Development of Preoperative Patient Education using A Patient Education Platform for Total Joint Arthroplasty

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Orthopedic surgeries, such as total joint arthroplasties, are complex procedures requiring preoperative optimization of patients and planning for extensive recoveries. As with many medical procedures, there is often a gap between existing patient knowledge and a baseline functional knowledge required for a safe postoperative patient recovery. It is the responsibility of the healthcare team, including nurse practitioners, to ensure their patients understand the nature of the procedure and recovery from it through preoperative education. This project explored efficacy of a specific patient education delivery system in this total joint arthroplasty (TJA) patient population.

Problem Description

TJA procedures for patients with end-stage osteoarthritis are some of the most frequently performed surgeries worldwide and, are anticipated to increase annually due to the aging population (Barry, 2017; Marquez et al., 2021). Every year in the United States, approximately 790,000 total knee replacements and 544,000 hip replacements are performed (American College of Rheumatology, 2024). These extensive procedures involve replacing damaged cartilage and bone with metal and plastic implants in order to increase mobility and reduce pain. They require significant recovery time and effort by the patients. Preoperative education benefits patients by reducing anxiety through setting realistic expectations and better preparation for postoperative recovery (Causey-Upton et al., 2020; Furtado et al., 2022). For instance, Solano et al. (2020) found that a majority of patients surveyed prior to preoperative total joint education believed they would come out of surgery with no pain. Patients without this education are more likely to have a lower level of satisfaction with their surgery and take more pain medication postoperatively than those who have been educated on how to manage their postoperative pain (Careneder et al., 2022).

A level 1 trauma center in a metropolitan city in the northwest, Academic Health Center (AHC), is known for leading-edge research and advancement of bone and joint care, and performs approximately 1500 arthroplasty cases per year (AHC, n.d.). For patients undergoing surgery, preoperative patient and family education is a requirement for Det Norske Veritas (DNV) hospital accreditation. Prior to 2010, AHC held a formal preoperative total joint class to educate patients on what to expect during the intraoperative and postoperative periods. Since the discontinuation of these classes and prior to launching Patient IQ, AHC's TJA website offered patients educational videos to answer frequently asked questions about total joint surgeries, how to prepare for surgery, and what to expect post procedure.

To provide patients with consistent messaging in their preoperative education, and to close the gap around knowledge deficits on TJAs, ACH has implemented Patient IQ for preoperative education. This new patient education platform enables the health center to meet criteria for patient education in a manner that satisfies DNV and Centers for Medicare & Medicaid Services (CMS) requirements. This platform could also support a certification allowing AHC to broaden their umbrella of patient care, while simultaneously enabling their patients the convenience of accessing the education from home. The purpose of this project is to assess the effectiveness of perioperative patient education delivery via Patient IQ related to the TJA patient population, as measured through the parameters of patient satisfaction, and increased knowledge of TJA surgery.

Available Knowledge

Educational programs for TJA decrease anxiety, improve pain control, increase preparation for surgery, reduce length of stay, and reduce falls while in hospital (Causey-Upton et al., 2020; Furtado et al., 2022; Holte et al., 2021). Research has shown that without preoperative education, patients do not have accurate expectations surrounding pain and expected functional performance postoperatively (Causey-Upton et al., 2020; Solano et al., 2020). Although preoperative TJA patient education is common and required by DNV and CMS, there has been no standard of care identified in the review of literature

(Causey-Upton et al., 2020). Some common topics covered in preoperative patient education include preparation for surgery, the recovery process, what to expect while in the hospital and after surgery, managing pain, safety at home, and exercise before and after surgery (Causey-Upton et al., 2020, Furtado et al., 2022). Research on the timing of perioperative education also varied; when interviewed, educators found that having patients attend one preoperative education session 2-4 weeks before surgery was ideal (Causey-Upton et al., 2020). Patient knowledge gaps around the TJA procedure and recovery expectations lead to poorer outcomes with postoperative pain and mobility, so it is imperative to ensure patients are able to receive this education in cohesive manner.

Patient education can be offered in a variety of modalities, including in-person verbal education provided in an individual/group format, written instruction, virtual classes, and a hybrid approach. The COVID-19 global pandemic led to rapid innovation in delivery of care to reduce disease transmission, including adoption of virtual patient engagement platforms, which improved patient access to education and, the ability to share knowledge (Sniderman & Abdeen, 2023). Web-based platforms deliver education regarding pathophysiology of osteoarthritis, planning for surgery and postoperative course (Holte et al., 2021). They also work to reduce cost, increase convenience for patients, and increase engagement in their care (Holte et al., 2021). In an analysis of the use of in-person and virtual joint classes in 3,090 TJA patients, Pietaro et al. (2022) found that attendance to the telehealth class was lower than in-person classes, but it alleviated barriers to access related to physical distance, while increasing barriers for older adults due to their limited experience with technology. Considering most patients undergoing surgery for a TJA are, on average, 70 years old it is a concern as to whether this web-based program would be appropriate and beneficial in this patient population. Studies show conflicting evidence on patient utilization of web-based education programs versus in-person courses with barriers including computer access and technology literacy in the TJA patient population (Martin et al., 2022). A retrospective study of 832 patients using an online patient engagement platform found that this method

of information delivery cannot discriminate between patients based on their age or sex, and high levels of patient engagement and activity were observed irrespective of these factors (Martin et al., 2022). One study of 184 patients showed that online instruction is an effective tool in TJA by improving outcomes such as, expediting ambulation and reducing hospital stays without compromising outcomes and postoperative complications (Kim et al., 2022). Another study compared the addition of a web-based interactive patient-provider platform to the standard of care and found no difference in patient satisfaction or healthcare utilization between the two groups in a study including 399 patients (Visperas et al., 2021). Online patient education platforms are a method that allow patients to access the information needed about their surgery and recovery in a consistent and convenient manner, which should aid in closing the perioperative knowledge gap.

Rationale

The framework for this project was guided by the Model for Improvement (MFI). This model supports the outcome of the project by helping to identify the goal and what defines success. A root cause analysis (Appendix A) was completed, which identified that there is no standard process in the clinic for designation of roles and responsibilities around delivering and recording patient education. Neither is there a standard of utilization of the Epic platform and online technology delivery systems in recording patient education to meet the DNV and CMS documentation requirements of patient family education. By implementing a patient platform already in use at AHC, Patient IQ, for their preoperative total joint education programs, the orthopedic department is able to fill this gap. The intervention is the implementation of Patient IQ with integration into EPIC to deliver patient education. Surveys were used to establish measures of patient knowledge of TJAs and patient education are documented per the metrics required by DNV and CMS. We used the Plan-Do-Study-Act (PDSA) model to test our intervention by obtaining quantitative as well as qualitative feedback from our patients obtained via Likert and knowledge surveys. Patients were surveyed for familiarity with perioperative education using a Likert

scale, prior to receiving the education through patient IQ followed up with a post-education response Likert scale and a knowledge test. The orthopedic department utilizes a defined multidisciplinary approach to follow up with patient education, ensuring preoperative optimization through utilization of a checklist and timely delivery the education.

Specific Aims

This project aimed to gather information on the background knowledge of the patient undergoing a TJA prior to preoperative education via the Patient IQ platform and compare it to the knowledge gained after participating in the online perioperative education program and as it relates to CMS and DNV guidelines. The goal is to use this data to inform improvements in future patient education of TJA and overall patient satisfaction within the program in the AHC orthopedic department. It also ensures documentation of patient and family education per DNV and CMS requirements. These surveys were launched December 1, 2024 and completed for project analysis March 1, 2025. The goal was, by March 1, 2025, patients undergoing TJA at AHC will have shown a 25% increase in knowledge around the TJA surgery by utilization of the preoperative education in the Patient IQ platform, as evidenced by their pre-education versus post-education surveys.

Methods

Context

The setting of this project is in a large, metropolitan ACH. The interdisciplinary members that comprise the orthopedic clinical department span two official areas within the AHC campus. ACH has three fellowship-trained joint surgeons, two orthopedic residents, and one joint fellow, who do about 1500 THA/TKAs a year. Their support staff includes two physician assistants, two nurse practitioners, three patient access specialists, and six medical assistants. Before launching Patient IQ, patients had three major appointments preoperatively in which they receive preoperative education. The first appointment is with their orthopedic provider (MD or PA), which mainly covered surgical

appropriateness and plan. Their second appointment is with the preoperative medicine clinic (PMC), which covered medical optimization for surgery. Their final appointment was with an RN case manager to cover basic surgical education and preparation. Some patients also had a preoperative physical therapy visit. As these are separate visits, messaging and education can be inconsistent.

Patient IQ, a virtual patient engagement platform, measures patient outcomes by integrating with the EHR and logging patients into customizable pathways while collecting data about education and satisfaction (PatientIQ, 2024). This program will consolidate patient education and reduce confusion while allowing AHC to analyze trends and compare patient cohorts to drive positive outcomes.

Interventions

A survey was integrated and distributed by Patient IQ to patients planning to undergo TJA and set up with the preoperative education program through the Patient IQ platform. These surveys (Appendix B) serve as the primary method for data collection. The preliminary survey was compared to the surveys post TJA education to analyze the level of knowledge gained by patient exposure to the patient engagement platform. The final survey included questions regarding patient satisfaction with the program. The survey design includes pre and post-education Likert scale questions based on patient's opinion on their level of knowledge around the perioperative topics. The posttest includes multiple choice and free text comment options, providing both qualitative and quantitative information about their knowledge gained from the preoperative patient education and the overall experience with the delivery of the education through the Patient IQ program.

Study of Intervention

The study of the intervention includes measuring and comparing data between the pre-education survey and post-education survey distributed to TJA patients. Feedback is received on patient satisfaction with utilization of the patient engagement platform through a Likert Scale satisfaction

question and free text comment box. A bar chart (Appendix C) will demonstrate the improvement of patient knowledge around TJA surgery compared to pre–Patient IQ education.

Measures

The outcome measures of this project were chosen to address the specific aims of evaluating the knowledge of TJA surgery and the perceptions of patients utilizing the Patient IQ platform. The Likert surveys measure the patient understanding of TJA surgery by including questions related to the education required by DNV such as: preparation for surgery, the recovery process, what to expect while in the hospital and after surgery, managing pain, safety at home, exercise, and functional movement after surgery. The post-education questions reflect the knowledge gained from the intervention and allow patients to give feedback on their experience with the use of the patient education platform. These surveys are written in English at the 5th grade reading level and are not a validated tool. Patient IQ delivers patients a single-item literacy survey (SILS) evaluating the patient's health literacy and ability to fill out surveys via a validated tool.

Analysis

Survey response data is compiled using Patient IQ. Analyses include patient demographics, utilization and satisfaction. Quantitative analysis of pre and post-education Likert surveys were be measured and compared for patient understanding of perioperative education. Outliers can be determined by identifying patients who have had previous total joint surgeries. The SILS survey delivered by Patient IQ also provides a validated way to determine outliers based on the patient's health literacy and ability to fill out a survey. Post test knowledge questions demonstrate patients' knowledge gained from the preoperative education delivered through Patient IQ. Qualitative analyses were derived from a free-text survey question on patient satisfaction with the Patient IQ platform and manually assessed for themes within these responses.

Ethical Considerations

Ethical considerations for this project include preserving anonymity of patients surveyed. All surveys were distributed with no trackability back to the source of the survey distribution and contain no identifiable factors. Participation in the survey will be voluntary. A request for determination was obtained and submitted to the Oregon Health and Science University (OHSU) Investigational Review Board (IRB) and was determined to not be human research. The participating clinical site gave consent to the project by signing the OHSU Letter of Support. The project lead reports no conflict of interest involved in the undertaking of this project.

Results

Patient IQ launched as a patient education resource for TJA in September of 2024 with the patient education handout incorporated September 26, 2024. Patient initial Likert scale surveys, to be completed 2 weeks before their online education, launched December 1, 2024 along with the knowledge test. The final Likert scale surveys launched January 29,2025. The patients were asked to assess their familiarity with questions related to the surgery and postoperative recovery period. A total of 110 TKA patients completed the pre-education Likert scale survey and 41 completed the post-education survey. A total of 95 THA patients completed the pre-education Likert scale survey and 41 completed the post-education survey. Both cohorts were 60% female and 40% male. There was a 16.1% increase in familiarity from the pre-education Likert scale survey to the post-education survey in TJA patients. The overall scores for not at all or slightly familiar decreased by 13.69%. The overall change in familiarity from the THA and TKA were similar at 16.46% and 15.74% of patients who are very or extremely familiar. Had the post-education survey launched at the same time as the other surveys, the number of responses likely would have been more proportional. The majority of patients answered the first three postoperative knowledge questions correctly: 86.5% correct on the first question, 57% on the second, and 97.5% on the third for all TJAs. When to expect to start physical therapy was the outlier with only 35.5% of all TJA patients answering the day after surgery. Of the TKA patients, 77.6% answered saying

they would start physical therapy the week after surgery, which is incorrect. The majority of the free text comments expressed thanks to the team and commented on repetition of the surveys or material.

Discussion

Summary

Although a goal of 25% increase in familiarity with perioperative TJA education was not met, a 16% increase is still noteworthy. There was a robust response to the surveys through the Patient IQ platform in the limited time prior to launch and calculation of the results of the surveys. Overall, 84% of TKA and 71.8% of THA patients stated they were very or extremely satisfied with the new online patient engagement format.

Interpretation

AHC implemented an online perioperative education course for TJA patients with integration of surveys, which allowed assessment of patients' familiarity with the materials required for patient and family education per DNV. Patients' familiarity was measured utilizing the Likert scale surveys pre and post patient education to determine their increase in knowledge from the patient education platform. With patient age range between 64.9 ± 13.59 for THA and older in TKA 67.3 ± 9.9, there was uncertainty about patient utilization of the platform and their satisfaction with it. The majority of both THA and TKA patients reported that they were very or extremely satisfied using the online education platform with no patients reporting being not at all satisfied in either cohort. There was minimal impact from the project on people and systems as the surgical coordinator and Patient IQ representative offered the majority of assistance with the project. The RNs assisted in the patient education material, offering suggestions pertaining to common patient postoperative questions. Nearly half of patients surveyed had undergone a previous TJA which could account for a higher baseline knowledge of the surgery. Having prior experience with a TJA could also contribute to patient satisfaction using the online patient engagement platform.

Limitations

The implementation of the Patient IQ platform for TJA patients was an extension for AHC as it was already utilized in the orthopedic department for other surgeries. Their prior utilization and knowledge of the system may not be generalizable to implementation in another department or another facility who has not use the program previously. No factors were found that may have limited internal validity such as confounding, bias, measurement, or analysis. Imprecision in the design may have been that some of the knowledge questions were eliminated from the online patient platform and the post-education Likert scale survey was implemented months after the program launched the pre-education Likert scale and knowledge tests. The Patient IQ platform did not do a sufficient job of distinguishing patient ethnicity/race as it had over 85% of TKAs as unknown and 93% of THAs which may impact association of results with patient experience.

Conclusions

The patient education platform has proven to be beneficial to patients and providers. Overall, patients were satisfied with the Patient IQ platform, benefitting them by allowing access to all of the educational materials. The platform, being integrated into EPIC, affords the providers documentation of the patient education per DNV requirements, and facilitates access to patient appointments by providing the patients with pertinent information online. Although the goal of 25% increased patient knowledge was not met, there was an increase in patient familiarity at 16%. Patient IQ is a modifiable patient education platform that can be used in multiple surgical specialties and departments for patient education and management of documentation within the EPIC platform. This project launched and recorded data for three months. The analysis of the data concluded that patient education increased, reducing knowledge deficits. Studies to assess the efficacy in long term patient outcomes could further determine the impact of the implementation of this education. Integration of these technologies in

patient healthcare systems ensures comprehensive and consistent patient education while meeting documentation requirements.

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