

Design and Implementation of an Evidence-Based Solid Organ Transplant Patient
Education Protocol

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Running Head: EVIDENCE-BASED TRANSPLANT PATIENT EDUCATION
PROTOCOL

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EVIDENCE-BASED TRANSPLANT PATIENT EDUCATION PROTOCOL

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Abstract

Kidney transplant recipients require comprehensive education about medications and caring for their new organ before discharge to prevent unwanted complications, including hospital readmission. Literature supports the need for comprehensive education to enhance outcomes. The purpose of this Doctor of Nursing Practice (D.N.P.) quality improvement project was to design, implement, and evaluate the impact of an evidence-based patient education protocol for kidney transplant recipients that focused on patient medication knowledge, nurse medication knowledge, patient satisfaction, and readmission rates at a transplant intermediate care (IMC) unit. Pender's Health Promotion Model (HPM) guided the conceptual underpinnings, and the Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) Model was used to organize the project. Evidence from a systematic review of literature was utilized to develop a standardized education protocol. Descriptive statistics were used to assess patient knowledge of medications and patient readmission rates pre- and post-implementation. Qualitative data analysis was performed to evaluate nursing knowledge surrounding patient education prior to implementation and their confidence in their delivery of education post-implementation. Analysis of patient 30-day readmission rates demonstrated a downward trend postimplementation. In addition, patients displayed satisfactory knowledge about their medications with an average score of 83.33% nurses who were more engaged during education sessions, and 75% of nurses felt more confident in their educational abilities. Results of this D.N.P. project supported how implementation of evidence-based patient education protocols can enhance and improve the process of medication education for both transplant patients and nursing staff to improve outcomes.

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Design and Implementation of an Evidence-Based Solid Organ Transplant Patient Education Protocol

Project Overview

Solid organ transplant patients must provide diligent care of their new organ, which includes strict adherence to complicated medication regimens and appointment schedules. Self-management and self-care are essential to maintaining the health of an individual's transplanted organ (Meng et al., 2016; Williams et al., 2016). In order for patients to be successful in the pharmacologic management of their new organ, effective education is necessary. Clinical nurses play an essential role in the delivery of such education to transplant recipients as they are able to employ necessary skills to accomplish desired outcomes in clinical care such as compliance, prevention of rejection, self-efficacy, and improved quality of life (Urstad et al., 2012; Urstad et al., 2018).

Background

Mangold (2020) postulates that organ transplant recipients have complex healthcare needs and must receive reliable and consistent education and care for successful self-management of their post-transplant regimen. Literature supports the development of standardized patient education to improve medication compliance and reduce hospital readmissions in the transplant population (see Appendix A). Standardized and interdisciplinary patient education protocols have proven to be effective in enhancing patient knowledge, self-care, and medication adherence (Asavakarn et al., 2016; Fitz et al., 2020; Mangold, 2020; Meng et al., 2016; Williams et al., 2016). In addition to improving patients' knowledge, standardized education can enhance patients' satisfaction of care at discharge and increase nurses' satisfaction with their education practices

(Asavakarn et al., 2016; Meng et al., 2016; Urstad et al., 2018).

Effective solid organ transplant patient education requires the collaboration of knowledgeable interprofessional team members, including nurses, pharmacists, doctors and surgeons, transplant coordinators, and transplant clinic staff. Nurses providing patient education must be able to communicate consistently across different care environments, as this can improve patients' self-management throughout all phases of transplantation (Mangold, 2020). A standardized solid organ transplant patient education protocol must also comply with regulatory requirements. Mangold (2020) found that unifying nursing education was successful at providing consistency and reducing redundancy in the education patients receive.

Significance of The Problem

In a transplant intermediate care (IMC) unit at a major urban university teaching institution, barriers to effective patient education exist as demonstrated by the amount of medication errors found in the post-transplant clinic and post-transplant readmission rates. A majority of the clinical nursing staff on the transplant IMC have less than two years of experience in solid organ transplant care. Although patients require frequent and consistent education prior to discharge, currently there is no formal transplant patient education protocol in place. The inexperience of the staff, the complexity of the medication and self-care regimen, and the lack of an existing protocol make it challenging to provide effective patient education.

Purpose of The Project

The purpose of this project was to reduce post-transplant patient-related medication errors and reduce post-transplant readmission rates through the design and

implementation of an evidence-based patient education protocol to kidney transplant recipients. To enhance and improve the process of education dissemination for transplant patients, nurses working on the transplant IMC will need to receive their own education so that they can follow a newly implemented standardized patient education protocol. This education must be interdisciplinary, much like the care of the solid organ transplant patient. Implementing a standardized patient education protocol requires participation of transplant team members from the various disciplines such as nursing, pharmacy, education, and transplant coordination. Unfortunately, the amount of post-transplant hospital readmissions that occur in less than thirty days after initial discharge for kidney transplant recipients averaged 35% for fiscal year 2021, and 55% within the first four months of fiscal year 2022 (Appendix K). The frequency of patient-related medication errors found in the post-transplant clinic, as well as the amount of post-transplant hospital readmissions, indicate that a standardized patient education protocol is needed for patients to be successful in managing their new organ, reducing medication errors, and reducing readmission rates.

Clinical Question

Implementation of this standardized patient education protocol sought the answer to the following clinical question: In kidney transplant patients over 18 years of age on a transplant intermediate care unit at a major urban university teaching institution, does implementation of an evidence-based standardized transplant patient education protocol compared to the use of non-standardized patient education, reduce self-medication administration errors and reduce hospital readmissions due to these errors in post-transplant patients over a 3-month period? In order to begin answering this clinical

question, a review of the literature was conducted (see Appendix A). Additionally, support from the collaborating agency was obtained and a timeline for completion was created (see Appendix B).

Synthesis and Analysis of Supporting and Related Literature

Search Strategy

A review of the literature was conducted to begin answering the clinical PICOT question: In kidney transplant recipients over 18 years of age, does implementation of an evidence-based standardized transplant patient education protocol compared to the use of non-standardized patient education, reduce self-medication administration errors, reduce hospital readmissions of kidney transplant recipients, and improve patient satisfaction over a 3-month timeframe?" The PRISMA flow diagram was utilized to aid in the organization of the database search, screening and synthesis, and display a visual of the overall search. Search terms included "solid organ" transplant education, "transplant patient" education, kidney transplant education, transplant recipient education, transplant medication education, transplant medication adherence, transplant patient medication compliance, and education to reduce readmission. ScienceDirect, PubMed, MEDLINE, the Cochrane database, and the Nursing and Allied Health databases were searched. Google Scholar was also searched. Limits applied to the search were full text, English language, and a date of publication within the last five years from the original search. with exception of one article from 2012 that was a randomized controlled trial most similar to the PICOT question. Inclusion criteria encompassed studies that were relevant to the PICOT question in that they discussed educational approaches to transplant patient medication adherence, they had educational interventions for the reduction of hospital

readmissions, and they addressed improving patients' self-management through education. Studies that did not involve an educational intervention were excluded in addition to those that only focused on nurse outcomes rather than patient outcomes. Twenty-four full text articles were evaluated for relevance, resulting in n=11 selected as pertinent to the PICOT question and included in the final literature review (see Appendix A).

Review and Synthesis of the Literature

Literature was identified surrounding the impact of evidence-based educational methods for transplant recipients; however, only a few studies were found that explored its effect on patient medication adherence and reduction of hospital readmissions. A review of eleven studies examining the effects of educational programs on various adult transplant recipient outcomes revealed several similarities and differences in methodology and research findings. Moreover, the fact that only a few studies explored standardized educational practices on outcomes such as patient medication adherence and reduction of hospital readmissions, further supported the need for additional knowledge in this area.

Overview of Methodologies

Research Designs

Two studies were systematic reviews, four were randomized controlled trials (RCTs), four used quasi-experimental designs, and one used an explorative qualitative design. Of the systematic reviews one contained reviews of controlled trials related to kidney transplant medication adherence and immunosuppressive drugs. Of all the quasi-experimental studies, none utilized a control group. One used a pre-test/post-test design,

one retrospectively compared new education to old education, while one utilized retrospective chart review, and one was observational. The qualitative study explored kidney transplant recipients' experiences.

Variations in Populations Studied

The populations included in the eleven articles were all adults varying in age from 18 to 72 years. Most studies included kidney transplant recipients (Aghakhani et al., 2021; Andersen et al., 2019; Covert et al., 2016; Garcia et al., 2015; Mathes et al., 2017; Mollazadeh & Maslakpak, 2018; Oberlin et al., 2016; Urstad et al., 2012). Three studies incorporated liver transplant recipients (Asavakarn et al., 2016; Dols et al., 2020; Promraj et al., 2016). All of the studies had populations with a variety of demographic backgrounds, with most conducted in urban areas. Four studies occurred exclusively in the hospital setting (Aghakhani et al., 2021; Andersen et al., 2019; Dols et al., 2020; Urstad et al., 2012). Two studies occurred exclusively in an outpatient transplant clinic (Garcia et al., 2015; Promraj et al., 2016). Five studies occurred in both the hospital and outpatient clinic settings (Asavakarn et al., 2016; Covert et al., 2016; Mathes et al., 2017; Mollazadeh & Maslakpak, 2018; Oberlin et al., 2016).

Types of Educational Interventions

All eleven studies assessed the use of educational interventions on transplant patient outcomes. Four studies utilized evidence-based structured educational programs or sessions (Aghakhani et al., 2021; Dols et al., 2020; Mollazadeh & Maslakpak, 2018; Urstad et al., 2012). Three studies utilized or analyzed the effect of both educational and behavioral interventions on transplant recipient outcomes (Garcia et al., 2015; Mathes et al., 2017; Oberlin et al., 2016). Two studies employed pharmaceutical educational

approaches (Asavakarn et al., 2016; Promraj et al., 2016). Two studies examined the use of patient-centered educational interventions on certain outcomes such as 30-day readmission rates (Andersen et al., 2019; Covert et al., 2016). These findings were relevant as they offered guidance on the design and methodologies to the proposed DNP project. Additionally, they provided evidence-based support for the need of standardized educational interventions in the transplant population.

Thematic Analysis of Study Findings

Several themes were found by grouping and analyzing outcomes of the eleven studies.

Structured, Individualized, and Multidimensional Education

When considering the delivery of medication education, several studies that focused on education and behavioral methods found that multidimensional interventions led to improved medication adherence. Garcia et al. (2015) and Mathes et al. (2017) found that the combination of behavioral and educational interventions were statistically significant in improving medication adherence. Dols et al. (2020) found a 16.3% decrease in readmission rates. The scoping review conducted by Oberlin et al. (2016), discovered that behavioral interventions work best to enhance medication adherence when they promote patient engagement and are multidimensional. Multidimensional education is important as one intervention is not superior to another for improved transplant patient outcomes (Oberlin et al., 2016). In consideration of the DNP project, promoting patient engagement and employing various styles of education were important aspects as multidimensional education is evidence-based and has shown improvement in patient outcomes.

Medication Adherence Impact

A majority of the studies that utilized multidimensional interventions found improvement in medication adherence. Three studies that focused on transplant medication education found that this specific education was significant in improving overall medication adherence and decreasing drug-related problems, such as non-adherence and adverse drug reactions among patients (Asavakarn et al., 2016; Garcia et al., 2015; Promraj et al., 2016). Additionally, the number of complications related to transplant medication and adherence was shown to significantly decrease after increased time of education and increased duration after transplant (Asavakarn et al., 2016; Garcia et al., 2015; Promraj et al., 2016). Finally, medication adherence was also shown to be a factor in 30-day readmission rates. Covert et al. (2016) and Dols et al. (2020) found that most patients who were readmitted within 30 days from their transplant were nonadherent to their medication regimen.

Impact on Quality of Life, Self-care and Self-management

Three studies found that educational interventions could improve quality of life, self-care, and self-management (Aghakhani et al., 2021; Mollazadeh & Maslakpak, 2018; Urstad et al., 2012). Five studies found that education should be structured yet individualized to each patient's unique needs. Interdisciplinary teams could facilitate structured education that promotes patient understanding (Asavakarn et al., 2016; Promraj et al., 2016). Individualized but structured education is important because individual patient factors may influence their outcomes, enhance engagement, promote compliance and self-efficacy, and improve quality of life (Andersen et al., 2019; Dols et al., 2020; Oberlin et al., 2016; Urstad et al., 2012). The standardized transplant patient

education protocol was structured yet individualized, allowing for flexibility based on a patient's unique factors and ability to learn.

Quality Comparison and State of the Evidence

Studies included in this review varied in quality due to differences in sample size and methodology. The Johns Hopkins Evidence-Based Rating Scale was used to assess and grade the studies for quality (Dang & Dearholt, 2017). Six studies ranked either level 1B or 2B, meaning they provided high level evidence by providing reasonably consistent results through a sufficient sample size and some control, allowing for reasonably definitive conclusions to be drawn (Dang & Dearholt, 2017). One case-control study ranked 3B because it had a retrospective design with different patient-level factors and a subjective definition of adherence but had good quality methodology. Four studies ranked 2C or 3C, due to insufficient sample sizes or flaws that limited the ability to draw generalizations (Dang & Dearholt, 2017). Although a majority of the evidence ranked at a high level, the state of the evidence is mixed in quality to support the idea that an educational protocol can positively impact kidney transplant recipients' outcomes (see Appendix C). Therefore, this scholarly quality improvement Doctor of Nursing Practice (DNP) project further explored the effects of a structured and standardized transplant-specific educational intervention on kidney transplant recipients' medication adherence, readmission rates, and satisfaction.

Conceptual/Theoretical Framework & QI/EBP Model

Theoretical Framework

Pender's Health Promotion Model (HPM) was chosen as the theoretical framework to guide the conceptual underpinnings of the design and implementation of an

evidence-based solid organ transplant patient education protocol. The HPM focused on interventions that develop resources to preserve and enhance one's wellbeing (Polit & Beck, 2016). The HPM incorporated the belief that one's individual characteristics and experiences influence their behavior, cognitions, and affect, thus influencing their behavioral outcome or the health-promoting behavior. Transplant patient education is an ongoing process influenced by various cognitive, behavioral, and emotional factors such as the environment, self-efficacy, one's beliefs and their support system. Mohsenipouya et al. (2018) postulated the development and implementation of educational interventions for post-operative patients based on the HPM can increase self-care actions and reduce readmissions. Additionally, educational interventions based on Pender's HPM can not only significantly impact self-efficacy, but treatment adherence and the overall wellbeing of patients (Masoudi et al., 2020). Appendix D displays a visual of the HPM.

The purpose of this model was to guide the development of the standardized patient education protocol with the appreciation that transplant patient education can enhance one's perceived self-efficacy related to the benefits of medication adherence. Per the model depiction, individual characteristics and experiences exert influence over one's behavior-specific cognitions and affect, thus influencing their behavioral outcome (Polit & Beck, 2016). A patient's prior behaviors related to managing their health exert influence over behavior-specific thoughts such as the perceived benefit of action, perceived barriers to action, perceived self-efficacy, and activity-related affect (Polit & Beck, 2016). Perceived benefits may include maintaining the health of their new transplanted organ and an improved quality of life, while barriers may include the cost of medications and or a lack of help and support. Educational interventions must lie in

activity-related affect and promote the benefits of properly self-medicating, filling a pill box, medication adherence, as well as provide positive feedback and praise to promote one's perceived self-efficacy, overcome the perceived barriers to action, and encourage the perceived benefits of action. Additionally, a patient's personal factors such as their psychological state, sociocultural factors, or their support system, may impact how their interaction with nurses and providers influence their health promoting behaviors. All of these factors then exert influence over the commitment to a plan of action, leading to the health promoting behavior.

Process Model

The Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) Model was used to guide and organize the evidence-based practice (EBP) project (see Appendix E). The JHNEBP model guides clinical decision making and focuses on the practice question, evidence, and translation into practice (PET process) (Dang & Dearholt, 2017). The JHNEBP model guided the project as it was developed, implemented, and evaluated through the steps of the PET process. This ensured that best practices and the latest research findings were rapidly and appropriately incorporated into patient care (Dang & Dearholt, 2017).

The EBP project development followed the steps identified in each phase of the PET process. Some steps in the process included an internal and external search for evidence, the identified EBP, the suggested practice change, the scope of practice, the responsibilities for leadership, and the interdisciplinary members involved along with meetings that occurred with pharmacists, transplant coordinators, nurse educators, and

potential project facilitators. Organizational support was obtained for the suggested practice change and action plan.

Project Design

The methodology chosen for this DNP project was based on the assumption that implementation of a standardized transplant patient education protocol on a transplant intermediate care unit would result in reduced patient self-medication administration errors and reduced hospital readmission rates. This DNP project focused on the implementation of an educational intervention for process improvement, through utilization of quantitative and qualitative methods comparing retrospective data prior to the intervention to new data collected after the intervention, as well as nurses' knowledge. Evidence from the literature was utilized to develop the standardized transplant patient education protocol focusing on one's self-care and medication regimen.

Observation through clinical practice, verbal discussion with various transplant team members, and patient satisfaction scores regarding communication surrounding medication hovering around a 60% benchmark, illustrated patients' lack of knowledge surrounding their transplant medication regimen and their discontent with the education they received prior to this project implementation. Inadequacy of transplant experience among the nursing staff played a role in the lack of effective patient education. Quantitative data was obtained using thirty-day hospital readmission rates, a pillbox medication audit conducted prior to patient discharge, patient satisfaction scores regarding medication education and communication about medication, and a *Patient Knowledge Assessment* test. Patient satisfaction scores were used to predict whether this proposed intervention is sustainable. Literature supported the use of standardized patient

education to improve health outcomes, reduce unplanned hospital readmissions, and patient satisfaction (Andersen et al., 2019; Asavakarn et al., 2016; Covert et al., 2016; Dols et al., 2020; Fitz et al., 2020; Garcia et al., 2015; Mahdizadeh et al., 2020; Mathes et al., 2017; Ndemera & Bhengu, 2017; Oberlin et al., 2016; Promraj et al., 2016).

Additionally, improved patient satisfaction has enhanced medication compliance through a sense of empowerment.

Project Site and Population

The project was implemented at a major urban university teaching hospital in Maryland on a transplant intermediate care unit (IMC). The designated project setting consisted of a 27-bed inpatient unit who interact with registered nurses (RNs), technicians, nurse practitioners (NPs); resident, fellow, and attending physicians and surgeons; pharmacists, social workers and transplant coordinators. There was also an outpatient transplant clinic associated with this transplant IMC that employed some of the same staff members who were cross-trained for continuity of care. The sample population included patients admitted to this unit who were greater than 18 years of age and had received a kidney transplant during their current hospital admission. Patients who were excluded were those that did not receive a kidney transplant during their current admission, and or those who were readmitted to the unit for other reasons. The projected sample size for this project was approximately 65 kidney transplant recipients. Additionally, nurses were a population of interest in this project. They received education on the protocol itself, how to implement it, what to document, and what data would be collected. Over 60% of the nursing staff on the transplant IMC had less than two years of nursing experience, most with minimal transplant experience. The demographics of the

nursing staff were an important factor, as their knowledge of patient education was also measured during the data analysis portion of the project.

Significance of the Problem

Transplant patients had received education throughout their hospital admission that was not standardized and did not follow any protocol or pathway. Patients would receive an hour-long transplant specific education session from transplant coordinators and another hour-long medication education session from their bedside nurse immediately prior to discharge. Documentation on education occurred in various places in a patient's electronic health record (EHR). These education practices overwhelmed patients and placed time constraints on the nurses. The literature demonstrated that standardized education provided throughout a patient's hospital stay is more effective than education given immediately prior to discharge (Andersen et al., 2019; Dols et al., 2020; Fitz et al., 2020; Mahdizadeh et al., 2020; Mathes et al., 2017; Oberlin et al., 2016). This project restructured the delivery of educational materials patients received. The goal of transplant patient education protocol was for it to become a standardized process for nurses to utilize in providing education and documenting this education during their patients' hospital stay over a minimum of three post-operative days. This would allow for the transplant coordinators' education session to be an educational review session prior to discharge rather than an intensive educational session of first-hand information, which would lessen the burden of education previously placed on patients and nurses.

Constraints and Barriers

Two constraints of this project included staff nurses' attitudes relative to change in current practice, and patient length of stay determinants. Many nurses and other

healthcare team members were resistant to a practice change. The transplant IMC employed many novice nurses, about 40%, and was also impacted by nursing staffing shortages. Additionally, a short hospital stay limited the time available for adequate education, while a lengthy stay due to post-operative complications hindered proper education. These weaknesses and threats impacted the implementation process of the DNP project. However, effective education was adaptable to these constraints as it adhered to a patient's learning style, their ability and interest to learn, included family members when applicable and considered their limitations and strengths.

Methods

Procedures, Timeline, and Data Collection

This project took place over 14 weeks, from September 7, 2021 until December 10, 2021, in the transplant IMC (Appendix B). Prior to beginning this project, the unit nurse educator was identified as the project facilitator. An email summarizing the project's evidence, purpose, process, and support required for the success of the project's implementation was sent to the transplant IMC nursing staff. Nurses received the *Nurse Knowledge Test* after reviewing this email, in a survey format, to assess their knowledge of the information provided by the DNP student (Appendix H).

Throughout the weeks of implementation and ending at week fourteen, the DNP student collected the previous fiscal year's (FY) hospital data of transplant readmission rates and patient satisfaction scores from the Press Ganey survey, a survey scientifically developed with patient-centered questions to provide an understanding of patients' care experiences. Specially, data from the communication about medicines category was

evaluated (Appendix K).

The pill box data and prior FY readmission data was collected by the DNP student during the first four weeks of the project. Education to clarify the project intervention and the use of the standardized patient education protocol was provided by the DNP student, the unit educator, and charge nurses during small informal huddles at shift change on the unit before and during the implementation phase. Additionally, information was sent out via email in regard to the project's progress on a weekly basis.

Project implementation and data collection started on week two. The standardized patient education protocol was utilized by the bedside nurses working on the transplant intermediate care unit (Appendix L). Throughout the implementation phase, the DNP student was available to meet with the interprofessional team to modify project components if needed, such as updating the educational documents with different medications. The patient's readiness to learn and evidence of understanding was documented based on the individual topics covered during the education provided on each day (Appendix L). Patients received the post-transplant *Patient Knowledge Assessment* on post-operative day three to measure their understanding of education provided during implementation of the protocol (Appendix M). The DNP student met with project facilitators on a weekly basis for feedback and to collect data from pill box audits and other surveys. Formative evaluation occurred throughout the implementation of the DNP project (Appendix N). Weekly data collection consisted of an assessment of the nurse utilization of the patient education protocol based on chart audits of documentation and the number of surveys completed in comparison to kidney transplant recipients, the number of medication errors made by patients through pill box audits, and

patient satisfaction scores through quarterly Press Ganey survey results.

Ongoing evaluation of the process took place by the DNP student throughout the implementation process. Barriers to protocol utilization and documentation were identified by verbal survey with the DNP student, project facilitators, and unit educator, and documented for use as feedback or further education for stakeholders to aid in reaching the goals of the project. Suggestions regarding how to navigate these barriers were communicated via weekly emails and in the reference binders to assist in overcoming any hurdles. Additionally, reminders about the project's purpose, goals, and progress toward such were communicated. Project implementation and data collection concluded on week fifteen.

Protection of Human Subjects

This evidence-based quality improvement project received approval from the university Institutional Review Board (IRB) and the project setting IRB (Appendix F). All surveys or assessments utilized included disclosure statements (Appendix I). During the project, all participants including patients and nurses remained anonymous as their data was de-identified and placed in aggregate form. Press Ganey survey results were anonymous and only visible to hospital employees, and transplant readmission rate data was found in a spreadsheet that could only be accessed with a password. Throughout the implementation period, daily and weekly data collection forms were stored in a locked file cabinet on the transplant IMC unit and the DNP student's password protected laptop. Data will be destroyed a maximum of five years after the project's completion.

Project Implementation

After IRB approval was obtained, reference binders were created for both nursing

stations with project information developed by the DNP student. Binders contained an informational PowerPoint outlining the entire project, the *Nurse Knowledge Test*, the educational protocol, the *Patient Knowledge Assessment*, the *Pillbox Audit*, the *Formative Evaluation*, and the *Post-Implementation Survey*. An email was sent to all nursing staff immediately prior to implementation that explained the project, purpose, and goals with an attached informational PowerPoint and the *Nurse Knowledge Test*. The standardized transplant patient education protocol was designed to be used for new kidney transplant recipients from their first post-operative day up until discharge.

Staff were instructed to complete the *Nurse Knowledge Test* anonymously and return to the secure collection folder by September 17, 2021 (Appendix H). Staff were also informed that the *Patient Knowledge Assessment* was to be given to the patient on post-operative day three, and that the *Pillbox Audit* was to be completed on the day the patient was discharging after the patient had attempted to fill their pillbox (Appendix M; Appendix J).

Initiating the Project

Project implementation was initiated on September 7, 2021. One reference binder was placed at each nurses' station on the unit. When placing the references binders, available staff were reminded of the project's evidence, purpose, process, and support required for the success of the project's implementation. The nursing staff present during the first day of implementation were encouraged to complete the *Nurse Knowledge Test* but were instructed that completing this document was completely anonymous and voluntary (Appendix H). Nurses that were caring for post-operative kidney transplant recipients were encouraged to use the education protocol with their patients. If a nurse's

patient was on post-operative day three, they were also encouraged to administer the Post-Transplant *Patient Knowledge Assessment* to them and patients on their third post-operative day in the future (Appendix M). If a nurse's patient was a new kidney-transplant recipient discharging that day, they were instructed to conduct a *Pillbox Audit* during discharge education. Nurses were reminded to complete appropriate surveys during change of shift huddle and throughout each shift by the charge nurses. Additionally, reminders were placed into each section of the reference binders. By week twelve of implementation, nurses on the transplant IMC completed a *Formative Evaluation Survey* of the *Patient Knowledge Assessment* (Appendix N). At the completion of implementation in week fourteen, all staff that participated in the implementation of the project were asked to complete the *Post-Implementation Survey* to help evaluate the sustainability of this practice change post-project completion (Appendix O).

Barriers and Facilitators

Barriers exist to any practice change. During the beginning of project implementation, some nurses felt as though this practice change would create more work for them or hinder their workflow. Many nurses verbalized that their shifts were already busy and filled with many tasks they must complete before ever beginning to educate their patients about medications. Additionally, many new graduate nurses had just begun working on the unit and expressed feeling overwhelmed as the project was implemented. Another barrier that was identified during the beginning of implementation was kidney transplant recipients who have a complicated post-operative course requiring admission to the intensive care unit (ICU) because they would not be able to follow the educational

protocol as planned. During these situations, the primary focus is on the patient's health and the ICU does not provide transplant specific education. When the patient is then admitted to the transplant IMC, it would sometimes already be post-operative day three and they had not received any education, so it would therefore not be feasible to have them complete a *Patient Knowledge Assessment*. However, these patients still benefited from the organization of the education that was provided following the patient education protocol and still had their pillbox audited at discharge.

To overcome attitudes of those resistant to practice change, nurses working on the transplant IMC were educated on the DNP project, its purpose, intended outcomes, and how to utilize the educational protocol. Emphasis was placed on the strengths and opportunities of the project, along with highlighting the goal of standardized education to improve patient compliance with their self-administered medications, along with decreasing readmissions and improving patient satisfaction with the communication they receive about their medications. Having a protocol to follow that outlined what was to be taught and documented each day helped streamline the nurses' shifts. This provided an opportunity to improve both nurse and patient satisfaction and knowledge.

Facilitators of this project include the transplant IMC nurse manager and nurse educator, charge nurses, transplant pharmacists, transplant coordinators, nurse practitioners, and staff nurses that wanted to promote evidence-based practice change. The nurse educator helped organize the project reference binders and assured that all staff had been made aware of the project implementation. The charge nurses also helped inform staff of the project through small informal shift change huddles. The charge nurses helped facilitate the utilization of the educational protocol by nurses caring for

kidney transplant recipients, along with the delivery of appropriate surveys and audit tools.

The professional development committee of the transplant IMC also assisted in the facilitation of this project. Throughout the weeks of implementation, they offered and provided suggestions to increase protocol usage and survey completion. The members of this committee assured that charge nurses on each shift had nurses utilize the educational protocol with the appropriate patients and administered the *Patient Knowledge Assessment* and *Pillbox Audits* when necessary per the protocol. Furthermore, this committee suggested placing the *Patient Knowledge Assessment* within the medication folder when the kidney transplant recipient is first admitted to the transplant IMC (Appendix L; Appendix M). This suggestion was beneficial for both the nurses and the patient as it served as a reminder that a survey was to be completed, and it also helped the patient associate the *Patient Knowledge Assessment* with their medication folder. This recommendation highlighted the significance of medication knowledge and the responsibility of the patient to learn about their new transplant medications.

Formative Evaluation

The *Pillbox Audit* was not conducted in the post-transplant clinic because prior to implementation, patients were coming to their follow-up appointments without having their pillbox filled, demonstrating poor medication knowledge and management. By conducting the *Pillbox Audit* on the day of discharge as the patient is filling their pillbox independently during discharge education, the effectiveness of the nurses' education as well as the patient's knowledge and ability to manage their medications was captured. This data was therefore utilized as both formative and summative evaluation of the

practice change, as it is documented in the patient's nursing discharge note visible to post-transplant clinic staff. As a result of this change, post-transplant clinic staff were alerted to a patient's need for further education or if a patient was proficient in their medication management. Transplant pharmacists evaluated new kidney transplant recipients in the transplant clinic and documented their medication adherence and pillbox compliance in the patient's electronic medical record. This documentation was accessible and visible to those caring for this patient if they were to be readmitted at a future date.

Summative Evaluation

Summative evaluation of the implementation process occurred through the utilization and completion of the surveys throughout the project. The *Nurse Knowledge Test* assessed the perceptions of readiness to implement an evidence-based standardized patient education protocol by evaluating if the nurses understood the necessity and benefits of the proposed project (Appendix H). The *Patient Knowledge Assessment* and the *Pillbox Audit* evaluated the patient's knowledge as well as the effectiveness of the nurse's education (Appendix M; Appendix J). Formative evaluation of the *Patient Knowledge Assessment* was measured through the survey in Appendix N. This survey evaluated the relevance and effectiveness of each of the questions from the *Patient Knowledge Assessment* at assessing the patient's knowledge about their medications. One of the most important components of summative evaluation in regard to nursing staff was the *Post-Implementation Survey* (Appendix O). This survey assessed the perception of readiness and necessity of implementing a practice change in addition to the effectiveness of the project and the sustainability of this practice change for the future.

Data Analysis

The DNP student announced the completion of the project to the transplant staff and stakeholders in person and through email during week fourteen. Final *Patient Knowledge Assessments* and *Formative Evaluation Surveys* were collected, quarterly Press Ganey survey data was obtained, and pill box audits were gathered. A *Post-Implementation Survey* was administered to review knowledge gained and subjective stakeholders' feedback for potential future changes to promote sustainability of the project for future use (Appendix O).

The DNP project evaluation appraised the implementation process, the project's outcomes, and its sustainability for future use. During the spring of 2022, (January 31, 2022 through May 13, 2022) this data was evaluated and compared to baseline data. Data analysis included descriptive and inferential statistics completed in Microsoft Excel, de-identified, and reported in aggregate to summarize the finding of this evidence-based process improvement project.

Analysis and Discussion of Findings

Kidney transplant recipients have complex healthcare needs and are at increased risk of infection, rejection, hospital readmission and graft failure if they do not follow a post-transplant care regimen. Therefore, patients must receive reliable and consistent education about their post-transplant regimen including their new medications. A needs assessment of the unit's current educational process was performed and revealed an inadequate patient education process with a lack of standardized content and process delivery. This project demonstrated the benefits of utilizing an evidence-based patient education protocol with transplant recipients.

Nurse Knowledge Test

Prior to project implementation, nurses on the Transplant IMC were asked to complete a *Nurse Knowledge Test* (Appendix H). Fourteen surveys were completed, and findings from this pre-implementation survey revealed that the nurses understood the significance of not having standardized patient education. Furthermore, the nurses understood the goals of standardizing this education, interventions to promote patient participation in education, and how to use the teach-back method.

Several themes emerged from the nurse feedback on this survey on how this project could improve patient outcomes. Many nurses identified that projected outcomes of this project could include a decreased length of stay in the hospital for patients, decreased avoidable readmissions, and decreased medication errors. Projected outcomes by unit nurses also included increased patient independence, knowledge, confidence, compliance, and readiness for discharge to home. Several nurses mentioned that having a standardized process for patient education could decrease hospital costs and would set the expectation for patient participation, allowing them to be more involved in their own care; and that it would also help improve new graduate nurses' confidence with their patient education practices.

Patient Knowledge Assessment

Kidney transplant recipients were given the *Patient Knowledge Assessment* on post-operative day three to assess their knowledge of transplant specific medications (Appendix M). Sixteen patients completed the *Patient Knowledge Assessment*, which consisted of twelve questions that assessed medication usage, side effects, and post-transplant care. The average score on the assessments was an 83.33% or 10 out of 12

questions correct. This indicates that patients had satisfactory knowledge about their transplant medications and post-transplant care after three days of receiving education following the evidence-based patient education protocol. Table 1 details participant response for each question of the *Patient Knowledge Assessment*.

Table 1

Patient Knowledge Assessment Scores

	Correct	Incorrect	Total Responses	Percent Correct
Question 1	15	1	16	93.75%
Question 2	13	3	16	81.25%
Question 3	15	1	16	93.75%
Question 4	13	3	16	81.25%
Question 5	15	1	16	93.75%
Question 6	15	1	16	93.75%
Question 7	4	12	16	25%
Question 8	14	2	16	87.50%
Question 9	15	1	16	93.75%
Question 10	15	1	16	93.75%
Question 11	12	4	16	75.00%
Question 12	14	2	16	87.50%
Average	13.33	2.67		83.33%

Further analysis of the *Patient Knowledge Assessment* revealed that only 4 patients answered question seven correctly. This question asked about the risks associated with taking one of the more common anti-rejection medications. All possible responses were risks that a patient needed to be aware of. However, by not selecting ‘all the above,’ patients demonstrated partial knowledge and did not answer the question correctly. Questions such as this one demonstrates the concept that patients do not fully process or comprehend the entirety of information provided to them at once. This supports the need for reinforcement and repetition in patient education, and the proper wording of questions

on the *Patient Knowledge Assessment* should this educational protocol be continued in the future.

The *Formative Evaluation Survey* of the *Patient Knowledge Assessment* was utilized at the middle to end of the DNP project implementation and provided formative evaluation as well as summative evaluation of the project's success (Appendix N). This survey asked nurses involved in the project's implementation to rate the usefulness of each question on the *Patient Knowledge Assessment* directed at assessing a patient's knowledge about their medications. Questions could be rated 0 = not useful, 1 = useful, or 2 = necessary. Nurses could also leave feedback or comments at the end of the survey if they had any suggestions. Only four nurses completed this evaluation. Of the nurses who completed this evaluation, all of them found each question on the *Patient Knowledge Assessment* to be either useful or necessary. The most necessary questions according to the evaluation results were questions 2, 3, and 8. Questions addressed important considerations of the anti-rejection medication Tacrolimus such as drug level monitoring through blood work and the timing of a patient's dose, all of which are essential to the health of a newly transplanted organ. The questions that were ranked as useful, or less necessary than the others on the *Patient Knowledge Assessment* were about preventing infections and dietary restrictions. While infection prevention and proper diet are important, the nurses completing the evaluation did not rank them as high as those questions that addressed proper medication administration, side effects, and post-transplant care. Formative evaluation of the *Patient Knowledge Assessment* is displayed in Table 2.

Table 2*Formative Evaluation Results*

	Not Useful	Useful	Necessary
1. Prograf (Tacrolimus), Myfortic (Mycophenolic acid), and Prednisone are what kind of drugs?	0.00%	25%	75%
2. On lab draw days, which medication should I wait to take until after my blood is drawn?	0.00%	0.00%	100%
3. Which medication requires blood work?	0.00%	0.00%	100%
4. Which medication prevents fungal infections?	0.00%	50%	50%
5. Which temperature would be a reason to call my transplant coordinator?	0.00%	25%	75%
6. What food or drink should I avoid if I am taking Tacrolimus (Prograf)?	0.00%	50%	50%
7. By taking Tacrolimus (Prograf), I am at increased risk of...	0.00%	25%	75%
8. What is a common side effect of Myfortic (Mycophenolic acid)?	0.00%	0.00%	100%
9. What can I do to prevent rejection of my new organ?	0.00%	25%	75%
10. What can I do to prevent infection?	0.00%	50%	50%
11. I should remember the following about taking my medications	0.00%	25%	75%
12. I need to bring these items with me to all of my Transitional Care Clinic (TCC) and follow up appointments	0.00%	25%	75%

Pillbox Audit

Nine *Pillbox Audits* were completed by nurses discharging kidney transplant recipients. Several errors were common among the audits that were completed. Four patients confused the frequency of their medication, such as twice per day, with taking two pills at a specific time. For example, if the patient is ordered 1mg Tacrolimus twice

per day (BID), the patient would place two pills in the morning slot rather than one pill in the morning and one pill in the evening slots. These patients also forgot to fill their pill box with their evening medications for the day they were being discharged. These patients were educated by their discharging nurse and corrections were made to their medication errors. Five patients successfully filled their pillboxes without any error. However, nurses who completed the *Pillbox Audit* mentioned that some patients were initially hesitant to fill their own pillboxes for their new medications as this was their first step in beginning to independently manage their new organ. Feedback from these audits suggests the importance of this psychomotor action and need for additional clarification of medication orders within the medication folder, and possible revision to the medication folder in order to make medication instructions more comprehensible for patients (Appendix J; Appendix L).

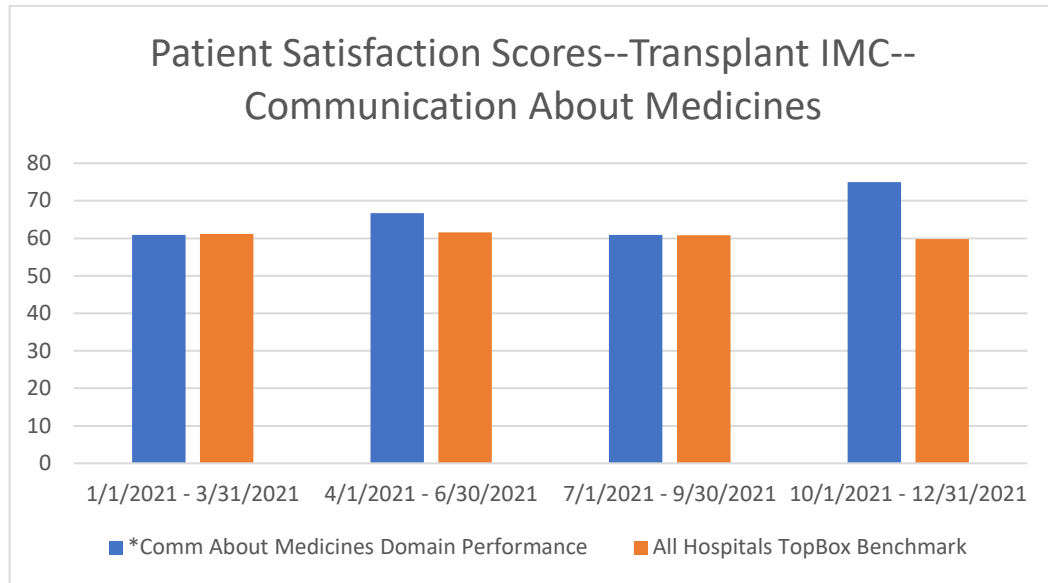
Patient Satisfaction

Unit specific patient satisfaction scores surrounding medication communication from nurses were measured and translated into scores. These scores from pre-implementation were compared to post-implementation scores. Prior to implementation, satisfaction scores in this category were consistently near the hospital goal of 60%. Satisfaction scores in this category from the time period in which implementation occurred increased to 75%. A limitation of these patient satisfaction scores is that the survey captures the response of all patients admitted to the transplant IMC rather than just kidney transplant recipients alone. Therefore, the scores include patients who received transplants other than a kidney who may not have received education following the evidence-based protocol. Figure 1 depicts a visual representation of the results of patient

satisfaction scores.

Figure 1

Patient Satisfaction Scores



Readmission Rates

During fiscal year 2021, the amount of post-transplant hospital readmissions for kidney transplant recipients that occurred less than thirty days post-discharge averaged 35%. Two months prior to project implementation, this average was 55%. During the project's implementation period, the thirty-day readmission rate revealed a downward trend, averaging 40% over four months. This indicates a decrease in the rate of readmission during project implementation. Additionally, the month after implementation, readmission rates decreased to 22%, below the goal of 25%. However, this decrease cannot be correlated directly to the project's implementation, and therefore no inferences or correlations can be made. Although the decreased rates of readmissions cannot be correlated to project implementation, the downward trend illustrates that medication regimen adherence factors into patient readmissions. Improved medication

compliance can help reduce post-transplant complications such as infection or rejection. Therefore, patient education is paramount in preventing readmissions, regardless of cause.

Post-Implementation Survey

The *Post-Implementation Survey* revealed valuable feedback from nurses who participated in the project's implementation. Four *Post-Implementation Surveys* were completed. All four nurses felt as though the *Patient Knowledge Assessment* was helpful at assessing patients' knowledge of their medications, and also stated that it helped the nurses focus their education. They also all felt as though their patients were more engaged during education sessions because they asked more questions about their care. Three out of four nurses noticed improvement in their patient's understanding of their medications. Half of the nurses stated that they felt their patients were more satisfied with their care and their overall hospital admission. Three out of the four nurses felt more confident in their ability to educate patients.

Results Overview

This DNP project demonstrated how implementation of an evidence-based patient education protocol to kidney transplant recipients can enhance and improve the process of education for both transplant patients and nurses. Interventions based on the health promotion model (HPM) can increase self-care actions and reduce readmissions (Mohsenipouya et al., 2018). In addition to self-efficacy, interventions in alignment with the HPM can improve treatment adherence and the overall wellbeing of patients (Masoudi et al., 2020). Self-care, self-efficacy, treatment adherence, patient satisfaction and reduced rates of readmission, while not statistically significant, was exhibited by

project participants. Nurses also displayed improved competence in the education they provided to patients, as well as increased knowledge of transplant medications and post-transplant care.

Although there was limited time and a small number of participants in this evidence-based quality improvement project, there were clinically meaningful outcomes. Most educational interventions require more time, as well as a larger number of patients in order to be able to demonstrate statistical significance. However, results identified after design and implementation of an evidence-based patient education protocol indicate that an educational protocol helps patients, specifically kidney transplant recipients, comprehend their new medication regimen, improve their self-efficacy, and participate in their own care. These small improvements also suggest that the use of standardized education provided by nurses improved patient satisfaction, improved patient engagement, and decreased thirty-day readmission rates. Therefore, evidence-based patient education protocols are clinically relevant tools for nurses who educate organ transplant recipients.

Project Limitations

The major limitation of this project was the small sample size of both nurse and patient participants, which reduces the ability to generalize findings of the project to a larger population of other organ transplant recipients or other transplant centers. The small number of participants make it unsuitable for the project team to make definitive conclusions about the project's findings due to the lack of diversity and statistical power. Nevertheless, the project team found clinical significance in many of the project's outcomes that are meaningful to nursing practice and patient education for organ

transplant recipients. Examples of project outcomes that are clinically significant were improved patient knowledge about their medications, improved patient engagement, and a reduction in thirty-day hospital readmission rates during and one month after the implementation period. If continued, these improvements may lead to improved outcomes such as medication compliance and reduced readmission rates among kidney transplant recipients as well as other organ transplant recipients, which is the main goal of transplant patient education.

Recommendations for Practice

Implementation of this DNP project yields valuable information and recommendations for patient education in clinical practice and supports continued use of evidence-based education protocols in the future.

Implications for Clinical Practice

Patient education is extremely important for patients to gain the knowledge and skills needed for self-management (Fawkes & Moore, 2019). Nurses in the acute-care setting are tasked with taking care of patients who are acutely ill and or are undergoing surgery. They must also provide effective education to their patients regarding their health condition, their medications, and their self-care. Patient self-management and self-care are essential to maintaining the health of an individual's transplanted organ (Meng et al., 2016; Williams et al., 2016). For transplant recipients, proper education is paramount and requires the collaboration of multiple disciplines. Nurses providing patient education must be knowledgeable, effective communicators. They must communicate with patients as well other health care professionals involved in the care of transplant recipients. Effective communication and education provided by transplant nurses can improve

patients' self-management throughout all phases of transplantation (Mangold, 2020).

A standardized solid organ transplant patient education protocol aids in the effectiveness of a nurse's communication as well as with their education practices. Streamlining patient education through the use of an educational protocol, specifically one that is evidence-based, can provide consistency and reduce redundancy in the education patients receive (Mangold, 2020). Additionally, providing such education may encourage nurses working in transplant to obtain their specialty certification of Certified Clinical Transplant Nurse (CCTN) thus enhancing their professional development and growth. This would also provide recognition of professional attributes that positively impact patient outcomes, nurse satisfaction, and interprofessional collaboration (Solomon et al., 2016).

Implications for the DNP-Prepared Leader

The Doctor of Nursing Practice Degree prepares advance practice nurses as leaders to guide healthcare system change (Sherrod & Goda, 2016). DNP-prepared nurses are equipped to identify clinical problems and implement changes to address these problems in complex organizational systems using evidence-based practice. Improving patient outcomes are underlined in AACN DNP Essential VI, *Interprofessional Collaboration for Improving Patient and Population Health Outcomes*, which was the principal DNP essential targeted in this project (American Association of Colleges of Nursing (AACN), 2006). This project also incorporated DNP essentials III, VII, and VIII exemplified by the interprofessional collaboration that occurred to develop a transplant patient education protocol, and the implementation of that evidence-based educational protocol to address the identified clinical practice problem as well as improve patient

outcomes (AACN, 2006).

This project demonstrates how DNP-prepared nurses are beneficial in leading change in the hospital setting that can translate to the ambulatory setting. It also demonstrates how DNP-prepared nurses can impact and improve patient care throughout the transplant process in the future. One hundred thirteen thousand people are awaiting lifesaving organ transplants (Donate Life America, 2021). The complexity of post-transplant care will necessitate, the employment of DNP-prepared advance practice nurses in transplant settings such as pre-transplant clinics, inpatient transplant units, and post-transplant clinics in the coming years. These advance practice leaders have the opportunity to collaborate with various healthcare professionals to improve population health for transplant recipients as well as identify areas for clinical practice change and implement quality improvement and evidence-based initiatives.

Economic Considerations

Economic outcomes such as cost reduction or healthcare savings were not evaluated in this project. However, it is important to consider the potential economic impacts standardized patient education may have on our healthcare system. Both the design and the implementation of the evidence-based solid organ transplant patient education protocol was free of cost. This protocol utilized educational materials already established at the hospital and formulated it into a protocol for nurses to follow to educate their patients while they are providing care. To implement this protocol at other transplant centers and in the future, nurses must have a careful understanding of transplant patient care. Associated costs would include training or orientation programs for novice or new nurses working in the specialty of transplant. However, proper

education and training of nurses in this specialty can lead to better patient outcomes and improved nurse satisfaction. Specialty training and certification can lead to a reduction in nursing turnover, vacancy rates and organizational employment costs (Whitehead et al., 2019). Patients may also be more satisfied with the nurses providing their care and the delivery of their education (Whitehead et al., 2019).

The probable economic advantages to hospitals with transplant centers, nurses, and patients outweigh any possible costs of what it would take to implement standardized patient education protocols. Hospitals and healthcare systems are reimbursed based on patient outcomes as well as patient satisfaction scores. Nurses are also drawn to work at healthcare organizations with low rates of turnover and ones that provide satisfaction with their nursing practice. Therefore, it is appealing for hospital systems, especially those with transplant centers, to assure their patients maintain the health of their new organ by practicing proper medication and self-care management and avoid readmission. While this project showed promise in reduction and overall improvement in kidney transplant readmission rates and in patient satisfaction scores, previous studies have confirmed a reduction in drug-related problems, such as non-adherence leads to a reduction in readmission rates among transplant patients (Asavakarn et al., 2016; Covert et al., 2016; Dols et al., 2020; Garcia et al., 2015; Promraj et al., 2016). With improved education of transplant patients, their quality of life and self-care management can improve which can lead to a reduction of readmissions and healthcare savings (Aghakhani et al., 2021; Mollazadeh & Maslarpak 2018; Urstad et al., 2012).

Direct patient care for kidney transplantation can cost over \$800,000 (Taber et al., 2021). Hospital readmission, especially within thirty days or less of discharge, can further

increase healthcare costs. Interventions focused on specific education for transplant recipients can significantly reduce rates of hospitalization, thus reducing costs (Taber et al., 2021).

Prospective cost savings to kidney transplant recipients related to better self-care management, especially regarding medication management, could offer a reduction of costs related to hospital visits or readmission. It could also include a reduction in lost income from missing work if the transplant recipient can avoid readmission to the hospital. However, these outcomes were not evaluated with this project.

Process and Outcome Recommendations

Future implementation of similar evidence-based quality improvement projects with transplant recipients immediately post-transplantation are needed with larger sample sizes. Recommendations include implementation of educational protocols for patients over a longer period of time. This will allow for a larger number of patients receiving education following the protocol and improved data collection from a larger sample size. Additionally, outcomes of protocol implementation can be followed for longer periods of time to determine long-term impacts of evidence-based transplant patient educational protocols.

Transplant nurses and those caring for transplant recipients can be educated and trained to deliver transplant specific patient education at their transplant centers, specifically during new hire orientation. The addition of checklists for the nurses to utilize while following an educational protocol may increase compliance with its utilization. Other materials such as videos for the patient to view prior to education with their nurse may be beneficial, and also provide another method of visual learning.

Sustainability of patient education protocols require the support of nurse educators, transplant pharmacists, transplant surgeons and advanced practice providers, hospital unit managers, and hospital administrators, as it needs to become part of the hospital and the unit's culture. Ongoing collaboration among the hospital unit and the post-transplant clinic is also essential. Transplant patient education protocols are easy to find from other transplant centers and can be developed for organization-specific requirements with little to no cost. With no demonstration of harm to patients or nurses, and numerous prospective benefits to both patients, their families, nurses, and hospital organizations performing organ transplants, integration of evidence-based solid organ transplant patient education protocols into nursing care should be seriously considered at hospitals with transplant centers nationally.

Dissemination Plan

This project was disseminated to university DNP committee members, faculty, and invited guests in a formal audiovisual presentation via Zoom video conferencing on Friday, April 29, 2022.

A project manuscript will be submitted to a scholarly journal that features organ transplant topics for viewing by national and international audiences. A journal about nephrology and or organ transplantation will be selected with the intent to have the project reach clinicians interested kidney transplantation and evidence-based educational interventions as well as various academic audiences. The main audience intended to reach with this submission are professionals employed in nursing roles, such as transplant nurses, that may have interest in reproducing the project or implementing similar quality improvement projects for transplant recipients at their healthcare organization.

An abstract for a poster or oral presentation of project findings may also be submitted for local, regional, or national conferences to reach target audiences previously mentioned in the coming months or years. These conferences provide an opportunity to connect with other health professionals and clinicians, especially in the specialty area of transplant, regarding evidence-based patient educational protocols for organ transplant recipients.

References

- American Association of Colleges of Nursing. (2006). *The essentials of doctoral education for advanced nursing practice*. AACN.
<https://www.aacnnursing.org/DNP/DNP-Essentials>
- Aghakhani, N., Maslakpak, M. H., Jalali, S., & Parizad, N. (2021). Self-care education program as a new pathway toward improving quality of life in kidney transplant patients: A single-blind, randomized, controlled trial. *Experimental and Clinical Transplantation: Official Journal of the Middle East Society for Organ Transplantation*, 19(3), 224–230. <https://doi.org/10.6002/ect.2020.0044>
- Andersen, M. H., Wahl, A. K., Engebretsen, E., & Urstad, K. H. (2019). Implementing a tailored education programme: Renal transplant recipients' experiences. *Journal of Renal Care*, 45(2), 111–119. <https://doi.org/10.1111/jorc.12273>
- Asavakarn, S., Sirivatanauksorn, Y., Promraj, R., Ruenrom, A., Limsrichamreern, S., Kositamongkol, P., Mahawithitwong, C., Tovikkai, W., & Dumronggittigule, W. (2016). Systematic pharmaceutical educational approach to enhance drug adherence in liver transplant recipients. *Transplantation Proceedings*, 48(4), 1202-1207. <https://doi.org/10.1016/j.transproceed.2015.12.100>
- Covert, K. L., Fleming, J. N., Staino, C., Casale, J. P., Boyle, K. M., Pilch, N. A., Meadows, H. B., Mardis, C. R., McGillicuddy, J. W., Nadig, S., Bratton, C. F., Chavin, K. D., Baliga, P. K., & Taber, D. J. (2016). Predicting and preventing readmissions in kidney transplant recipients. *Clinical Transplantation*, 30(7), 779–786. <https://doi.org/10.1111/ctr.12748>

Dang, D., & Dearholt, S. (2017). *Johns Hopkins nursing evidence-based practice: Model and guidelines* (3rd ed.). Sigma Theta Tau International.

Dols, J. D., Chargualaf, K. A., Gordon, A., Pomerleau, T., Mendoza, A., Schwarzbach, C., & Gonzalez, M. (2020). Relationship of nurse-led education interventions to liver transplant early readmission. *Progress in Transplantation*, 30(2), 88-94.
<https://doi.org/10.1177/1526924820913511>

Donate Life America. (2021). *Organ, Eye and Tissue Donation Statistics*.

https://www.donatelife.net/statistics/?gclid=Cj0KCQiAjJOQBhCkARIsAEKMtO37edLiSj_FgM-PJjkVhBBbieIUmnt4LVIFLwtJVPIuqahGq7xhaIkaAqWYEALw_wcB

Fawkes, K., & Moore, J. (2019). Newly registered nurses' experiences of delivering patient education in an acute care setting: An exploratory study. *Journal of Research in Nursing*, 24(8), 556-567. <https://doi.org/10.1177/1744987119869770>

Fitz, S., Diegel-Vacek, L., & Mahoney, E. (2020). A performance improvement initiative for implementing an evidence-based discharge bundle for lung transplant recipients. *Progress in Transplantation*, 30(3), 281–285. <https://doi.org/10.1177/1526924820933832>

Garcia, M. F. F. M., Bravin, A. M., Garcia, P. D., Contti, M. M., Nga, H. S., Takase, H. M., & de Andrade, L. G. M. (2015). Behavioral measures to reduce non-adherence in renal transplant recipients: A prospective randomized controlled trial. *International Urology and Nephrology*, 47(11), 1899-1905.
<https://doi.org/10.1007/s11255-015-1104-z>

- Mahdizadeh, A., Oskouie, F., Khanjari, S., & Parvizy, S. (2020). The need for renovating patient education in kidney transplantation: A qualitative study. *Journal of Education and Health Promotion, 9*, 154.
https://doi.org/10.4103/jehp.jehp_574_19
- Mangold, K. (2020). Unifying nursing education across the care continuum: Creating consistency in organ transplant. *Journal for Nurses in Professional Development, 36*(2), 63-67. DOI: 10.1097/NND.0000000000000610
- Masoudi, R., Lotfizade, M., Gheysarieha, M. R., & Rabiei, L. (2020). Evaluating the effect of Pender's health promotion model on self-efficacy and treatment adherence behaviors among patients undergoing hemodialysis. *Journal of Education and Health Promotion, 9*, 197.
https://doi.org/10.4103/jehp.jehp_747_19
- Mathes, T., Großpietsch, K., Neugebauer, E., & Pieper, D. (2017). Interventions to increase adherence in patients taking immunosuppressive drugs after kidney transplantation: A systematic review of controlled trials. *Systematic Reviews, 6*(1), 236. <https://doi.org/10.1186/s13643-017-0633-1>
- Meng, K., Musekamp, G., Schuler, M., Seekatz, B., Glatz, J., Karger, G., Kiwus, U., Knoglinger, E., Schubmann, Westphal, R., & Faller, H. (2016). The impact of a self-management patient education program for patients with chronic heart failure undergoing inpatient cardiac rehabilitation. *Patient Education and Counseling, 99*(7), 1190-1197. <https://doi.org/10.1016/j.pec.2016.02.010>
- Mohsenipouya, H., Majlessi, F., Forooshani, A. R., & Ghafari, R. (2018). The effects of health promotion model-based educational program on self-care behaviors in

patients undergoing coronary artery bypass grafting in Iran. *Electronic Physician*, 10(1), 6255–6264. <https://doi.org/10.19082/6255>

Mollazadeh, F., & Maslampak, H. M. (2018). The effect of teach-back training on self management in kidney transplant recipients: A clinical trial. *International Journal of Community Based Nursing and Midwifery*, 6(2), 146–155.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5845118/pdf/IJCBNM-6-146.pdf>

Ndemera, H., & Bhengu, B. (2017). Motivators and barriers to self-management among kidney transplant recipients in selected state hospitals in South Africa: A qualitative study. *Health Science Journal*, 11(5), 1-13. DOI:10.21767/1791-809X.1000527

Oberlin, S. R., Parente, S. T., & Pruett, T. L. (2016). Improving medication adherence among kidney transplant recipients: Findings from other industries, patient engagement, and behavioral economics—A scoping review. *SAGE Open Medicine*, 4, 2050312115625026. <https://doi.org/10.1177/2050312115625026>

Polit, D. F., & Beck, C. T. (2016). *Resource manual for nursing research*. Wolters Kluwer.

Promraj, R., Dumronggittigule, W., Sirivatanauksorn, Y., Ruenrom, A., Tovikkai, C., Limsrichamrern, S., Kositamongkol, P., Mahawithitwong, P., & Asavakarn, S. (2016). Immunosuppressive medication adherence in liver transplant recipients.

Transplantation Proceedings, 48(4), 1198-1201.

<https://doi.org/10.1016/j.transproceed.2015.12.097>

- Sherrod, B., & Goda, T. (2016). DNP-prepared leaders guide healthcare system change. *Nursing Management*, 47(9), 13-16.
<https://doi.org/10.1097/01.NUMA.0000491133.06473.92>
- Solomon, D., Lahl, M., Soat, M., Bena, J., & McClelland, M. (2016). Strategies to influence RN specialty certification. *Nursing Management*, 47(8), 38-46.
<https://doi.org/10.1097/01.NUMA.0000488858.54323.80>
- Taber, D. J., Fleming, J. N., Su, Z., Mauldin, P., McGillicuddy, J. W., Posadas, A., & Gebregziabher, M. (2021). Significant hospitalization cost savings to the payer with a pharmacist-led mobile health intervention to improve medication safety in kidney transplant recipients. *American Journal of Transplantation*, 21(10), 3428-3435. <https://doi.org/10.1111/ajt.16737>
- Urstad, K. H., Øyen, O., Andersen, M. H., Moum, T., & Whal, A. K. (2012). The effect of an educational intervention for renal recipients: A randomized controlled trial. *Clinical Transplantation*, 26(3), E246-E253. <https://doi.org/10.1111/j.1399-0012.2012.01666.x>
- Urstad, K. H., Wahl, A. K., Engebretsen, E., Larsen, M. H., Vidnes, T. K., Stenwig, A. G., Simensen, O.W., Nordli, A., Reisaeter, A.V., & Andersen, M. H. (2018). Implementation of a new patient education programme for renal transplant recipients. *Journal of Renal Care*, 44(2), 106-114.
<https://doi.org/10.1111/jorc.12236>
- Whitehead, L., Ghosh, M., Walker, D. K., Bloxsome, D., Vafeas, C., & Wilkinson, A. (2019). The relationship between specialty nurse certification and patient, nurse

and organizational outcomes: A systematic review. *International Journal of Nursing Studies*, 93, 1-11. <https://doi.org/10.1016/j.ijnurstu.2019.02.001>

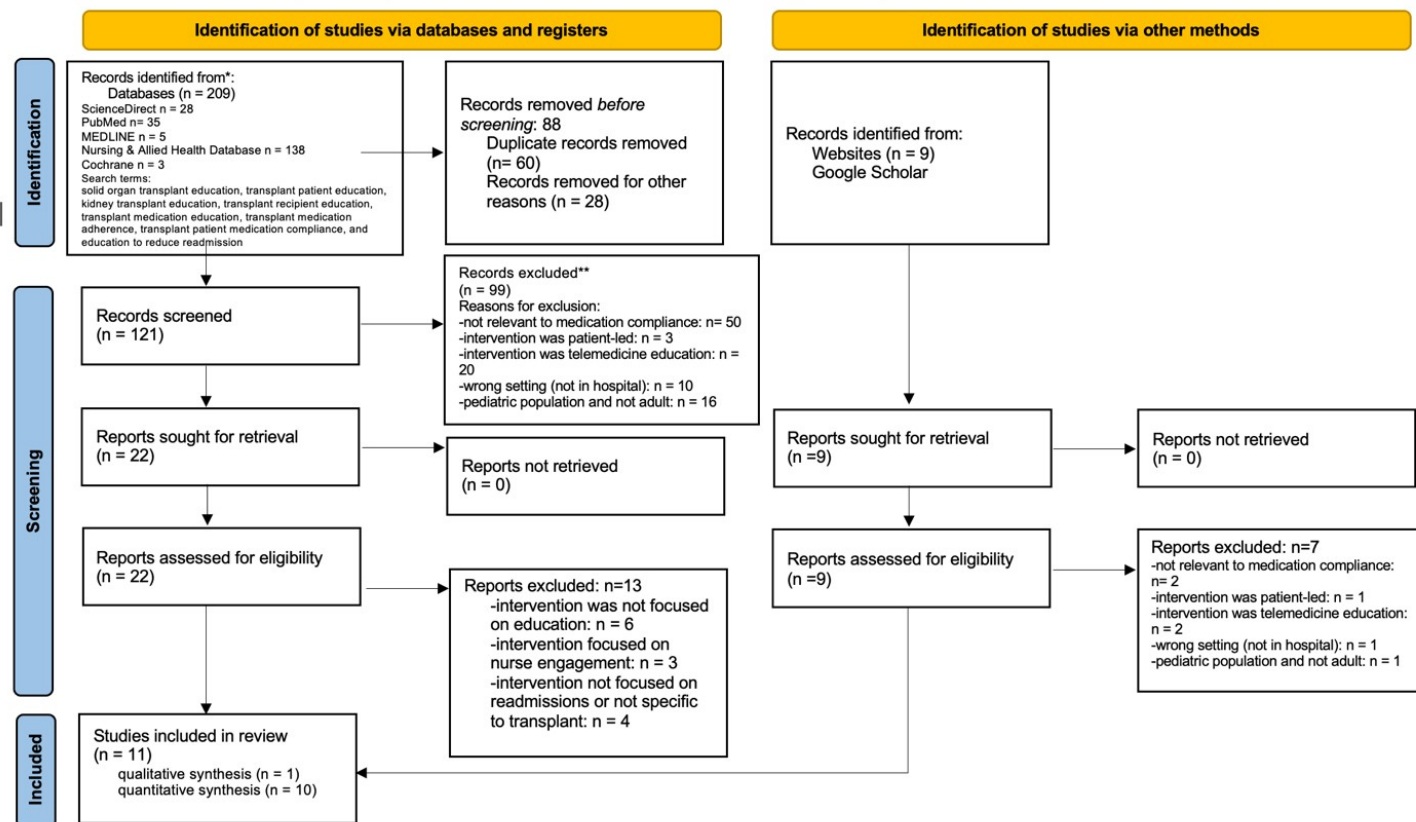
Williams, A., Low, J. K., Manias, E., & Crawford, K. (2016). The transplant team's support of kidney transplant recipients to take their prescribed medications: A collective responsibility. *Journal of Clinical Nursing*, 25(15-16), 2251–2261. <https://doi.org/10.1111/jocn.13267>

Appendix A

PRISMA Diagram

PRISMA 2020 flow diagram for new systematic reviews which included searches of databases, registers and other sources

Design and Implementation of an Evidence-Based Solid Organ Transplant Patient Education Protocol



*Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers).

**If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools.

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71. doi: 10.1136/bmj.n71. For more information, visit: <http://www.prisma-statement.org/>

Appendix B

Project Timeline

Date	Activities
<p>Spring 2021 (January-May 2021)</p> <p>NURS 882: Proposal Development</p>	<ul style="list-style-type: none"> • Select and develop educational intervention with the collaboration of transplant pharmacists <ul style="list-style-type: none"> ○ Select outcome measurement tools • Write and submit IRB proposal to Salisbury University and UMMC • Obtain IRB approval for project <ul style="list-style-type: none"> ○ Protocol #30: IRB approval obtained 5/4/2021 and valid through 6/30/2022
<p>Summer 2021 (June-August 2021)</p>	<ul style="list-style-type: none"> • Continue to finalize educational intervention • Finalize dates for implementation and discuss with unit manager, unit educator, and staff nurses • Prepare informational materials on the utilization of educational intervention for nurses and staff on the Transplant IMC unit • Study/Review educational protocol
<p>Fall 2021 (September-December 2021)</p> <p>NURS 883: Implementation</p>	<ul style="list-style-type: none"> • Educate nurses and staff on the purpose of project, and utilization of educational intervention and data collection procedures prior to implementation <ul style="list-style-type: none"> ○ Collect pretest and posttest surveys from nurses • Collect patient re-admission rate, pill box data, and patient satisfaction scores prior to implementation • Implement educational protocol on Transplant IMC unit • Begin data collection and formative evaluation
<p>Winter 2022 (January 2022)</p>	<ul style="list-style-type: none"> • Collect 3-month post-implementation re-admission rates, pill box audits, patient knowledge assessments, and patient satisfaction scores • Collect post implementation surveys • Continue data analysis
<p>Spring 2022 (February-May 2022)</p> <p>NURS 884: Write Up & Dissemination</p>	<ul style="list-style-type: none"> • Complete data analysis; evaluate outcomes • Write manuscript for submission/publication • Disseminate project findings to Salisbury University and UMMC

Appendix C

Table of Evidence

Citation	Conceptual Framework	Design/Purpose	Sample/Setting	Measurement of Major Variables	Study Findings	Appraisal of Worth to Practice	Strength & Quality of Evidence
Design and Implementation of an Evidence-Based Solid Organ Transplant Patient Education Protocol							
Aghakhani, N., Maslakpak, M. H., Jalali, S., & Parizad, N. (2021). Self-Care education program as a new pathway toward improving quality of life in kidney transplant patients: A single-blind, randomized, controlled trial.		<p>Single-blind RCT</p> <p>Intervention: a bedside self-care education program in 3 sessions</p> <p>control group only received routine care</p> <p>DV: effectiveness of self-care education program on QOL in kidney transplant patients (mean score of quality of life)</p>	<p>Convenience sample, 59 kidney transplant patients who were referred to Imam Reza Hospital: intervention (n = 29) and control (n = 30) groups</p> <p>Between 18 and 60 years old</p>	<p>Demographic questionnaire</p> <p>25-item Kidney Transplant Questionnaire (KTQ-25) to measure QOL in kidney transplant patients; Cronbach's alpha= 0.93</p>	<p>Independent <i>t</i> tests showed significantly different QOL scores between the 2 groups after the self-care education ($P < .001$)</p> <p>Total mean score was significant in both groups before and after the intervention</p>	<p>Control group that received routine care</p> <p>Trained researcher extracted self-care education programs from scientific resources and consult with nephrologist</p> <p>Can improve knowledge and skills of transplant patients through a self-care education program</p> <p>Teaching self-care knowledge/skills should be emphasized in</p>	

					QOL score improved in kidney transplant patients who received self-care education program	nursing education to improve patients' QOL	
Andersen, M. H., Wahl, A. K., Engebretsen, E., & Urstad, K. H. (2019). Implementing a tailored education programme: Renal transplant recipients' experiences.		Explorative qualitative design, elicit knowledge, insight and understanding of renal transplant recipients' perspectives Purpose: To explore renal transplant recipients' experiences of participating in new, tailored, EB education program semi-structured interviews 8 weeks post-transplant,	Hospital in Norway, only transplant center Twelve renal transplant recipients that were 8 weeks post-transplant, selectively recruited during stay at hospital, purposive sampling	Kvale and Brinkmann's (2009) method of meaning condensation Interview read through independently by two researchers, text divided into units of meaning/themes, findings, themes grouped together in context of participants' experiences	Two main themes: 1: Education tailored to the person's everyday life knowledge -patient-centered approach -nurses focused education on what was important to each patient 2: Education as a standard procedure	Represents patient perspective Sample was diverse but 12 participants and were all 8-weeks post-transplant Patient education more complex— tailoring education to individual needs is important, knowledge increases chance of behavioral change, thus improving outcomes Managers/leaders must facilitate change for new knowledge to be	

		audiotaped and analyzed			<p>regardless of the person’</p> <p>-nurses’ need verification of patients’ knowledge level—this overshadowed education being patient-centered</p> <p>overall positive attitude towards the education program</p>	implemented into practice	
<p>Asavakarn, S., Sirivatanauksorn, Y., Promraj, R., Ruenrom, A., Limsrichamrern, S., Kositamongkol, P., Mahawithitwong, C., Tovikkai, W., & Dumronggittigule, W. (2016). Systematic</p>		<p>Single-center cross-sectional study of liver transplant patients who received pharmaceutical education from transplant pharmacists</p> <p>Intervention: the 3-stage systematic pharmaceutical educational</p>	<p>50 liver transplant recipients from 86 visits were enrolled from single transplant center from October 2012-September 2014</p>	<p>Drug-related problems (DRPs) and pre- and post-transplantation educational tests (divided into 3 parts: immunosuppressants [12 points], drug monitoring [6 points], and general drugs [2 points]) were analyzed</p>	<p>The post-test score significantly increased in all 3 parts of the questionnaire ($P<.001$).</p> <p>The incidence of major DRPs, rate of nonadherence, and adverse</p>	<p>Interdisciplinary team—offers opportunity to correct patient misunderstand</p> <p>Little demographic data on sample (did not discuss inclusion/exclusion criteria other than liver transplant)</p>	

<p>pharmaceutical educational approach to enhance drug adherence in liver transplant recipients.</p>		<p>approach: Siriraj-Support Medication Adherence in Organ Transplantation (S-SMAOT) program</p> <p>1: immediate post-operative period</p> <p>2: during discharge process</p> <p>3: 1st visit to clinic</p> <p>DV: incidence of major drug-related problems (DRPs), scores of pretest/posttest transplant educational tests</p>	<p>52.3% female, mean age 58 +/- 14 years</p>		<p>drug reactions and drug interactions were 8%, 4% and 2%, respectively.</p>	<p>“drug adherence” covers many aspects of organ transplantation—lack of standardized definition and criteria to measure drug adherence</p> <p>Repeated education improves understanding of medication administration</p>	
<p>Covert, K. L., Fleming, J. N., Staino, C., Casale, J. P., Boyle, K. M., Pilch, N. A., Meadows, H. B., Mardis, C. R., McGillicuddy, J.</p>		<p>retrospective case-control study in adult kidney transplant recipients</p> <p>Outcome: identify and assess patient-level and</p>	<p>384 patients, ≥18 years, kidney transplantation at 750-bed tertiary care academic hospital between</p>	<p>Univariate and multivariate analyses to assess patient and process determinants of 30-d readmissions</p> <p>Kaplan– Meier to assess the impact</p>	<p>Patients readmitted within 30 days significantly more likely to experience graft loss or</p>	<p>Retrospective chart and database review</p> <p>Adequate sample size</p> <p>patient-level factors predict higher rates</p>	

<p>W., Nadig, S., Bratton, C. F., Chavin, K. D., Baliga, P. K., & Taber, D. J. (2016). Predicting and preventing readmissions in kidney transplant recipients.</p>		<p>process-level risk factors that contribute to 30-day readmit rates in kidney transplant recipients</p> <p>Secondary outcomes: patient and graft survival</p>	<p>August 1, 2011-December 31, 2014</p>	<p>of 30-d readmissions on graft loss and death</p> <p>Multivariate logistic regression to determine which covariates independently influenced readmissions</p>	<p>death (p<0.001)</p> <p>No significant difference in level of education or financial support between readmission group and control group</p> <p>Patients readmitted within 30 days had more history of diabetes and/or exposure to hemodialysis</p> <p>more patients in 30-day readmit group were not understanding or non-adherent to their post-transplant</p>	<p>of post-transplant readmissions</p> <p>medication non-adherence and non-understanding are risk factors for 30 day readmits</p> <p>different provider thresholds for readmission</p> <p>subjective definition of adherence</p>	
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					medication regimen (29% vs. 14%, p = 0.019)		
Dols, J. D., Chargualaf, K. A., Gordon, A., Pomerleau, T., Mendoza, A., Schwarzbach, C., & Gonzalez, M. (2020). Relationship of nurse-led education interventions to liver transplant early readmission.		<p>Single-center, correlational study</p> <p>Intervention: new EB education designed by nurse researchers</p> <p>DV: 30-day readmission rates</p>	<p>Convenience sample: from 250-bed tertiary care hospital in South Texas</p> <p>>18 years admitted to hospital receiving a liver transplant January 1, 2017 to December 31, 2017 included for retrospective comparison n= 51; those admitted in 2018 and participated in new education included n = 35</p>	<p>Researcher-designed data collection tool for 30-day readmissions: causes, risk factors, demographics, previous medical history, transplant-related information, admission/discharge information, and donor information</p>	<p>No statistically significant difference between liver transplant recipients' participation in the 2017 or 2018 patient education program and early readmission posttransplant ($P=.112$)</p> <p>decrease of 16.3% in 30-day readmissions from the 2017 cohort to the 2018 cohort</p>	<p>the sample size was too small to detect a statistically significant difference</p> <p>reducing health literacy burden needed to improve outcomes after transplantation</p> <p>understanding of unique risk factors enables more effective, individualized care, interventions, and tools to be developed for patients</p> <p>education should be structured while allowing it to be individualized to patient—multimodal methods</p>	

						reducing 30-day readmits, improves outcomes	
Garcia, M. F. F. M., Bravin, A. M., Garcia, P. D., Contti, M. M., Nga, H. S., Takase, H. M., & de Andrade, L. G. M. (2015). Behavioral measures to reduce non-adherence in renal transplant recipients: A prospective randomized controlled trial.		<p>Prospective RCT</p> <p>evaluate the impact of an educational and behavioral strategy on treatment adherence of kidney transplant recipients</p> <p>DVs: treatment adherence at 3 months; renal function at 3, 6, and 12 months; incidence of transplant rejection</p>	<p>Renal transplant patients (n=111) divided into two groups (control & treatment)</p> <p>control group received the usual transplant patient education by the medical team, n=56</p> <p>treatment group received standard education in addition to intervention program over 3 months with ten</p>	<p>Immunosuppressant Therapy Adherence Scale—ITAS answered by both groups</p> <p>Renal function and serum levels of immunosuppressant drugs assessed at each outpatient visit at 3 months 6 months and 1 year</p> <p>incidence of biopsy-proven acute rejection assessed at 12 months</p>	<p>significantly higher percentage of non-adherence was observed in control group compared with treatment group (46.4 vs. 14.5%; $p = 0.00$)</p> <p>Multivariate analysis demonstrated 5.84 times (CI 1.8–18.8, $p = 0.003$) higher risk of non-adherence in the control group</p> <p>no differences in renal</p>	<p>Adequate sample size but not adequately powered to show differences in renal function or rates of rejection</p> <p>Control group</p> <p>Non-adherence is common in first 3-months post renal transplant</p> <p>behavioral and educational strategies addressing patients’ perceptions and knowledge about anti-rejection drugs can improve short-term adherence to immunosuppressive therapy</p>	

			30min sessions, n=55		function and rejection rates between groups		
Mathes, T., Großpietsch, K., Neugebauer, E., & Pieper, D. (2017). Interventions to increase adherence in patients taking immunosuppressive drugs after kidney transplantation: A systematic review of controlled trials.		Systematic review of controlled trials—related to adherence, kidney transplantation, and immunosuppressive drugs	only included studies on educational, behavioral, and reminder interventions 12 publications satisfied all inclusion criteria—8 RCTs, 2 retrospective cohort studies, 1 non-concurrent cohort study, 1 non-randomized trial	articles screened according to the predefined inclusion criteria risk of bias assessed with Cochrane risk of bias tool two independent reviewers Data extracted in standardized tables Data synthesized in a structured narrative way	adherence interventions for kidney transplant recipients can increase adherence Most comparisons of adherence outcomes were statistically significant but only slightly increased Combination of educational and behavioral approaches showed larger effects and more statistical significance	Multimodal interventions reveal stronger effects Individual patient characteristics require different intervention components—multimodal intervention increases proper intervention component adherence measures and measurement methods varied among studies more high-quality RCTs on multimodal and individualized interventions are warranted	

<p>Mollazadeh, F., & Maslakpak, H. M. (2018). The effect of teach-back training on self management in kidney transplant recipients: A clinical trial.</p>	<p>Teach-back training (TBT)</p>	<p>Double blind RCT Intervention: educational content presented in 5, 60-minute sessions</p>	<p>Convenience sampling then double-blind random assignment into control or intervention groups 84 kidney transplant recipients who referred to the special clinic of kidney transplantation, n= 42 for each group</p>	<p>Self-Management Scale for Kidney Transplant Recipients; Cronbach's alpha = 0.76</p>	<p>Self-management score between the control and intervention groups was not statistically significant before intervention (P=0.90) self-management increased after implementation of TBT in the intervention group compared to the control group (P=0.001)</p>	<p>TBT is effective in improvement of self-management in kidney transplant recipients Short-term study (3 months) Educational content can be presented to patients based on their needs using TBT and lead to positive outcomes TBT can improve recovery, nutrition, fluid intake, food safety, hygiene, surgical care, prescribed medication, control of vital signs TBT can be effective in designing community-based education</p>	
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<p>Oberlin, S. R., Parente, S. T., & Pruet, T. L. (2016). Improving medication adherence among kidney transplant recipients: Findings from other industries, patient engagement, and behavioral economics—A scoping review.</p>	<p>Arksey and O'Malley's five-stage methodology</p>	<p>Scoping review to find established or novel interventions to improve medication adherence among kidney transplant recipients</p> <p>assessing three areas: behavioral-focused interventions, patient engagement theories, and behavioral economic principles</p>	<p>Search strategies: mining business, social sciences, medical literature; additional guidance from six consultative interviews</p> <p>46 articles (other industries n=10, patient engagement n=20, behavioral economics n=16)</p>	<p>5 frameworks stages</p> <p>1: ID the research question(s)</p> <p>2: ID relevant studies</p> <p>2a: consultation exercise</p> <p>3: study selection</p> <p>4: chart the data</p> <p>5: collate, summarize, and report results</p>	<p>review suggests no intervention stands out as superior or likely to be more effective than any other intervention</p> <p>relationships built on trust promote engagement</p> <p>patient engagement — educational, behavioral, and technical aspects improved medication adherence in kidney transplant patients</p> <p>Individual rewards, attention, and</p>	<p>promising strategies/interventions were identified that can enhance existing methods or be incorporated as new methods to improve adherence among kidney transplant recipients</p> <p>behavioral interventions work best when they are multidimensional, combined with frequent engagement, peer mentors</p>	
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					recognition help maintain motivation		
Promraj, R., Dumronggittigule, W., Sirivatanauksorn, Y., Ruenrom, A., Tovikkai, C., Limsrichamrern, S., Kositamongkol, P., Mahawithitwong, P., & Asavakarn, S. (2016). Immunosuppressive medication adherence in liver transplant recipients.		cross-sectional observational study The Siriraj-Support Medication Adherence in Organ Transplantation (S-SMAOT) program—a systematic pharmaceutical educational approach to educate patients and their caregivers DV: Immunosuppressive Therapy Adherence Scale (ITAS) score	50 liver transplant patients who visited the Siriraj outpatient liver transplant clinic from October 2012 to September 2014 who received educational training under the S-SMAOT program enrolled in study	Immunosuppressive medication adherence assessed with Immunosuppressive Therapy Adherence Scale (ITAS, scored from 0 to 12; very poor to excellence adherence) correlations between ITAS scores and clinical profiles of the patients, duration after transplantation, and transplant educational scores post-test	ITAS score was significantly correlated with the duration after transplantation ($P < .001$) and the educational scores ($P = .009$)	patients need consistent assessment of immunosuppressive medication adherence longitudinal study needed to assess lasting benefit of education program educational programs emphasizing the importance of immunosuppressive drugs are effective at promoting adherence	

<p>Urstad, K. H., Øyen, O., Andersen, M. H., Moum, T., & Wahl, A. K. (2012). The effect of an educational intervention for renal recipients: a randomized controlled trial.</p>		<p>RCT</p> <p>to test the efficacy of an educational intervention on renal recipient's knowledge, compliance, self-efficacy, and quality of life</p> <p>intervention: five tailored one-to-one sessions</p>	<p>159 renal recipients out of 382 patients undergoing kidney transplantation from October 2007 to March 2009</p> <p>randomized to the intervention (N = 77) or control group (N = 82). A total of 139 participants reached second measure point (7–8 wk post-Tx), and 120 participants reached third measure point (six months post-transplant).</p>	<p>knowledge questionnaire</p> <p>“The General-Self-efficacy Scale,” SF-12</p> <p>patient observations</p>	<p>Significantly higher levels of knowledge in the experimental group compared to control group at both measure points (p = 0.002 and p = 0.004).</p> <p>Compliance significantly higher experimental group at second measure point (p = 0.000)</p> <p>experimental group reported significantly better scores on self-efficacy (p = 0.036) and mental score</p>	<p>structured, tailored educational intervention can increase renal recipients' levels of knowledge both short and long term; beneficial to compliance, self-efficacy, and mental quality of life</p> <p>tailoring and timing education important factors to effectiveness of education</p> <p>studies longer than 6 months needed</p> <p>future studies need to investigate outcome of graft function and burden of medication</p>	
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					of quality of life (p = 0.001)		
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Table of Evidence Key:

QOL: quality of life

EB: evidence-based

DV: dependent variable

RCT: randomized control trial

DRP: drug-related problem

PFCE: patient- and family-centered education

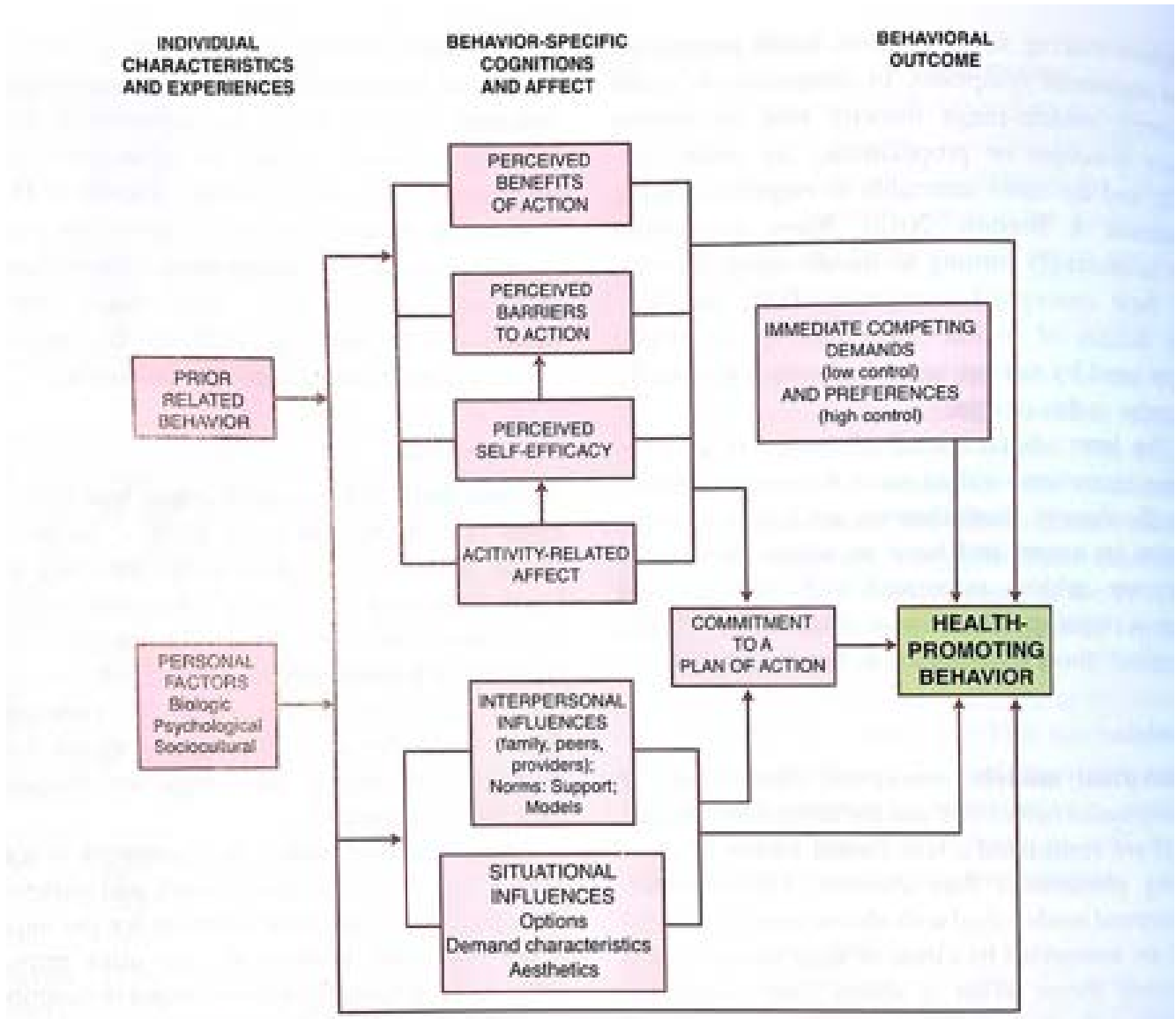
TBT: teach-back training

ID: identify

ITAS: Immunosuppressive therapy adherence scale

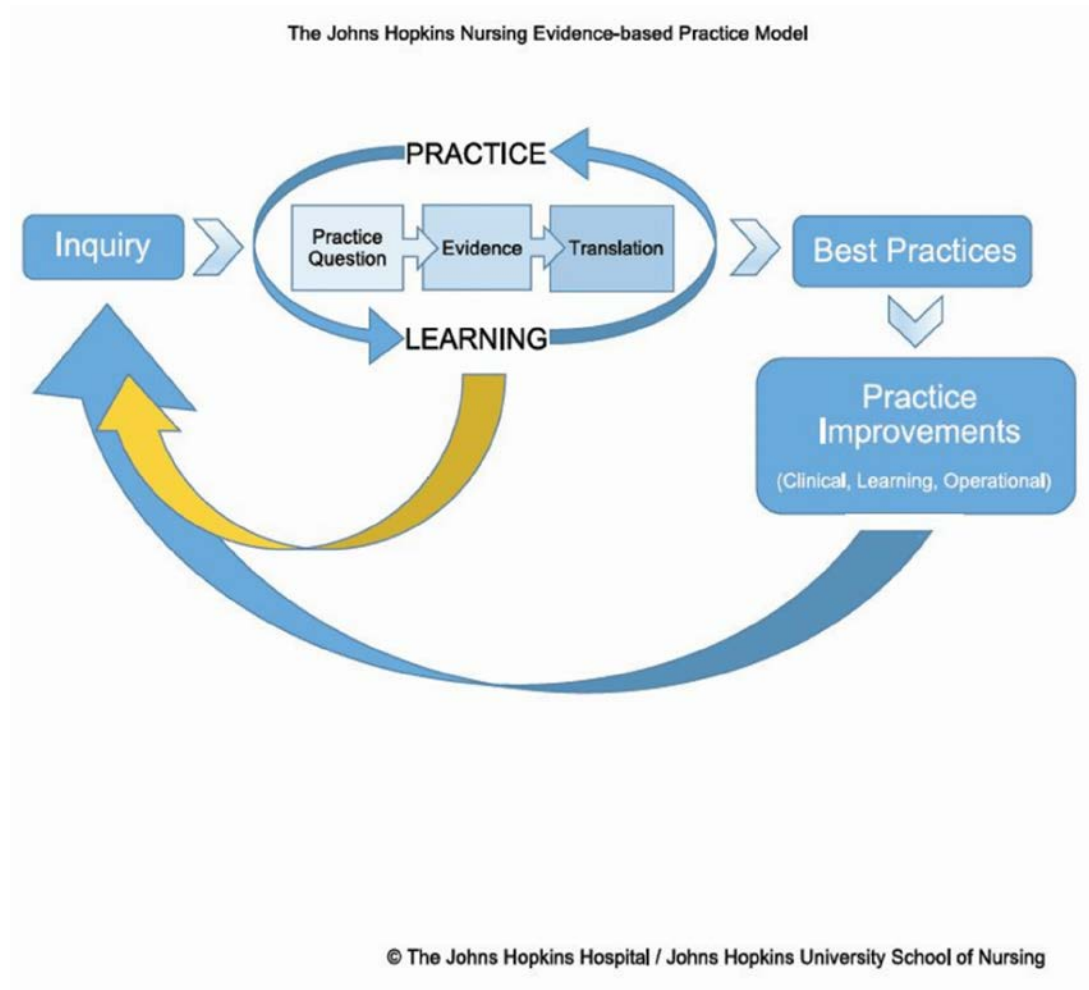
Appendix D

Health Promotion Model



Appendix E

Johns Hopkins Nursing Evidence-Based Practice Model



Appendix F

IRB Approval (2 pages)

Salisbury University

Salisbury University
Institutional Review Board
Committee on Human Research
Phone: (410) 548-3549
Fax: (410) 677-0052
Email: humanresearch@salisbury.edu

IRB Research Protocol Approval Notification

Date: 5/4/2021

To: K. Allen

A. Rothstein

RE: Protocol #30

Type of Submission: Expedited

Type of IRB Review: Expedited

Protocol is scheduled to begin 8/2021 and 6/2022

Approval for this project is valid from 5/4/2021 to 6/30/2022.

This letter serves to notify Dr. Kimberly Allen and Amy Rothstein that the Salisbury University (SU) Institutional Review Board (IRB) approved the above referenced protocol entitled, Design and Implementation of an Evidence-Based Solid Organ Transplant Patient Education Protocol on May 4, 2021.

Pursuant to Federal regulations 21 CFR 56.109, the IRB has determined that this protocol qualifies for Expedited review.

Federal regulation 45 CFR 46.103 (b)(4)(iii) requires Primary Investigators (PI), except when a subject is in immediate danger, to assure any change to an approved protocol is not initiated prior to IRB review and approval. Additionally, the PI must also inform the IRB of unanticipated problems involving risks to participants.

These same federal regulations require continuing review of research be conducted by the IRB at intervals appropriate to the degree of risk. Your research is scheduled to begin 8/30/2021 and end 6/30/2022. It is the PI's responsibility to submit continuing review reports in a timely manner (at least 3 weeks prior to scheduled end date on the protocol approval).

The SU IRB is organized and operated according to guidelines of the United States Office for Human Research Protections and the United States Code of Federal Regulations and under Federal Wide Assurance No. FWA00020237.

If you have any questions about this review or questions, concerns, and/or suggestions regarding this process, please do not hesitate to contact the Office of Graduate Studies and Research at 410-548-3549 or humanresearch@salisbury.edu.

Agency Approval

Institutional Review Board
Phone: (410) 706-5037
Fax: (410) 706-4189
Email: hrpo@umaryland.edu

NOT HUMAN RESEARCH DETERMINATION

OF NOTE: The Principal Investigator should review the University of Maryland Baltimore criteria for performing research during the current COVID-19 pandemic emergency. Understand that IRB approval of this research does not suggest that performance of this research under current guidelines is allowed. Failure to comply with the UMB President's directives would be considered non-compliance. The UMB Research directives can be found at <https://www.umaryland.edu/coronavirus/>. If you need clarification or guidance please call the Human Research Protections Office at 410-706-5037.

Date: June 9, 2021

To: Amy Rothstein
RE: HP-00096935
Name: Design and Implementation Of a Standardized Transplant Patient Education Protocol

This letter is to acknowledge that the UMB IRB reviewed the information provided and has determined that the submission does not require IRB review. This determination has been made with the understanding that the proposed project does not involve a systematic investigation designed to develop or contribute to generalizable knowledge OR a human participant (see definitions below).

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these activities are human subject research in which the organization is engaged, please submit a new request to the IRB for a determination.

Definitions –

Human Research: Any activity that either:

- Is "Research" as defined by DHHS and involves "Human Subjects" as defined by DHHS ("DHHS Human Research"); or
- Is "Research" as defined by FDA and involves "Human Subjects" as defined by FDA ("FDA Human Research").

Research as Defined by DHHS: A systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge.

Research as Defined by FDA: Any experiment that involves a test article and one or more human subjects, and that meets any one of the following:

- Must meet the requirements for prior submission to the Food and Drug Administration under section 505(i) of the Federal Food, Drug, and Cosmetic Act meaning any use of a drug other than the use of an approved drug in the course of medical practice;

-
- Must meet the requirements for prior submission to the Food and Drug Administration under section 520(g) of the Federal Food, Drug, and Cosmetic Act meaning any activity that evaluates the safety or effectiveness of a device; OR
 - Any activity the results of which are intended to be later submitted to, or held for inspection by, the Food and Drug Administration as part of an application for a research or marketing permit.

Human Subject as Defined by DHHS: A living individual about whom an investigator (whether professional or student) conducting research obtains (1) data through Intervention or Interaction with the individual, or (2) information that is both Private Information and Identifiable Information. For the purpose of this definition:

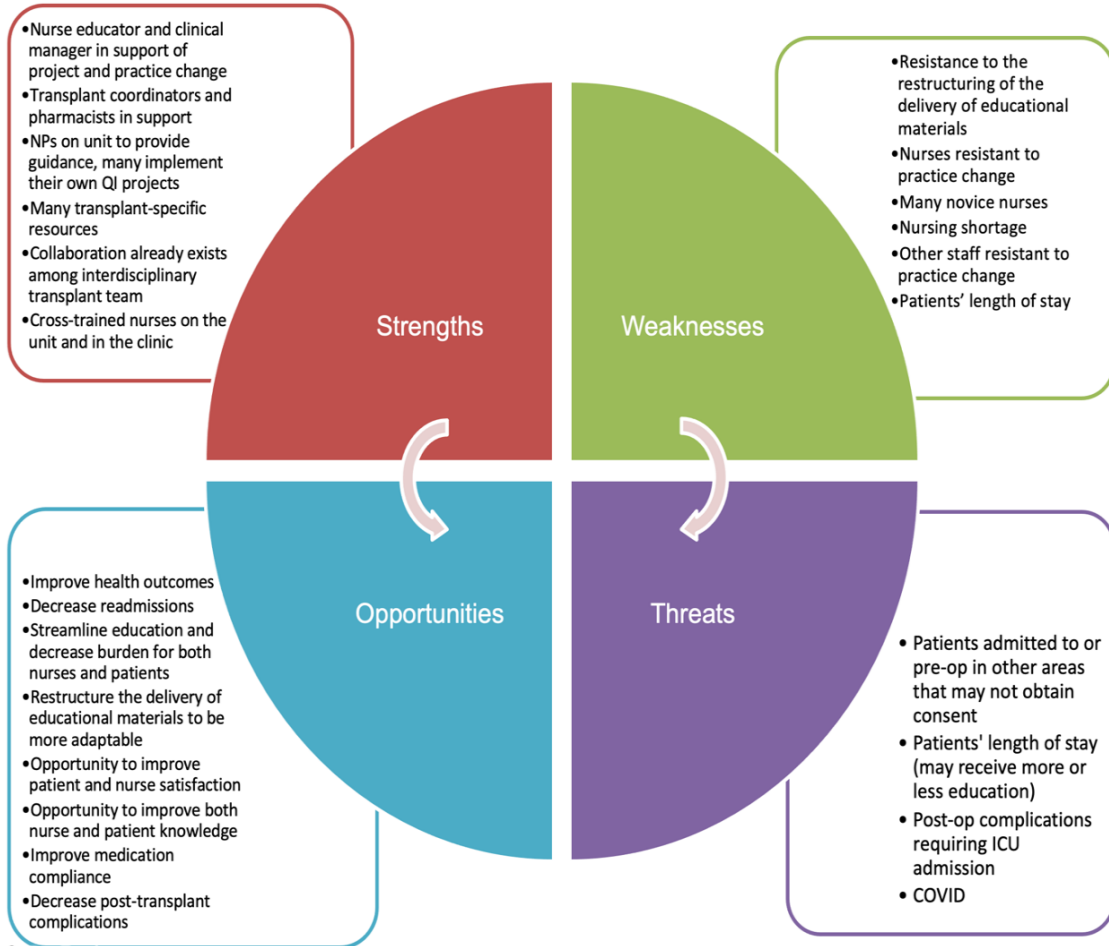
- Intervention means physical procedures by which data are gathered (for example, venipuncture) and manipulations of the subject or the subject's environment that are performed for research purposes.
- Interaction means communication or interpersonal contact between investigator and subject.
- Private Information means information about behavior that occurs in a context in which an individual can reasonably expect that no observation or recording is taking place, and information which has been provided for specific purposes by an individual and which the individual can reasonably expect will not be made public (for example, a medical record).
- Identifiable Information means information that is individually identifiable (i.e., the identity of the subject is or may readily be ascertained by the investigator or associated with the information).

Human Subject as Defined by FDA: An individual who is or becomes a subject in research, either as a recipient of the test article or as a control. A subject may be either a healthy human or a patient. A human subject includes an individual on whose specimen (identified or unidentified) a medical device is used.

Please keep a copy of this letter for future reference. If you have any questions, please do not hesitate to contact the Human Research Protections Office (HRPO) at (410) 706-5037 or HRPO@umaryland.edu.

Appendix G

Organization System Analysis



Appendix H

Nurse Knowledge Test

1. Significance of the Problem
Lack of a standardized patient education program can cause or lead to the following problems (Select all that apply)
 confusion over medication administration
 stress over transplant and medication management for patients
 medication administration errors
 post op complications
 prolonged hospitalization
 increased readmissions

2. Goals of Standardized Patient Education
The goals for implementing a Standardized Transplant Patient Education Protocol include:
 standardize the education transplant patients receive
 initiate education with patients as soon as feasible
 increase the workload of bedside nurses
 decrease the overall workload of bedside nurses
 decrease patient confusion over their medication regimen
 empower patients in their self-care regimen

3. Patient Education Interventions
What interventions will help with patient participation in their education?
 Setting the expectation for patients to participate in their education
 Assessing patients' preferred learning methods
 Assessing patients' readiness to learn
 Utilizing standardized patient education protocol
 A multidisciplinary approach to education
 Assessing patients' understanding of your education through the use of the teach-back method

4. Teach-Back Method
The teach-back method is a way of assessing one's understanding by:
 asking patients to state in their own words what they need to know or do
 confirming that you have explained things in a way your patient understands

5. Standardized Patient Education Improves Outcomes
List projected outcomes from implementing a standardized transplant patient education protocol at the patient, unit, and institutional levels

Appendix I**Disclosure Statement****Participant Disclosure Statement****SALISBURY UNIVERSITY SCHOOL OF NURSING
DISCLOSURE STATEMENT**

This form is being provided to you because a DNP student is implementing a project to explore whether a standardized patient educational protocol is helpful to both nurses and kidney transplant recipients. Completing this survey is completely voluntary and anonymous, please do not write your name on this survey. If you choose to complete this form your answers will be kept confidential and will not impact your care. Completing this form indicates that you agree to allow the data collected to be used by the DNP student.

Appendix J

Pillbox Audit Form

Kidney Transplant Patient Pill Box Audit

This chart represents the patient’s pill box. Please indicate what and where in the pill box a medication error was made.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Morning	Morning	Morning	Morning	Morning	Morning	Morning
Noon	Noon	Noon	Noon	Noon	Noon	Noon
Eve	Eve	Eve	Eve	Eve	Eve	Eve
Bed	Bed	Bed	Bed	Bed	Bed	Bed

Provide more detail below about medication error if needed:

Appendix L

Transplant Patient Education Protocol

Use reference binders corresponding to post-operative day to guide your education

Post-operative Day 0 (POD #0):

- Orient patient to transplant intermediate care unit and what to expect during their hospital admission
 - What their medications are, what they are for (classes of medications), side effects, etc.
 - Transplant Post Op Plan of Care
- Assess patient's readiness to learn and preferred learning style (listening, reading, demonstration)
- Introduce Medication Folder/Chart to patient
- Discuss medication administration in the hospital vs. home
 - Expectation to be able to fill their pill box and manage their medication regimen using medication folder/chart by discharge
 - Introduce Transplant Daily Logs (home care and daily self-care routine)
 - Why they are important
 - What patient should monitor and record
 - Why monitoring and recording vital signs, temperature, weight, intake & output are important
 - Things they need to report to a healthcare provider or transplant coordinator
- Educate patient on anti-rejection/immunosuppressive medications
 - What are these medications, and how do they work?
 - Important things to know about these medications
 - Risk factors and side effects of these medications
 - Tacrolimus (Prograf) or Envarsus
 - Safety tips
 - Lab draws
 - Medication timing
 - Mycophenalic Acid (Myfortic or Cellcept)
 - Safety tips
 - Medication timing
 - Prednisone
 - Safety tips
 - Steroid taper if applicable
- Have patient use teach-back method to evaluate their understanding
- Document education provided and patient's level of understanding in EPIC Education tab

POD #1:

- Review information discussed with patient on POD #0
 - Assess patient's readiness to learn new information
 - Address any questions or confusion

- Review Medication Folder/Chart
- Introduce and educate patient on Transplant Anti-Infective Medications
 - What are these drugs, how do they work?
 - Important things to know about these medications
 - Safety tips
 - Valcyte (Valgancyclovir)
 - Nystatin or Fluconazole (Diflucan)
 - Bactrim
- Educate patient on Infection Prevention
 - Hand washing, mask use
 - Why infection prevention is important for the health of their transplanted organ
 - Signs and symptoms of infection and what to report to a healthcare provider
- Have patient use teach-back method to evaluate their understanding
- Document education provided and patient's level of understanding in EPIC Education tab

POD #2:

- Review education provided to patient on POD #0 and POD #1
 - Assess patient's readiness to learn new information
 - Address any questions or confusion
- Review Medication Folder/Chart
- Review Transplant Daily Logs
- Educate patient on any other medications included in their regimen
 - Safety tips
 - Side effects
- Discuss post-transplant coordinator
 - Reasons patient would need to call their coordinator
 - What to report
 - Why their coordinator is important in the health of their new organ
- Educate on transplant-specific dietary restrictions and any patient-specific dietary restrictions
- Discuss the Transplant Transitional Care Clinic (TCC)
- Have patient use teach-back method to evaluate their understanding
- Document education provided and patient's level of understanding in EPIC Education tab

POD #3:

- Review education provided to patient on POD #0, POD #1, POD #2
 - Assess patient's readiness to learn new information
 - Address any questions or confusion
- Review Medication Folder/Chart
- Review Transplant Daily Logs
- Prepare patient for possible discharge home
 - Educate patient on follow up appointments and TCC appointments
 - What they need to bring to their appointments

- What to expect at these appointments
 - What the appointment is for
 - If patient is to be discharged:
 - Review all medications with patient and orient them to the use of filling their pill box using Medication Folder/Chart
 - Have patient fill their pill box up to their first TCC appointment date independently
 - Check pillbox for correctness when patient is finished
 - Correct any medication errors in the pill box and address them with the patient
 - Have patient use teach-back method to evaluate their understanding
 - Administer Post-Transplant Patient Knowledge Assessment to the patient
 - Document education provided and patient's level of understanding in EPIC Education tab
 - Document in a written note in EPIC pill box mistakes that were found, how they were addressed and patient's understanding of what they did incorrectly
 - If patient is discharging home: complete discharge required documentation
- POD #4 and beyond*:**
- If patient does not discharge on POD #3:
 - Review education provided to patient on previous days
 - Assess patient's readiness to learn new information
 - Address any questions or confusion
 - Review Medication Folder/Chart
 - Review Transplant Daily Logs
 - Prepare patient for possible discharge home
 - If patient is to be discharged:
 - Review all medications with patient and orient them to the use of filling their pill box using Medication Folder/Chart
 - Have patient fill their pill box up to their first TCC appointment date independently
 - Check pillbox for correctness when patient is finished
 - Correct any medication errors in the pill box and address them with the patient
 - Document in a written note in EPIC pill box mistakes that were found, how they were addressed and patient's understanding of what they did incorrectly
 - If patient is discharging home: complete discharge required documentation
 - Have patient use teach-back method to evaluate their understanding
 - Document education provided and patient's level of understanding in EPIC Education tab

*If patient is not discharging home: continue activities listed under POD #4 until discharge

Front Cover of Patient Medication Folder/Chart

Patient Reference and Medication Folder

Kidney/ Pa splant

Patient Name: _____

Transplant Date: _____ Transplanted Organ(s): _____

Contacting the Transplant Center:

For Clinic Appointments: (410)328-4300 (locally) or 1-800-492-5538 (ext 4300)

For Medical Concerns:

(410)328-5224 locally or 1-800-492-5538 (ext 5224)

Daily Self Care Routine:

** All values should be recorded on your flow sheet*

Morning	Evening	All day
Temperature	Temperature	<i>Blood sugars if diabetic</i>
Blood Pressure	Blood Pressure	
Weight		







Regularly check your medication supplies and order refills at least 1 week before you will run out!!! Call transplant office during Monday- Friday 8:30 am- 4:30 pm for new prescriptions when needed.

Reasons to call a transplant coordinator:

- ◇ Fever Greater than 100°F
- ◇ Progressive weight gain over 2-3 days or swelling
- ◇ Decreased urine output
- ◇ Pain around transplant site
- ◇ Tenderness, warmth, or increased drainage from wound
- ◇ Significant change in blood pressure
- ◇ Flu- like symptoms (ex. Headache, dizziness, fatigue, body aches, Nausea, vomiting, diarrhea or burning/ painful urination)
- ◇ Sore throat or white coating on your tongue

Inside of Medication Folder/Chart

Patient Name _____ Drug Allergies _____
Remember to call for new prescriptions during office hours: Monday-Friday 8:30am - 4:30pm

Medication	Pictures (Tab/capsule strength)	Purpose	Dosage	Times/Day
Prograf® (tacrolimus)	 0.5mg 1mg 5mg	Anti-rejection		
Myfortic® (mycophenolic acid EC)	 180mg 360mg	Anti-rejection		
Prednisone	 1mg 2.5mg 5mg 10mg 20mg	Anti-rejection	per taper	
Valcyte® (Valganciclovir)	 450mg	Prevent infection x3 months		
Bactrim® (SMX-TMP)	 SS (400mg - 80mg)	Prevent infection x6 months		
Mycexlex Troche® (Clotrimazole)	 10mg	Prevent infection x6 months		

Breakfast (7am-9am)	Lunch (11am-1pm)	Dinner (6pm-8pm)	Bedtime (9pm-11pm)

Back Cover of Medication Folder/Chart

WHAT TO REMEMBER WHEN COMING TO CLINIC:

- ◇LOCATION: 16 South Eutaw Street; 2nd floor
- ◇ALWAYS bring your medication folder
- ◇EVERY visit may start with blood work;
 - *DO NOT TAKE your am Prograf®, Rapamune® and/ or Cyclosporine until after your labs are taken.
 - *We want a level ~12 hr after your evening dose
 - *You should take all other meds and EAT BREAKFAST
- ◇ Bring your AM doses of Prograf®, Rapamune® and/ or Cyclosporine with you

Immunosuppression Regimen:

Induction:	Thymoglobulin®	Simulect®	Campath®
Maintenance:	Myfortic®	720mg	1440 mg (mg/day)
	Cellcept®	500 mg	2000 mg (mg/day)
	Prograf®		
	goal: 6-8 ng/ml	8-9 ng/ml	9-11 ng/ml

Steroids:

- SWT- withdrawal taper, d/c after 21 day taper
- SST- taper to maintenance Prednisone per instructions
- AAST- taper to maintenance Prednisone per instructions

Other: _____
(agent & goal)

Study Protocol: _____
(if applicable)

Patient Education Documentation in EPIC Education Tab

The screenshot displays two side-by-side windows from the EPIC Education Tab, both titled "UMMS CR IP 4Q TRANSPLANT NEW TRANSPLANT".

Left Window Content:

- New Transplant
 - Transplant Home Medications
 - Educate as to why home medications may be different in the hospital
 - Why did the medical team stop the medications I was taking at home?
 - Can my regular doctor still prescribe medications?
 - What are things I should report to my healthcare providers
 - Transplant Post Op Plan of Care
 - Educate patient on the plan of care
 - What is the plan of care?
 - Why is this important?
 - How can I/my family be involved in my care?
 - Transplant Medication Chart
 - Educate on use of Medication Folder
 - What are things you can do to get comfortable with your medicines?
 - Why is it important to do these things?
 - What things should I report to staff/healthcare providers?
 - Transplant Immunosuppressive Medications
 - What are these medicines, and how do they work?
 - Important things to know about these medicines
 - Risk factors of these medicines
 - Prograf (Tacrolimus) Safety Tips
 - Myfortic Safety Tips
 - Prednisone Safety Tips
 - Transplant Anti-Infective Medicines
 - What are these drugs, and how do they work?
 - What are my anti-infective medicines?
 - Important things to know about these medicines
 - Valcyte/Valgancyclovir Safety Tips
 - Bactrim Safety Tips
 - Mycelex Safety Tips
 - Diflucan Safety Tips
 - Transplant Hospital-Supervised Medication Administration
 - Educate on Supervised Medication Administration
 - What is supervised medication administration?
 - Why is it important to do these things?

Right Window Content:

- Infection Prevention
 - Educate on ways to prevent infection after transplant
 - What do I do to prevent infections?
 - Why is it important to prevent infections?
 - What things should I report to staff/healthcare providers?
- Transplant Signs/Symptoms of Infection
 - Educate patient on the signs/symptoms of infection
 - What are the signs/symptoms of infection?
 - Why is this important?
 - What things do I need to report to staff?
- Transplant Daily Logs
 - Educate on daily logs, home care routine, daily self care routine
 - What should be monitored?
 - Why is it important to do these things?
 - What things should I report to staff/healthcare providers?
- Transplant Coordinator
 - Educate on reasons to call transplant coordinator
 - What should I report?
 - Why is it important to do these things?
 - What other reasons should I call my transplant coordinator?
- Transplant Go Home Resources
 - Educate: Identify patient resources at home
 - Identify go home resources
 - Is it okay to call?
 - What should I call these people for?
- Transplant Follow Up Appointments
 - Educate patient on follow up appointments
 - What do I need to know?
 - What types of appointments are there?
 - What should I report to providers?
- Transplant TCC/Transitional Care Clinic
 - Educate patient on the TCC
 - What do I need to know?
 - What should I bring to this appointment?
 - What is this appointment for?

Both windows have "Accept" and "Cancel" buttons at the bottom.

Appendix M

Patient Knowledge Assessment

Post-Transplant Patient Knowledge Assessment

Please answer these questions about your new transplant medications to the best of your ability:

1. Prograf (Tacrolimus), Myfortic (Mycophenolic acid), and Prednisone are what kind of drugs?
 - a. Pain medications
 - b. Anti-infection
 - c. Anti-rejection
 - d. Blood pressure
2. Which medication requires blood work?
 - a. Myfortic (Mycophenolic acid)
 - b. Nystatin
 - c. Bactrim (SMX-TMP)
 - d. Tacrolimus (Prograf)
3. On lab draw days, which medication should I wait to take until after my blood is drawn?
 - a. Prednisone
 - b. Tacrolimus (Prograf)
 - c. Bactrim (SMX-TMP)
 - d. Blood pressure medication
4. Which medication prevents fungal infections?
 - a. Nystatin
 - b. Myfortic (Mycophenolic acid)
 - c. Valcyte (Valganciclovir)
 - d. Bactrim (SMX-TMP)
5. Which temperature would be a reason to call my transplant coordinator?
 - a. 98.6F or 37C
 - b. 96.8F or 36C
 - c. 100F or 37.8C
 - d. 99F or 37.2C
6. What food or drink should I avoid if I am taking Tacrolimus (Prograf)?
 - a. Orange juice
 - b. Pineapples
 - c. Apples
 - d. Grapefruit/grapefruit juice

7. By taking Tacrolimus (Prograf), I am at increased risk of...
 - a. Skin cancer
 - b. Infection
 - c. Headache
 - d. All the above
8. What is a common side effect of Myfortic (Mycophenolic acid)?
 - a. Upset stomach or diarrhea
 - b. Skin cancer
 - c. Headache
 - d. None of the above
9. What can I do to prevent rejection of my new organ?
 - a. Fill out my daily logs
 - b. Take my anti-rejection medications
 - c. Call my coordinator when indicated
 - d. Attend my clinic appointments as scheduled
 - e. Have my labs drawn regularly
 - f. All the above
10. What can I do to prevent infection?
 - a. Avoiding people who are sick
 - b. Washing hands frequently
 - c. Not sharing eating utensils, drinks, or toothbrushes with others
 - d. Take my anti-infection medications
 - e. Call my coordinator for temperature >100F or 37.8C
 - f. All the above
11. I should remember the following about taking my medications:
 - a. I will need to take medications the rest of my life
 - b. Check with my post-transplant nurse coordinator before taking any new medication on my own
 - c. Do not change my medications
 - d. Take my medications at the same time, each and every day
 - e. All of the above
12. I need to bring these items with me to all of my Transitional Care Clinic (TCC) and follow up appointments:
 - a. My daily logs
 - b. My Medication Folder/Chart
 - c. All of my pill bottles
 - d. My pill box
 - e. My discharge paperwork and/ or paperwork from my last appointment
 - f. All of the above

Appendix N

Formative Evaluation

Formative Evaluation of Post-Transplant Patient Knowledge Assessment

Please rate the relevance of each question using the scale below

Post-Transplant Patient Knowledge Assessment

1. Prograf (Tacrolimus), Myfortic (Mycophenolic acid), and Prednisone are what kind of drugs?
(0) Not useful (1) Useful (2) Necessary
2. Which medication requires blood work?
(0) Not useful (1) Useful (2) Necessary
3. On lab draw days, which medication should I wait to take until after my blood is drawn?
(0) Not useful (1) Useful (2) Necessary
4. Which medication prevents fungal infections?
(0) Not useful (1) Useful (2) Necessary
5. Which temperature would be a reason to call my transplant coordinator?
(0) Not useful (1) Useful (2) Necessary
6. What food or drink should I avoid if I am taking Tacrolimus (Prograf)?
(0) Not useful (1) Useful (2) Necessary
7. By taking Tacrolimus (Prograf), I am at increased risk of...
(0) Not useful (1) Useful (2) Necessary
8. What is a common side effect of Myfortic (Mycophenolic acid)?
(0) Not useful (1) Useful (2) Necessary

9. What can I do to prevent rejection of my new organ?

(0) Not useful (1) Useful (2) Necessary

10. What can I do to prevent infection?

(0) Not useful (1) Useful (2) Necessary

11. I should remember the following about taking my medications:

(0) Not useful (1) Useful (2) Necessary

12. I need to bring these items with me to all of my Transitional Care Clinic (TCC) and follow up appointments:

(0) Not useful (1) Useful (2) Necessary

Comments:

Appendix O

Post Implementation Survey

- 1. Did you notice an improvement in patients’ understanding of their transplant medications and self-care regimen?

yes
no

- 2. Do you believe your patients had improved engagement throughout their medication education sessions?

yes
no

2a. List ways patients demonstrated engagement

- 3. Do you feel more confident in your ability to educate transplant recipients?

yes
no

- 4. Do you feel as though patients are more satisfied with their care and overall hospital admission?

yes
no

- 5. Any comments or feedback?
