39. https://doi.org/10.4103/joacp.JOACP_35_18	NA	concept review	NA	NA	NA	improving patient outcomes, limiting cost, and decreasing readmission rates	reduce LOS, readmission rate, and improve functional recovery	Improved outcomes-decreased LOS, improved functional outcomes
Kumble S, McLaughlin K., Funk, K., Dekany, S., Ludwig, D., Farley, H., Stone, A., Tahara, N., Newkirk, E., Hoyer, E., Young, D., Klein, L., Flanagan, E., Lavezza, A., and Friedman, M. (2024) Development of a new tool to combine the promotion of patient mobility with safe patient handling equipment: The Johns Hopkins safe patient handling mobility (JH-SPHM) guide. Workplace Health & Safety. https://journals.sagepub.com/doi/full/10.1177/21650799241268745	A modified Delphi approach	object: suggest SPH equip aligns Pts mobility capability & daily mobility goal; min assess & doc-clinicians & enhancing the pt mobility strategy>adherence to mobility assessments, mobility goals, & utilizing SPH equipment	1,146-bed tertiary care hospital, 106 hospitalized patients were seen for 125 physical therapy sessions;	IV=JH-Safe Patient Handling Mobility Guide equipment DV= equipment recommendations from two physical therapists	JH-Safe Patient Handling Mobility Guide (JH-SPHM) Bedside Mobility Assessment Tool (BMAT) Activity Measure for Post-Acute Care "6-Clicks" Inpatient Mobility Short Form (AM-PAC 6-Clicks Excellent interrater -- reliability between nurses and physical therapists JH-HLM is valid and reliable among hospitalized patient	-Does the newly created JH-Safe Patient Handling Mobility Guide provide appropriate safe patient handling equipment -Recommendations to help accomplish patients' daily mobility goals provides SPH equipment recommendations based on patient performance F6e Activity Measure for Post-Acute Care "6-Clicks" Inpatient Mobility Short Form (AM-PAC 6-Clicks)	Revealing strong agreement (n = 125, 88%) Facilitates pt mobility & optimizes RN safety w/ BMAT and AM-PAC 6-Clicks demo mod levels of convergent validity, unlike the BMAT, the AM-PAC 6-Clicks scored without having the pt complete all tasks ---Staff more conservative than PT ----JH SPHM agreed with PT 70.4% of pt; PT agreed 96% of time with JHSPHM	panel of experts-opinions problem-each round, provided with the results & comment on opinions provided & adjust feedback; consensus reached - study two rounds, including a survey and a FU focus group. Recommendations for SPH equip ----draft of the JH-SPHM Mobility Guide created & depicted the AM-PAC, JH-HLM, and SPH equip recommend

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Lei, YT., Xie, JW., Huang, Q., Huang, W., & Pei, XF. (2021). Benefits of early ambulation within 24 h after total knee arthroplasty: A multicenter retrospective cohort study in China. Military Medical Research (8)17. https://doi.org/10.1186/s40779-021-00310-x	NA	Retrospective cohort study	24 large teaching hospitals; January 2014 - November 2016 ---2687 patients Chinese; 18 years and older, osteoarthritis as the primary diagnosis and indicator for primary TKA, and capable of providing informed consent; 2687 who began ambulating within 24 h and 3761 who began ambulating later than 24 h	IV=THA/TKA DV= pt who began ambulating within 24 h (group A) DV= pt who began ambulating later than 24 h (Group B).	LOS= Admit to DC; total hosp costs=total payment that the pts' insurance provided to hosp; pn level= VAS; knee flexion ROM= goniometer 72 h post-operation, results of the SF-12=at 4th week post op; incidence of DVT & other complications recorded during LOS & 3 mo. FU Data Analysis ---SPSS version 24 software. Student's t-test to analyze the parametric samples, Wilcoxon Mann-Whiney U test used for non-parametric data Categorical data expressed as n (%), and the Pearson chi-square test and Fisher's exact test; $P < 0.05$ statistically significant for all	(1) early ambulation within 24 h after TKA shortens length of stay (LOS), (2) early ambulation within 24 h is associated with better knee function and pain relief, (3) this regimen reduces total hospital costs, (4) this regimen decreases the incidence of DVT events after TKA, and (5) this regimen increases risk of treatment related adverse events	Group A shorter LOS & lower hosp costs & pain than Group B; enhancing ROM for pts in Group A compared with pts in Group B. Group A pts had higher postop SF-12 scores than in Group B; incidence of DVT & pulmonary infection lower in Group A than in Group B incidence of (PE) and other complications did not differ between the two groups.	LOS in A shorter than B ($P < 0.001$). hosp costs A < B ($P < 0.001$); VAS score at 72 h after surgery A < B ($P < 0.001$). ROM improved in both groups following TKA, & favorable effect in enhancing ROM= A compared with B ($P < 0.001$). A higher postop SF-12 scores than B ($P < 0.001$); occurrence of DVT in A< B ($P = 0.008$). incidence of pulmonary infection A < B ($P = 0.031$)

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Li, Y., Yin, Z., & Liu, P. (2024). Meta-analysis of rapid rehabilitation surgery in hip and knee replacement. Alternative Therapies in Health and Medicine. https://www.proquest.com/scholarly-journals/meta-analysis-rapid-rehabilitation-surgery-hip/docview/3089882635/se-2?accountid=28148	NA	Meta-analysis of RCT's	1673 patients in six studies that conducted RCTs, including 565 patients who received ERAS and 1108 patients who received RCTS -Yulin No. 2 Hospital, Yulin, China.	Aimed to evaluate the efficacy of the Rapid Rehabilitation Surgery (RRS) protocol, an enhanced recovery after surgery (ERAS) approach,	Software ReviewManager5.3 and R3.6.2	(1) LOS (2) to postop complications (3) to blood-transfusion rates (4) to postop pain.	RN reduced mean LOS by 2.17 days compared to combined control groups from five studies (SMD=-2.17, 95% CI [-3.36-0.99], P < .01). Incidence of surgical complications was 9.1% lower in combined intervention groups than in the combined control groups (r=0.30, 95% CI [0.10 to 0.94], P = .02)	Reduced LOS, decreased surgical complications
Lisevick, A., Kelly, S., Cremins, M., Vellanky, S., McCann, G., LeBlanc, K., Derla, M., Comerford, E., & Sinha, S. (2020). Mobility technicians: A viable solution to early ambulation of total joint replacement patients. *Orthopaedic Nursing* 39(5). DOI: 10.1097/NOR.0000000000000698	NA	Retrospective chart Review	TJR surgeries; single institution between June 1, 2014, and Oct 31, 2018; 11,777 patients with TJR; (pre-MT: 1,297; post MT: 10,477); pre-MT (June 1, 2014, to Dec 31, 2014); post-MT, grouped by year (2015–2018); 66 avg age; 30.3 kg/m2 avg BMI	IV= early ambulation of patients with TJR DV= effectiveness of the MT model (post) DV= a traditional PT model (pre)	Egress Test Ambulation= distances greater than 10 ft Pearson $\chi 2$ & Mann-Whitney U tests were utilized. All analyses conducted using IBM SPSS Statistics v.22	number of POD0 ambulation's, POD0 ambulation distance, total distance ambulated, time to first ambulation and LOS; 30-day readmissions	#of POD0 ambulation's, POD0 ambulation distance, & total distance ambulated all increased while time-to-first ambulation decreased. with the (Post) MT model, the mean total distance of ambulation on POD0 more than doubled in years 1 and 2 post implementation MT program & more than tripled in years 3 and 4. This difference was statistically significant, p < .001.	Increased POD 0 ambulation and distances
Liu, J., Zheng, Q.-Q., & Wu, Y.-T. (2023). Effect of enhanced recovery after surgery with multidisciplinary collaboration on nursing outcomes after total knee arthroplasty. World Journal of Clinical Cases, 11(32), 7745–7752. https://doi.org/10.12998/wjcc.v11.i32.7745	NA	Retrospective cohort study-- Lack of research investigating the effects of ERAS with nursing in pt with TKA	80 pt with TKA at tertiary hospital between Jan 21 and Dec 22.	IV= TKA pt DV= ERAS group DV= Conventional group	t- test or Mann-Whitney U test; chi-square or Fisher's exact test P < 0.05 significance Blinded	LOS; Hosp cost; intra-op blood loss HGB 24 hr post-surgery - VAS score for pain- rated on scale 0-10, measured every 24,48, and 72 hrs after surgery; ROM knee joint - measured by a goniometer at 24, 48, and 72 hrs post; HSS status of knee joint; standardized questionnaire (before & DC); the post op comp/events after surgery	ERAS group significantly < LOS < hosp cost, < intraop blood loss, > hgb 24 h after surgery, < VAS score for pain,> knee joint ROM, and > HSS knee score than the conventional group (all P < 0.05). no significant difference in incidence of postop complications btwn groups (P > 0.05).	Mobilization: Patients started passive ROM exercises of the knee joint within 2 h after surgery and active ROM exercises within 6 h. The pts assisted getting out of bed & walking with a walker within 12 h. Pt received daily PT until DC

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Mazzei, C., Yurek, J., Patel, J., Poletick, E., D'Achille, R., & Wittig, J. (2020). Providing patient mobilization with a mobility technician improves staff efficiency and constrains cost in primary total hip arthroplasty. The Journal of Arthroplasty. 35(8). https://doi.org/10.1016/j.arth.2020.03.042	NA	Retrospective Review ---Impact on Mobility technicians	Control group = 542 pts; Study group 1297 pts Avg age 67; predominantly female	IV=THA pt DV= Before MT DV= After MT Control: standard PT and Nsg Protocols Study group: access to MT @ RN direction	LOS- cost associated	median LOS of 2 days (P =.121)	Median LOS 2 days (P ¼ .121) > study group pts DC home than control group (91.51%-87.43%, P=.012). annual savings of $119,794.50 in total first post-acute care costs to the institution	MTs would need to successfully treat only 5 patients annually to recoup a savings equivalent to their salary

McLaughlin, K., Friedman, M., Hoyer, E., Kudchadkar, S., Flanagan, E., Klein, L., Daley, K., Lavezza, A., Schechter, N., & Young, D. (2022). The Johns Hopkins activity and mobility promotion program: A framework to increase activity and mobility among hospitalized patients. *Journal of Nursing Care Quality*. 38(2). DOI: 10.1097/NCQ.0000000000000678	Translating Research into Practice (TRIP) model	Quality improvement	NA	physical capacity (am-pac) pt performance	tools utilized: the Activity Measure for Post Acute Care (AM-PAC) Inpatient Short Forms and the Johns Hopkins Highest Level of Mobility (JH-HLM) --excellent interrater reliability between nursing and physical therapists	(1) organizational prioritization; (2) systematics measurement and daily mobility goal; (3) barrier mitigation; (4) local interdisciplinary roles; (5) sustainable education and training; (6) workflow integration; (7) data feedback; and (8) promotion and awareness	(1) AM-PAC and JH-HLM documentation compliance, (2) mobility goal achievement as determined by the JH-MGC, and (3) rehabilitation consult utilization	Mobility advocates (4 per unit)
Full citation	**Theoretical basis**	**RCT? Meta Analysis? hypothesis/ question?**	**Number, Characteristics,** Attrition rate & why?	**Independent variables/ Dependent variables**	**What scales were used to measure the outcome variables**	**What stats were used to answer the clinical question**	**Statistical findings or qualitative findings**	**Strengths and limitations of the study**
Mori, C., & Ribsam, V. (2018). Best practice guidelines total knee replacement (arthroplasty). *National Associatin of Orthopedic Nurses: Advancing the art and science of orthopedic care*.	NA	Guidelines	NA	NA	multiple per guideline area	improve pt outcomes and improve recovery, shorten LOS, improve pt experience, enhance clinical and functional outcomes	ERAS protocols adopted to expedite post-op recovery, decrease complications & decrease LOS	Decrease LOS, decrease complications, increase patient experience, increase functional outcomes

Parkes R.J., Ayeko O., Brunton L., Griffiths-Jones, W., Ungvari, Z., & Goss, H. (2021). Revolutionizing rapid recovery: A quality improvement project in hip and knee replacement. *BMJ Open Quality. 10(2).* doi: 10.1136/bmjoq-2020-001249	PDSA cycles-simultaneously	QI Project---- Improve wait lists, relieve bed pressure for THA and TKA pts Retrospective data collection SMART: increase throughput; 90% case mobilization day 0 POD, reduced LOS by 1 day within 1 year	Model Hospital; Q4 2017/2018 to Q2 2018/2019	IV= elective hip and knee joint replacement surgeries DV= retrospective (pre-implementation group) DV= prospective (post-implementation group)	data uploaded to a bespoke database - One-tailed t-test used to statistically assess the comparability based on age and $\chi 2$ test for comparability based on sex; Unpaired two-tailed t-test-- statistical method used to analyze LOS in both groups --Rx ward stock use and targeted audits	time of first mobilization, discharge, reasons for delay; Pt demographics, joint school attendance, the surgical team involved, type of surgery, anesthetic details, mobilization and discharge outcomes; prescribing patterns and opiate drug usage	improved throughput of TKA &THA achieved. Predicted yearly throughput from Q4 2019/2020 improved to 560 joint cases compared with 480 predicted; OS-2019/2020 fiscal pre protocol implementation group, reduction in LOS from a mean of 3.6 to 2.0days ($p<0.0001$) knees	Pt experience improve due to increased preop info; shorter length of stay and better outcomes; operation, demographic details, LOS, who mobilized patients and when
Pulkkinen, M., Jousela, I., Engblom, J., Salanterä, S., & Junttila, K. (2020) The effect of a new perioperative practice model on length of hospital stay and on the surgical care process in patients undergoing hip and knee arthroplasty under spinal anesthesia: A randomized clinical trial. BMC Nursing (19)73. https://doi.org/10.1186/s12912-020-00465-3	NA	2-group parallel single-blind RCT - compare standard periop care of a new periop practice model (NPPM) on the LOS and the time points of the surgical care process; find out if any subgroups with different response could be found	Intervention group (n = 230) =A control group (n = 220) = B = 450 pts adult female and male pts; 18 yo or >; operations planned under spinal anesthesia; scheduled btwn Mon- Thurs; Sept 2016 - Dec 2017	IV= THA/TKA DV =Perioperative care DV= NPPM-new periop practice	operating room management software (Opera, CHCA, Quebec, Canada) and hospital information system (Uranus, CGI Finland Oy, Helsinki, Finland),	: preparation time from the patient's arrival to the operating department to the administration of anesthesia agents (h), surgery time from incision to closing of the wound (h), operating room time from patient entrance to the operating room to patient exit from it (h), PACU time (h), recovery time from patient readiness for discharge from PACU to patient discharge from the hospital (h) and LOS from hospital admission to hospital discharge (days).	No statistically significant; higher age, type of arthroplasty and ASA score 3–4 all caused prolonged LOS; LOS (days) 3.08 intervention group and 3.18 control group (difference of means = − 0.10, 95% CI [− 040, 0.19] p = 0.49). Converted to hrs, mean LOS was 2.40 h shorter in A; A and B. differences btwn groups statistically significant on surgery time (5 min) & operating room time (7 min) shorter B	no handovers between different nurses at transition from the OR to the post-anesthesia care unit (PACU). weekday of surgery as predictive of LOS= did not find any statistically significant differences;
Full citation	**Theoretical basis**	**RCT? Meta Analysis? hypothesis/ question?**	**Number, Characteristics,** Attrition rate & why?	**Independent variables/ Dependent variables**	**What scales were used to measure the outcome variables**	**What stats were used to answer the clinical question**	**Statistical findings or qualitative findings**	**Strengths and limitations of the study**
Stewart, E., Collector, L., Friedman, L.A., Gares, M., Funk, K., Gopie, C., Vincent, L., Young, D., & Hoyer, E.H. (2024). Capturing patient mobility levels in the hospital: An examination of nursing charting and behavioural mapping. Journal of clinical nursing.	NA	prospective observational study	3 adult units- 22-bed med unit, 32- bed cardiac unit & 32-bed surgical unit. 7 behavioural mapping sessions, recorded obs from 61 pt days, 55 pts; obs from 7 AM varied 10 & 12 h day shift; 7nonconsecutive days between spring and fall of 2022; Mean age 55	IV= Nursing Staff DV= actual performed pt mobility DV= Accurate charting of ambulation DV= JH-HLM level charted	Behavioural mapping; JH-HLM scores; AM-PAC; Inpatient Basic Mobility Short Form; '6-clicks'; JH-MGC A Bland Altman Plot	to assess the accuracy of nurse charting in the eMR-, only the JH-HLM documented during day shift included in analysis, as that time matched the period when behavioural mapping occurred	mean AM-PAC of 18.7, (8 to 24); spearman correlation coefficient of 0.66 obs comparing JH-HLM - RN behavioural mapping records; Bland Altman Plot a mean difference 0.1 observed; goal= (JH-HLM 1–8), 46 (75.4%) pts met mobility goal with obs & 46 (75.4%) met their goal with RN documentation; JH-HLM achieved in 49 (80.3%) pts obs	of typical workflow at our institution nursing records AM-PAC daily and JH-HLM during each shift

https://doi.org/10.1111/jocn.17360			yo; 44% female, 38% black				and 47 (77.1%) Pts on RN charting.	
Sutton, R., Goh, G., D'Amore, T., Clark, S., Meghpara, M., & Purtill, J. (2022) Activity measure for post-acute care mobility scoring system: Comparison of nursing and physical therapy evaluation for primary hip and knee arthroplasty patients. *American Academy of Orthopaedic Surgeons.* 30 (24). DOI: 10.5435/JAAOS-D-22-00299	NA	retrospective review--- aimed to identify factors that led to improved performance on the AM-PAC scoring system and whether AM-PAC scores predict 90-day outcomes.	2019-2021; 2 surgeons reviewed; 1119 pts	IV- AM-PAC scoring DV=Nurses DV=therapists	AM-PAC scores, readmission, complication, LOS, nonhome discharge; Paired student t- test	AM-PAC scoring by nurses in the postoperative period could (1) substitute for AM-PAC scoring by therapists and (2) predict 90-day outcomes in TJA patients	Spearman correlation weakly positive 0.437; RN scores conducted earlier (204.0 6 249.9 min versus 523.5 6 449.4 min; P , 0.001) RN scores not notable predictors for 90-day complications or readmissions -higher therapy & RN scores predictors of less than 2-day LOS (odds ratio [OR] 0.63, P , 0.001; OR 0.88, P , 0.001) & fewer nonhome DC (OR 0.62, P , 0.001; OR 0.84, P , 0.001).	nursing-driven mobility assessments could potentially improve efficiency of patient discharge and control costs, nursing AM-PAC scoring did not serve as an appropriate substitute for PT scoring
Tazreean, R., Nelson, G., & Twomey, R. (2022). Early mobilization in enhanced recovery after surgery pathways: current evidence and recent advancements. Journal of comparative effectiveness research, 11(2), 121–129. https://doi.org/10.2217/cer-2021-0258	NA	nonsystematic search of databases	September 2011 to September 2021	IV= ERAS surgeries DV= Early Ambulation	Review	Early Mobilization	crucial part; interventions to usual care in surgical specialties is convincing; reduces the risk of postop complications, accelerates the recovery of functional walking capacity, positively impacts several pt- outcomes & reduces LOS; reducing care costs; edu & decision-making tools improve compliance	facilitated early mobilization improved step counts and compliance targets, ---- **Barriers--** lack of awareness & edu on benefits, resources & culture that prioritizes activity after surgery
Full citation	**Theoretical basis**	**RCT? Meta Analysis? hypothesis/ question?**	**Number, Characteristics,** Attrition rate & why?	**Independent variables/ Dependent variables**	**What scales were used to measure the outcome variables**	**What stats were used to answer the clinical question**	**Statistical findings or qualitative findings**	**Strengths and limitations of the study**
Thomas, L., Hadfield, N., & Munt, R. (2024) Patient experience during their joint replacement journey: The role of the Orthopaedic Nurse Practitioner. International Journal of Orthopaedic and Trauma Nursing. 54. https://doi.org/10.1016/j.ijotn.2024.101106	NA	Qualitative descriptive design	undergone THA/TKA; able to communicate in English, no known cognitive impairment; 11 participants- btwn 7 wks & up to 4 mos post-op; during 2022; telephone interviews; All were females with a median age of 65.8 yo	IV= THA/TKA DV= The use of an ONP	Braun and Clarke's reflexive thematic analysis framework used to analyze interviews	3 main areas where participants interacted with the ONP including pre-operatively, while in hospital and going home	NP's ability to positively contribute to holistic pt care working w/ multidisciplinary team to max pt recovery; reduction LOS & readmission rates leading to an overall decrease in healthcare	Reduce LOS

Vaudreuil, N., Gulledge, C., McGlaston, T., Bove, A., & Klatt, B. (2021) Ambulation milestones in post-operative physical therapy after total knee arthroplasty: How can we improve short-term outcomes? Physiotherapy Theory and Practice, 37(12). https://doi.org/10.1080/09593985.2019.1706212	NA	Retrospective review---- evaluate performance on POD 0 PT after TKA and determine how POD 0 PT affects LOS or discharge destination	412 patients who underwent TKA over 1 year	IV=TKA DV=POD 0 PT DV= no POD 0 PT	Student's t-tests and categorical variables were compared using Pearson chi-square analysis; significant when the two-tailed p-value was <0.05; other groups were analyzed with odds ratios and 95% confidence intervals,	shorter hospital length of stay (LOS); demographics, surgery/recovery, PT, and DC destination age, gender, body mass index (BMI), preop use of assistive device, prior arthroplasty, arrival time to (PACU), arrival time to floor, time spent in PACU? PT performed on POD 0 and 1, ft ambulated with PT on POD 0 and 1, hospital LOS, DC destination; time of PT assessment on POD 0, duration of time on the floor prior to PT session, pain level at PT evaluation, barriers to PT, reasons for failure to receive PT on POD 0 or 1; ambulation distance < 10 ft and > 10 ft	88.8% (366/412) of pts received POD 0 PT; 73.9% of pt did not receive POD 0 PT; Pt walked > 10 ft on POD 0 or 100 ft on POD 1 more likely shorter LOS and more likely DC home; Pt participated in POD 0 PT had shorter LOS (p = .005) & more likely to walk >100 ft in POD 1 PT (p = .015) compared to pt who did not participate in POD 0 PT. Participation in POD 0 PT resulted in decreased DC to PAF; not a significant finding (p =.176). Pt walked > 10 ft on POD 0-had shorter LOS (p < .001), had decreased DC to PAF (p < .001), more likely to walk > 100 ft POD 1 PT (p < .001). Pt walked > 100 feet on POD 1 shorter LOS (p <.001), and decreased DC to a PAF (p <.001).	Late arrival to inpatient floor had the strongest associations with inability to perform PT
Full citation	**Theoretical basis**	**RCT? Meta Analysis? hypothesis/ question?**	**Number, Characteristics,** Attrition rate & why?	**Independent variables/ Dependent variables**	**What scales were used to measure the outcome variables**	**What stats were used to answer the clinical question**	**Statistical findings or qualitative findings**	**Strengths and limitations of the study**
Zhang, Q., Chen, Y., Li, Y., Liu, R., Rai, S., Li, J., & Hong, P. (2024). Enhanced recovery after surgery in patients after hip and knee arthroplasty: A systematic review and meta-analysis. Postgraduate Medical Journal. 100(1181), 159–173. https://doi.org/10.1093/postmj/qgad125	NA	Meta-analysis- - improve postop recovery attenuate surgical stress response	TKA and THA; 47 studies; 76971 pts; ERAS group 29702; control 47269;	IV=ERAS protocol vs Control DV= LOS; Post op complications, readmission rates; 2nd: transfusion rates, mortality rate	VAS; Western Ontario and McMasters University Osteoarthritis Index (WOMAC), short form 36 bodily pain (SF-36BP); physical function (SF-36PF), oxford knee score and ROM	LOS, transfusion rates, readmission rates, post of mortality, ROM, VAS scores, SF-36BP, SF-36PF	ERAS shortened LOS, reduced transfusion rates, and lowered 30-day post op mortality, without increasing complications or readmission rates; decreased VAS while increasing ROM, SF-36BP and SF-36PF	Reduce LOS, transfusion rates, complications

Zhao, X., Chen, L., Huang, F., Huang, Z., & Zhou, H. (2023). Enhanced recovery after surgery in patients undergoing total joint arthroplasty: A retrospective study. Pakistan Journal of Medical Sciences, 39(3). https://doi.org/10.12669/pjms.39.3.7169	NA	Retrospective cohort study-	94 pts in study group (ERAS), 113 pt in control (non-ERAS); July 2020- June 2021; July 2021- Dec 2022; no attrition	IV= TKA/ THA pt DV= ERAS group DV=conventional group	T-test; chi-square or Fisher's exact test (P< 0.05) significance Blinded	post op nausea and vomiting; pain scores; LOS; functional outcomes- preop LOS, pain score, post op LOS, ROM on 1st and 3rd POD, HSS scale (1 week ,1 mo, 3 months)	statistically significant reduction in the incidence of postop N/V, lowered pain scores, reduced LOS; better functional outcomes postop LOS shorter compared to the control group; Study group better ROM on both 1st & 3rd postop days; HSS score higher in the study group at all 3 FU times;	Early walking was encouraged in the recovery room
Zhong, Z., Liu, D., Tang, H., Zheng, Y., Bai, Y., Liang, Q., & Yang, X. (2021) Impacts of the perioperative fast track surgery concept on the physical and psychological rehabilitation of total hip arthroplasty A prospective cohort study of 348 patients. Medicine 100(32). http://dx.doi.org/10.1097/MD.0000000000026869	NA	Observational Study	January 2015 to December 2018. We divided the patients into 2 groups – 348 patients- 180 received rapid rehabilitation nursing, and 168 patients received conventional nursing	IV=THA DV=the rapid rehabilitation group DV= conventional rehabilitation group	Self-Rating anxiety scale; Self-Rating depression scale; visual analog scale scores; SPSS 22.0 software was used for statistical analysis. chi-square test used to compare count data. Indep-sample t test was used for comparisons btwn groups. If P<.05, difference significant	LOS, time to off-bed activity, pain score, Self-Rating Anxiety Scale scores, Self-Rating Depression Scale scores, complication rate, and rate of satisfaction during hospitalization.	rapid rehabilitation group shorter LOS (11.5±1.2 day vs 15.5±2.3 day, P=.021), resumed off-bed activities sooner (20.5±3.4 hrs vs 61.8±4.7 hrs, P=.001, ess postop pain (4.0±1.2 vs 6.5±1.1, P<.001), & lower anxiety & depression scores (anxiety score: 24.4±2.1 vs 47.9±2.9; depression score: 25.8±1.8 vs 43.7±1.7, P<.001).	rapid rehabilitation surgery in total hip arthroplasty can accelerate patients' postoperative recovery, relieve anxiety and depression, and increase the patient's satisfaction with the treatment

Appendix B

Pre-and Post-Intervention Survey

1. What is your job role?

- ◯ Nurse
- ◯ CNA
- ◯ PSA

2. How long have you been in the organization?

- ◯ Less than 1 year
- ◯ 1-2 years
- ◯ 2-3 years
- ◯ 3-4 years
- ◯ 4-5 years
- ◯ More than 5 years

3. Which shift do you work?

- ◯ Days
- ◯ Nights
- ◯ Evenings
- ◯ Some of all

4. Overall, what is your comfort level when ambulating.....

	Extremely Uncomfortable	Somewhat Uncomfortable	Neither confortable nor uncomfortable	Somewhat Comfortable	Extremely Comfortable
Any Type of Patient	◯	◯	◯	◯	◯
Any Post-op Patients	◯	◯	◯	◯	◯
Any Patients needing assist of 2 or more staff	◯	◯	◯	◯	◯
TKA patients post-op prior to PT evaluation	◯	◯	◯	◯	◯

5. How often do you ambulate your post-op TKA patient?

	Never	Very Rarely	Rarely	Sometimes	Frequently	Very Frequently
Post-op day Zero (Day of surgery)	◯	◯	◯	◯	◯	◯
Post-op day One (Day after Surgery)	◯	◯	◯	◯	◯	◯

6. Do the below barriers impact your availability in ambulating your TKA patients on POD 0?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Knowledge	◯	◯	◯	◯	◯
Comfort Level	◯	◯	◯	◯	◯
Time	◯	◯	◯	◯	◯
Staffing	◯	◯	◯	◯	◯
Patients' Pain	◯	◯	◯	◯	◯
Patients' Nausea	◯	◯	◯	◯	◯
Patients' numbness	◯	◯	◯	◯	◯
Patient arriving after 5pm	◯	◯	◯	◯	◯

7. Any other barriers that you feel impact the ability for you to be able to ambulate your TKA patients on post-op day 0?

8. Any other feedback you want to provide?

Appendix C

Activity Measure for Post Acute Care (AM-PAC) Six Click's Functional Assessment

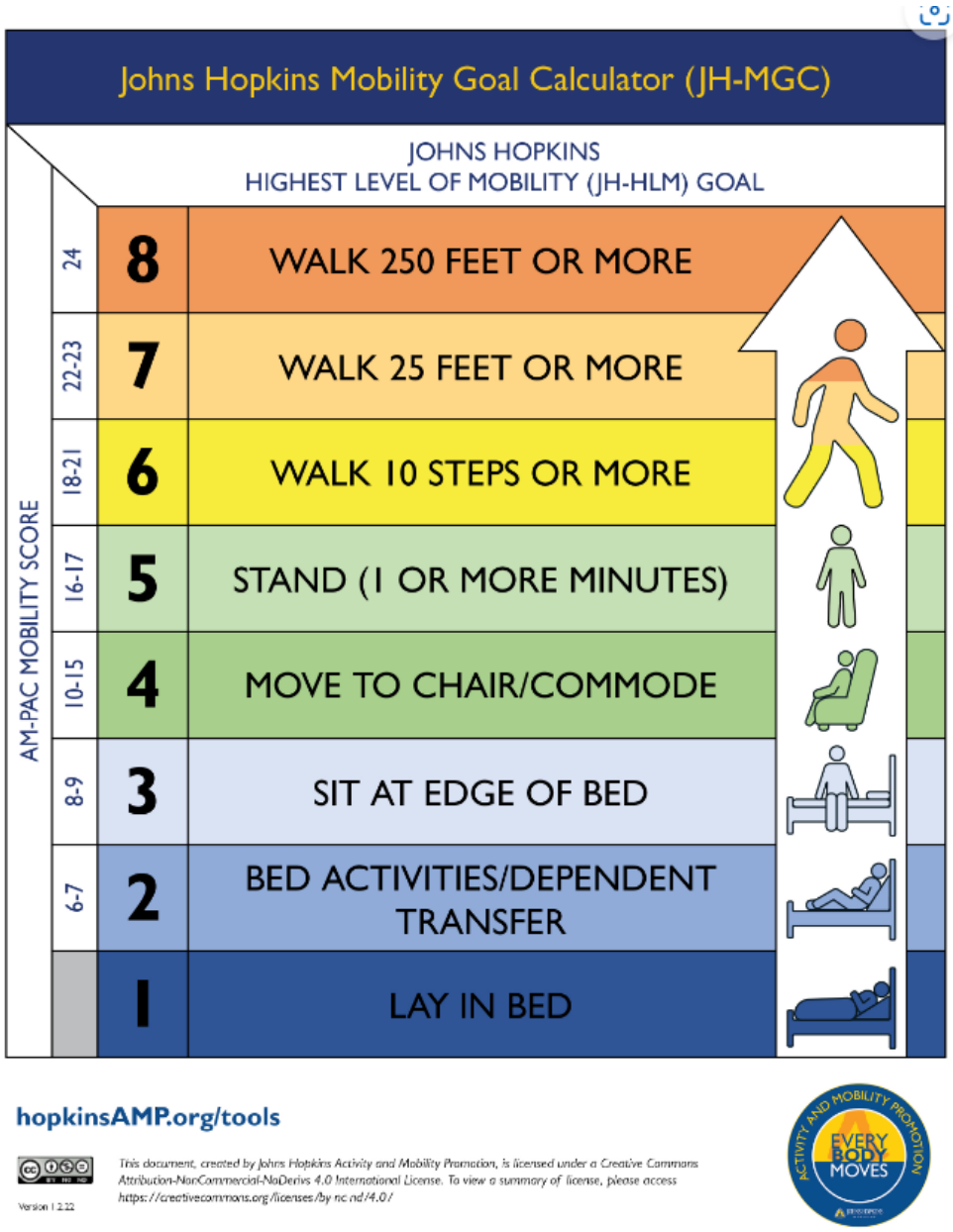
Please check the box that reflects your (the patient's) best answer to each question.

How much difficulty does the patient currently have…	Unable	A Lot	A Little	None
1. Turning over in bed (including adjusting bedclothes, sheets and blankets)?	☐1	☐2	☐3	☐4
2. Sitting down on and standing up from a chair with arms (e.g., wheelchair, bedside commode, etc.)	☐1	☐2	☐3	☐4
3. Moving from lying on back to sitting on the side of the bed?	☐1	☐2	☐3	☐4

How much help from another person does the patient currently need…	Total	A Lot	A Little	None
4. Moving to and from a bed to a chair (including a wheelchair)?	☐1	☐2	☐3	☐4
5. Need to walk in hospital room?	☐1	☐2	☐3	☐4
6. Climbing 3-5 steps with a railing?	☐1	☐2	☐3	☐4

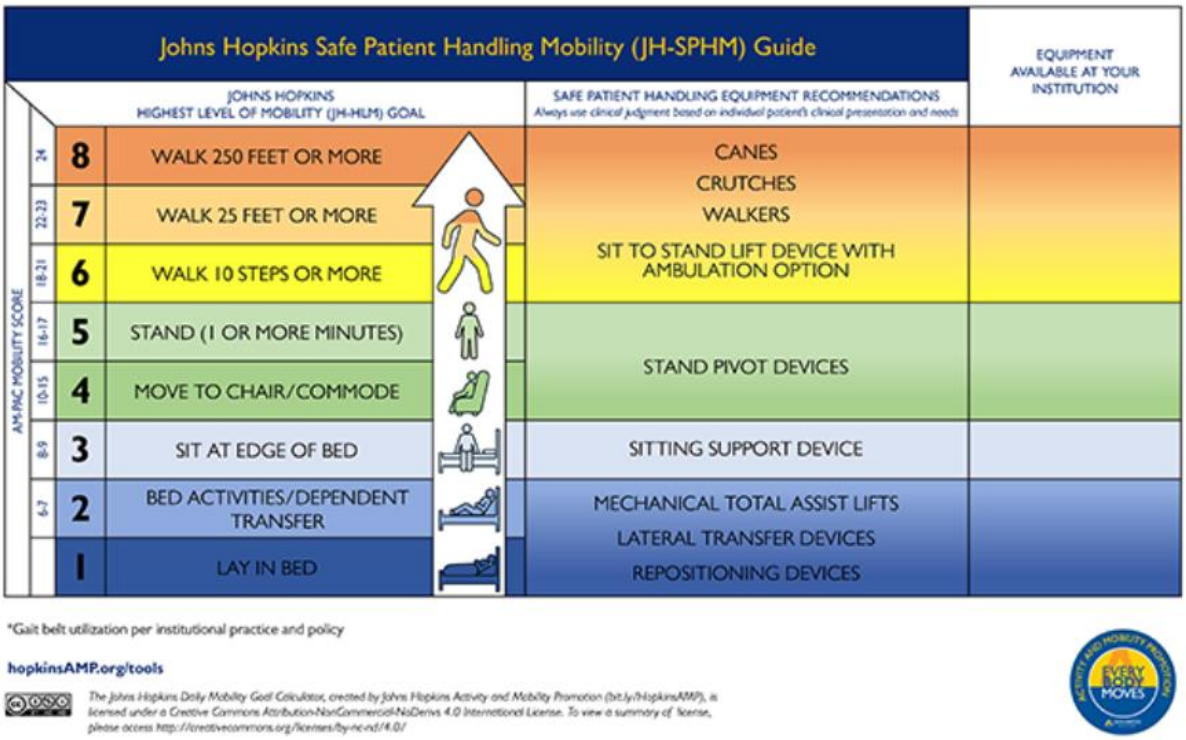
(Menendez, et al., 2016)

Appendix D



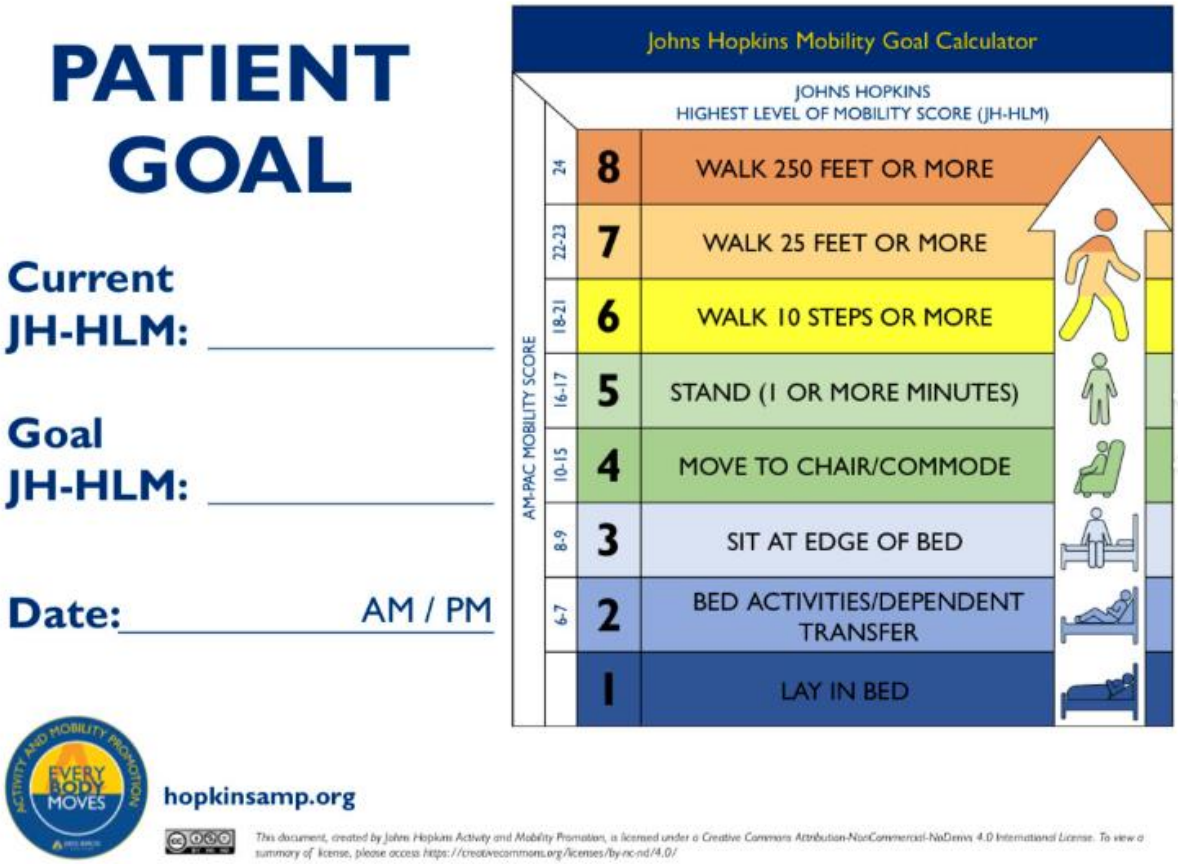
Johns Hopkins Mobility Goal Calculator (JH-MGC) uses both the Johns Hopkins Highest Level of Mobility (JH-HLM) Goal and the AM-PAC Mobility Score (Johns Hopkins Medicine, 2025).

Appendix E



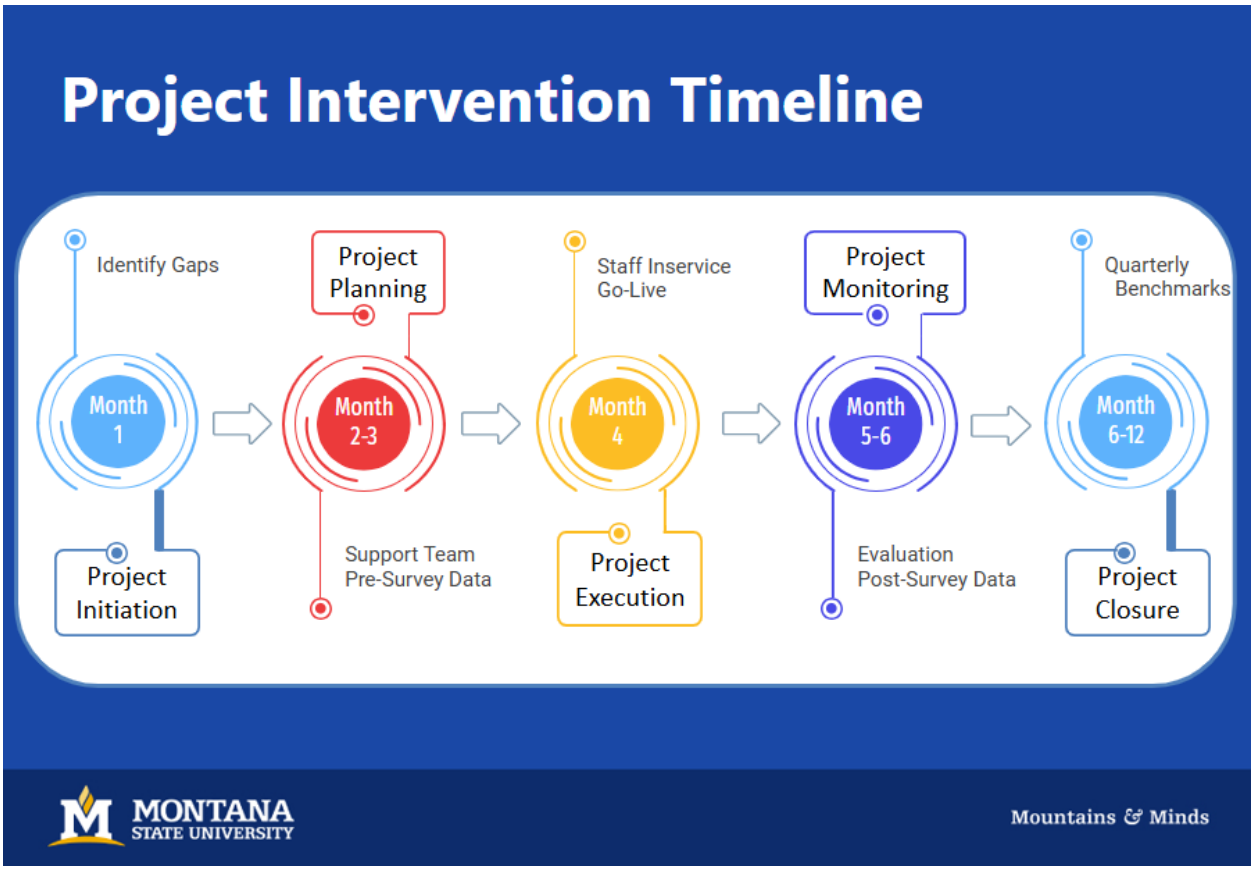
Johns Hopkins Safe Patient Handling Mobility (JH-SPHM) Guide combines the Johns Hopkins Mobility Goal Calculator (JH-MGC), the Johns Hopkins Highest Level of Mobility (JH-HLM) Goal and the AM-PAC Mobility Score to recommend the proper equipment to safely ambulate a patient (Johns Hopkins Medicine, 2025).

Appendix F



Johns Hopkins Mobility Goal Calculator (JH-MGC) with Patient Daily Goals to individualized patient ambulation goals (Johns Hopkins Medicine, 2025).

Appendix G


Project Intervention Timeline
Identify Gaps
Project Initiation
Month 1
Project Planning
Support Team Pre-Survey Data
Month 2-3
Staff Inservice Go-Live
Project Execution
Month 4
Project Monitoring
Evaluation Post-Survey Data
Month 5-6
Quarterly Benchmarks
Project Closure
Month 6-12
MONTANA STATE UNIVERSITY
Mountains & Minds

Appendix H

Measured ambulation distances in feet for the ONU unit at Institution X (Baker, S., 2025).

Appendix I

Activities/ Materials	Cost Per Unit	Estimated Time/Number	Total
Development of Education			0
Printing of Handouts (Laminated copies of scales and unit distances)	$400		$400
Inservice Educators Time Nurses Time CNA's Time	 Nml edu work hrs ~$60/hr RN ~$17/hr CNA/UC	 42 RNs 15 CNAs 3 Unit Clerks	 2520 +305 $2826
Ambulation Advocates (2 weeks)	~$30/hr CNA ~$75/hr RN (includes overtime)	2 staff	$2000/ week + $500 stipend weeks 1 and 2
Total Cost			~$8200

Estimate of expenses for TKA ambulation project on ONU at Institution X.