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Improve readmissions and patient satisfaction scores with a revised discharge education plan

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Improve Readmissions and Patient Satisfaction Scores
with a Revised Discharge Education Plan

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A Clinical Research Project submitted to the Graduate Faculty of

JAMES MADISON UNIVERSITY

In

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Dedication & Acknowledgments

I would like to dedicate this work to my husband, John, who has been my rock and support as I worked on this project and my doctoral degree. I would also like to dedicate this to my two loving children, Ayden and Mallory, who sacrificed a lot of “mommy time” during my commitment to this work as well. I hope my example will show them that hard work pays off and always reach for their goals. Many thanks to my mom, dad, and sister for their enduring support and encouragement along the way! I would like to acknowledge my faculty who have provided guidance, wisdom, expertise, and support, especially Dr. Linda Hulton. I feel very fortunate to have been on this journey with you! Many thanks to my project committee, Dr. Andrea Knopp, Dr. Julie Sanford, and Dr. John Bowman for their advice and guidance through the many evolutions of this project. A special thanks goes to Dr. Amber Kujath for her statistical expertise, assistance, and advice! I would also like to thank two of my co-workers and colleagues, Mrs. Pauline Elliott and Ms. Amanda Black. Pauline, thank you for your words of wisdom, your commitment to our patients, and for being my “life coach”. Amanda, without your support in the workplace and the many laughs in between, this project would have been nearly impossible. I would like to acknowledge the support and cooperation of the nursing staff and administration at CRH who willingly participated in and helped implement this project. Finally, I would like to thank my “battle buddies”. These are my colleagues and fellow doctoral students Samantha, Janice, Heather, Debbie, Shawn, and Stephen who read, re-read, gave countless hours of feedback, and provided emotional support for three years as we completed our coursework and tackled pages of writing together.

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Abstract

Problem: Payers of health insurance are tracking key performance measures and are limiting payments to hospitals. With this threat to financial reimbursement hospital systems have increased emphasis on tracking and improving outcomes. The purpose of this project is to reduce all-cause 30-day readmissions and improve patient satisfaction scores in the care transitions domain after a total hip or total knee replacement by revising the discharge materials and education.

Method: The total joint replacement discharge education materials were revised to address the common causes of readmissions. The documents were reformatted to improve literacy level, readability, and patient learning. Nurses were educated to address patient learning preferences, barriers, and comprehension in their discharge teaching.

Findings: Nurse pre-surveys and the implementation of the revised discharge education plan showed a statistically significant positive change in behavior in identifying learning preferences, removing barriers to learning, including family in teaching, using the teach-back method, and considering cultural appropriateness. The readmission rate dropped significantly from 8.87% to 2.92%. The patient responses in the care transition HCAHPS questions also improved.

Conclusion: Improving the readability of the discharge material and individualizing the information and delivery based on patient needs, and preferences can improve patient confidence to care for themselves after discharge and reduce hospital readmissions. *Keywords:* readmissions, HCAHPS, patient satisfaction, health literacy, discharge.

Introduction

In the acute care setting, quality measures and initiatives are mandated from multiple sources and require astute attention from health care providers, hospital staff, and administration. These prescribed quality initiatives have become key drivers of healthcare delivery today. Payers of health insurance, such as the Centers for Medicare & Medicaid Services (CMS), are tracking key measures, both objective and subjective data, to assure that their clients are receiving quality care and are limiting payments to hospitals that fall short of those expectations. In fiscal year 2015, CMS added the total hip and total knee replacement population to its hospital readmission reduction program. With this threat to financial reimbursement and an increased emphasis on readmissions as a quality indicator, it has become vital for hospital systems to track and reduce all-cause 30-day readmissions.

Problem Description

Readmission rates for the elective total joint replacements at a community hospital in a mid-Atlantic state, referred to as Community Regional Hospital (CRH), were consistently above national benchmarks which are defined by volume and patient acuity levels. In fiscal years 2015 and 2016, the observed incidences of readmissions were surpassing expected benchmarks of 4.5%. At that time CRH had no comprehensive report readily available to identify trends and target risk factors for those readmissions. Without access to useful readmission data CRH also lacked crucial information needed to intelligently target care at the bedside. Instead of proactively working to identify those at risk and preemptively managing risks, providers at CRH only reacted to readmissions after they occurred.

CRH not only struggled with higher than expected readmission rates in fiscal year (FY) 16, but it also experienced lower than targeted patient satisfaction scores in the area of care

transitions and discharge information. The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey measures patients' perceptions of their hospital experience. Payers use this to hold health care facilities accountable for the care provided through the hospital value based purchasing program. The care transition domain is one of eight in the HCAHPS survey and involves patients' perceptions of discharge process and their readiness to care for themselves at home. Historically, CRH performed below the 75th percentile when compared with like similar hospitals across the country. Poor communication processes, specifically at discharge, can contribute to errors, omissions and lapses in care leading to patient risk and an array of other medical complications (Dufault, et al., 2010).

Background

A systematic literature review was completed to identify causes and risk factors of hospital readmissions within thirty days of an elective total hip or total knee replacement. This review revealed readmission rates ranging from 2.2% to 6.5% for both surgery types- total hip replacements (THR) and total knee replacements (TKR) (Bernatz, Tueting, & Anderson, 2015). Patient variables such as age, body mass index (BMI) >35, length of hospital stay (LOS) >5 days, American Society of Anesthetist (ASA) classification of III or IV, discharge to a skilled nursing facility (SNF), and insurance provider/payer were among some of the common risk factors found to be correlated with increased readmissions (Bernatz, et al., 2015). According to Bernatz, et al. (2015) almost 46% of readmissions were found to be related to complications with the surgical site. Clement, et al., (2013) ranked surgical site infections as the second most common cause of infections, next to "other infections" which included pneumonia, urinary tract infections, and other wounds. Avram, Petruccioli, Winemaker, and de Beer (2014) linked THR and TKR 30-day readmissions to surgical site infections, cellulitis, bowel and bladder

complications, and a dependent functional status. Understandably, hospital acquired conditions also account for a large portion of complications that could contribute to readmissions after discharge. However, patients with multiple co-morbidities, by the nature of their compromised health conditions, will have an increased and potentially unavoidable risk for readmission compared to more healthy patients.

Rationale

There is pertinent evidence available in the literature identifying the common risk factors for hospital readmissions for patients who received a total hip or total knee replacement, but there is no data to suggest a direct link in these risk factors to the actual causes of readmission. Correlations between risk factors and readmissions can help to flag and stratify patients according to their readmission potential, but attention focused on risk factors and comorbid conditions may not be a fruitful readmission reduction strategy.

Discharge education provides an opportune target to proactively teach patients to care for themselves, individualize their needs, and minimize the risks related to the causes of readmission. However, the education they receive should be clear, thorough, and easy to follow. The purpose of health education is to “promote, retain, and restore health” (Miller & Stoeckel, 2016, p. 4). The World Health Organization (2003) has maintained its definition of health as “a state of complete physical, mental, and social well-being, not merely the absence of disease or infirmity” since 1948. Achieving health goes beyond the clinical methods to prevent, treat and manage diseases and must include education about optimizing health and promoting healthy behavior (Miller & Stoeckel, 2016).

Prior to the implementation of this project, the discharge education at CRH was generic to the procedure performed and rarely individualized to the patient or their identified risks. At

CRH, nurses perform the discharge teaching and are expected to disseminate the written materials. However, there was no standard method of delivery or format to optimize the individual's understanding and learning. The higher readmission rates and low performance on the care transition HCAHPS questions raised concern about the discharge education process. Nurses have limited time to educate patients, complicated discharge materials, and distracting work environments that can prevent ideal discharge education and compromise the patients' learning (Lasater & McHugh, 2016).

Clinical Question

This project aims to address the following clinical question: "Would a redesign of the discharge education content, format, and delivery reduce thirty-day readmission rates and improve responses to specific HCAHPS questions in patients who receive elective total hip and knee replacements?"

Purpose

The health of patients and the community requires that educators share their skills and knowledge to equip people with information to care for themselves, prevent illness, and have successful outcomes. This project focused on improving the discharge communication and transitions of care from the hospital setting with a specific aim to reduce all-cause thirty-day readmissions after a total hip or total knee replacement. Secondary aims included complication reduction, improving pain management, and positively influencing the HCAHPS questions in the care transition domain.

Methods

Theoretical Framework

Malcolm Knowles' Theory of Adult Learning suggests that adults are primarily willing to learn after they have an understanding of why they should learn it (Knowles, 1970). Rather than just telling patients what they should do, nurses need to take the time to explain background information. When presented with the 'why', most patients listen attentively, in order to avoid a problem. The adult learning theory also states that most adult learners want to be actively engaged in the learning process and that teaching should occur in a comfortable and an informal setting (Miller & Stoeckel, 2016). Education that is "realistic, timely and immediately applicable" motivates learning according to Walker and Stevenson (2016, *Learning theory support of simulation to improve nurses' care of critically ill patients*, p.28). There are various opportunities to turn the patient's hospital room into a more comfortable and engaging learning environment.

The constructivist learning theory recommends that the educator first assess the patient's point of reference and foundation of knowledge (Vygotsky, 1978). Their knowledge base serves as an introduction, or a point of entry, on which nurses can begin with the topics that are on the forefront of the patient's mind, and then segue in other areas to fill in the knowledge gaps. Patient-centered teaching can help nurses build a connection, mutual understanding, and trust while increasing the patient's willingness to learn (Walker & Stevenson, 2016).

Patient needs assessment. Many of the diagnoses from the CRH 2016 readmissions report, such as overdose, syncope, constipation, and hypotension, all correlated with complications in pain management. Other reasons for readmissions in 2016 included constipation, post-operative ileus, sepsis, and anemia. A review of the total joint replacement

discharge instructions revealed a need for better information on safely managing pain after discharge and guidance in preventing complications and other related areas.

Unfortunately, the literature offers little consensus on a single recommended method for counseling patients at discharge. McCarthy, Wolf, and Courtney (2015) completed a study in an emergency department in which patients received no counseling and were only given written discharge instructions. This discharge process was not effective since most patients self-reported that they did not read their written instructions. In order to address the concerns of the patient-provider communication, health literacy, and the safe use of medications, McCarthy, et. al. (2015) trained nurses and successfully engaged patients in a patient-centered review of the medication list by having them read aloud the discharge medication sheets.

Patient instructions should be written using a health literacy standard and sequenced based on the patient's perspective (Agency for Healthcare Research and Quality, 2010). Health illiteracy can severely impact learning and, therefore, should significantly impact methods for teaching in the healthcare setting (Miller & Stoeckel, 2016). In addition to the learning gap created by the volume of text and the lack of a proper verbal review process, the literacy level of written material used at CRH created another barrier to learning. The total joint replacement discharge instructions at CRH were written using many medical terms, complex words, and instructions. When measured using the Text Readability Consensus Calculator (TRCC), the level of writing measured at about the 9th grade reading level which far surpassed the recommendation of a 5th grade level. Patients with less education struggle to comprehend and comply wordy or complex instructions (Miller & Stoeckel, 2016). Health literacy is gaining recognition as an important area to assess in each patient. Red flags for low literacy include non-

compliance, submission of incomplete forms, an inability to give a medical history, identifying pills by sight instead of the name, and asking fewer questions (Dewalt, et al., 2010).

Professional Needs Assessment. As educators, nurses should understand their learners' preferences, barriers and limitations of learning. Ramani and Leinster (2008) point out that many clinicians "lack knowledge of educational principles and teaching strategies" (p.347). Miller and Stoeckel (2016) state that healthcare professionals' perceptions of patient learning are often influenced by their own experiences with teaching. Additionally, nurses tend to overestimate patient literacy levels, which can compromise communication and affect the patient's care, safety, and education (Dickens, Lambert, Cromwell, & Piano, 2013). Despite the responsibility to educate, nurses face a variety of barriers that prevent good patient. Short hospital stays offer less time to provide education and further compound the challenges of quality patient learning. Furthermore, varying levels of literacy, and more specifically health literacy, require individualization of teaching styles and materials to meet the patients' needs.

All adults have individual barriers to learning that require assessment and correlated adaptation of teaching (Miller & Stoeckel, 2016). During the observed discharge teaching the nurses at CRH seemed unaware or desensitized by the multitude of barriers they unknowingly encountered. The nurses were subsequently unfamiliar with ways to modify the discharge teaching to meet the patient's preferred learning method, red flags for low literacy, and barriers that affect the teaching/learning process.

Assessing for the patient's readiness to learn, or the willingness and ability to engage in a learning activity was another identified opportunity on the CRH orthopaedic unit (Miller & Stoeckel, 2016). Patient readiness to learn is often compromised by illness, medication side effects, and information overload. Post-operative patients are in a unique situation where their

need for information and education are centered around their current health state and pain experiences (Miller & Stoeckel, 2016).

Objectives. Success and health after a hospital discharge can be greatly impacted by the patient’s understanding of the discharge instructions. Even though patients and their families are the end learners, the nurses also became learners in this project to better prepare patients for a safe discharge home. Table 1 lists the project goal and objectives.

<p>Table 1.</p> <p><i>Discharge Teaching Goal and Learning Objectives</i></p>
<p>GOAL: The total joint replacement patient education will prepare patients to effectively manage their health in the post-hospital setting</p>
<p>NURSE OBJECTIVES:</p>
<p>1. The nurse will recall the three modalities of learning (visual, auditory, and kinesthetic) and apply them in his/her teaching where appropriate.</p>
<p>2. The nurse will assess for and identify potential barriers to patient learning, including literacy, and adapt or modify teaching to enhance learning accordingly.</p>
<p>3. The nurse will identify ideal teaching styles, identify personal barriers to their teaching/learning, and place value in prioritizing and optimizing safe and clear discharge teaching.</p>
<p>PATIENT OBJECTIVES</p>
<p>1. The patients will recall the names, instructions, and purpose for their medications.</p>

2. The patient will demonstrate a readiness to learn how to manage their health at home.

3. The patient will participate in discussion to evaluate effectiveness and problem solving of self-care after discharge.

Study Design

This quality improvement project used revisions to the discharge education plan in three specific areas – content, format, and delivery. First, IRB approval was obtained from the CRH and university. Then discharge materials were redesigned to improve the content, health literacy level, readability, and suitability. The content of the discharge education material was changed to pre-emptively integrate instructions to help avoid complications related to common causes of readmissions – specifically to expect and/or recognize important signs and symptoms of surgical complications, such as a blood clot or infection, how to self-manage minor complications or side effects, and how to manage pain. The second phase of this project involved the formatting and layout revisions to improve patient comprehension and learning. The last phase included nursing education about the revisions to the discharge materials, strategies to use adult learning principles, minimizing learning barriers, the teach-back method, and assessing for cultural needs.

This project was a mixed qualitative and quantitative pre-test and post-test design focused on implementing a discharge teaching and learning plan for the total joint replacement population. All patients discharged from CHR after a primary THR or TKR from March 1, 2017 through May 31, 2017, known hereafter as the implementation period, were included in the dependent variable group. Readmission rates and HCAHPS scores for two care transition questions (“When I left the hospital, I had a good understanding of the things I was responsible

for in managing my health” and “When I left the hospital I clearly understood the purpose for taking each of my medications”) for the post-implementation group were compared to patients discharged during the same dates in 2016 (March 1, 2016 – May 31, 2016).

All patients discharged during the implementation period received the revised discharge education material. Since all patients discharged from CRH receive discharge education materials, it was unnecessary to recruit or obtain consent for this intervention. However, consent was obtained from the orthopaedic nursing staff who completed the discharge education course as their compliance and post-test results were used to verify their learning. The nursing administration approved and fully endorsed this education for all inpatient orthopaedic staff nurses. The nurses were paid for four hours educational time away from patient care and given continuing education credits to complete this course.

Sample selection and location. This project was conducted at a community hospital in a mid-Atlantic state (CRH), located in a suburban area just outside of Richmond, Virginia. CRH is not-for profit 224-bed facility with a 27 bed inpatient orthopaedic unit that performs over 700 total joint replacements per year. All patients who had a primary, single, elective total hip or knee replacement and were discharged during the pre-implementation dates (3/1/16 - 5/31/16) and the post-implementation dates (3/1/17 - 5/31/17) were included. These dates were selected based on the completion of the revised discharge material and the nursing education courses which were in February, 2017. The patients who received a THR or TKR in following three months, March through May, were used as the dependent variable. The exact same months in the previous year, 2016, were used as the comparison group. This match minimized the chance for seasonal or other unknown variables to skew the readmission data.

Ethical considerations. Approval was obtained from both the CRH and University Internal Review Boards. With no identified risks to patients or staff, exempt reviews were obtained. Nurses were given information about the quality improvement project and consent for voluntary completion of the Nurse Survey of Current Discharge Practices (NSCDP, Appendix D) before receiving education about adult learning needs and barriers. Each nurse used a unique code comprised of their two digit birth month, two digit birth date, and the last two digits of their employee number. This code protected their anonymity and allowed for a comparison of each individual's response to the survey questions before and after education and implementation.

Data gathering. Readmission rates of the patients discharged during the pre-implementation period of 3/1/16 - 3/31/16 were compared to the readmission rates of the intervention population (patient discharged 3/1/17 - 5/31/17). A monthly readmission report, generated in a program called Tableau, was used to identify readmissions for all patients having a total hip or total knee replacement. The data was filtered to include only patients who have procedures that qualify for the MS DRG 469 (Total Joint Replacement with Major Comorbid Conditions) or 470 (Total Joint Replacement without Major Comorbid Conditions). There was a thirty day delay in receiving any readmission data since a readmission is calculated from the date of the initial discharge. Final readmission results for this implementation period were reported at the end of June 2017. Any confidential data such as name, social security number, medical record number, address, date of birth, etc. were only visible to the principle investigator. Private health information data elements were hidden when sharing outcomes and trends with the clinical team. The electronic medical record (EMR) was used to collect clinical information for each readmission for review and comparison, and charts were reviewed for the appropriate use of discharge education templates. A literature review provided a comparison of the identified

common causes of readmission at CRH versus the findings in the literature. The specific readmission data for CRH total hip and total knee replacement may later be used to create educational material for the key stakeholders of the total joint replacement program at CRH. The HCAHPS survey is conducted by an external survey vendor. A random sample of patients were asked to complete the survey via phone or mail after discharge. Data collected was divided by unit and procedure type so that only results from patients who had a THR or TKA were included in this project. There is an approximate 45 day delay in this data collection and reporting due to the six week survey window. All responses were sorted by DRG and discharge date. Final HCAHPS data were available after July 15th, 2017.

Time line. Approval of this DNP project proposal was obtained from the DNP project chair and committee and then submitted for IRB approval from the community hospital and the university in December, 2016. Readmissions and HCAHPS data for the pre-implementation period were collected to identify trends and causes of readmissions and to help revise the content of the discharge materials. Revisions to the discharge education materials were completed by then end of January 2017 and reassessed using the Suitability Assessment of Materials (SAM) tool. After revisions, the score increased to 39 of 44 points and achieved 88.6% compliance with the tool's guidelines.

A four hour course on Revised Discharge Education was developed and approved for continuing education credits. The professional education was offered to nurses on four different dates in February 2017. The new discharge teaching materials were placed in the EMR for distribution on March 1, 2017 through May 31, 2017. The thirty-day readmissions were collected between March 2, 2017 and June 30, 2017. HCAHPS data was collected through July 15th to allow for the 45 day response time after the final date in the implementation period, May

31, 2017. Data analysis and comparison were completed during the summer and fall of 2017. Final reports and the project summary were written, completed, and shared with the key stakeholders in the fall of 2017.

Instruments. A readmission report formatted in Excel was generated to filter readmissions specific to total hip and knee replacements and to provide pertinent data of interest about the readmission. The SAM tool is tested and validated to standardize the evaluation of patient education materials (Doak, et al., 1996). According to the Food and Drug Administration, the SAM tool was “developed under the Johns Hopkins School of Medicine, funded by the National Institutes of Health, and validated with 172 health care providers from several cultures” (www.fda.org). The TRCC uses seven validated readability formulas to create a composite grade level of any text (IHA, 2017). The professional education and the pre and post-surveys for nursing education were written and provided by the principle investigator. The revised discharge education materials were created in the EMR and available for use during the implementation period as a replacement to the previous instructions. SPSS was used to complete the statistical analysis of the data.

Interventions

Patient education plan. Revisions began with modifications to the discharge material for total joint replacements. Key components of pain management, infection prevention, and self-care at home were added to reflect the needs of the patient and the common causes of readmissions. For example, specific ways to prevent infection included monitoring for infection, wound care, hygiene, smoking cessation, and appropriate nutritional intake. Some content areas were adjusted to initially explain the “how” and why” to comply with the Adult Learning Theory (Knowles, L., 1978). Other instructions were changed to more clearly explain constipation

prevention, blood clot prevention and the concurrent use of an H2 receptor antagonist to prevent gastric bleeding and anemia. All of these content areas replaced previously verbose and confusing instructions.

Next, the format was revised using the SAM tool to assure that the new instructions were readable, easy to follow, and more appropriate for people with lower educational and literacy levels (Ryan, 2014). The SAM score sheet (Appendix A) scores material based on six main areas – content, literacy demand, graphics, layout learning stimulation and cultural appropriateness. The previous discharge materials received a score of 17 out of 44 points which was just barely in the “adequate” category and equated to being only 38.6% compliant with the SAM tool.

One in seven Americans read at or below the 5th grade reading level (Miller & Stoeckel, 2016). The readability of the discharge material was assessed using the Text Readability Consensus Calculator (Appendix B) which provided a grade level based on the number of words used, sentence length and structure, number of syllables, and more (IHA, 2017). A superior score is considered to be at or below the 5th grade level. Adequate levels are those that score between the 6th and 8th grades (Ryan, 2014). The pre-implementation discharge instructions received a “standard/average” score for ease of reading and was measured to be at the eighth to ninth grade reading level. The average sentence length decreased from 16 words and 16% of the words have three or more syllables to an average of nine words with less than 8% having more than three syllables.

Because many elderly and low-literate adults focus on reading each and every word and easily lose sight of key concepts, Choi (2011) recommends the use of pictographs, or simple drawings, to display instructions instead of complex words. As people age, cognition and

literacy usually decline, which lead to older adults attempting to link words to their own mental images. Therefore, pictographs, pictures, and simple charts were added, where possible, to simplify the instructions and provide visual cues. Adults also respond better to learning when teaching is done with visual aids (Choi, 2011). Medication teaching was done with actual prescription bottles when possible. Once the materials were revised to comply with recommended health literacy levels and at a superior rating in the SAM tool, the new instructions were populated into the EMR for use and publication beginning on March 1, 2017.

Professional education plan. The patient education plan included obtaining a commitment from nurses to deliver the information and education in a way that would optimize learning. Often experienced nurses develop habits and there exists an opportunity to build on previous knowledge that may skew or inhibit complete education for patients. A course was developed for the orthopaedic nursing staff to prepare them to be better, more effective educators and four dates were scheduled for the nursing education. Administrative support was obtained to make the course mandatory for the orthopaedic nurses to attend and to allow for time away from patient care responsibilities. The nurses were given an informed consent (Appendix C) and voluntary survey (Appendix D) about their current discharge teaching practices immediately before the professional education. The same survey was given again after the implementation period and compared for any significant changes in practice. This comparison helped to assess nurse knowledge about patient education, whether significant learning occurred, and if the concepts were applied to discharge teaching during the implementation period.

A variety of teaching modalities were employed in the professional education including a PowerPoint presentation with bulleted key concepts, class dialogue, and group participation. Emphasis was placed on teaching nurses about the various modalities of learning (visual,

auditory, and kinesthetic) as well as identifying adult learning needs and inpatient teaching barriers as shared by Ramani and Leinster (2008). All three learning modalities were addressed using the visual media for visual learners, physical activity for kinetic learners and verbal instruction for auditory learners. The nurses received information about the common causes and implications for readmissions for total joint replacements, pain management principles and medications, adult learning principles, barriers to patient learning, health literacy, and the teach-back method to validate learning. Cadorin, Bagnasco, Rocco, and Sasso (2013) suggests that meaningful learning occurs when the learner is able to build on knowledge they already have. The use of case scenarios were employed as a way help the nurses apply the newly acquired knowledge and old principles in their teaching. This role play method with each other helped the nurses prepare for questions and scenarios typically presented by patients and families and to provide feedback to one another.

The nurses were taught the importance of taking preparatory steps before conducting any discharge teaching such as organization and review of materials, optimizing the environment for learning, and assuring that the patient is comfortable and ready to learn. After an initial review for accuracy and clarity, the nurses provided patients with a copy of the printed materials, a pen, and a highlighter to encourage note taking and to foster better learning throughout the discharge teaching (Ryan, et. al., 2014). The nursing education took place in the orthopaedic classroom away from the mainstream of busy patient care.

The nurses were instructed to remove any potential learning barriers before teaching. The hospital can be a noisy, fast-paced, and distracted environment, therefore, nurses were asked to make every attempt to minimize external distractions so that learning could be optimized (Syx, 2008). Due to spatial and time constraints, the patient discharge education continued to

occur at the bedside, rather than in a quiet designated area. A door sign, which read “STOP! Discharge Teaching in Progress” (See Appendix E), was created for nurses to place on the outside of the patient’s door, to indicate to others not to enter the room or interrupt. Nurses were instructed to hand off care of other patients to the charge nurse before entering a room for teaching, and to temporarily silence all phones during the education. To avoid spatial separation and to foster a trusting relationship, nurses were encouraged to sit down with the patient or at the bedside and to be sure that the patient was comfortably positioned to see the materials and to engage in learning.

Not all factors of learning can be controlled by the educators. Certain patient demographic and social variables can influence learning and the educators must learn how to teach within the patients’ constraints and preferences. The nurses were instructed to review the admission database for information about the patient’s ethnicity, race, religious affiliation, social support, and learning preferences in order to adjust teaching to meet patient needs.

Evaluation of patient learning. The Agency for Health Research and Quality (2013) lists twelve steps in its Project Re-Engineered Discharge that can help to reduce readmissions. Teaching a written discharge plan in a way that the patient can understand, educating the patient about medications, and assessing the patient’s comprehension of the discharge plan are three of the twelve components of the RED (AHRQ, 2013) used for this project. Evaluating the patient’s learning and the effectiveness of teaching in the healthcare setting decreases the chances of noncompliance or misunderstanding that could lead to serious complications and/or readmission to the hospital. The teach-back method is an evidence-based method that can empower nurses to gauge a patient’s understanding, clarify information where needed, and to verify the patient’s

understanding of how to care for themselves in the home environment (Kornburger, Gibson, Sadowski, Maletta, & Klingbeil, 2013).

Evaluation of professional learning. Nurse learning was evaluated by the pre and post-survey as well as by direct observation. Direct observations of nurses performing their discharge teaching before the revised discharge education revealed no consistent approach to education. Instead it was a nurse-dependent and widely variable approach. After receiving the education, the nurses were observed again to see if the elements of the revised education plan were implemented, such as the teach-back education. Prior to instruction, they were given a pre-education survey on their current discharge practices. The survey compared differences in nurse discharge education practice to the post-implementation survey which was given at the conclusion of the implementation period to assess nurse knowledge and whether significant changes in practice occurred.

Results

Three different measures were chosen to study the outcomes of this project. First the nurses' discharge teaching behaviors were measured by a self-reported survey for inclusion of the discharge education plan. This measure represents whether the revised discharge teaching was successfully implemented and applied in practice. Next, readmission rates were compared between the pre-implementation period and the post-implementation period. The final measure involved the HCAHPS scores in two questions from the care transition domain to gauge the patients' perception of readiness to care for themselves and understanding the purpose of their medications after receiving education via the revised process.

After completion of the pre-implementation/pre-education survey, nurses participated in the 4 hour intervention course. The return rate of pre-implementation survey was 29/30

participants in the class for rate of 95.5%. The response rate of post-implementation survey was 21/22 eligible participants in the class for rate of 96.7%. The thirty day readmission data was reviewed for accuracy by the principle investigator by a closed chart review. The readmissions were captured only if readmitted in one of the three local facilities for both the pre-and post-implementation periods. The HCAHPS sampling protocol is designed to capture uniform representative information about patient perspectives after a hospital stay. The data came directly from the infoEdge report which is provided by the survey vendor via mail, phone, mixed mail with phone follow-up or an interactive voice response. The responses can be completed by the patient or any representative which could skew the responses and results. This data was keyed into SPSS for calculation and cross verified for accuracy. The responses to the nursing survey questions were assigned a number value and keyed in to Excel. The survey tool offered a Likert scale for responses from strongly disagree, disagree, agree, and strongly agree. The responses were keyed into Excel using a numeric value of 1-4 respectively and all data entry values were verified using a 10% random check for accuracy.

The data analysis was performed in SPSS using a paired t-test on the twenty-one survey responses of the nurse behaviors for discharge education between the pre- and post-implementation periods. The comparison of means showed a statistically significant improvement in five of the seven questions (Table 2). Question 1 demonstrated a significant improvement ($p=0.001$) in how often the nurses identified patients' learning needs or preferences. However, question 2 showed that nurses did not significantly change ($p=0.68$) how often they incorporated identified preferences into their teaching practice. Question 3 showed that nurses made significantly ($p=0.029$) more effort in the post implementation phase to include the patient's family or caregiver in the discharge teaching session. Question 4 demonstrated the

greatest improvement with a significant change ($p < 0.0001$) in how often nurses made attempts to remove learning barriers when performing their discharge teaching. When responding to question 5, nurses reported a significant improvement ($p = 0.025$) in the use of the teach-back method to validate learning. Question 6 was negatively worded and the goal was to see a drop in the mean. While the nurses reported a very slight drop in the frequency of interruptions during the implementation period, there was no significant ($p = 0.815$) change. In the final question, nurses reported a significant improvement ($p = 0.047$) when adjusting the discharge teaching to meet the patient's cultural needs.

Question #	Content of questions	pre mean	post mean	p value
Q1	Identify Learning Preference	3.29	4.14	*0.001
Q2	Modify Teaching to Match Preference	4.1	4.19	0.68
Q3	Involved Family in Teaching	4.24	4.62	*0.029
Q4	Removed Learning Barriers	3.62	4.38	* < 0.0001
Q5	Used Teach-Back	3.81	4.24	*0.025
Q6	Avoided Interruptions	3.2	3.15	0.815
Q7	Made Cultural Modifications	3.71	4.14	*0.047

Note. Significant at $p < 0.05$ indicated by *

Causes of readmissions seen at CRH were similar to those seen in the literature. There were a total of 124 total hips and knee replacements done between March and May 2016. Eleven of those patients were readmitted within thirty days of their discharge accounting for a

readmission rate of 8.87% with a 95% confidence interval of 3.86-13.87. In the post-implementation period, March-May 2017, there were 171 total hip and total knee replacement surgeries performed and only five of these patients required readmission within 30 days. The readmission rate in 2017 dropped below the lower confidence interval to 2.92% showing a significant improvement ($p < 0.05$) in the post-implementation period.

HCAHPS data were collected from the survey vendor reports showing the number of respondents for patients who had a major joint replacement with or without major complications categorized in Diagnosis Related Group (DRG) 469 and 470 respectively. These two groups were merged together for data reporting. The two questions in the care transitions domain in focus were “When I left the hospital, I had a good understanding of the things I was responsible for in managing my health” and “When I left the hospital I clearly understood the purpose for taking each of my medications”. The HCAHPS scores for the two care transition domain questions were abbreviated as MMH (manage my health at home) and POM (purpose of medications). There were 55 respondents for the 2016 pre-implementation period and 62 for the post-implementation period. The POM question offered the same four responses and an additional option “not given medications”. There were five patients who reported that they were not given medications at discharge so this left a total of 51 respondents in the 2016 pre-implementation period and 61 in the post-implementation period. The comparison of responses between the two periods ~~were~~ was performed in SPSS using a 95% confidence interval and is shown in table 3. While there were fewer negative responses in the strongly disagree or disagree categories, only one change was significant. The number of responses to the POM question in 2016 increased from 56.5% strongly agreeing that they understood the purpose of their medication to 73.77% in strong agreement in 2017 is shown in table 4. The 95% confidence

interval for this response option was 33.35-60.75 and since the response is greater than this upper confidence interval, this measure has a significant improvement with a p value <0.05.

Table 3.					
<i>HCAHPS Survey Response Comparisons for Managing my Health</i>					
Question	# Observations	# Events	Percentage	Lower CI	Upper CI
MMH 2016 Disagree	55	1	1.82%	-1.71%	5.35%
MMH 2017 Disagree	62	0	0.00%	0.00%	0.00%
MMH 2016 Agree	55	24	43.64%	30.53%	56.74%
MMH 2017 Agree	62	27	43.55%	31.21%	55.89%
MMH 2016 Strong A	55	30	54.55%	41.39%	67.71%
MMH 2017 Strong A	62	35	56.45%	44.11%	68.79%
MMH 2016 A + SA	55	54	98.18%	94.65%	101.71%
MMH2017 A + SA	62	62	100.00%	100.00%	100.00%
<i>Notes.</i> A = Agree, SA = Strongly agree, D = Disagree, SD = Strongly disagree					

Table 4.					
<i>HCAHPS Survey Response Comparisons for Purpose of Medications (POM)</i>					
Question	# Observations	# Events	Percentage	Lower CI	Upper CI
POM 2016 Str. Dis.	51	2	3.92%	-1.41%	9.25%
POM 2017 Str. Dis.	61	1	1.64%	-1.55%	4.83%
POM 2016 Disagree	51	2	3.92%	-1.41%	9.25%
POM 2017 Disagree	61	1	1.64%	-1.55%	4.83%

POM 2016 D + SD	51	4	7.84%	0.46%	15.22%
POM 2017 D + SD	61	2	3.28%	-1.19%	7.75%
POM 2016 Agree	51	23	45.10%	31.44%	58.75%
POM 2017 Agree	61	14	22.95%	12.40%	33.50%
POM 2016 Strong A	51	24	47.06%	33.36%	* 60.76%
POM 2017 Strong A	61	45	* 73.77%	62.73%	84.81%
POM 2016 A + SA	51	47	92.16%	84.78%	99.54%
POM 2016 A + SA	61	59	96.72%	92.25%	101.19%
<i>Notes.</i> A = Agree, SA = Strongly agree, D = Disagree, SD = Strongly disagree					
Significance is indicated with *.					

Discussion

With heightened awareness on performance measures such as readmission rates and HCHAPS scores, hospitals and clinicians are searching for ideas and opportunities to impact change in these areas. The literature on the subject matter of thirty-day readmissions for total joint replacements speak to the notion that the causes of readmissions vary too much to make a cohesive decision on a single plan of attack. The literature consistently reports that more research and information is needed to provide guidance on actionable steps to improve these outcomes.

The causes for readmissions at CRH were no different and varied as much as was reported in the literature. However, it was noted that many of the reasons for the causes of the 2016 readmissions were addressed in some fashion in the discharge instructions. A review of the verbatim responses from the HCAHPS surveys and the previous scores in the care transition

domain questions generated the concern that the current discharge instructions and process was inadequate.

Patients deserve to receive information in a learner friendly format that optimizes their understanding and learning. Surprisingly, the previous discharge instructions were written at a 9th grade reading level. Further investigation revealed even more discrepancies from recommended guidelines for readability and health literacy. The discharge materials needed simplification of the instructions to allow delivery in a more organized, clear, and concise way to optimize learning, patient compliance, and confidence in self-care. Revising the discharge education content and delivery optimized learning and improved readmissions and HCAHPS scores after a total hip or knee replacement.

Summary. In addition to being the primary goal of the project, the significant drop in the readmission rate from 8.87% to 2.92% ($p < 0.00001$) offers the most clinically significant outcome. While the readmission rates did drop significantly, there are other confounding variables that could contribute to the potential for readmissions. For example, the discharge instructions are buried within a document, the After Visit Summary (AVS) that nurses must print and give to every patient. The format, content, and organization of this larger document is long, unorganized, and sparsely populated with meaningful information to the patient. The core discharge instructions are usually found seven pages deep and nurses bypass them routinely. The facility was working on other concurrent readmission reduction strategies such as post-discharge phone calls, earlier follow-up surgical post-op appointments from four weeks to two weeks. However, it was the nursing survey of discharge teaching behaviors that measured the success and the greatest impact of the revised discharge education plan. The project

implementation focused directly on the modification of the materials, both format and content, as well as the delivery of those materials through education.

Interpretation. Not only did the readmission rates demonstrate statistically significant improvements, but the root cause analysis revealed some clinically significant improvements from the types of readmissions from 2016 to 2017 as well. Reasons for readmission during the project implementation were compared to those reported in the literature. The causes for the eleven readmissions in the 2016 pre-implementation period included sepsis, hypotension, complications from CHF, joint infection and anemia. All conditions could be closely related to the initial hospitalization for the total joint replacement, and appropriate modifications were made to the discharge education material to address each. Other unrelated reasons for readmission in 2016 or reasons not directly addressed in the discharge materials, included mental health disorders and a retroperitoneal adhesion. This categorization correlates with 73.7% (eight out of the eleven patients) having conditions that would have been addressed more clearly if given the revised discharge materials and education. Interestingly, none of these same causes were seen again in the post-implementation period. Four of five patients in 2017 were readmitted for atrial fibrillation, myocardial infarction, traumatic fracture, and a complication from an unrelated vascular procedure. Only one case was readmitted for a reason, post-operative ileus, which is addressed in the revised discharge materials. With only 20% of these cases categorized as a related and potentially avoidable root cause, it appears the lack of related causes for readmissions is due to the use of the improved discharge communication tool and education process.

The NSCDP included 7 questions and four of them were found to have a statistically significant change in practice for the better and an overall significant improvement and

compliance with the revised discharge teaching plan. The pre-education surveys indicated nurses were concerned patients were not receiving education in a way that was easily understood. This was further validated by observations of the pre-implementation discharge teaching. Many of the nurses reported in their course evaluations that they found the information helpful and that they planned to incorporate the principles of adult learning into practice.

The first question of the NSCDP asked how often the nurse identified a patient's learning style and preferences before teaching. Prior to receiving the education, 51.6% of nurses reported that they never to sometimes did. After completing the professional education and implementing the revised discharge education plan, 76% of nurses reported that they identified the patient learning style and preference very often to always. The remaining responses reported they sometimes did. Identifying learning preferences is a key principle and drives how the patient education and information is individualized. The second survey question asks if the nurses modified their teaching method based on the preferred learning style. There was an insignificant improvement from 4.1 to 4.19, but the pre-education mean was already quite high which left little room for improvement. The next three questions involved the inclusion of family, the removal of learning barriers, and the use of the teach-back method. All three of these behaviors improved significantly from the pre-education period, with the removal of barriers representing the most significant improvement of all ($p < 0.0001$). Nurses mitigated barriers during discharge teaching by intentionally timing the education, reducing noise and distraction in the room, and practicing presence by sitting with the patient during the teaching. The sixth question focused on how often the discharge teaching was interrupted. While the nurses were taught ways to minimize interruptions such as use of a sign (Appendix E) to indicate teaching was occurring in the room, many of the typical interruptions still occurred. Nurses reported, and direct

observations confirmed, that the signage was directly ignored and disregarded most of the time resulting in the signage being used less often.

The HCAHPS scores during the pre-implementation period were close to national and facility benchmarks in pre-assessment. In comparison, many of the responses moved from disagree to agree and strongly agree and represents some improvement in patient perception and satisfaction with feeling prepared to care for themselves at home and understanding the purpose of their medications. Even when grouping the responses in categorical agreement verses disagreement, there was no significant shift. The one exception was seen in the significant leap to strongly agree when asked if they understood the purpose of the medications ($p < 0.05$). The discharge instructions and sentences were reformatted to clearly explain the purpose of the instruction, or medication, before providing the steps that were needed based on the SAM tool. This reorganization of the information helps to plant a vested interest for compliance in the mind of the patient.

Limitations. During the five month time frame from the dates of the nursing education to the time that the post-surveys were collected, the orthopaedic department lost eight orthopaedic nursing staff members. This is a confounding variable and creates a limitation of this project. As a result, staffing was at a critical low and supplemented with float pool nurses who did not receive the revised discharge education. It is important to note, however, that the revised discharge education material was implemented on March 1, 2017.

There were other confounding variables that could have contributed to better readmission rates and HCAHPS scores other than this project. The EMR began flagging patients registered in the emergency room with a tornado icon to indicate a recent admission. This icon signaled ED providers to investigate the past admission and to prevent a readmission where possible.

Secondly, all nurses at CRH were instructed to stick magnetic medication cards which had basic information about the purpose and side effects medications to the white boards in the patient rooms. This visual cue could have also contributed to the patients' positive perception in the POM question.

Conclusion. The revised discharge education plan proved to be a useful tool for the nursing staff. The nurses responded positively to the education about health literacy, learning principles, learning barriers, and the teach-back method and readily incorporated it into their practice. Nurses reported that the lack of time and frequent interruptions were the most common challenges during discharge education. More education is needed for members of other disciplines about the impact interruptions have on teaching and learning comprehension. As nursing staff turns over, the sustainability of the revised education delivery, the use of adult learning needs, and barrier removal will be at risk. Nursing leadership is aware of this and has agreed to have new hires attend a brief version of the course during their orientation. Early in the intervention, float pool nurses, who had no knowledge of the revised discharge education plan, were assigned to orthopaedic patients. These nurses were invited to participate in the education; however, none attended.

The orthopaedic specific discharge instructions were formatted for font, layout, sentence structure, and word choice to improve the readability and suitability of the materials. However, these instructions were included in the "After Visit Summary" (AVS) which is a collective document that nurses are required to print and hand to the patient at the time of discharge. The AVS document is typically fifteen pages long with poor readability and poor information. The principle investigator began working with a corporate team to modify the EMR so that the content, format, and organization will comply with readability standards.

Nurses providing discharge care for THR/TKR population should be equipped with knowledge and awareness about ways to optimize patient education. Given the success of this project, there is an opportunity to change the patient content and reproduce the revised discharge plan in a variety of hospital settings while possibly improving readmission rates and HCAHPS for other patients.

Appendix A

SAM Scoring Tool with Evaluation Criteria

SAM FACTOR TO BE RATED	EVALUATION CRITERIA	SCORE
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1. Content	a. Purpose It is important that readers understand the purpose of the materials. If they don't they may miss the main point.	Purpose is explicitly stated in the title, cover illustration or introduction.	2
		Purpose is not explicit. It is implied or multiple purposes are stated.	1
		No purpose is stated in the title, illustration or introduction	0
	b. Content topics Adult learners usually want to solve their problem, rather than learn facts. The content of most interest and use is likely to be behavior information to help solve their problem.	Thrust of material is application of knowledge/skills aimed at desirable reader behavior rather than facts.	2
		At least 40 per cent of content topics focus on desirable behaviors or actions.	1
		Nearly all topics focus on non-behavior facts.	0
	c. Scope Scope should be limited to the purpose/objectives of the material, and to what can reasonably be learned in the time typically allocated to reading the information.	Scope limited to essential information directly related to the purpose. Experience shows it can be learned in the time available.	2
		Scope expanded beyond the purpose of the document, but no more than 40% is non-essential information. Key points can be learned in the time available.	1
		Scope is far out of proportion to the purpose and time available.	0
	d. Summary/review A summary offers readers a chance to see the key points in other words or examples. They are important; readers often miss the key points when they first read them.	A summary is included and retells the key message in different words and examples.	2
		Some key ideas are reviewed.	1
		No summary or review is included.	0
2. Literacy demand	a. Reading Grade Level The text reading level will be an important factor in whether your target group understands your document. Reading formulas, like SMOG, provide a reasonably accurate measure of reading difficulty.	5th-grade or lower (5 years of schooling).	2
		6 th – 8 th - grade level (6 – 8 years of schooling).	1
		9 th -grade level and above (9+ years of schooling).	0
	b. Writing style Conversational style and active voice lead to easy-to-understand text. E.g. 'Take your medicine every day' (active voice) is more effective than 'Patients are advised to take their medicine every day' (passive voice). Embedded information – long or multiple phrases included within a sentence – slows down the reading process and often makes comprehension harder.	Both of the following are present: the text is mostly conversational style and active voice ▪ simple sentences are used extensively ▪ few sentences contain embedded information.	2
		About 50 per cent of the text uses conversational style and active voice. Less than half of the sentences have embedded information.	1
		Passive voice is used throughout. Over half the sentences have extensive embedded information.	0
	c. Vocabulary	All three of the following are present:	2

	<p>It's best to:</p> <ul style="list-style-type: none"> ▪ use common, explicit words, e.g. 'doctor' rather than 'specialist'/'physician'. ▪ avoid words that express general terms: <ul style="list-style-type: none"> ▪ categories, e.g. 'a disability unit' versus 'a unit that's specially designed for people with disabilities' ▪ concepts, e.g. 'normal range' versus '15–70 meters' ▪ value judgements, e.g. 'excessive pain' versus 'pain that makes it hard to think about anything else' ▪ use words that create an image, e.g. 'brown bread' versus 'dietary fiber'; a 'runny nose' versus 'excess mucus'. 	<ul style="list-style-type: none"> ▪ common words are used nearly all the time ▪ technical, concept, category and value judgement words are explained by examples ▪ imagery words are used as appropriate for content. 	
		<p>Common words are frequently used. Technical concept, category and value judgement words are sometimes explained by examples. Some jargon or math symbols are included.</p>	1
		<p>At least two of the following are present:</p> <ul style="list-style-type: none"> ▪ uncommon words are frequently used in lieu of common words ▪ no examples are given for technical, concept, category and value judgement words ▪ extensive jargon is used. 	0
	<p>d. Context</p> <p>We learn new facts/behaviors more quickly when told the context first. E.g. 'To find out what's wrong with you (the context first), the doctor will take a sample of your blood for testing in the lab.'</p>	<p>The material consistently provides context before presenting new information.</p>	2
		<p>Provides context before new information about 50 per cent of the time.</p>	1
		<p>Context is provided last or no content is provided.</p>	0

	e. Advanced organizers	Nearly all topics are preceded by an advance organizer (a statement that tells what is coming next).	2
	Headers or topic captions tell very briefly what's coming up next. These 'road signs' make the text look less formidable, and prepare the reader's thought process to expect the next topic.	About 50 per cent of the topics are preceded by advance organizers.	1
		Few/no advance organizers are used.	0
3. Graphics		a. Cover graphic	All three of the following are present: The cover graphic is friendly The cover graphic attracts attention The cover graphic clearly portrays the purpose of the material.
	People do judge a booklet by its cover. The cover image is often the deciding factor in a reader's attitude toward, and interest in, the information.	The cover graphic has one or two of the superior criteria.	1
		The cover graphic has none of the superior criteria.	0
		b. Type of illustrations	Both of the following are present: Simple, adult-appropriate line drawings/sketches Illustrations are likely to be familiar to readers.
	Simple line drawings can promote realism without including distracting details (photos often include extra details). Visuals are accepted and remembered better when they portray what is familiar and easily recognized.	One of the superior factors is missing.	1
		None of the superior factors are present.	0
		c. Relevance of illustrations	Illustrations present key messages visually so the reader can grasp the key ideas from the illustrations alone. There are no distracting illustrations.
	Non-essential details such as room background, elaborate borders, unneeded color can distract the reader, whose eyes may be 'captured' by these details. The illustrations should tell the key points visually.	Illustrations include some distractions and/or there are insufficient illustrations.	1
		There are confusing or technical illustrations (non-behavior related), no illustrations or an overload of illustrations.	0
		d. List, tables, graphs, charts	Step-by-step directions, with an example, are provided that will build comprehension and self-efficacy.
	Many readers do not understand the purpose for lists, charts, and graphs. Explanations and directions are essential.	'How-to' directions are too brief for reader to understand and use the graphic without additional counselling.	1
		Graphics are presented without explanation.	0
		e. Captions	Explanatory captions are provided with all or nearly all illustrations and graphics.
	Captions can quickly tell the reader what the graphic is all about and where to focus within the graphic. A graphic without a caption is usually an inferior instruction and a missed	Brief captions used for some illustrations and graphics.	1
		Captions are not used.	0

	learning opportunity.		
4. Layout and typography	a. Layout Layout has a substantial influence on the suitability of materials.	At least 5 of the following are present: Illustrations are on the same page adjacent to the related text. Layout and sequence of information is consistent, making it easy for the reader to predict the flow of information. Visual cuing devices (shading, boxes, arrows) are used to direct attention to specific points or key content. Adequate white space is used to reduce clutter. Use of color supports and is not distracting to the message. Viewers need not learn color codes to understand and use the message. Line length is 30–50 characters and spaces. There is high contrast between type and paper. Paper has non-gloss or low-gloss surface.	2
		Three+ superior factors are present.	1
		Two (or less) superior factors are present. The material looks uninviting or discouragingly hard to read.	0
	b. Typography Type size and fonts can make text easy or difficult for readers at all skill levels. For example text in ALL CAPS slows reading comprehension. Also, when too many (six or more) type fonts and sizes are used on a page, the appearance becomes confusing and the focus uncertain.	The following four factors are present: Text type is in uppercase and lower-case serif (best) or sans-serif. Type size is at least 12 points. Typographic cues (bold, size, color) emphasize key points. No ALL CAPS are used for long headings or running text.	2
		Two of the superior factors are present.	1
		One or none of the superior factors are present, or six or more type styles and sizes are used on a page.	0
c. Subheadings ('chunking') Few people can remember more than seven independent items. For adults with low literacy skills, the limit may be three- to five-item lists. Longer lists need to be broken into smaller "chunks".	Lists are grouped under descriptive subheadings or "chunks". There are no more than five items presented without a subheading.	2	
	No more than seven items are presented without a subheading.	1	
	More than seven items are presented without a subheading.	0	
5. Learning stimulation, motivation	a. Interaction When a reader responds to an instruction (i.e. does something in response) chemical changes take place in the brain that enhance retention in long-term memory. Readers should be asked to solve problems, to make choices, to demonstrate, etc.	Problems or questions are presented for reader responses.	2
		Question-and-answer format is used to present problems and solutions (passive interaction).	1
		No interactive learning stimulation provided.	0
	b. Modelling of behaviors	Instruction models specific behaviors or skills, e.g. for nutrition instruction, emphasis is given to specific behaviors like reading	2

	People often learn more readily by observation, by doing something for themselves rather than by reading or being told, and when specific, familiar instances are used rather than the abstract or general.	produce labels.	
		Information is a mix of technical and common language that the reader may not easily interpret in terms of daily living (for example, Starches: 80 calories per serve; High fiber: 1-4 grams of fiber per serve).	1
		Information is presented in non-specific or category terms such as food groups.	0
	c. Motivation People are more motivated to learn when they believe the tasks/behaviors are do-able by them.	Complex topics are subdivided into small parts so that readers may experience small successes in understanding or problem solving, leading to self-efficacy.	2
		Some topics are subdivided to improve the readers' self-efficacy.	1
		No partitioning is provided to create opportunities for small successes.	0
	6. Cultural appropriateness	a. Cultural match A valid measure of cultural appropriateness of material is how well its logic, language, and experience (inherent in the instruction) match the logic, language and experience of the intended audience. For example a nutrition instruction is a poor cultural match when it tells readers to eat asparagus if asparagus is rarely eaten by people in that culture and is not sold in the readers' neighborhood.	Central concepts/ideas of the material appear to be culturally similar to the logic, language and experience of the target culture.
Significant match in the logic, language and experience for 50 per cent of the central concepts.			1
Clearly a cultural mismatch in the logic, language and experience.			0
b. Cultural image and examples To be accepted, an instruction must present cultural images and examples in realistic and positive ways.		Images and examples present the culture in positive ways.	2
		There is neutral presentation of cultural images or foods.	1
		Negative images are used, such as exaggerated or caricatured cultural characteristics, actions or examples.	0
		Total SAM score	
		Total possible score	
		Per cent score	

Retrieved November 2016 from

http://www.dhhs.tas.gov.au/publichealth/about_us/health_literacy/health_literacy_toolkit/suitability_assessment_of_material_score_sheet

Appendix B

Text Readability Consensus Calculator Results Before Modifications

Flesch Reading Ease score: 61.2 (text scale)

Flesch Reading Ease scored your text: standard / average.

[\[f\]](#) | [\[a\]](#) | [\[r\]](#)

Gunning Fog: 10.1 (text scale)

Gunning Fog scored your text: fairly easy to read.

[\[f\]](#) | [\[a\]](#) | [\[r\]](#)

Flesch-Kincaid Grade Level: 8.6

Grade level: Ninth Grade.

[\[f\]](#) | [\[a\]](#) | [\[r\]](#)

The Coleman-Liau Index: 8

Grade level: Eighth grade

[\[f\]](#) | [\[a\]](#) | [\[r\]](#)

The SMOG Index: 9.1

Grade level: Ninth Grade

[\[f\]](#) | [\[a\]](#) | [\[r\]](#)

Automated Readability Index: 6.6

Grade level: 11-13 yrs. old (Sixth and Seventh graders)

[\[f\]](#) | [\[a\]](#) | [\[r\]](#)

Linsear Write Formula : 9.2

Grade level: Ninth Grade.

[\[f\]](#) | [\[a\]](#) | [\[r\]](#)

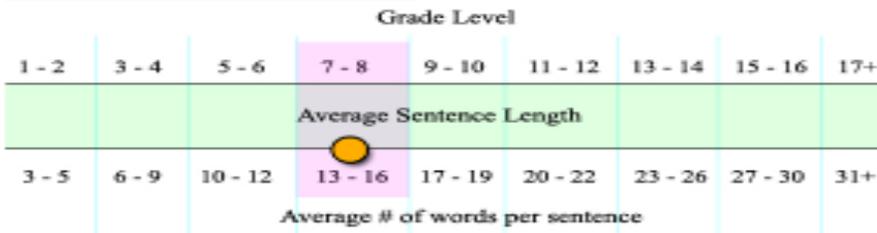
Appendix B

Readability Summary of Content Before Modifications

<p>Readability Consensus Based on 8 readability formulas, we have scored your text: Grade Level: 8 Reading Level: standard / average. Reader's Age: 12-14 yrs. old (Seventh and Eighth graders)</p>

Show Word Statistics

Show Graph Statistics

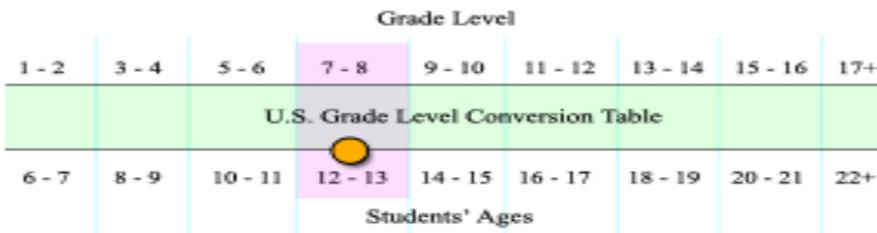


(Green color) = Name of graph

(Pink color) = U.S. average grade level.

● = Your text

The average sentence length for U.S. high school and adult readers is between 13-16 words. Your average sentence length is 16.

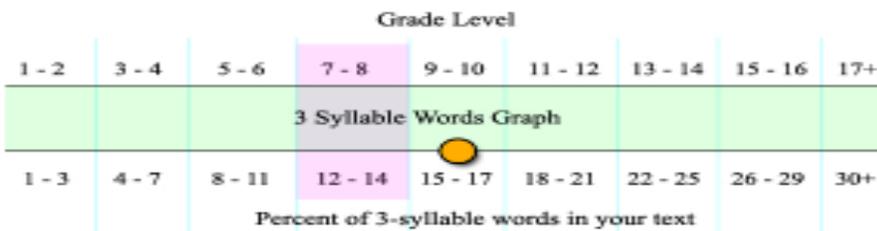


(Green color) = Name of graph

(Pink color) = U.S. average grade level.

● = Your text

The average reading level for U.S. high school and adult readers is between 7th and 8th grade. Your text's grade level is 8.



(Green color) = Name of graph

(Pink color) = U.S. average grade level.

● = Your text

The average percent of 3-syllable words for U.S. high school and adult readers is between 12-14%. The percent of 3-syllable words in your text is 16%.

Appendix C

Informed Consent for Nursing Survey

Michele M. Hughes
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Improve Readmissions and | Patient Satisfaction Scores with a Revised Discharge Education Plan

Consent Form

You are invited to take part in a research survey about discharge teaching. Your participation will require approximately five minutes. There are no known risks or discomforts associated with this survey. Your information will help determine opportunities for improvement in the discharge process. Taking part in this survey is completely voluntary. If you choose to be in the study you can withdraw at any time without adversely affecting your relationship with anyone at MRMC. Your responses will be kept strictly confidential, and digital data will be stored in secure computer files after it is entered. Any report of this research that is made available to the public will not include any individual information by which you could be identified. If you have questions or want a copy or summary of this survey's results, you can contact the investigator at the email address above. Completing this survey indicates that you are 18 years of age or older and indicates your consent to participate in the research.

Appendix D

Nursing Pre-Education Survey

Nurse Survey of Current Discharge Practices

Unique Nurse Code: _____ (date of birth MM/DD/last two of Lawson #)



1. How often do you identify your patients learning style and preferences before teaching them?					
Never	Not very often	Sometimes	Very Often	Always	What are learning styles?
2. How likely are you to modify your teaching method to meet the identified learning style of the patient?					
Not at all	Not very likely	Likely	Very Likely	All of the time	What are teaching methods?
3. How often do you involve the patient's family or caregiver in the discharge teaching?					
Never	Not very often	Sometimes	Very Often	Always	
4. How likely are you to identify and remove learning barriers prior to discharge teaching?					
Not at all	Not very likely	Likely	Very likely	All of the time	What are barriers?
5. How often do you use teach-back method during your discharge education?					
Not at all	Not very often	Sometimes	Very Often	All of the time	What is teach-back?
6. How often are you interrupted while doing your discharge teaching?					
Not at all	Not very often	Sometimes	Very Often	Every time	
7. How often do you modify your teaching for cultural differences?					
Not at all	Not very often	Sometimes	Very Often	All of the time	What are cultural differences?

Appendix E

Nurse Interruption Prevention Tool



References

- Agency for Healthcare Research and Quality. (2013). *Re-Engineered Discharge (RED) Toolkit*. Retrieved from <http://www.ahrq.gov/professionals/systems/hospital/red/toolkit/index.html>
- American Pain Society. (2016). *Clinical Practice Guideline for Post-surgical Pain Management*. Retrieved from <http://americanpainsociety.org>
- Armstrong, G., Headrick, L., Madigosky, W., & Ogrinc, G. (2012). Designing education to improve care. *The Joint Commission Journal on Quality and Patient Safety*, 38(1); 5-14.
- Avram, V., Petruccelli, D., Winemaker, M., de Beer, J. (2014). Total joint arthroplasty readmission rates and reasons for 30-day hospital readmission. *Journal of Arthroplasty*, 29, 465-468.
- Bernatz, J., Tueting, J., & Anderson P. (2015). Thirty-day readmission rates in orthopedics: a systematic review and meta-analysis. *PLOS One*. doi: 10.1371/journal.pone.0123593
- Bik-Wai Bilvick, T., Bae, Y., LaRue, C., & Law, A. (2016). Putting words into action: a simple focused education improves prescription label comprehension and functional health literacy. *Journal of the American Pharmacists Association*, 56(2), 145–152.
- Cadorin, L., Bagnasco, A., Rocco, G., & Sasso, L. (2014). An integrative review of the characteristics of meaningful learning in healthcare professionals to enlighten educational practices in health care. *Nursing Open*; published by John Wiley & Sons Ltd.
- Centers for Medicare & Medicaid Services. (2017). *The HCAHPS Survey – Frequently Asked Questions*. Retrieved from <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HospitalQualityInits/Downloads/HospitalHCAHPSFactSheet>

201007.pdf

- Choi, J. (2011). Pictograph-based discharge instructions for low-literate older adults after hip replacement surgery: development and validation. *Journal of Gerontological Nursing, 37(11)*; 47-56.
- Clement, R., Derman, P., Graham, P., Speck, R., Flynn, D., Levin, L., & Fleisher, L. (2013). Risk factors, causes, and the economic implications of unplanned readmissions following total hip arthroplasty. *Journal of Arthroplasty, 28(1)*, 7-10.
- Costello, M. (2015). Prescription opioid analgesics: promoting patient safety with better patient education. *American Journal of Nursing, 115(11)*; 50-56.
- Curran, M. (2014) Examination of the teaching styles of nursing professional development specialists, part I: best practices in adult learning theory, curriculum development, and knowledge transfer. *Journal of Continuing Education in Nursing, 45(5)*, 233-240.
- Dewalt, D., Callahan, L., Hawk, V., Broucksou, K., & Hinck, A. (2010). Health Literacy Universal Precautions Toolkit. Agency for Healthcare Research and Quality. Retrieved from <http://www.ahrq.gov>
- Dickens, C., Lambert, B., Cromwell, T., & Piano, M. (2013). Nurse overestimation of patients' health literacy. *Journal of Health Communication, 18(1)*, 62-69.
- Doak, C., Doak, L., & Root, J. (1996). Teaching patients with low literacy, 2nd Ed. Philadelphia: Lippincott Company.
- Dufault, M., Duquette, C., Ehmann, J., Hehl, R., Lavin, M., Martin, V., ... & Willey, C. (2010). Translating an evidence-based protocol for nurse-to-nurse shift handoffs. *Worldviews on Evidence-Based Nursing, 7(2)*, 59-75.

- Food and Drug Administration. (2010). Suitability Assessment of Materials. Retrieved from <https://www.fda.gov/AdvisoryCommittees/CommitteesMeetingMaterials/RiskCommunicationAdvisoryCommittee/ucm202895.htm>
- Herman, J. (2011). Keeping their attention: innovative strategies for nursing education. *The Journal of Continuing Education in Nursing*, 42(10); 449-456.
- Inneh, I., Lewis, C., & Schutzer, S. (2014). Focused risk analysis: regression model based on 5,314 total hip and total knee arthroplasty patients from a single institution. *Journal of Arthroplasty*, 29, 2031-2035.
- Institute for Healthcare Advancement. (2017). *Text Readability Consensus Calculator*. Retrieved from <http://www.healthliteracysolutions.org/resource/free-text-readability-consensus-calculator/> .
- Jones, R., & Haskell, S. (2012). Know the score: a new tool to help assess, address, and evaluate COPD education. *Canadian Journal of Respiratory Therapy*, 48(1), 26-27.
- Kornburger, C., Gibson, C., Sadowski, S., Maletta, K., & Klingbeil, C. (2013). Using teach-back to promote safe transition from hospital to home: an evidence-based approach to improving the discharge process. *Journal of Pediatric Nursing*, 28(3): 282-291.
- Knowles, M. S. (1970). *The Modern Practice of Adult Education. Andragogy versus Pedagogy*. Englewood Cliffs: Prentice Hall/Cambridge.
- Lasater, K., & Mchugh, M. (2016). Nurse staffing and the work environment linked to readmissions among older adults following elective total hip and knee replacement. *International Journal for Quality in Health Care*, 28(2), 253-258.
- Leat, S., et. al. (2015). Improving the legibility of prescription medication labels for older adults and adults with visual impairment. *Canadian Pharmacists Journal*, 149, 174-184.

- Manchikanti, L., Helm, S., &...Boswell, M. (2012). Opioid epidemic in the united states. *Pain Physician Journal*, 15; ES9-ES38.
- McCarthy, D., Wolf, M., ...& Courtney, D. (2015). Improving patient knowledge and safe use of opioids: a randomized controlled trial. *Journal of the Society for Academic Emergency Medicine*, 22, 331-339.
- Mesko, N., Bachmann, K., Kovacevic, D., LoGrasso, M., O'Rourke, C., Froimson, M. (2014). Thirty-day readmission following total hip and knee arthroplasty – a preliminary single institution prediction model. *Journal of Arthroplasty*, 29, 1532-1538.
- Miller, M., & Stoeckel, P. *Client Education: Theory and Practice*. Birmingham: Jones & Barlett Learning.
- Nguyen, L., Sing, D., & Bozic, K. (2016). Preoperative reduction of opioid use before total joint arthroplasty. *Journal of Arthroplasty*, 31, 282-287.
- Paxton, E., Inacio, M., Singh, J., Love, R., Bini, S., & Namba, R. (2015). Are there modifiable risk factors for hospital readmission after total hip arthroplasty in a US healthcare system? *Clinical Orthopaedics and Related Research*, 473, 3446-3455.
- Pfizer. (2011). *Newest Vital Sign: A Health Literacy Assessment Tool*. Retrieved at http://www.pfizer.com/health/literacy/public_policy_researchers/nvs_toolkit
- Pugely, A., Callaghan, J., Martin, C., Cram, P., Gao, Y. (2013). Incidence of and risk factors for 30 day readmission following elective primary total joint arthroplasty: analysis from the ACS-NSQIP. *Journal of Arthroplasty*, 28, 1499-1504.
- Ramani, S., & Leinster, S. (2008). AMEE guide no 34: teaching in the clinical environment. *Medical Teacher*, 30; 347-364.
- Ramos, N., Karia, R., Hutzler, L., Brandt, A., Slover, J., Bosco, J. (2014). The effect of discharge

- disposition on 30-day readmission rates after total joint arthroplasty. *Journal of Arthroplasty*, 29, 674-677.
- Ryan, L., Logsdon, M., McGill, S., ...& Davis, D. (2014). Evaluation of printed health education materials for use by low-education families. *Journal of Nursing Scholarship*, 46(4); 212-228.
- SAM: Suitability Assessment of Materials for evaluation of health-related information for adults. (1996). Retrieved at <http://aspiruslibrary.org/literacy/sam.pdf>
- Saucedo, J., Marecek, G., Wanke, T., Lee, J., Stulberg, D., & Puri, L. (2014). Understanding readmission after primary total hip and knee arthroplasty: who's at risk? *Journal of Arthroplasty*, 29, 256-260.
- Syx, R. (2008). The practice of patient evaluation; the theoretical perspective. *Orthopaedic Nursing*, 27(1), 50-54.
- Vygotsky, L. (1978). *Mind in Society*. Cambridge, MA: Harvard University Press.
- Walker, M., & Stevenson, G. (2016). Learning theory support of simulation to improve nurses' care of critically ill patients. *Journal of Continuing Education in Nursing*, 47(1); 27-31.
- World Health Organization. (2003). WHO definition of health. Retrieved at <http://who.int/about/definition/en/print.html>.