

A DISCHARGE PROTOCOL INITIATIVE TO DECREASE HOSPITAL READMISSION
FOLLOWING AMPUTATION IN ADULTS WITH TYPE 2 DIABETES

A Doctor of Nursing Practice Project Report

by

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MSN, Texas A&M University-Corpus Christi, 2021

Submitted in Partial Fulfillment of the Requirements for the Degree of

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This Doctor of Nursing Practice Project Report meets the standards for scope and quality of Texas A&M University-Corpus Christi College of Nursing and Health Sciences and is hereby approved.

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August 2021

DEDICATION

I would like to dedicate this work to my husband, Joe, who has been my rock and supported me with unyielding as I worked on this project. I would also like to dedicate this to my two loving children, Jaselle and Jenika, whose support and encouragement have been my constant source of inspiration. Your words of encouragement motivated me to get through the program. To my parents, thank you for the constant motivational words and the push to finish. To my two sisters, who have also supported me throughout this process. Thank you for believing in me.

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ABSTRACT

Introduction: In the United States, lower limb amputations are more common in patients, than in those without diabetes, and can result in infections and unplanned hospital readmissions, that cost the U.S. billions of dollars annually. However, very few hospitals focus on amputation discharge education to prevent such readmissions. The purpose of this quality improvement project is to improve the quality of diabetic amputee discharge education by implementing a Diabetes-Amputation Protocol, with the intent of reducing infection related hospital readmissions. **Methods:** A Quality Improvement (QI) project conducted in an acute care, non-profit hospital. A one group, pre-and-post design was used to conduct this project.

Inclusion criteria: Participants >21 years of age, with T2DM, with initial amputation received the Diabetes-Amputation Protocol. Paired sample *t*-tests were used to compare patient knowledge, pre-and-post education. Descriptive statistics were used to calculate monthly percentages of patients who were readmitted and received the protocol. **Results:** The total number of participants was 30, with a mean age of 59.7 years. Findings from the DWCK questionnaire scores showed a statistically significant positive change from pre-to-post knowledge scores, with $t(29)$ and $p < 0.01$. The readmission rate decreased significantly from 20% to 7%, and 100% of participants received the Diabetes-Amputation Protocol. **Conclusion:** Improved the discharge material and individualized discharge information based on patient needs can improve patient knowledge, increase independent self-care and reduce hospital readmissions.

Key words: diabetes, amputations, wounds, hospital readmissions, discharge education

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INTRODUCTION

Diabetes mellitus (diabetes) has become widespread in the United States (U.S) with an estimated 1.5 million cases diagnosed annually among adults over the age of 18 years (Centers for Disease Control and Prevention; CDC, 2020). It is estimated 34.2 million people in the US live with diabetes and an additional eight million have undiagnosed diabetes (CDC, 2020). Each year, the incidence of diabetes in individuals younger than 20 years of age, increases, with racial minorities having the highest prevalence (CDC, 2020). Diabetes is associated with various contributing factors, such as ethnicity, age, family history, obesity, and sedentary lifestyle (CDC, 2020).

There are two types of Diabetes: type 1 and type 2. This paper will focus on type 2 diabetes (T2DM), a metabolic disorder characterized by abnormal blood sugar levels due to inefficient use of insulin by the body (American Diabetes Association; ADA, 2020). Diabetes-related complications, such as cardiovascular disease, kidney disease, neuropathy, and non-traumatic lower extremity amputations (NLEA's), are the leading causes of increased morbidity and mortality among people with diabetes, and result in a heavy economic burden on the U.S. healthcare system (ADA, 2020). Over 7.8 million patients discharged from hospitals in the US had diabetes listed as a diagnosis (CDC, 2016), and 130,000 of those discharges were for NLEAs. Incidence of limb loss because of diabetes-related complications occurs every 30 seconds in the United States, with the majority (70%) of lower limb amputations leading to infections (Gok et al., 2016). Post-amputation infection is a leading cause of hospital readmissions in adults with T2DM (Gok et al., 2016).

The most common reason for readmission in T2DM patients was the lack of patient understanding of diagnosis, treatment, and medications (Horwitz et al., 2014). Ethnic minorities with limited English proficiency (LEP) and lower literacy have worse health outcomes than non-minorities and those with better English proficiency and literacy, and minorities are more likely to be readmitted to the hospital within 30-days of discharge (Sharon et al., 2017). Unplanned readmissions to the hospital are common, costly and potentially avoidable. In the United States, unplanned hospital readmissions cost a staggering \$327 billion annually of healthcare spending (Alper et al., 2020). Therefore, it is important to develop discharge interventions designed to meet the patients' needs. For healthcare providers (HCPs) to overcome health literacy deficiencies, they must recognize how self-management of chronic diseases such as diabetes, is affected by health literacy, LEP, and social and cultural factors. The purpose of this QI project was to improve the quality of discharge education provided to adult T2DM patients post-amputation, within a Texas hospital, through the implementation of a Diabetes-Amputation Protocol (DAP) using The EDUCATE Model.

Background

A lack of knowledge by health care providers regarding the many factors that inhibit T2DM patients' understanding of health-related education has contributed to the increase in amputations and hospital readmissions. Increased vulnerability of amputation wounds occurs due to the lack of high-quality discharge education, which in turn contributes to increased hospital readmissions. In a prospective observation cohort study, done on patients who suffered from heart failure and were 65 years or older; of the 395 patients who were enrolled in the study, 59.6% were able to accurately describe their diagnosis post discharge, and 43% could recall details of their follow-up appointment. The study found the reason for readmission was due to

inadequate discharge instructions written at a reading level understood by patients (Horwitz et al., 2014). Low health literacy places patients at risk for increased emergency room (ER) visits, hospital readmissions, and decreased treatment adherence (Horwtiz et al., 2014). It is essential that evidence-based protocols for discharge instruction and education are implemented, particularly those that consider health literacy, social and cultural practices, language barriers and access to healthcare.

Review of Literature

An extensive review of the literature was completed to identify the causes of and risk factors for NLEA readmissions, including non-healing wounds (19% of readmissions) and wound infections 49% of readmissions (Beaulieu et al., 2015). Anderson et al. (2016), completed an in-person survey to understand patients' beliefs and attitudes about 30-day readmissions to identify ways hospitals can reduce readmissions. Of 230 patients interviewed, 29% reported not feeling ready for discharge; 35% failed to recall being given discharge paperwork, and 22% did not recognize the warning signs for seeking medical attention (Anderson et al., 2016). Over 35% of adults have low health literacy, which is associated with poor outcomes after discharge from the hospital including medication errors, mortality, and readmission within 90 days (Anderson et al., 2016). Another study, explored factors related to the physician-patient relationship among older veterans with T2DM and inadequate health literacy (Liang et al., 2017). In this study, researchers determined a lack of knowledge on self-care management. Liang et al. (2017) found HCP's, as well as inability to respond to a variety of patient needs, led to lack of patient understanding and engagement (Liang et al., 2017). Current guidelines from the CDC (2020) recommend educating T2DM patients about the importance of self-care management using patient-centered education, shared decision-making and individualized care.

A systematic review of the literature done by Jones et al. (2016) focused on transitional care interventions and their effect on hospital readmission after surgery. The researchers found a reduced readmission rate of 15% at 30 days, and 23% at 12 weeks (Jones et al., 2016) when a discharge education protocol was used with post-operative patients. This study supports that a discharge education protocol was beneficial in the prevention of readmissions among post-operative patients. Providing patients with discharge education tailored to patient needs was essential in promoting their ability to comply with self-care instructions and regain their independence (Jones et al., 2016). A randomized control trial including 47 post-amputation patients with T2DM, found readmissions might be avoided with closer monitoring and improved patient education (Rubin et al., 2018). Rubin et al. (2018) also concluded that “teach-back,” a method that helps ensure comprehension, can greatly reduce readmissions. Additionally, in a retrospective cohort study involving 696 English-speaking participants, aged 55-74 years, researchers found that those with basic or below basic literacy are 21% likely to be readmitted than those above basic literacy (Cooper-Bailey et al., 2015). In this same study, researchers support health literacy to be a significant and independent predictor of readmissions and should be considered in readmission reduction efforts (Cooper-Bailey et al., 2015).

In a randomized controlled trial, conducted with 975 participants who had literacy-appropriate education, 80% of patients reported adherence to discharge instructions and followed-up with their doctors after discharge as instructed (Biese et al., 2018). Providing standardized patient education content improved patient engagement and health literacy (Biese et al., 2018). Using multivariable logistic regression, a study found, of 5,372 patient undergoing amputation, readmission rate was 18%. The overall complication rate was 43%, and reoperation for wound

complication or additional amputation was found in 79% of the cases (Curran et al., 2014). King and Hatch (2018) also found participants with T2DM had a greater susceptibility to early cognitive decline and, impaired verbal comprehension compared to those without T2DM. Thus, improving hospital readmissions through sharing written warning signs of infection, instructions on dressing changes, and establishing a routine follow-up appointment can reduce readmissions (King & Hatch, 2018).

Problem Description in the Setting

This QI project was conducted in acute care, not-for-profit hospital in South Texas. The hospital was comprised of over 600 centers, including long-term care facilities, community hospitals, and walk-in clinics with over 15,000 health care providers. The hospital cares for vulnerable patients suffering from health disparities often associated with low health literacy levels. According to a community assessment report in 2020, 64.5% of the patient population identified as Hispanic, and 29.2% as non-Hispanic white; 15.9% spoke English and were living below federal poverty level and 18.7% spoke Spanish and were living below the federal poverty level (Christus Health, 2020). In addition, the report revealed that 26% of patients aged 18 to 64 years had no insurance and no access to primary health care (Christus Health, 2020). Admission data revealed a relatively high rate of avoidable hospital admissions due to surgical wound infections. Based on this data, a need for a discharge protocol specific to this population group was identified.

Further investigation through staff interviews revealed discharge education was completed immediately prior to discharge, and education was often generic and rarely individualized to a specific patient's needs or diagnosis. The Hospital Readmissions Reduction Program (HRRP) encouraged hospitals to improve communication and care coordination to better engage patients

and caregivers in discharge plans to reduce avoidable readmissions (CMS, 2018). Staff on the medical-surgical floors included registered nurses, case managers, wound care practitioners and infectious disease practitioners, who were all supportive of the need for change and implementation of an evidenced-based discharge protocol. This change in practice was embraced by these professionals who were competent in carrying out the interventions. Facility leaders recognized discharge education as becoming increasingly important for improving clinical outcomes and reducing hospital costs, and this initiative coincided with the hospital's vision which is driven by respect and commitment to diversity and individualized care.

Project Purpose and Aims

The purpose of this QI project was to improve discharge education processes using an evidenced-based discharge protocol, the DAP, guided by the EDUCATE Model, to increase patient knowledge regarding post-discharge care and to reduce preventable hospital readmissions. for T2DM patients undergoing NLEA in a South Texas acute care hospital. This QI project was guided by the following clinical practice question: Among T2DM patients with a new amputation, in a South Texas hospital, does a DAP increase patient knowledge regarding post-discharge self-care and reduce hospital readmissions, compared to patients who did not receive the protocol, 90 days post-intervention?

Involving patients in their own plan of care has been associated with improved patient outcomes and fewer readmissions (Kang et al., 2019). Patients have increasingly expressed a desire to actively engage in their health care, and to understand their health status, medications and discharge plans (Haire, 2017). Disease prevention and health promotion are especially important for people with T2DM because with diabetes-related complications have a high risk of mortality (Gok et al., 2016). The specific aims and goals for this project included:

(1) Reduce hospital readmissions by at least 10% from pre-intervention to post-intervention. The 10% improvement goal was chosen based a QI project that implemented discharge education interventions and decreased readmissions by 9.2% (Vernon, 2019).

(2) Increase patient knowledge by a mean score of 2 points from pre-to-post DWCK score. The goal of a 2-point increase was chosen based on an interventional study that found an increase from pre-to-posttest mean score of 1.2 points (Carter, 2019).

(3) Achieve use of the DAP in at least 100% of eligible patients by the end of the 90-day project period. This goal was supported by a QI project study that implemented a standardized discharge protocol for patients with CHF to reduce readmission and decreased readmissions by 3.7% (Mishbath, 2020).

This project applied DNP Essential VII: “Clinical prevention and population health for improving the nation’s health” (AANC, 2006). This project used research on patient-centered education to develop a standardized discharge protocol tailored for the care of T2DM patient’s post-amputation. In addition, the intervention was designed to improve patient-provider communication to improve patient engagement, knowledge of disease, and self-care management. The National Organization of Nurse Practitioners Faculties (NONPF) core competency in practice inquiry was applied by identifying gaps in discharge interventions contributing to amputation readmissions (NONPF, 2017).

Guiding Frameworks

Dr. Avedis Donabedian was a physician who spent most of his life writing over 100 papers and 11 books on aspects of quality care in health systems (Oostendorp et al., 2020). His best-known framework in health services; was the Donabedian Model (see Appendix A). This

model has been applied in health care quality management with the emphasis being shifted from preoccupation with assessing quality to focus on the actual medical care process itself.

Donabedian believed that quality resides in the ethical dimension of individuals which is critical to a system's success (Oostendorp et al., 2020). "You have to love your patient, love your profession, and have to trust God. If you have these ideas, you can go backwards to improve the system" (Donabedian, 1966). Concepts in the model evaluated the effects of structure and processes on outcome measures. The three concepts are as follows:

- In the structure concept, structural measures are used to assess the capability of a health care system and its processes of delivering high quality care.
- In the process concept, interventions, are assessed for effectiveness, to identify any gaps in care and, to improve the health outcomes of patients.
- In the outcomes concept, results are gathered to determine if interventions improved a patient's health outcome. (Oostendorp et al., 2020)

The Donabedian Model was integrated with the DAP to identify learning and cultural barriers to individualize discharge plans that could increase patient communication and engagement and, subsequently improve outcomes. The education guiding model (EDUCATE Model) was used to identify learning styles, literacy level, and any social and culture barriers, to apply clear communication and methods for the assessment of learning (see Appendix B) The educating guiding model consists of the acronym E-D-U-C-A-T-E to lead the educator through the five stages of teaching and education goals (Marcus, 2015). "E" is for education goals, "D" for deliver patient-centered care, "U" for understand the learner, "C" for communicate in plain, non-medical language, "A" for address health literacy and cultural barriers, and "T" is for teach-back method and "E" is to ensure education goals have been met (Marcus, 2015). Based on

results from Marcus' (2015) study, the discharge education guiding model has shown to improve a patient's learning, comprehension, and retention, thus decreasing readmissions. This QI project aligned with the hospital's goal of providing specialty care tailored to the individual needs of every patient, aiming to deliver-high quality services with excellent clinical outcomes (ChristusHealth, 2020). The high rates of readmission within the facility motivated restructuring and redesigning discharge education interventions in this population group

The Plan-Do-Study-Act (IHI, 2020) cycle is a four-staged learning approach to adapt changes aimed at improvement (See Appendix C). This model was an overarching guide for this QI project. In the *Plan* stage medical records and current discharge processes were reviewed to identify gaps in practice and a systematic review of literature was conducted to design the diagnosis-specific discharge protocol. In the *Do* stage we worked to ensure all staff understood the discharge process and implemented the protocol. In the *study* stage data was collected and analyzed. In the *Act* stage data was evaluated and changes to the current interventions (Coury et al., 2017). The PDSA cycle guided this QI project by providing a systematic approach for evaluating changes needed, and determined future recommendations based on the study results.

METHODS

Ethical Considerations

This project plan was reviewed by the Texas A&M University-Corpus Christi Research Compliance Office and received a determination of “Not Human Subjects Research” and permission to proceed as a Quality Improvement project. Refer to the Letter of Determination in Appendix D. A letter of support from the acute care hospital was provided by the Regional Research Director (Appendix E). A unique coding system consisting of a participant's age and first two letters of the last name was used to protect confidentiality. This code was necessary to compare responses to pre- and post-knowledge scores before and after education implementation, and to track readmissions.

Project Design

This QI project used a before and after design, to implement an evidence-based discharge protocol aimed at improving patient knowledge, decreasing avoidable hospital readmissions and increasing the use of a standardized discharge protocol for post-amputation T2DM patients, in a South Texas acute care hospital. This QI project aligns with the hospital's goal of providing specialty care tailored to the individual needs of every patient, aiming to deliver high-quality services with excellent clinical outcomes (ChristusHealth, 2020).

Several barriers could have affected the success of this improvement project including fewer than usual surgeries being performed due to COVID-19, healthcare provider time constraint, fast turnaround time from admission to discharge, and lack of continuity of care (See Risk Assessment Tool Appendix F). Countermeasures taken to mitigate these various risks included explaining the benefits of the study to staff and patients to improve study participation, particularly in light of an already low number of potential participants due to the ongoing

COVID-19 pandemic. HCP time constraints were mitigated by incorporating medical assistants to provide patients with the pre-DWCK questionnaire, calculate the score and provide results to the registered nurses (RNs), WCNP or IDNP. WCNP and IDNP then individualized a care plan and began discharge education tailored to the patient.

Patients were identified for this study using the medical-surgical floor census sheet and operating room schedule. Participants were included in the project if they met the following inclusion criteria: (1) was an adult 21 years of age and older, (2) had a post-operative initial amputation, (3) had a diagnosis of type 2 diabetes at the time of the study, and (4) was interested in participating. A retrospective chart review was done on the medical records of 30 patients who met criteria, randomly chosen from patients seen between January 1, 2020 to March 31, 2020.

Intervention

In this project, a patient-tailored protocol was implemented based on recommendations from the CDC and ADA to improve patient knowledge and self-care management in T2DM patient's post-amputation. In this project, The DAP was developed by the Wound Care Nurse Practitioner (WCNP), Infectious Disease Nurse Practitioner (IDNP) and myself. The DAP protocol included step-by-step guidelines for evaluating patient's knowledge of diabetes, amputation and self-care management (see Appendix G). Instructions in the DAP included documentation guidelines for DWCK pre-and-post-questionnaire, medication review, wound and ID consults, and follow-up appointments. The education was patient-tailored based on language preferred, learning preferences, cultural barriers, religious barriers, and literacy level recommended by the CDC and AADE guidelines. Patient education was guided by the EDUCATE Model and included the ADCES7 self-care behaviors for T2DM: healthy coping, healthy eating, staying active, monitoring blood glucose levels, medication management, and

problem-solving skills (Association of Diabetes Care & Education Specialists, 2021). Education also included amputation wound care, signs/symptoms of infection, importance of follow-up visits, and when to call the primary care provider (see Appendix H for a sample of education material).

Implementation of this QI project (see Project Timeline in Appendix I) began with education to project team members (IDNP, WCNP, RNs, medical assistants, Registered Nurses, and Case Managers) via an online PowerPoint presentation (See Appendix J). Team member education included:

Statistical data on readmissions

- Patient inclusion and exclusion criteria.
- DWCK pre-and-post knowledge questionnaire
- DAP and how it should be integrated into the discharge process
- The EDUCATE Model as the education guiding model
- Reiteration of the importance of a standardized discharge and information on when and how to fill out the DAP
- Team member roles

The interventions for this protocol were chosen based on research previously referenced, as well as the facility's vision and cultural dynamics. The protocol was as follows:

1. During the intake process patients are asked by the medical assistant (MA): (1) if they require an interpreter, and in what language do they prefer written information and verbal education, (2) any cultural or social barriers, (3) learning style (auditory/visual), (4) any physical or cognitive limitations, and (5) document findings on DAP and initial that it has been completed

2. Next, the patient is given the pre-DWCK questionnaire by the MA (available in English and Spanish): initial on DAP that it was completed
3. After pre-questionnaire is given, the RN will document the score on DAP and begin to individualize an education plan for the patient based on their needs
4. The RN will consult WCNP and IFNP; date and initials that it was completed placed on DAP
5. The case manager will interview the patient on their support system at home, identify needs, and invite family members to participate in the discharge education:
document in DAP of results
6. WCNP educates patient using the EDUCATE Model and includes: (1) post-amputation wound care (cleaning, handling and dressing), (2) signs of infection (fever, increased redness, pain, warmth), (3) when to call the primary care provider, and (4) document on DAP that it was completed
7. IDNP educates patient using the EDUCATE Model and includes: (1) antibiotic medications (how to take, missed doses, resistance), (2) how elevated blood glucose interferes with wound healing, (4) healthy eating, (5) signs of infection, (6) importance of follow-up visits, and (7) document on DAP that it was completed
8. Patient given the post-DWCK questionnaire by RN; score documented on DAP
9. Teach-back method is done by RN to engage patient and confirm understanding of education; if lack of understanding was noted, reeducation was conducted.
10. On day of discharge: RN reinforces signs and symptoms of wound infection, when the patient needs to call provider, provides discharge paperwork and education materials to patient along with verbal reminder of discharge follow-up visits

11. The patient is followed post-discharge at 30 days, 60 days and 90 days for readmission; I as the project director collect this data

The teach-back method has been found to improve health outcomes by asking the patient to repeat information, in his/her own words to evaluate his or her understanding (Marcus, 2015). Research has found, discharge protocols improve interdisciplinary collaboration, streamline outpatient referrals, and played a role in decreasing readmissions and emergency room visits (Wei et al., 2015).

Data Collection

The RN in charge and the operating room scheduler were in charge of notifying the PD of possible participants eligible for the project. A data sheet was initiated by the project director and included patient ID (unique code given), age, gender, ethnicity, post-operative date, type of surgery, education level, language spoken and A1C level upon admission. This data was entered into an Excel spread sheet for data collection and analysis by the project director. Data collected during this project included the DWCK questionnaire data, documented by the project director and imported into excel at initial visit and on day of discharge. The project director completed the discharge checklist as the tasks were completed and imported the data into Excel. A retrospective chart review via the electronic medical record was done on 30 patient charts, with patients randomly chosen from patients seen from January 1, 2020 – March 31, 2020 who met the inclusion criteria. Data that was collected included: age, gender, ethnicity, type of surgery, date of surgery, diabetes A1C, date of discharge, discharge education, and date of discharge. The patients' electronic medical record was followed from day of discharge to 30-, 60-, and 90-days post-discharge to assess for readmission. Readmission data was collected by the project director

at 30 days, 60 days, and 90 days post-discharge. See timeline (Table 2) for a visual timeline of this project.

Measurement Tools

The discharge checklist was used in this protocol to provide a standardized discharge for this population group to decrease delay of care and increase the quality of patient outcomes. The discharge checklist consisted of seven components that each patient needed to have done prior to discharge and includes: (1) DWCK pre-questionnaire, (2) Education done using the EDUCATE Model, (3) Wound care consulted, (4) Infectious Disease consulted, (5) Follow-up appointment scheduled, (6) DWCK post-questionnaire, and (7) discharge education and information given in written form. The discharge checklist was used to provide consistency for health care providers across the continuum of care and to determine if the use of standardized discharge protocol decreases readmissions (see Appendix K).

The DWCK questionnaire was adapted from the Wound Quality of Life (WQOL) questionnaire (Sommer et al., 2017) was used to evaluate patient pre-and-post education knowledge regarding T2DM and amputation wound care. The WQOL questionnaire was tested and found to be reliable and valid for use in assessing knowledge in 100 patients who completed the questionnaire twice, 3-7 days apart (Sommer et al., 2017). The Wound QOL questionnaire has been widely used by clinicians to assess for patients' knowledge with good reliability and predictive validity, with the intraclass correlation coefficient between 0.79 and 0.86 (Sommer et al., 2017). The WQOL is a 14 questionnaire on quality of life with a chronic wound and includes questions such as: (1) my wound has a bad smell, (2) the treatment of the wound is a burden to me, (3) my wound has a disturbing discharge, (4) worried about my wound (Sommer et al., 2017). The WQOL questionnaire has been adapted to include questions on diabetes management,

antibiotic medication, signs and symptoms of infection. The DWCK pre-and-post knowledge questionnaire has 14 questions that consist of yes/no and multiple-choice responses and can be given in written or oral form. If a question is answered correctly, 1 point is given, if answered incorrectly or not answered at all, no points are given. The responses are summed to obtain final score of patient knowledge regarding his/her condition. Scoring levels include: 0-5 (low score; little knowledge), 6-9 (medium score; some knowledge), and 10 or more (high score; moderate knowledge). The higher the score, the more knowledge the patient has regarding his/her condition. Examples of questions on the DWCK pre-and-post questionnaire (see Appendix L) were: (1) Should the wound have a bad smell, (2) Should the wound be red, swollen and warm, (3) should you stop taking the antibiotics prescribed once the wound starts to look and feel better?

The electronic medical record (EMR) MediTech was used to do a retrospective chart review on 30 patient charts, with patients randomly chosen from patients seen from January 1, 2020 – March 31, 2020 who met the inclusion criteria. The patients' EMR was followed from day of discharge to 30-, 60-, and 90-days post-discharge to assess for readmission. Readmission data was collected by the project director at 30 days, 60 days, and 90 days post-discharge. See timeline (Table 2) for a visual timeline of this project. MediTech has proven to deliver high quality care, provides clinicians with access to the latest evidence-based protocol, and has cut down on error rates and improved patient safety (Jones, 2019). Research has found MediTech had $p < 0.03$ in positive performance (Beauvais et al., 2021).

Data Analysis

This QI project used JASP 0.14.1 software to analyze the results. Descriptive statistics were used to analyze the demographic data collected, which included age, sex, ethnicity, highest

education level, preferred language spoken and A1C levels. Aim 1, data was analyzed using descriptive statistics to determine the percentage of patients readmitted at 30, -60, - and 90-days pre-protocol implementation (20%) and post-protocol implementation (7%). Mean readmission percentage rates across all three months was calculated for each group. To determine if Aim 2 was met descriptive statistics and a paired samples *t*-test was used to detect statistically significant differences between pre-to-post intervention DWCK questionnaire scores. Cohen's *d* was calculated to determine effect size. To analyze data collected for Aim 3, frequencies were used to determine monthly percentages of eligible patients who received the DAP in months one, two, and three and documented.

RESULTS

The total number of participants in the protocol implementation sample was 30, including 6 females, and 24 males, with a mean age of 59.7 years ($SD = 12.8$ years). Participants were predominantly Hispanic ($n = 20$, 66%), with the others identifying as White, ($n = 9$, 30%), and one identifying as Black ($n = 1$, 3%). The participants' mean A1C was 7.83 ($SD = 1.97$). Sample demographics are summarized in Appendix M.

To determine if Aim 1 was met, descriptive statistics were used to provide the number and percentage of participants readmitted at 30-, 60-, and 90-days post-discharge for the pre-protocol implementation sample ($n = 30$) and the post-protocol implementation sample ($n = 30$). At 30 days, 40% of patients had been readmitted; at 60 days, 31% had been readmitted, and at 90 days, 20% had been readmitted for postoperative amputation complications. In the implementation sample, at 30 days, 16% were readmitted, 12% at 60 days, and 7% at 90 days. Mean readmission rate was 30.33% for the pre-implementation group and 11.67% for the post-implementation group, which is an overall decrease of 18.67% from pre to post (see Appendix N).

To determine if Aim 2 was met, descriptive statistics, and a paired sample t -test, were conducted to detect statistically significant differences between the pre-and-post intervention DWCK questionnaire scores. There was a statistically significant improvement in patients' DWCK scores from pre-intervention ($M = 7.76$, $SD = 1.85$) to post-intervention ($M = 12.6$, $SD = 1.63$), $t(29) = -19.73$, $p < .01$. The effect size was calculated using Cohen's d ($d = -3.60$), which is considered a large effect ($d > 0.8$) according to Grove and Ciper (2020). Patient DWCK pre-knowledge scores ranged from 4 to 11. The patients DWCK pre-knowledge scores ranged from 4 to 11 and post-knowledge scores ranged from 8 to 14.

To determine if Aim 3 was met, descriptive statistics were used to calculate monthly percentages of eligible patients who received the DAP at 30 days, 60 days and 90 days; a cumulative percentage was calculated across all three months. At 30 days, 6 patients were eligible to receive the discharge protocol and 100% received the full protocol per review of the discharge checklist. At 60 days, 10 patients were eligible and 100% received the full protocol. At 90 days, 14 patients were eligible and 100% received the full discharge protocol. Across all three months, all 30 eligible patients, received the full discharge protocol per review of the discharge checklist.

DISCUSSION

With increased awareness of HRRP 30-day readmission measures, hospitals are searching for opportunities to make changes to their discharge processes. The purpose of this QI project was to improve discharge education processes using an evidence-based discharge protocol, the Diabetes Amputation Protocol (DAP), to increase patient knowledge regarding post-discharge care and to reduce avoidable hospital readmissions for T2DM patients undergoing NLEA. The DAP used the EDUCATE Model to tailor interventions to each patient's educational level and health literacy level, while also considering language barriers and using culturally competent techniques to increase comprehension. This QI project aimed to decrease readmissions by at least 10% from pre-protocol implementation to post-protocol implementation. This aim was met as mean readmission rates decreased by 18.7% from pre-to-post implementation of the protocol. Our second aim was to increase patients' knowledge score means by at least 2 points from pre-to-post intervention and/or significantly increase mean scores. This goal was met as mean scores increased by almost 5 points and there was a significant improvement from pre-to-post intervention. Our third aim was also met, we achieved a 100% protocol implementation rate for all eligible patients by the end of the 90-day intervention.

Following the implementation of the DAP we found patients' knowledge regarding T2DM and postoperative care, significantly improved and readmission rates decreased by almost 20%. Applying discharge processes and materials that were diagnosis and procedure-specific, literacy appropriate, culturally-sensitive and in the patients preferred language and preference, increased knowledge, improved self-care and reduced hospitals readmissions in this South Texas hospital. With increased awareness of the HRRP 30-day readmission measures, hospitals are searching for opportunities to make changes to their discharge processes.

This QI project's key success was to increase patient understanding of the discharge education and decrease readmissions. Care delivery changes within the healthcare system included an amputation specific discharge protocol and checklist developed and implemented to be used as a guide to promote a safe and timely discharge by providing essential steps needed prior to discharge. The EDUCATE Model provided a process to identify language, social, and cultural barriers by using the acronym E-D-U-C-A-T-E to individualize the discharge care plan and, therefore increase patient comprehension. With this integrated approach, different specialties were brought together to create a comprehensive discharge plan for the patient. This QI project's implementation of the Diabetes-Amputation Protocol established consistency of roles and responsibilities between staff and provided patients with clear discharge instructions to ensure a safe transition home. Post-intervention, patients verbalized an increased knowledge of their chronic condition and how glucose can affect the healing process, the importance of foot inspections, signs and symptoms of infection, and when to seek help. Patients understood the importance of discharge follow-up, with 100% of them verbalizing they would follow-up with their primary care providers within 1 week of discharge.

Limitations

The impact of the Coronavirus (COVID-19) pandemic caused changes in the hospital during the implementation of this project. Many patients avoided a trip to the hospital due to exposure to COVID-19, which resulted in fewer than usual surgeries. In spite of the project start date of January 1, 2021, no eligible participants were found, and implementation took place two weeks later. As a result of COVID, the hospital's visitor guidelines made it impossible for family members to attend the discharge education sessions.

Unexpected findings included staff's awareness of patients perceiving their illness being too complex and difficult to understand. This resulted in healthcare staff focusing more on providing discharge education that was appropriate to the patients' health literacy, preferred language, and providing visual documents for patients to review and take home.

Interpretation

This project has the potential to reduce readmissions, therefore decreasing organizational costs and potential insurance penalties. The new discharge interventions included individual based education, in patients preferred language and preferred method. Education included signs and symptoms of wound infections, when to call their HCP, importance of follow-up visits after discharge, and diabetes education. The main strength of the new discharge protocol is that it is individualized based on patient needs. Another strength to the new protocol is the step process to confirm all steps of the discharge have been done. This checklist can be picked up by another HCP and completed without any question as to where the other HCP left off. The PDSA model and the Donabedian Model guided this QI project's methods. The PDSA model is a four-stage problem-solving model used for improving processes or carrying out a change (Institute for Healthcare Improvement, 2020).

The Donabedian Model, as described by Oostendorp et al., (2020), consists of three concepts: structure (includes the staff at an acute care hospital), process (care coordination and delivery of patient education), and outcomes (increased quality of care by decreased readmissions). Not only did the model guide this project in decreasing readmission rates, but it also provided a guide to increase patient's engagement, resulting in increased patient knowledge and the confidence to manage their own health.

Staff shortage may be a significant barrier to long-term continuation of this QI project as due to the lack of time to provide timely discharge education. Obtaining input and feedback from the front-line staff may identify barriers. The Donabedian Model is recommended to further assess and evaluate the factors in a patient's environment that may hinder continuity of a standardized discharge and the use of a discharge protocol. Research indicates that care collaboration and a discharge planning team ensure a smooth transition home (Biese et al., 2018).

There is a high rate of hospital readmissions for patients diagnosed with T2DM and T2DM-related conditions such as ulcers, infected wounds, and post-amputation infections. In the next PDSA cycle, the Project Director will obtain input from the Infectious Disease Physician, Wound Care Physician, and hospital administrators in creating and implementing policies on wound care education. The educational intervention will improve HCP's recognition of barriers to implement a standardized discharge plan to reduce hospital readmissions. Dissemination of the Diabetes-Amputation Protocol and the education guiding model to other areas of the hospital will help to ensure the sustainability of the project. Implementing the DAP into the electronic medical record with prompts to alert the HCP that the DAP needs to be implemented.

Amputation wound care teaching should be included in all discharge education for any diabetic patient upon discharge as the risk for wounds is high. It is important to increase staff member awareness of patients who are at high risk for readmission by providing an educational model intervention. Over time, this Diabetes-Amputation protocol will increase collaboration of staff nurses, Wound Care NP, and Infectious Disease NP and improve the overall quality of care for patients as well as reduce readmissions. The project interventions were feasible and replicable because several measures from the project could be easily adopted into nursing

practice and policy changes. This was a low-cost project that would benefit the hospital. By reducing readmissions, the hospital can avoid penalties on readmissions, avoid emergency room visits, and decrease costs connected to this patient population group.

Conclusion

It is a fact that incidence of lower limb amputations is more common in adults with T2DM, and results in wound infections and hospital readmissions. Healthcare providers need to be aware of barriers that inhibit the patient to be compliant with diabetes and diabetes-related complications. It is crucial for healthcare professionals to provide culturally competent healthcare to ensure a safe discharge transition and the prevention of adverse events. The findings from this QI project provide evidence to support the need to incorporate a discharge protocol for T2DM post-amputation, following CDC and AADE guidelines into the hospital setting.

A significant decrease in mean percentage in hospital readmissions for T2DM post-amputation is possible with the use of a discharge protocol that allows for tailored-patient education based on the patients' needs. Healthcare providers need to identify barriers, underlying factors that lead to the amputation, educate and prepare patients for home self-care management. The teach-back method is an evidence-based, patient-centered tool to engage patients and verify knowledge comprehension. By utilizing the discharge protocol and the teach-back method, discharge education is improved and patients will have the knowledge to take care of themselves at discharge.

REFERENCES

- Agency for Healthcare Research and Quality. (2019). *Readmissions and adverse events after discharge*. <https://psnet.ahrq.gov/primer/readmissions-and-adverse-events-after-discharge>
- Alper, E., O'Mailey, T., & Greenwald, J. (2020). *Hospital discharge and readmission*. <https://www.uptodate.com/contents/hospital-discharge-and-readmission>
- American Association of Colleges of Nursing. (2006). *The essentials of doctoral education for advanced nursing Practice*. <https://www.aacnnursing.org/Portals/42/Publications/DNPEssentials.pdf>
- American Diabetes Association. (2020). *Study finds minority patients in states with Medicaid expansion experience fewer leg amputations*. <https://www.diabetes.org/newsroom/press-releases/2020/study-finds-minority-patients-in-states-with-medicaid-expansion-experience-fewer-leg-amputations>
- Anderson, J., Busuttil, A., Lonowski, S., Vangala, S., & Afsar-manesh, N. (2016). From discharge to readmission: Understanding the process from the patient perspective. *Journal of Hospital Medicine*, 1(16), 407-412. [https://doi: 10.1002/jhm.2560](https://doi.org/10.1002/jhm.2560)
- Association of Diabetes Care & Education Specialists. (ADCES) (2021). ADCES7 Self-care behaviors. [https:// https://www.diabeteseducator.org/living-with-diabetes/aade7-self-care-behaviors](https://www.diabeteseducator.org/living-with-diabetes/aade7-self-care-behaviors)
- Beaulieu, R., Grimm, J., Lye, H., Abularrage, C. & Perler, B. (2015). Rates and predictors of readmission after minor lower extremity amputations. *Journal of Vascular Surgery*, 6(21),101-105. [https://doi:10.1016/j.jvs.2015.01.021](https://doi.org/10.1016/j.jvs.2015.01.021)

- Beauvais, B., Kruse, C., Fulton, L., Shanmugam, R., Ramamonjiarivelo, Z. & Brooks, M. (2021). Association of electronic health record vendors with hospital financial and quality performance: Retrospective data analysis. *Journal Medicine Internet Research*, 23(4), 239-261. [http:// doi: 10.2196/23961](http://doi:10.2196/23961)
- Biese, K., Busby-Whitehead, J., Cai, J., Stearns, S., Roberts, E., Mihas, P. Emmet, D., Zhou, Q., Farmer, F., & Kizer, J. (2018). Follow-ups for older adults discharged to home from the emergency department: A pragmatic randomized control trial. *Journal of the American Geriatrics Society*. 66(3), 452 – 458. [https:// doi: 10.1111/jgs.15142](https://doi:10.1111/jgs.15142).
- Boyle, J., Speroff, T., Worley, K., Cao, A., Goggins, K., Dittus, R. & Kripalani, S. (2017). Low health literacy is associated with increased transitional care needs in hospitalized patients. *J. Hospital*, 1(211), 918-924. <https://doi:10.12788/jhm.2841>
- Centers for Disease Control and Prevention (2016). *Coexisting conditions and complications?* [Coexisting Conditions and Complications | Diabetes | CDC](https://www.cdc.gov/diabetes/basics/diabetes.html)
- Centers for Disease Control and Prevention (2020). *What is diabetes?* <https://www.cdc.gov/diabetes/basics/diabetes.html>
- Centers for Medicare & Medicaid. (2018). *Guide to reducing disparities in readmissions*. https://www.cms.gov/About-CMS/Agency-Information/OMH/Downloads/OMH_Readmissions_Guide.pdf
- Carter, S. (2019). A pre- and post-survey to evaluation patient perception of group diabetes self-management education in rural health clinics, *Posters*. 8(20), 212-226.
- Christus Spohn Health System. (2020). *Community Health Needs Assessment 2020-2022*. [christusspohnhealthneedsassessment2019.ashx \(christushealth.org\)](https://christushealth.org/christusspohnhealthneedsassessment2019.ashx)

- Cooper-Bailey, S., Fang, G., Annis, I., O'Conner, R., Paasche-Orlow, M. & Wolf, M. (2015). Health literacy and 30-day hospital readmission after acute myocardial infarction. *BMJ*, 5(6), 1-10. <https://doi.org/10.1136/bmjopen-2014-006975>
- Coury, J., Schneider, J. L., Rivelli, J. S., Petrik, A. F., Seibel, E., D'Agostini, B., Taplin, S. H., Green, B. B., & Coronado, G. D. (2017). Applying the plan-do-study-act (pdsa) approach to a large pragmatic study involving safety net clinics. *BMC Health Services Research*, 17(1), 411. <https://doi.org/10.1186/s12913-017-2364-3>
- Curran, T., Zhang, J., Lo, R., Fokkema, M., Mc Callum, J., Buck, D., Darling, J., & Schermerhorn, M. (2014). Risk factors and indications for readmission following lower extremity amputation in the ACS-NSQIP. *Journal of Vascular Surgery*, 60(5), 1315-1324. <https://doi.org/10.1016/j.jvs.2014.05.050>
- Donabedian, A. (1966). Evaluating the quality of medical care. *The Milbank Memorial Fund Quarterly*, 44(2), 166-206. <https://doi.org/10.2307/3348969>
- Gok, U., Selek, O., Selek, A., Guduk, A., & Guner, M. (2016). Survival evaluation of the patients with diabetic major lower-extremity amputations. *Musculoskeletal Surgery Journal*. 100(2), 145-148. <https://doi.org/10.1007/s12306-016-0399>
- Grove, S. & Ciper, D. (2020). *Statistics for nursing research: A workbook for evidence-based practice*. Elsevier.
- Guirguis-Blake, J. (2020). Transitional care interventions to prevent readmission for patients with heart failure. *American Family Physician*, 93(5), 401-403. [https:// PMID: 26926978](https://pubmed.ncbi.nlm.nih.gov/26926978/).
- Horwitz, I., Moriarty, J., Chen, C., Fogerty, R., Brewster, U., Kanade, S., Ziaieian, B., Jeng, G., & Krumholz, H. (2014). Quality of discharge practices and patient understanding at an

- academic medical center. *JAMA Internal Medicine*, 173(18), 1715-1722.
<https://doi.org/10.1001/jamainternmed.2013.9318>
- Institute for Healthcare Improvement. (2020). *Science of improvement: Testing Changes*.
<http://www.ihi.org/resources/Pages/HowtoImprove/ScienceofImprovementTestingChanges.aspx>
- Jones, C., Hollis, R., Wahl, T., Oriel, B., Itani, K., Morris, M., & Hawn, M. (2016). Transitional care interventions and hospital readmissions in surgical populations: A systematic review. *The American Journal of Surgery*, 212(2), 327-335. <https://doi.org/10.1016/j.amjsurg.2016.04.004>
- Jones, S. (2019). How EHRs can help address patient safety concerns. <https://blog.meditech.com/how-ehrs-can-help-address-patient-safety-concerns>
- King, K., & Hatch, D. (2018). A critical look at readmissions for patients with diabetic foot infections. *Podiatry Today*, 31(9), 12-16. <https://doi.org/10.1053/2018.09.012>
- Liang, C.-Y., Wang, K.-Y., Hwang, S.-J., Lin, K.-C., & Pan, H.-H. (2013). Factors affecting the physician–patient relationship of older veterans with inadequate health literacy: An observational study. *British Journal of General Practice*.
<https://doi.org/10.3399/bjgp13X667222>
- Marcus, C. (2015). Strategies for improving the quality of verbal patient and family education: A review of literature and creation of the EDUCATE model. *Human Psychology & Behavioral Medicine*, 2(1), 482-495. <https://dx.doi.org/10.1080/21642850.2015.900450>
- Misbath, N. (2020). A standardized discharge protocol for heart failure patients to reduce hospital readmissions. *Cureus*, 12(3): e7420. <https://doi.org/10.7759/cureus.7420>

- National Organization of Nurse Practitioners Faculties. (NONPF). (2017). *Nurse practitioner core competencies content*. [2017 NPCoreComps_with_Curric.pdf \(ymaws.com\)](https://www.nursepractitioner.org/2017-NPCoreComps-with-Curric.pdf)
- Oostendorp, R., Elvers, J., Rutten, G., Heijmans, M., Hendriks, E., Koonig, D., Laekeman, M., Laekeman, M., & Samwell, H. (2020). Relationships between context, process, and outcome indicators to assess quality of physiotherapy care in patients with whiplash-associated disorders: Applying Donabedian's Model of Care. *Patient Preference Adherence*, 2020(4), 425-442. [https://doi: 10.2147/PPA.S234800](https://doi.org/10.2147/PPA.S234800)
- Polster, D. (2015). Patient discharge information tools for success. *Nursing Journal*, 45(5), 42-49. [https:// doi: 10.1097/01.NURSE.0000463652.55908.75](https://doi.org/10.1097/01.NURSE.0000463652.55908.75)
- Rubin, D., Donnel-Jackson, K., Jhingan, R., Golden, S. & Paranjape, A. (2018). Early readmissions among patients with diabetes: a qualitative assessment of contributing factors. *Journal of Diabetes and its Complications*, 28(6), 869-973. [https://doi:10.1016/j.jdiacomp.2018.06.013](https://doi.org/10.1016/j.jdiacomp.2018.06.013)
- Sharon, W., Stevenson, C., & Adams, M. (2017). Improving health literacy with diabetes. *Nursing*, 47(1), 24-313. [https://doi:10.1097/01.NURSE.000051039.60928.a9](https://doi.org/10.1097/01.NURSE.000051039.60928.a9)
- Sommer, R., Augustin, M., Hampel-kalthoff, C., & Blome, C. (2017). The Wound-QOL questionnaire on quality of life in chronic wounds is highly reliable. *Wound Repair and Regeneration*, 25(4), 730-732. <https://doi-org.manowar.tamucc.edu/10.1111/wrr.12578>
- Thomas, D. and Siaki, L. (2017). A partnership for patient's initiative: redesigning a medical-surgical units discharge process to reduce, readmissions. *Nursing Economics*, 35(2), 739-749.

Vernon, D., Brown, J., Griffiths, E., Nevil, A., & Pinkney, M. (2019). Reducing readmission rates through a discharge follow-up service. *Future Health Journal*, 6(2), 114-117.

[https://doi: 10.7861/futurehosp.6-2-114](https://doi.org/10.7861/futurehosp.6-2-114).

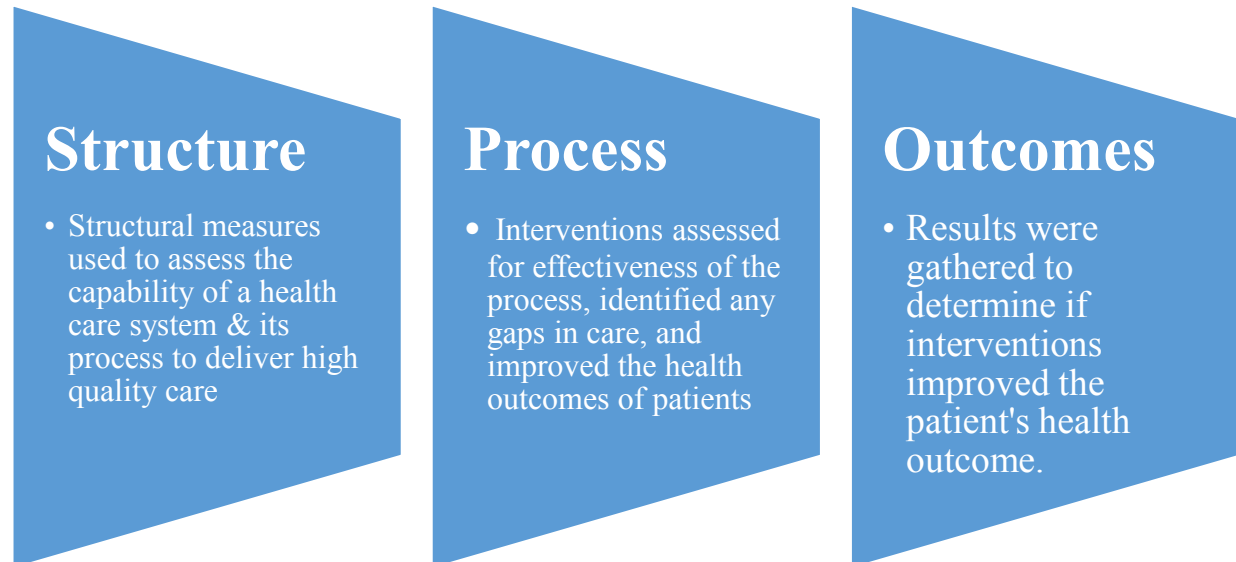
Yen, P. & Leasure, A. (2019). Use and effectiveness of the teach-back method in patient education and health outcomes. *Federal Practitioner*, 36(6), 284 – 289.

Wei, J., Defries, T., Lozada, M., Young, N., Huen, W., & Tulskey, J. (2015). An inpatient treatment and discharge planning protocol for alcohol dependence: efficacy in reducing 30-day readmissions and emergency department visits. *General Internal Medicine*. 30(3), 365-370. [https:// doi: 10.1007/s11606-014-2968-9](https://doi.org/10.1007/s11606-014-2968-9)

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APPENDIX A: Donabedian Model



APPENDIX B: The EDUCATE Model

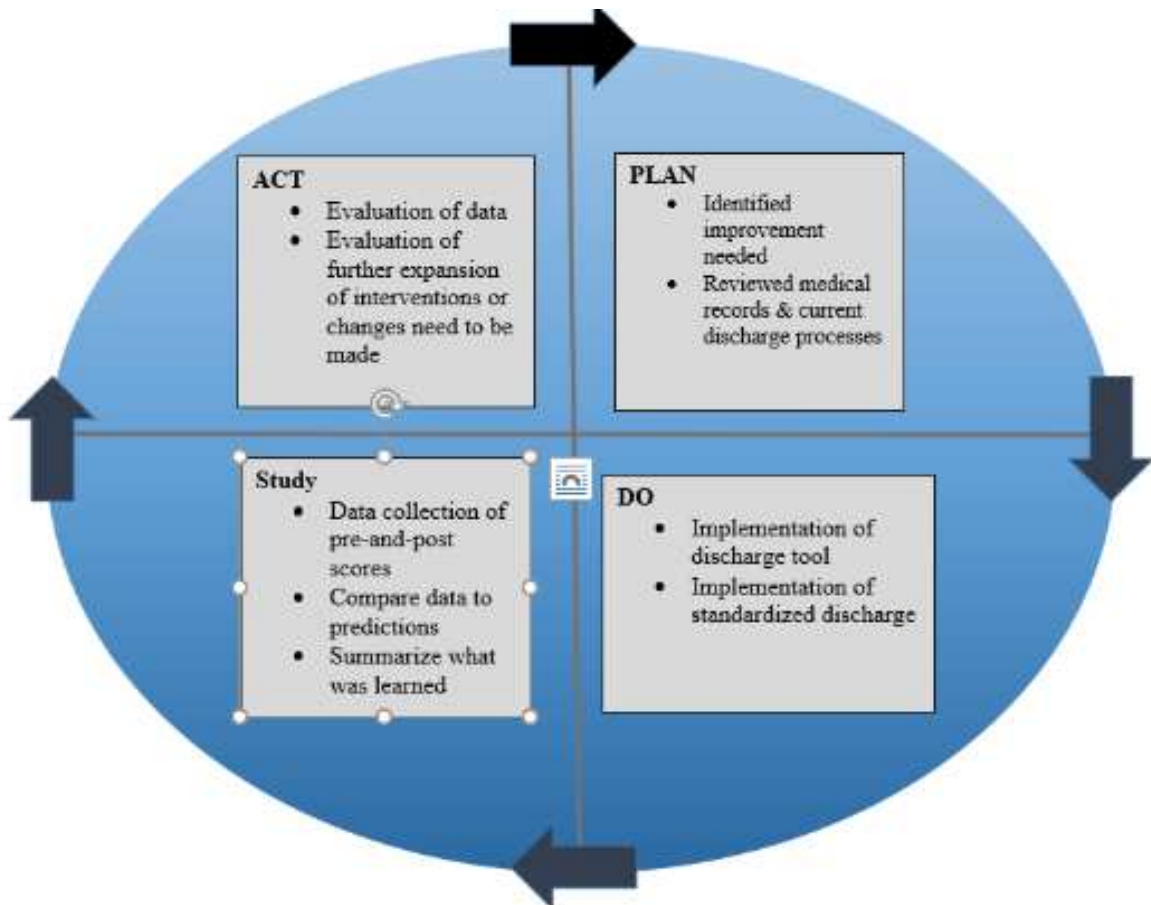
Table 2.

Summary of presentations on success strategies used in practice.

Home healthcare	Library services	Nutrition
E Give patients information in small increments, so that the patient can build on each block of information		
D Teach the patient problem solving skills Try to motivate the patient to gain information, skills, and confidence so that they can make informed decisions about their health		
U	Consumer health library staff can play a role in patient education through the "reference interview" to find out the patient's information needs and learning abilities in order to provide them with resources that they can learn from and share with their providers	
C		Professional tools like "conversation maps" may be helpful in aiding communication
A Address the patient's current living situation, barriers the patient may be facing in complying with instructions and the patient's motivation and level of confidence		
Rehabilitation	Social work	Surgery
E Patients are instructed how to perform exercises and each time they come, the exercise is reviewed and changes are demonstrated		A nurse discusses the surgery with the patient at least one week before. It is also recommended that there should be verbal education early on by the patient's physician. Patients are asked to call in the day before surgery to review the information Face-to-face is the best way to communicate because a provider can assess if the patient really understands
D	Try to get an understanding of the patient – how they connect with family, what support systems are in place, and how their environment impacts their care Try to assess if the person is taking in the information presented to them and what stressors are in the way. If they are anxious, try to find out what the source of the anxiety is Try to get the person engaged in conversation and find topics that the patient feels comfortable talking about Try to establish a relationship with the patient	
U		
C Patients have the opportunity to ask many questions and are given expectations throughout treatment		
A Visual tools usually supplement verbal education		

Notes: (E) Enhance comprehension and retention; (D) deliver patient-centered education; (U) understand the learner; (C) communicate clearly and effectively; (A) address health literacy and cultural competence.

APPENDIX C: PDSA Cycle



APPENDIX D: Letter of Determination

Dear

Activities meeting the DHHS definition of research or the FDA definition of clinical investigation and involves human subjects are subject to IRB review and approval.

On 11-23-2020, the Office of Research Compliance reviewed the project below and determined that the proposed activity does not meet the FDA definition of a clinical investigation or DHHS definition of research:

Type of Review:	Not Human Subjects Determination
IRB ID:	TAMU-CC-IRB-2020-11-114
Project Lead:	
Title:	: Use of Educate Model to Decrease Post Amputation Hospital Readmission in the Adult Diabetic Population
Rationale:	The project will not develop or contribute generalizable knowledge

Limits to this determination:

1. This determination applies only to the activities described in the documents reviewed. Any planned changes require submission to the IRB to ensure that the research continues to meet criteria for a non-human subject research determination.
2. This project may NOT be referenced as "IRB approved".

The following statement can be included in the manuscript: "This Project was reviewed and determined to not meet the criteria for human subjects research by the Texas A&M University-Corpus Christi Institutional Review Board."

Please do not hesitate to contact the Office of Research Compliance with any questions.

Respectfully,

Germaine Hughes-Waters

Office of Research Compliance

APPENDIX E: Letter of Support



CHRISTUS
Health.

OUR MISSION "To Extend the Healing Ministry of Jesus Christ"

September 16, 2020

Dr. Sara Baldwin
Associate Dean for Academic Programs
College of Nursing and Health Sciences
Texas A&M University – Corpus Christi
6300 Ocean Drive
Corpus Christi, TX 78412

Dr. Baldwin,

The purpose of this letter is to provide Jennifer Vasquez, FNP-C, a Doctor of Nursing Practice student at Texas A&M University College of Nursing and Health Sciences, a letter of support to conduct her Nursing Research project at CHRISTUS Spohn Shoreline Hospital.

Ms. Vasquez cannot begin her research until a letter of approval from a recognized IRB is submitted to my office for review. Please note depending on the outcome of the review and the components of the project she may be required to submit to the CHRISTUS Health IRB for facilitated review.

Please let me know if you have questions. We wish your student success in their research endeavors.

Sincerely,

A handwritten signature in cursive script that reads "Polly Mock RN, CCRC, CHRC".

Polly Mock, RN, CCRC, CHRC
Regional Research Director CHRISTUS Health South Texas
361-861-9595
Polly.mock@christushealth.org

APPENDIX F: Risk Assessment Tool

Risk	Impact	Countermeasures	Facilitators	Barriers
1. Lack of surgeries due to COVID-19	Low participants	Reinforce benefits of project study	HCP staff handout education sheets	Increased patient load
2. HCP time constraint	Low participants d/t quick readmissions and discharge	Reinforce benefits of education interventions	Designate personnel to do education	Rotate to various units
3. Lack of continuity of care	Low participants d/t patients admitted various units	Provide reminders on to units throughout hospital as reminder	Charge RN to notify the project director of possible participants	Increased work of load and lack of staff

APPENDIX G: Diabetes Amputation Protocol

Initial/Ongoing	Discharge Education	Day of Discharge
<p>___ Identify the learner</p> <ul style="list-style-type: none"> • Language preferred <p>___</p> <ul style="list-style-type: none"> • Cultural & social barriers <p>___</p> <ul style="list-style-type: none"> • Learning style <ul style="list-style-type: none"> ___ auditory ___ visual • Physical & cognitive limitations <p>___ DWCK Pre-Test Score: ___</p> <p>___ Tailor Education needs</p> <p>___ Wound care consult</p> <p>___ ID consult</p> <p>___ Follow-up appointment Scheduled</p> <p>Date: _____</p> <p>Time: _____</p> <p>Address: _____</p> <p>Phone #: _____</p>	<p>___ E: Education goals:</p> <p>___</p> <p>___ D: Deliver patient-centered education</p> <ul style="list-style-type: none"> • Acknowledge fears & worries • Be empathic • Talk to, NOT at <p>___ U: Understand the learner</p> <ul style="list-style-type: none"> • Find out what patient knows • Be aware of non-verbal cues • Ask family members to be present <p>___ C: Communicate clearly and effectively</p> <ul style="list-style-type: none"> • Present most important information first • Use easy to understand language (Avoid medical jargon) • Allow patient to ask questions <p>___ A: Address literacy</p> <ul style="list-style-type: none"> • Ask patient if they need help understanding • Provide supplemental materials • Use interpreter if needed <p>___ T: Teach back method</p> <ul style="list-style-type: none"> • Teach-back method • Engage patient in learning <p>___ E: Ensure education goals have been met:</p> <ul style="list-style-type: none"> • Ensure patient understanding • Identify support system • Overcome barriers 	<p>___ DWCK Post-Test Score: ___</p> <p>___ Allowed time for questions</p> <p>___ Reinforced signs & symptoms of infection & when to call PCP</p> <p>___ Verbal reminder of discharge follow-up visits</p> <p>___ Supplemental education material given</p> <p>___ Reviewed medication</p> <p>___ Provide discharge summary to patient</p> <p>___ Fax discharge summary to PCP</p> <p>___</p> <p style="text-align: right;">Patient ID: _____</p>

APPENDIX H: Education Material



Fact Sheet

Wound Care: Preventing Infection

by NLLIC Staff (Revised 2009)

After your surgery, attention will be focused on care of the wound and maintenance of the residual limb.

Any wound from amputation or other surgery is at risk of becoming infected because the skin opening can allow germs or dirt to enter the bloodstream. Infections can cause tenderness or pain, fever, redness, swelling and/or discharge. These infections can lead to further complications or surgery or even death if not treated properly.

While you are in the hospital, it is mainly the responsibility of the healthcare workers to care for your wound. Even so, the more you know about what is happening, the better you'll be prepared to take care of yourself once you leave the hospital.

You will always need to pay special attention to the hygiene of your residual limb (not only just after the surgery), because it will be enclosed in the socket or liner of your prosthesis and so will be more prone to skin breakdown and infections.

If you suspect you are getting an infection, do something! Act quickly, before a small irritation becomes a serious problem.

Take note that this advice also applies to wounds that may occur on the remaining limb or other areas of the body.

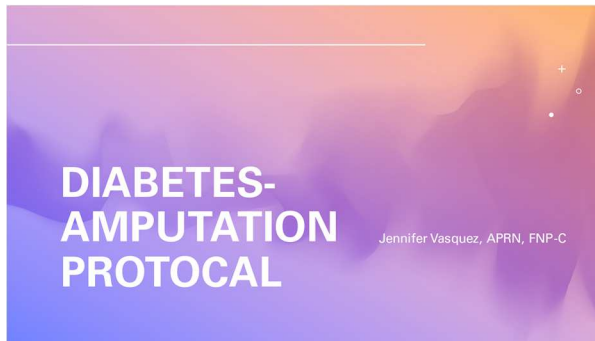
Remember: The best way to handle an infection is to *prevent* it by following these guidelines:

- Wash your residual limb with mild soap and water, then rinse and pat dry. Do this at least once a day, or more if you sweat a lot or are treating a rash or infection. Ask your pharmacist to recommend a nonperfumed, pH-balanced lotion.
- Wash anything that comes into contact with your skin (liners, socks, inner socket, etc.) with mild soap and water, then rinse and dry (check manufacturer's instructions).
- Do not use alcohol-based lotions on your skin, as it dries it out and can cause cracks, which can lead to infections.
- Use only enough softening lotion to avoid flaking, peeling dry skin. Ask your pharmacist to recommend a nonperfumed moisturizing lotion. Do not apply moisturizing lotion to the amputated limb immediately before applying prosthesis. The best time to apply lotion is at night before going to bed. It is important to prevent either excessive dryness or excessive humidity of the skin.
- Maintain a good prosthetic fit; learn how to adjust your sock ply, if applicable, or go for a prosthetic adjustment if you start to get redness over a pressure area. This will prevent the pressure area from becoming a pressure sore.

APPENDIX I: Project Timeline

Date	Intervention
7/2020	Review of Evidence-Based discharge protocols, DAP development
8/2020	Project planning, PDSA cycle started & retrospective chart review
9/2020	Submitted project proposal to IRB & letter of support
10/2020	Development of teaching materials and PowerPoint
12/2020	Educated team members & described roles
1/2021	Began recruitment & implementation of DAP
2/2021	Recruitment & DAP continued; readmission data gathered
3/2021	Continued recruitment & DAP, gathered readmission data & analyze data
4/2021	DAP protocol data gathered, imported & analyzed
5/2021	Project wrapped up; data analyzed & communicated to team members

APPENDIX J: Education PowerPoint



DAP

Initial/Ongoing	Discharge Education	Day of Discharge
<ul style="list-style-type: none"> Identify the learner <ul style="list-style-type: none"> Language preferred Cultural & social barriers Learning style <ul style="list-style-type: none"> auditory visual Physical & cognitive limitations DWCK Pre-Test Score Talix Education needs Wound care consult ID consult Follow-up appointment <ul style="list-style-type: none"> Scheduled Date Time Address Phone # 	<ul style="list-style-type: none"> E. Education goals D. Deliver patient-centered education <ul style="list-style-type: none"> Acknowledge fears & worries Be realistic Talk to, NOT at U. Understand the learner <ul style="list-style-type: none"> Find out what patient knows Be aware of non-verbal cues Ask family members to be present C. Communicate clearly and effectively <ul style="list-style-type: none"> Present most important information first Use easy to understand language (avoid medical jargon) Allow patient to ask questions A. Address literacy <ul style="list-style-type: none"> Ask patient if they need help understanding Provide supplemental materials Use interpreters if needed T. Teaching goals <ul style="list-style-type: none"> Engage patient in learning Overcome barriers Identify support system living situation E. Education goals <ul style="list-style-type: none"> Ensure patient understanding by using the Teach-back method 	<ul style="list-style-type: none"> DWCK Post-Test Score Allowed time for questions Reinforced signs & symptoms of infection & when to call PCP Verbal reminder of discharge follow-up visits Supplemental education material given Reviewed medication Provide discharge summary to patient For discharge summary to PCP

Roles

MA: responsible for asking patients

- Need an interpreter
- Language Preferred
- Learning Style
- Cognitive and/or physical limitations
- Give Pre-DWCK questionnaire

RN: Pre-DWCK score & document in protocol

- Individualize education plan
- Consult ID & Wound care NP

Case Manager

- Make follow up appointment
- Ask about support system
- Invite family to participate in discharge education

Wound Care NP:

- Educate on post-amputation wound care using The EDUCATE Model

Infectious Disease NP:

- Educate on antibiotics, blood glucose levels + healing.
- Importance of follow up visits

APPENDIX K: Discharge Checklist

	Yes	No
Patient Unique ID		
Pre-Questionnaire done		
Education done using the model		
Wound care consulted		
Infectious Disease consulted		
Follow up appt scheduled		
Post-survey done		
Written material given		

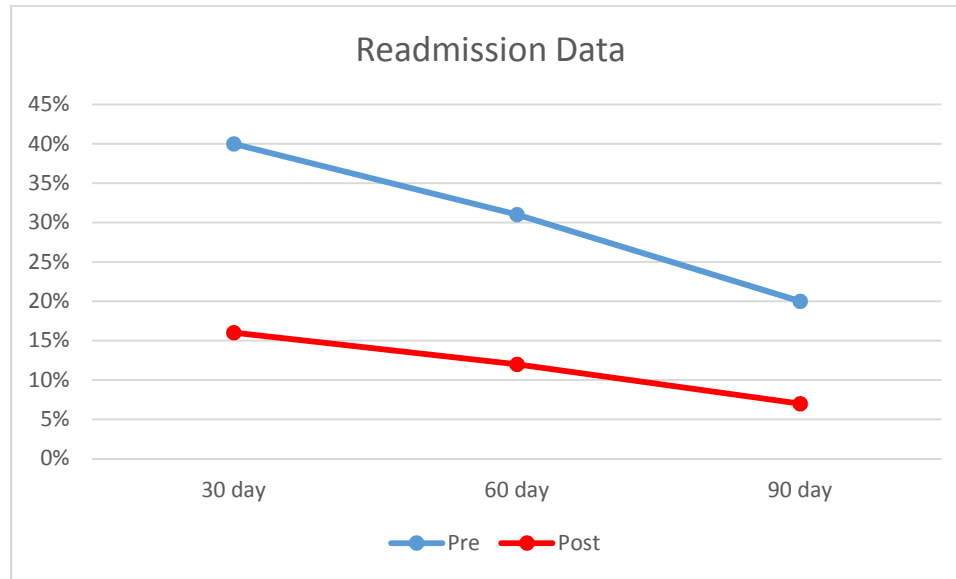
APPENDIX L: DWCK Pre-and-Post Questionnaire

		Yes/Si	No	Answerchoice/ Elección de la respuesta
1.	Should the wound have a bad smell? Debe la herida tener mal olor?			
2.	Should you worry if pain to amputation has increased or is tender to touch? Debe preocuparse si el dolor de la amputación ha aumentado o tiene sensibilidad al tacto?			
3.	Should the wound be red, swollen and warm? La herida debe estar roja, hinchada y caliente?			
4.	Does your sugar level have an effect on your wound healing? Su nivel de azúcar tiene un efecto en la cicatrización de la herida?			
5.	Should you stop taking the antibiotics (if prescribed) once the wound starts to look & feel better? Debe dejar de tomar los antibióticos (si se los receta) una vez que la herida comience a verse y a sentirse mejor?			

APPENDIX M: Patient Demographics

Characteristics	Value (n = 30)
Gender	
Female	6 (20%)
Male	24 (80%)
Age	
Mean	59.7 years, (SD=12.8)
Minimum	35
Maximum	70
Ethnicity, self-identified	
White	9 (30%)
Hispanic	20 (66%)
Other	1 (3%)
Language	
English	24 (80%)
Spanish	6 (20%)
Highest Education Level	
7 th - 8 th grade	6 (20%)
High School	10 (33%)
Graduated High School	14 (46%)
A1C	
Mean	7.83
SD	1.97

APPENDIX N: Pre-and-Post Readmission Trends



	Pre	Post
30 day	40%	16%
60 day	31%	12%
90 day	20%	7%