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Frailty Screening in Cardiac Surgery Patients: Improving Risk Stratification

April P. Hargett

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Frailty Screening in Cardiac Surgery Patients: Improving Risk Stratification

by

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A DNP project submitted to the faculty of
Gardner-Webb University Hunt School of Nursing in
partial fulfillment of the requirements for the degree of
Doctor of Nursing Practice

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Abstract

Frailty has been noted throughout the literature to have a negative effect on patient outcomes especially in patients undergoing major surgical interventions such as cardiothoracic surgery. Preoperative assessments have historically included assessment of all body systems, however fails to evaluate patients for baseline physical functioning or frailty. The American College of Cardiology has recommended frailty screening on all cardiac surgery patients; however, facilities have failed to educate staff providing care to this population on the impact of frailty and use of commonly used frailty screening tools. This project hypothesized that Cardiothoracic Surgery Nurses and providers would have improved knowledge and confidence regarding the description and impact of frailty and use of frailty screening tools after receiving education. The project outcomes found that nurses and providers had significantly improved knowledge and confidence regarding description and impact of frailty. Knowledge and confidence regarding completion of frailty screening tools (Katz-6 and Lawton Independent Activities of Daily Living) improved also. Providers (100%) acknowledged that the educational intervention would change their current practice.

Keywords: prolonged length of stay, prolonged length of stay and cardiac surgery, frailty assessment, frailty assessment and cardiovascular, frailty screening, Katz Index, and Lawton Instrumental Activities of Daily Living Scale (Lawton IADL).

Acknowledgments

“Those who trust in the Lord will renew their strength; they will soar on wings like eagles; they will run and not grow weary; they will walk and not faint”. **Isaiah 40:31**

Lord, first I would like to thank you for all I have in my life, and for being my strength through this journey, without you none of this would have been possible. I do not know what my future holds, however I will always trust in you to be my strength.

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SECTION I

Introduction

Background

Prolonged hospitalization is an adverse outcome in cardiac surgery which has been linked to increased morbidity and mortality (Lee, Buth, Martin, Yip, & Hirsch, 2010). Commonly utilized tools to assess preoperative risks have failed to account for the patient's physiological reserve and only calculate risks based on specific organ systems (Revenig et al., 2013). Assessing the preoperative risks of the elderly population is an emerging research topic, as postoperative complications are associated with increased costs, hospitalization, and overall decreased quality of life (Saxton & Velanovich, 2011).

Due to the increased aging population and the number of elderly patients presenting for cardiac surgery, current clinical tools are incomplete in assessing risks as they do not include assessment of frailty (Lee et al., 2010). Morley, Malmstrom, and Miller (2012) defined frailty as “a condition in which there is decreased physiological reserve and resilience” (p.601). Frailty is not defined by age and has been noted in previous studies in middle aged patients as well as the elderly (Lekan et al., 2017). Zdradzinski, Phelan, and Mace (2017) defined frailty as a “multifactorial state in which physical, social, and psychological factors place the patient at risk of adverse health outcomes or death when exposed to further stressors” (p.298). Stressors are defined as acute or chronic illness and are sometimes iatrogenic which would include surgery (Afialo et al., 2014). Prevalence of frailty in patients with cardiovascular disease has

been noted to range from 10% to 60% and is dependent on the severity of the disease (Afialo et al., 2014).

Frailty has been linked in multiple studies to increased length of stay, mortality, and morbidity following cardiac surgery. Literature suggests assessing frailty enables providers to fully inform patients of risks of surgery due to its potential impact on quality of life and mortality. By assessing for frailty, patients and surgeons are better informed of risks and either decline surgery or consider less invasive measures due to risks. In failing to assess for frailty surgeons are often “blind-sided” by poor outcomes (Lee et al., 2010). Poor outcomes may have been prevented by not operating or delaying surgery while the patient has a supervised rehabilitation period, termed prehabilitation.

In early 2016, frailty screening was briefly addressed during an Cardiothoracic (CT) Surgery Team meeting at the project facility. No formal education of frailty or the use of frailty screening tools followed the meeting and therefore screening implementation failed and screening was not integrated into the preoperative workflow. There was an identified gap in the best practice of frailty screening and actual practice at the project implementation site. The Doctorate of Nursing Practice (DNP) Project was designed to provide education on frailty and use of screening tools and ensure appropriate implementation into current workflow through collaboration with CT Surgery Team members. The project also provided an opportunity for members of the CT Surgery Team to ask questions regarding the tools and practice the use of tools in the educational sessions.

Problem Statement

The lack of pre-screening for frailty in cardiac surgery patients increases the risk for post-operative complications. Increased risk of postoperative complications directly correlates with increased length of hospital stay, increased cost of hospitalization, and increased length of stay in the Intensive Care Unit. Frailty screening had been addressed at the project facility previously, however failed implementation due to knowledge deficits regarding frailty and confidence in the use of Frailty Screening tools.

Needs Assessment

PICOT Statement

Will education on the concept of frailty, including instruction on administration of two frailty screening tools, Katz Index of Independence in Activities of Daily Living (Katz-6) and Lawton Independent Activities of Daily Living (Lawton IADL), increase knowledge and confidence levels in CT Surgery Team members? Will education on the concept of frailty and instruction on administration of two frailty screening tools, Katz-6 and Lawton IADL, increase pre-operative completion rate of frailty screening tools in cardiothoracic surgery patients?

Identification of Sponsor and Stakeholders

During the needs assessment phase of the project internal and external key stakeholders were identified for this project. Internal stakeholders identified included Cardiothoracic Surgeons, Chief of Cardiothoracic Surgery, Chief Nursing Officer, Advanced Care Providers (ACP) in Cardiothoracic Surgery, Director of Surgical Services, Clinical Nurse Specialist in the Cardiovascular Intensive Care Unit (CVICU), Director of Critical Care Services, Nurse Managers for CVICU and Cardiac Telemetry

Unit, and nursing staff in Cardiac Telemetry and Intensive Care Unit at the project facility. External stakeholders consisted of CT Surgery patients, the families of patients served, and individuals in the communities served. Center for Medicare and Medicaid Services, private and third-party insurers, Mended Hearts Program volunteers, and Cardiac Rehabilitation Staff could also be included as external stakeholders.

Team Selection

The team for completion of this project consisted of Cardiothoracic Surgeons, Surgical ACP's, the Nurse Educator for Cardiac Telemetry, the case managers in the cardiothoracic unit, the Clinical Nurse Specialist (CNS) for CVICU, and nursing staff on Cardiac Telemetry and CVICU. The Chief Cardiothoracic Surgeon at the project facility collaborated with the project leader, assisting with problem identification and playing a key role in the success of this project. The chief ACP and CNS of CVICU provided mentorship for the project leader and assisted with navigation of the healthcare system.

SWOT Analysis

A SWOT analysis was completed at the beginning of this project and is found in Figure 1. In preparing the needs assessment a SWOT analysis was used to allow the project leader to recognize the strengths and allow for planning to address any weaknesses or threats. This tool is often utilized in the business world, however can be easily adopted and used in any project (Zaccagnini & White, 2017).

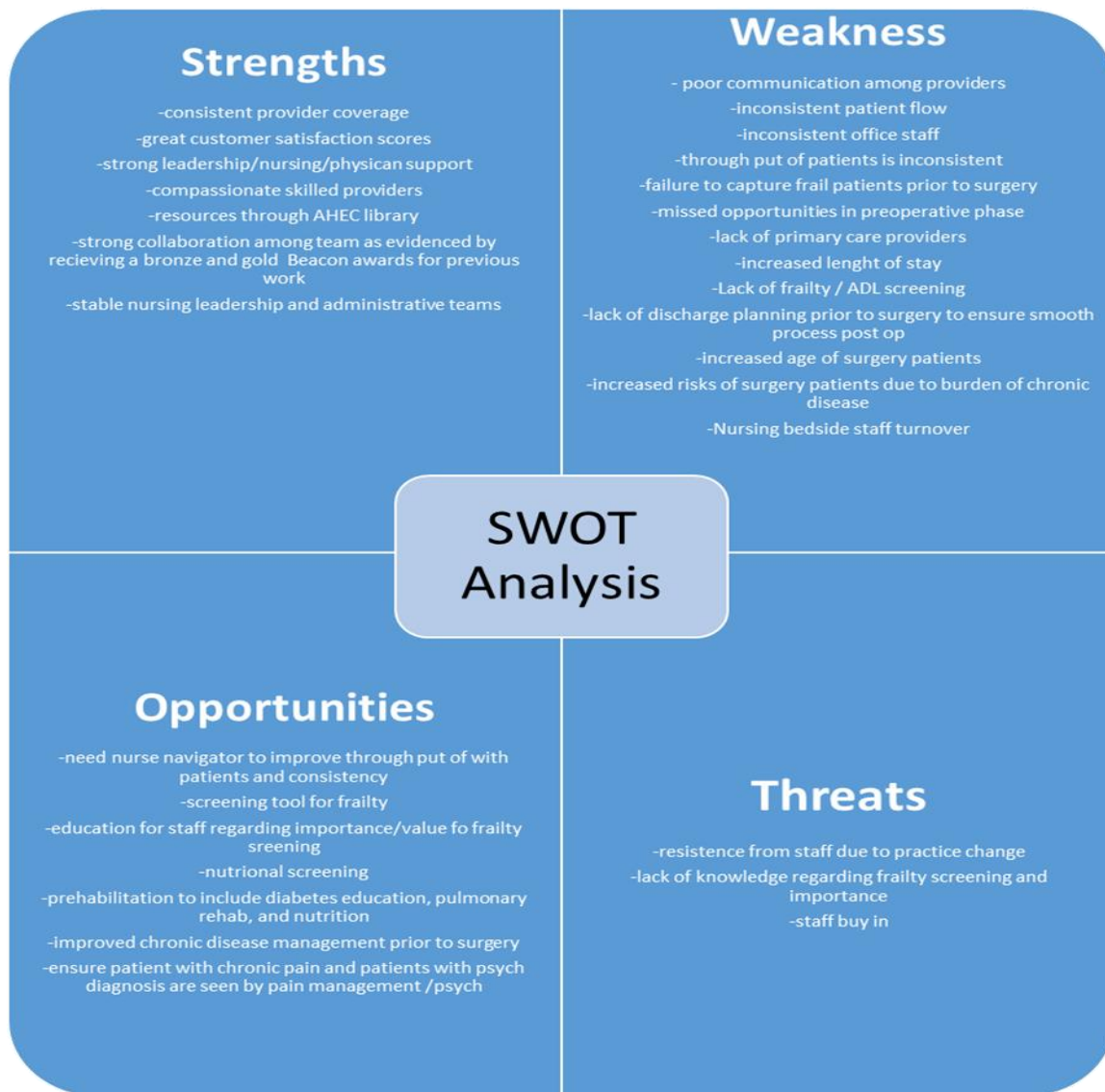


Figure 1. SWOT Analysis

Scope of the Problem

Increasing confidence levels of providers and nurses performing frailty screening at the project facility would increase the number of screenings performed on cardiac surgery patients. Frailty screening would allow for improved risk stratification, and allow for fully informed consent prior to surgery. Frailty screening would also help identify patients at increased risk of prolonged hospital length of stay, and the possible need for discharge to other facilities prior to returning home. Identifying higher risk patients would allow case management and the surgery team the opportunity to discuss rehabilitation and long-term care options earlier, therefore allowing for patients and families to discuss all their options prior to surgery and plan appropriately.

Goals, Objectives, and Mission Statement

Goals

The goal of this project was to improve risk stratification for cardiac surgery patients at project facility by educating nursing staff, ACP's, and CT Surgeons on the impact of frailty in this population and proper administration of the Katz-6 and Lawton IADL screening tools. Upon completion of the educational intervention, frailty screening would be integrated into existing preoperative screening assessments.

Objectives

Objectives of the project included increasing knowledge of frailty, the importance of frailty screening, and the potential impact of pre-screening for frailty on cardiac surgery patients. The second objective was to integrate the Katz-6 and Lawton IADL into the established preoperative workflow to ensure compliance. Long term objectives included improvement of patient outcomes, such as decreased length of stay and

decreased readmissions. Frailty screening was integrated into the current workflow and incorporated into the existing preoperative evaluation for cardiac surgery patients.

Mission Statement

The mission of this DNP Project was to increase confidence and knowledge of Cardiothoracic Surgery Team members regarding the impact of frailty and administration of the Katz Index and Lawton IADL screening tools. Screening for frailty would potentially allow the Cardiothoracic Team to improve patient outcomes by ensuring proper risk stratification prior to surgery and allow for improved informed consent process.

Purpose of the Project

The purpose of the DNP project was to provide education on the concept of frailty, including instruction on administration of two frailty screening tools, the Katz Index of Independence in Activities of Daily Living (Katz-6) and Lawton Independent Activities of Daily Living (Lawton IADL), in order to increase knowledge and confidence levels in CT Surgery Team members, at the project facility, and ultimately increase pre-operative completion rate of frailty screening tools in cardiothoracic surgery patients.

Cost Benefit Analysis

In assessing the cost of implementation and the potential benefit there was a potential savings of \$1,666,440 noted annually. This savings was calculated based on a per day bed charge in the CVICU of \$5,018 and Cardiac Telemetry daily bed charge of \$2,697. Average daily bed charges were obtained from hospital administration for use in this project. The goal length of stay for patients undergoing Cardiothoracic Surgery is

two days in CVICU (\$10,036) and three days on Cardiac Telemetry (\$8,091) per patient. In 2016, there were 108 patients with an increased length of stay with an average stay in the CVICU of four days (\$40,144.00) and Cardiac Telemetry of five days (\$40,455.00) per patient (Figure 2). The cost of training staff and implementation (\$545.90) was calculated based on an approximate amount of time calculated for education, paper and supplies needed for copies, and reference materials. Total costs of materials for the educational session totaled \$34.10. Cost of training staff accounted for 30 minutes of time needed for the education of staff, which was based on an average hourly rate of each discipline which totaled \$505.85 (Table 1).

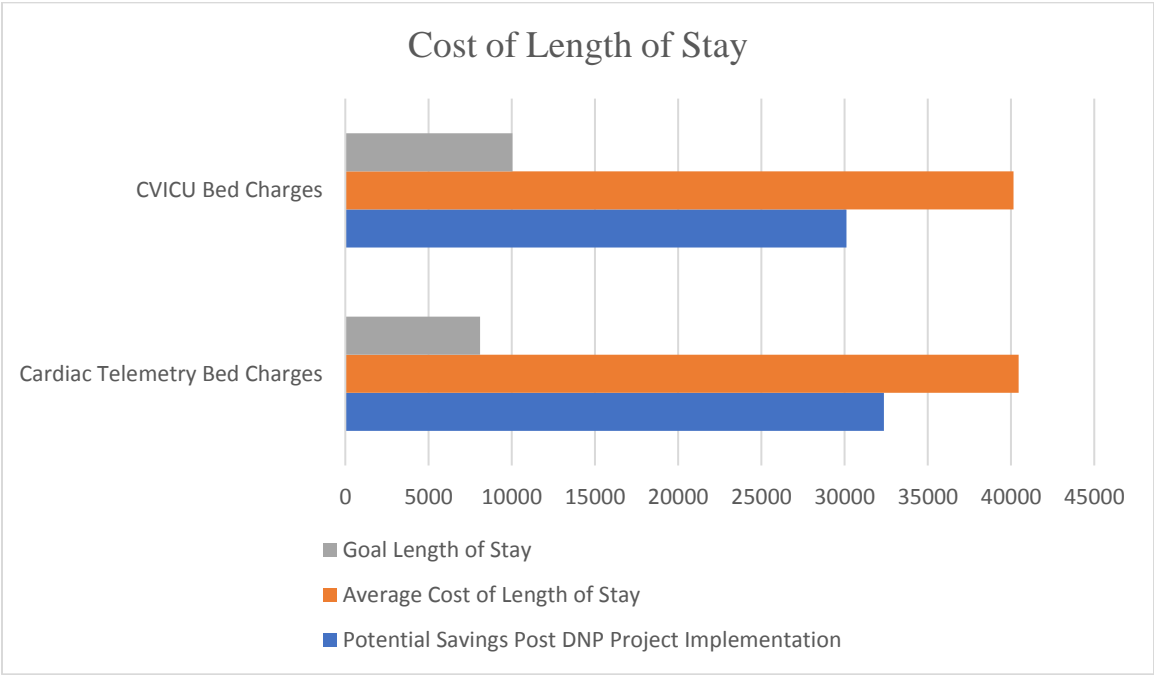


Figure 2. Cost of Length of Stay

Table 1

Cost of Training

Staff Title	# of Staff to be trained	Total Time	Cost per hour	Total costs
ACP	11	.5hrs x 10= 5.5	\$55.00 (avg per hr)	\$302
RN	14	.5 hrs x 14 = 7hrs	\$29.05 (avg per hr)	\$203.35
Surgeons	6	.5 hrs x 6= 3 hrs	Included in salary	No additional cost
Total	31	12.5	84.05	\$505.85

SECTION II

Review of Literature

A search was conducted for literature published between 2000-2017 via Cumulative Index for Nursing and Allied Health Literature (CINAHL), the University's Bulldog One Search and ProQuest. The search was conducted using the following key words; "prolonged length of stay", "prolonged length of stay and cardiac surgery", "frailty assessment", "frailty assessment and cardiovascular", "frailty screening", "Katz Index", and "Lawton Instrumental Activities of Daily Living Scale (Lawton IADL)". Following the initial searches with keywords, articles with the following inclusion and exclusion criteria were selected for a matrix to perform this review. Inclusion criteria included articles in peer reviewed journals published between 2000 and 2017 which reviewed frailty screening in patients in the acute care setting undergoing surgery or invasive procedures and tools used for frailty. Exclusion criteria included studies not printed in the English language. A secondary search was conducted on the use of the Katz Index and the Lawton IADL tools.

Search Outcome

The initial search yielded ($n=2947$) articles. The secondary search initially yielded ($n=1519$) articles. Duplicate articles and articles not meeting inclusion criteria were eliminated. Articles were further reviewed for context pertaining to cardiac surgery patients and use of frailty screening in this population in relation to postoperative outcomes. Articles related to the Katz Index and Lawton IADL were reviewed for context of use in the acute care setting and in the patient undergoing surgery or invasive procedures.

Findings

The Journal of American College of Cardiology published a White paper in 2014 (Afialo et al.) discussing the importance of frailty assessment in cardiovascular patients. Afialo et al. (2014) defined frailty as a “biological syndrome that reflects a state of decreased physiological reserve and vulnerability to stressors” (p.747). The burden of frailty was noted as affecting 10%-60% of cardiovascular patients (Afialo et al., 2014). Afialo et al. (2014) reviewed the pathobiology of frailty, assessment tools available, and the importance of assessing for frailty in clinical practice. There are many frailty screening tools available but currently there is not a gold standard noted in the literature. Cardiac surgery is an iatrogenic physiological stressor and in a person with less resiliency or rather increased frailty post-operative outcomes are often negatively affected (Afialo et al., 2014). Afialo et al. (2014) found that surgeons have been performing subjective frailty screening often referred to as an “eyeball test” for many years, however reliable and valid frailty screening tools offer objective data for screening. Frailty has been noted in previous studies as predictive of post-operative mortality, morbidity, increased length of stay, and increased risks of being discharged to facilities other than home as noted by Afialo et al. (2014).

Afialo et al. (2014) recommended it is best practice for frailty assessment tools to be used in the pre-operative period prior to cardiac surgery and for patients with increased frailty to have preoperative optimization using a multidisciplinary approach. Development of a heart team to review patients with increased frailty by appropriate consultants was also suggested (Afialo et al., 2014). Another recommendation was the use of cardiac rehabilitation prior to the procedure to improve frailty and facilitate

recovery of frail individuals (Afialo et al., 2014). It was noted that further research was needed on the use of frailty in the screening of cardiovascular patients and use of cardiac rehabilitation to improve frailty.

Impact of Frailty

Publication of frailty research has increased, potentially due to the predicted growth in the aging population. Archibald et al. (2017) postulated that the international prevalence of frailty ranges from 4.9% to 27.3%. In their five-year qualitative study of experiences and perceptions of frailty amongst various stakeholders, they defined frailty as an “age-related clinical state of increased vulnerability to stressor events” (Archibald et al., 2017, p. 1). According to Archibald et al. (2017) individuals with frailty have been noted to have multiple negative outcomes including, less social interaction, decreased quality of life, increased rate of morbidity and mortality, and increased utilization of the healthcare system. To improve outcomes associated with frailty, early identification is necessary. Early identification and intervention have the potential to decrease decline. Patients who are frail have decreased independence and increased dependence on secondary caregivers. This increased dependence leads to caregiver fatigue, stress, and potential loss of income (Archibald et al., 2017). Archibald et al. (2017) proposed a qualitative study over a five-year period to improve understanding of experiences and perceptions of frailty among various stakeholders to include patients and healthcare providers to improve identification and prevention of frailty.

Post-operative complications have been associated with significant cost and negative effects on patients. In the past, postoperative outcomes have been predicted based on the surgeon’s experience with insufficient tools available for predictability of

outcomes. Saxton and Velanovich (2011) assessed the role of preoperative quality of life and frailty in relation to postoperative complications. This retrospective cohort study was conducted in a hospital setting in Detroit Michigan using a random sample of patient records (Saxton & Velanovich, 2011). The sample was not limited to patients over the age of 65, as younger patients have also been noted as frail, according to Saxton and Velanovich (2011). The researchers used a 36-item Short Form Health Survey (SF-36) which measured eight domains of quality of life including physical functioning, role-physical, role-emotional, bodily pain, vitality, mental health, social functioning, and general health (Saxton & Velanovich, 2011). In their study Saxton and Velanovich (2011) extracted data from the patient's chart to answer a 70-item Canadian Study of Health and Aging Frailty Index.

A negative correlation between quality of life and frailty scores was found by Saxton and Velanovich (2011). Patients with increased frailty were also noted to have increased surgical complications. Small sample size, retrospective design, and inability to complete questionnaires, which could have led to underestimation of data were limitations of this study. The study also had decreased generalizability due to the study being conducted in only one area of the United States. A strength of this study is the use of univariate and multivariate statistics to compare patient outcomes of frailty and quality of life to postoperative outcomes. Recommendations from this study are the need for a prospective study to confirm the results.

Dasgupta, Rolfson, Stolee, Borrie, and Speechly (2009) aimed to examine if frailty was linked with an increased risk of postoperative complications in adults, aged 70 or older, with medical illness having non-cardiac, major elective surgery. Frailty was

defined in this study as an “increased vulnerability to different adverse outcomes, and is not specific to a particular disease process” (Dasgupta et al., 2009, p.79). Dasgupta et al. (2009) sought to ascertain if a frailty assessment would add any additional information relating to preoperative risk beyond general risk obtained from standard risk assessments. This study was conducted in a tertiary teaching hospital in Ontario, Canada between June 2002 and April 2003 (Dasgupta et al., 2009). The sample consisted of 125 patients who were recruited by Dasgupta et al. (2009) from a preadmissions clinic and met inclusion criteria. Participants underwent standard medical workup including exam, history and physical, laboratory testing, application of Detsky Modified Risk Index criteria, frailty assessment with Edmonton Frail Scale, and demographics with the Cumulative Illness Rating Scale (Dasgupta et al., 2009). Adverse outcomes of surgery were defined by Dasgupta et al. (2009) as any cardiac or pulmonary complication, delirium, death, gastrointestinal bleed, or stroke. Length of hospitalization and inability to be discharged home were also assessed in this study (Dasgupta et al., 2009).

Adverse outcomes were noted in 25% of the participants (Dasgupta et al., 2009). Frailty and postoperative complications had a positive correlation. Limitations of this study included decreased generalizability, the use of chart audits for outcomes as they may have been missed, and small sample size. Future studies are needed to validate findings of this study. Research evaluating other frailty tools is also needed.

Frailty is often evaluated by combining multiple frail characteristics found in a patient. Robinson et al. (2011) defined frailty as a state of increased vulnerability to health-related stressors, therefore, hospitalized patients should be evaluated for frailty due to its impact on outcomes. Frailty has been a syndrome often noted in older adults and

due to greater than half of all operations being performed on patients 65 years of age or older, understanding the relationship between frailty and surgical outcomes is essential to improving quality of care (Robinson et al., 2011). Robinson et al. (2011) found that following major operations 20% to 44% of geriatric patients require institutional discharge. Institutional discharge is often needed due to functional decline in this population and further decreases a person's independence (Robinson et al., 2011). If surgeons had the ability to evaluate patients for frailty and this correlated with increased need for institutional discharge this would allow them to discuss these expected outcomes with patients and families prior to surgery (Robinson et al., 2011).

Robinson et al. (2011) conducted a prospective cohort study consisting of 223 patients at a Denver Veterans Affairs Medical Center who were undergoing major operations requiring postoperative intensive care admission. Patients who were institutionalized prior to surgery were excluded along with those who underwent emergent surgery resulting in acute blood loss (Robinson et al., 2011). Subjects were recruited by Robinson et al. (2011) in their study over a 26-month period with frailty characteristics evaluated in the preoperative period. Frailty characteristics were assessed in six domains which included "burden of comorbidity, function, nutrition, cognition/mental, geriatric syndromes and extrinsic frailty" (Robinson et al., p. 38, 2011). The burden of comorbidity was measured using the Charlson index, the American Society of Anesthesiologists score, number of medications prescribed, and hematocrit (Robinson et al., 2011). Robinson et al. (2011) evaluated functional status using the Katz Index of Daily Living score, and a timed get up and go. Nutrition was assessed by measuring albumin level prior to surgery, body mass index, and weight loss of 10 pounds

or greater in the past six months (Robinson et al., 2011). Cognition and mental function were evaluated by Robinson et al. (2011) using the Mini-Cog test and a use of a Two-Question Depression Screen. Geriatric syndromes were measured by evaluating for one or more falls in the past six months (Robinson et al., 2011). Extrinsic frailty which is also known as social vulnerability was defined as someone living alone or someone without a spouse or companion for this study (Robinson et al., 2011).

Three or more frailty characteristics in a subject correlated with potential increased need for institutional discharge in the study by Robinson et al. (2011). Preoperative characteristics significant for discharge to an institution were a high burden of chronic disease, anemia, functional dependence, low albumin levels, cognitive dysfunction and the presence of falls (Robinson et al., 2011). Robinson et al. (2011) found that there were three variables most predictive of increased need for institutional discharge. They were prolonged “get up and go”, any functional dependence noted on the Katz Index of Daily Living and a Charlson index of 3 or greater.

A limitation of this study is gender bias as the study was conducted on predominately male patients. There was also decreased generalizability as these results are from only one Veteran Affairs Hospital and cannot be assumed for all populations. Strengths of the study was that their findings were consistent with that of previous studies.

These findings further acknowledged the importance of assessing for frailty in the preoperative patient. Robinson et al. (2011) found that due to the increased research regarding frailty and its negative effects on outcomes, using frailty to improve risk stratification in patients prior to surgery was imperative. This signifies a shift in the

traditional preoperative assessment which only included preoperative evaluation of only single end-organ function (Robinson et al., 2011).

Using frailty as a risk factor for negative patient outcomes specifically in cardiac surgery patients had not been assessed and therefore Lee et al. (2010) conducted a retrospective study to evaluate the impact of frailty in this population. There are many definitions of frailty and Lee et al. (2010) defined frailty as “any impairment in activities of daily living, ambulation, or a history of dementia (p.973). Frailty is not defined by chronological age, and older adults range from robust to frail due to their biological age (Lee et al., 2010). Lee et al. (2010) proposed that frailty assessment would improve risk stratification in patients undergoing cardiac surgery and identify patients who should be considered for other processes of care. Lee et al. (2010) included a large sample of 3,826 patients over a 42-month period at a hospital in Canada. Records of patients were selected from a large clinical database of patients who had undergone cardiac surgery since 1995 (Lee et al., 2010). Any patient with any deficiency in the Katz Index of Activities of Daily Living, ambulation, or any diagnosis of dementia were defined (Lee et al., 2010). Outcomes measured by Lee et al. (2010) were in-hospital mortality, midterm all-cause mortality, and institutional discharge. The study by Lee et al. (2010) found that frailty was predictive of need for institutional discharge following cardiac surgery. Mortality and prolonged length of stay were also increased in frail patients compared to non-frail patients (Lee et al., 2010). Frailty was also noted to be independent of age in this study.

The literature notes a strong association with frailty and increased dependence in activities of daily living. Data obtained from the study justifies the need for frailty

screening to be incorporated into preoperative assessment to improve risk stratification and allow physicians as noted by Lee et al. (2010) to “engage patients in fully informed consent” (p. 977). Not informing patients of risks associated with increased frailty, and thus allowing for discussion regarding these risks, fails to engage patients in fully informed consent prior to surgery (Lee et al., 2010).

Programs are needed to address mobility of frail patients and their nutritional deficiencies prior to surgical intervention (Lee et al., 2010). Future research is needed to assess outcomes following interventions prior to surgery. Preoperative assessments should include assessment of frailty to improve risk stratification and ensure patients are engaged in fully informed consent prior to surgical intervention (Lee et al., 2010). Frailty screening is needed in cardiac surgery patients and should be performed as part of the preoperative assessment (Lee et al., 2010).

Provider Knowledge of Frailty

There are many frailty assessment tools and literature to support frailty in predicting adverse surgical outcomes; however, frailty screening has failed to be incorporated into preoperative screening. According to Eamer et al. (2017) preoperative frailty is more indicative of adverse outcomes of surgery than age. Eamer et al. (2017) conducted a study to assess healthcare professional’s perceptions of frailty and their attitudes towards and practices for frail patients. The survey was conducted using 5-point Likert scale questions and open-ended questions (Eamer et al., 2017). Canada was the setting for the study conducted by Eamer et al. (2017) and the initial sample consisted of 117 healthcare professionals, including surgeons, residents, nurses, occupational therapist, dietitians, physical therapists, social workers, and service aids. Of the 117

surveys sent 49 (42%) were returned and respondents were primarily female and greater than half were between the ages of 25 and 34 (Eamer et al., 2017).

Eamer et al. (2017) found that participants noted they had barriers to assessment of frailty of patients which were linked to institutional, healthcare system, and professional knowledge. A theme among all disciplines was a knowledge deficit regarding frailty and its effect on outcomes and everyone noted they would benefit from formal training on frailty, frailty assessment and its use (Eamer et al., 2017). Although healthcare professionals acknowledged the need for frailty screening to improve care they failed to include frailty assessments into their routine. (Eamer et al., 2017)

Limitations of this study were small sample size due to low response rate and decreased generalizability as this was one healthcare system in Canada (Eamer et al., 2017). Gender bias could also be assumed as the majority of respondents were female. A strength of the study was this data confirms previous research conducted which noted similar knowledge gaps on the topic of frailty. The study recommended interprofessional education on frailty and use of frailty screening tools prior to implementation to ensure proper integration (Eamer et al., 2017). Eamer et al. (2017) recommended development of strategies to address workload, knowledge deficits, and communication among teams when implementing frailty assessments in the surgical setting is needed. (Eamer et al., 2017)

Preoperative Screening

Frailty has been linked in the literature to have a negative effect on postoperative outcomes, however frailty has not been added to preoperative assessments. Due to preoperative assessments not including frailty screening, they fail to account for the

patient's physiologic reserve which can affect postoperative outcomes. Revenig et al. (2013) conducted a prospective cohort study to "characterize preoperative measurements of frailty and their ability to reliably predict postoperative outcomes" (p.666). Sample consisted of 189 patients undergoing major urologic surgery, general surgery, or surgery related to an oncology illness (Revenig et al., 2013). Inclusion criteria for the study conducted by Revenig et al. (2013) consisted of participants 18 years of age or older who were undergoing surgery requiring hospital admission. Exclusion criteria consisted of inability to walk, impaired dexterity, failure to understand questionnaires, and or illiteracy. Patients were assessed for frailty using the Hopkins Frailty Score (Revenig et al., 2013). Activities of daily living, a nutritional assessment, depression assessment, and demographic data was obtained by Revenig et al. (2013). Routine preoperative laboratory test were completed. Complications within 30 days of surgical intervention were measured by conducting medical record reviews using the Clavien-Dindo Classification (Revenig et al., 2013).

Patients enrolled in the study by Revenig et al. (2013) were 59.8 % male and 71.4% Caucasian with a mean age of 62 years of age. In this study frailty was noted as being a statistically significant predictor of postoperative complications (Revenig et al., 2013). Frailty was not limited by age and the study hoped to assess the utility of frailty screening in all ages as a risk for postoperative outcomes. Due to low numbers of participants 40 years of age or younger the study by Revenig et al. (2013) was unable to make a definitive statement regarding the utility of frailty screening in younger patients.

Future studies are needed to assess the utility of frailty screening in younger patients. Limitations of this study included gender bias as 59.8% of participants were

male, decreased generalizability as the study was conducted at one facility in the United States, and small sample size. The potential impact of preoperative interventions was not assessed as part of this study which is another limitation. The study found that frailty screening can improve risk stratification of patients and allow for interventions prior to planned procedures to potentially improve outcomes if frailty is decreased (Revenig et al., 2013).

Frailty has been noted in the literature to be a predictor of physiologic reserves and preoperative risks assessments in the past have failed to account for these reserves. To evaluate whether frailty can be a predictor of postoperative outcomes Makary et al. (2010) conducted a prospective cohort study which measured frailty in patients over the age of 65. The study consisted of 594 patients who presented to John Hopkins for preoperative anesthesia evaluation over a one-year period 2005-2006 (Makary et al., 2010). Makary et al. (2010) assessed for frailty at the time of standardized preoperative assessments. Frailty screening consisted of a scoring system which evaluated five domains including shrinking, grip strength, exhaustion, low physical activity, and walking speed (Makary et al., 2010). Complications of surgery were defined by Makary et al. (2010) as readmission within 30 days, length of stay, and discharge to a facility other than home. Participants in the study were recruited on selected days of the week with the days rotating on a consistent basis (Makary et al., 2010). Exclusion criteria consisted of patients with a history of Parkinson Disease and stroke, a Mini-Mental Status Examination score < 18, and anyone prescribed antidepressants, carbidopa/levodopa, or donepezil hydrochloride (Makary et al., 2010).

There were 594 participants 10.4 % were frail, 31.3% were noted at moderately frailty, and 58.3% were non- frail (Makary et al., 2010). Postoperative complications were noted by Makary et al. (2010) in 33.7% of moderately frail patients and 43.5% in frail patients which indicated frailty being an independent predictor of postoperative complications. Moderately frail and frail patients were noted in the study to have significant increase in length of stay and institutional discharge when compared to non-frail patients (Makary et al., 2010).

The study by Makary et al. (2010) noted the importance of frailty screening in preoperative patients as it correlated with increased postoperative complications. In previous studies frailty had been associated with increased mortality, morbidity, falls, decline in function, and hospitalization of non-surgical patients, however this was the first study addressing frailty in surgical patients (Makary et al. 2010). Limitations of this study included decreased generalizability due to it being performed in only one location of the United States. Other limitations included the evaluation of only short terms outcomes associated with frailty, and no correlation with other laboratory data which has been associated with poor outcomes (Makary et al., 2010).

Makary et al. (2010) found that frailty screening allowed for improved risk stratification prior to surgery. Studies are needed to assess whether frail patients would benefit from interventions prior to surgery to improve outcomes and if heightened awareness of frail patients during their hospitalization would allow for interventions to improve negative outcomes. Future research should also evaluate the relationship between frailty and laboratory values such as albumin levels and complete blood count regarding patient outcomes (Makary et al., 2010).

Increased Length of Stay

Due to the increasing demand for critical care beds, Rosenfeld, Smith, Woods, and Engel (2006) conducted a study to recognize predictors of critical care length of stay for patients undergoing isolated coronary artery bypass grafting surgery. Previously there have been various indicators of increased length of stay in cardiac surgery patients which included gender, age, left ventricular function, timing of surgery, and reoperations. Rosenfeld et al. (2006) conducted a perspective case-control cohort study over a nine-year period, with data collected on 225 variables during admission. Sample included 944 patients 18 years of age or older with a critical care length of stay greater than seven days (Rosenfeld et al., 2006). Fifteen preoperative risks factors were measured with 11 outcome variables on all participants by Rosenfeld et al. (2006).

Rosenfeld et al. (2006) found nine risks factors which were significant for increased length of stay and included female gender, age > 70, hypertension, chronic obstructive pulmonary disease urgent interventions, and prolonged pump time. Participants with increased length of stay were noted to have increased renal dysfunction, sternal wound, pulmonary, gastrointestinal, and intraoperative complications (Rosenfeld et al., 2006). Rosenfeld et al. (2006) identified patients who underwent on pump surgery had greater length of stay than surgeries conducted off pump.

Limitations of this study included gender bias as the case and the control group were both predominately male and racial bias as the sample of both groups was predominately Caucasian which will also decrease generalizability across all ethnic, racial, and gender groups. Strengths of this study included the large sample size and

consistency of findings in this study having been noted in previous research regarding predictors of length of stay in the intensive care unit.

There are many outcomes associated with increased length of intensive care stay, however this study was limited to only in hospital outcomes and future research should expand to include out of hospital outcomes. Research is needed to identify any relationships associated with increased length of intensive care stay and disability and morbidity.

Frailty Effects on Need for Institutionalization

Health care reform continues to place pressure on facilities to decrease length of hospital stay and readmission within 30 days following surgical procedures. With this heightened awareness in relation to decreasing length of stay Walters et al. (2014) conducted a retrospective cohort study to identify factors in the preoperative phase associated with need for discharge to an extended care facility following discharge from the hospital. Previous studies have noted the multiple variables associated with extended care facility discharge which include age, preoperative functional and nutritional status, peripheral vascular disease, and use of home oxygen (Walters et al., 2014). Walters et al. (2014) theorized that if they could identify specific variables associated with discharge to an extended care facility they could improve the efficiency of discharge planning to decrease hospital length of stay.

Walters et al. (2014) included 1,646 patients in their sample who underwent thoracic surgery with a hospital stay of greater than one day. A hospital database was used to obtain demographics and preoperative variables if they met inclusion criteria (Walters et al., 2014). Age, albumin level, Zubrod score, history of peripheral vascular disease,

and use of home oxygen were chosen as variables Walters et al. (2017) obtained from charts of patients included in the sample.

Functional status, age, and albumin level were noted by Walter et al. (2014) as being statistically significant indicators of need for discharge to an extended care facility which supported previous research regarding these variables and is strength of this study. Limitations of this study were the small retrospective review and potential for selection bias. Gender bias can also be assumed as the sample was predominately male.

Generalizability is limited due to this being conducted at one facility in Virginia and therefore cannot be assumed that all patients nationwide would have the same results.

Results of this study supported the need for implementation of strategies prior to surgery to improve the probability of patients being discharged home. Preoperative identification of patients at risk of discharge to somewhere other than home has the potential to improve the discharge planning process and thus decreased length of hospitalization as noted by Walters et al. (2014). Walters et al. (2014) recommended future studies to address these concerns in not only thoracic surgery population, but all surgical candidates and evaluate the effect of preoperative interventions on decreasing risk of being discharged to extended care facilities.

Katz Index of Activities of Daily Living

The process of deciding as to whether to operate on a person or not is a question surgeons face daily and with increased aging populations current preoperative risks assessments do not include a method to evaluate for frailty. As frailty has become a topic of interests due to its negative effects on postoperative outcomes research is being conducted to assess tools used for assessment Robinson et al. (2013). Robinson et al.

(2013) conducted a prospective cohort study to establish if there is a relationship between frailty and incidence of postoperative outcomes in colorectal and cardiac surgery patients.

Robinson et al. (2013) included 201 participants in their study which was conducted at a Denver Veterans Affairs Medical Center in Denver, Colorado from January 2007 to November 2010. Inclusion criteria consisted of patients undergoing elective cardiac or colorectal surgery who were 65 years of age or older (Robinson et al., 2013). Emergent operations and patients with acute blood loss anemia from surgery were excluded by Robinson et al. (2013). Frailty was assessed in this population through assessment of seven frailty characteristics (Robinson et al., 2013). Frailty characteristics assessed by Robinson et al. (2013) consisted of Timed Up and Go, Katz Index of Activities of Daily Living Score, Charlson Index, Mini-Cog, hematocrit, albumin level, one or more falls in the past six months which were all assessed during the preoperative workup within 30 days of surgery.

Robinson et al. (2013) found a correlation between increased frailty and increased length of stay and readmission within 30 days for both surgical groups in their study. In hospital postoperative complications were also increased in identified frail patients (Robinson et al., 2013). Limitations of this study included gender bias, as the sample was predominately male. There was decreased generalizability due to the study being conducted at only one facility therefore results may not be assumed for all populations. A strength of this study was the congruence of findings with multiple other studies related to frailty's impact on outcomes. This study further justified the need for frailty screening in surgical patient prior to surgery to improve risk stratification and the use of the Katz Score in the process (Robinson et al., 2013).

The Katz Index of Independence in Activities of Daily living was used in a study conducted by Zdradzinski et al. (2017) to screen for frailty in emergency department patients. Zdradzinski et al. (2017) sought to identify whether frailty and sociodemographic factors effected risk of admission. A convenience sample of 306 patients was included in the study and were recruited in an emergency department at an urban, academic tertiary-care hospital in the Midwestern United States by Zdradzinski et al. (2017). Sociodemographic data was collected upon presentation and the Katz Index was completed for frailty screening along with the Groningen Frailty Index for comparison (Zdradzinski et al., 2017). The Katz Index was used by Zdradzinski et al. (2017) as it focuses on specific activities and abilities and has been noted in the literature to be useful as a rapid screening tool. Zdradzinski et al. (2017) wanted to compare the results of the Katz Index to the Groningen Frailty Index in relation to its ability to identify frail patients. Upon comparison of the two tools the Katz Index was noted to have a high specificity for assessing for frailty in participants (Zdradzinski et al., 2017).

Zdradzinski et al. (2017) found patient with a positive response to the Katz Index indicating frailty was noted to have increased risk of admission to the hospital while other sociodemographic data was not significant. This study found that use of the Katz Index in this population correlated with increased frailty risk and need for hospitalization, however future studies are needed to determine its use in other populations (Zdradzinski et al., 2017).

The Katz Index is being utilized in hospitalized adults to assess functional status and assist in appropriate discharge planning post hospitalization (Wallace & Shelkey, 2008). This tool was created in 1970 originally, to assess geriatric patient's ability to

complete activities of daily living and assess for changes in abilities with any illness which would allow for intervention when slight changes were noted (Wallace & Shelkey, 2008). Wallace and Shelkey (2008) noted that this tool had been used to assist with measurement of nursing workload in nursing homes, and in prediction of length of hospital stay, mortality and morbidity. Wallace and Shelkey (2008) described the use of the Katz Index, presented case studies to allow readers to understand the usefulness of the tool and provided tips on administration of the tool in their article. Use of the Katz Index in various settings was discussed and the importance of communicating the results of the test to the patient and family was addressed (Wallace & Shelkey, 2008). Reliability and validity of the tool was also discussed however, Wallace and Shelkey (2008) agreed future research is needed to assess for specificity and sensitivity of the tool.

The Katz Index has been noted in the literature as a useful tool in evaluation of frailty in patients. Most studies have assessed persons over the age of 65 however the study by Zdradzinski et al. (2017) noted its use in all patients in predicting frailty. In the study by Lee et al. (2010) the Katz was used in the assessment of frailty in cardiac surgery patients and therefore could be used alone or in addition with other frailty characteristics.

Lawton Instrumental Activities of Daily Living Scale

The Lawton Instrumental Activities of Daily Living (IADL) Scale has been used in addition to other frailty scales to improve risk stratification of patients. In a study by Sanchis et al. (2014) the Lawton IADL Scale was used to evaluate instrumental disability as a contributor to geriatric conditions which placed patients at risk of increased mortality following acute coronary syndrome. Sanchis et al. (2014) sought to determine whether

geriatric conditions and frailty were predictive of outcomes in patients following acute coronary syndrome. A prospective cohort study was conducted by Sanchis et al. (2014) and consisted of 342 patients hospitalized for acute coronary syndrome at one hospital in Spain from October 2010 to February 2012. Participants were excluded if they had prior cardiac disease or if they required cardiac surgery (Sanchis et al., 2014). Data was collected by Sanchis et al. (2014) on the day of discharge. Outcomes evaluated by Sanchis et al. (2014) were post discharge all-cause mortality and readmission for acute myocardial infarction. Follow up was conducted at 25 and 30 months after discharge (Sanchis et al., 2014).

The Lawton IADL scale was used alone and was not predictive of mortality, however its utility with other geriatric conditions improved predictability of mortality in the study by Sanchis et al. (2014). Sanchis et al. (2014) recommended future research to determine whether geriatric conditions are predictive of other outcomes such as readmission, and increased length of stay.

The Lawton (IADL) scale has been used to assist with discharge planning in the acute care setting. The scale was developed in 1969 and was originally used to assess activities of daily living in older adults (Graf, 2008). The scale allows assessment of both cognitive and physical functioning and instrumental skills have been noted to be lost prior to other activities of daily living skills therefore allowing for improved assessment of function of persons who may otherwise appear independent (Graf, 2008). Graff (2008) explained that administration of the Lawton IADL scale takes approximately 10-15 minutes and consists of eight questions. The questions can be answered via a written questionnaire or by interview (Graf, 2008). Graf (2008) described the use of the Lawton

IADL scale in the acute care setting with case study examples and provided readers with tools to use in practice. (Graf, 2008)

In the article by Graff (2008) scoring and interpretation of the tool was discussed. Graff (2008) also addressed challenges in use of the tool and importance of remembering special needs in your population, use of large print on documents, ensuring when interviewing patients, they were comfortable and the environment was free of distractions (Graf, 2008). According to Graf (2008) validity was also tested previously and was determined using correlations with four other scales measuring domains of function with correlation significant at .01 or 0.5 level. The Lawton IADL is appropriate for use in the acute care setting to assist with discharge planning and a strength of its use being that it measure complex functioning rather than just activities of daily living (Graff, 2008).

Combined Lawton IADL and Katz Index

Karakurt, Kasimoglu, Bahceli, Baskan, and Agdemir (2017) used the Lawton IADL and the Katz Index of Daily Living to determine if activities of daily living effected the Self-care agency scale of patients in a cardiovascular surgery clinic. The study was a descriptive study conducted in a cardiovascular surgery clinic in the Eastern Region of Turkey between June 2014 and January 2015 (Karakurt et al., 2017). Karakurt et al. (2017) collected sociodemographic data and completed the Katz Index, Lawton IADL and Self-care agency scale on all participants.

Karakurt et al. (2017) found that mean scores for Katz Index were higher than the Lawton IADL in their study, which supported previous research that decline in IADL is noted prior to other activities of daily living. There was a positive correlation noted between self-care agency score and activities of daily living (Karakurt et al., 2017).

In the postoperative period following cardiac surgery, programs should be developed by nursing to improve patient independence in activities of daily living as this can also improve their self-care behaviors as noted by Karakurt et al. (2017).

Postoperative cardiac surgery patients are at increased risk of a decrease in independence of activities of daily living and this should be addressed by staff caring for this populations (Karakurt et al., 2017). Future research is needed to assess the effects of interventions during this period on patient outcomes

Laan et al. (2013) combined the Katz Index of Daily Living and Lawton IADL to form the Katz-15 tool and conducted a retrospective study using data from a single blind, three-armed, cluster-randomized control trial to determine the predictive value of the Katz-15 in determining unfavorable health outcomes and to assess the reliability and validity of the scale. Participants (n=2321) in the study were frail participants age 60 years or older recruited at general practitioner offices in the Netherlands (Laan et al., 2013). Laan et al. (2013) defined unfavorable outcomes as hospitalization, admission to a skilled nursing facility or assisted living, or death. Reliability of the Katz-15 was assessed by Laan et al. (2013) by using Kuder-Richardsons – 20 measure which is like Cronbach's alpha, however assessed for internal consistency with dichotomous items. The validity of the Katz Index was also studied by Laan et al. (2013) for comparison. Validity was assessed in a two-step process using Spearman rank correlations and areas-under-the-curves (Laan et al., 2013).

Laan et al. (2013) found the Katz-15 to be both a reliable and valid tool, with the Katz -15 having increased predictability of unfavorable outcomes when compared to the original Katz Index which is a strength of this study. Combining the Katz and Lawton

tools increased reliability and validity and predictability of poor patient outcomes (Laan et al., 2013). A limitation of this study would be decreased generalizability as this study was conducted in the Netherlands and would need further research using this tool in the United States. Use of the combined tool in various settings in healthcare would be an area where future research is needed (Laan et al., 2013).

Strengths of the Literature

Numerous articles were found to describe the impact of frailty on patient outcomes and the importance of early identification. The literature provided strong evidence for the need for frailty screening in surgical patients to ensure adequate informed consent is obtained by allowing for appropriate risk stratification of patients prior to intervention.

Limitations of the Literature

A limitation noted in the literature was the vagueness of which tools were best used in the cardiac surgery populations as limited research has been conducted in this population in relation to actual screening. There were many suggestions, however, research was inconclusive regarding the best utilization of various tools in this population.

Summary of Literature Review

Frailty is noted in the literature as a predictor of negative patient outcomes in multiple specialties including the cardiac surgery population. Despite the increase in the elderly patient population, preoperative assessments have failed to routinely include frailty screening in their workup. As noted by Lee et al. (2010) failing to assess for frailty and discussing outcomes of surgery related to frailty status does not allow fully

informed consent to be obtained in surgical patients. Frailty screening is recommended as best practice throughout the literature to become part of the preoperative assessment and in the acute care setting for all patients.

There are various screening tools available and many frailty screenings use multiple tools in the screening process. Preoperative screenings already consist of patient demographics, past medical history, evaluation of prescription drug use, multiple organ system evaluations, and laboratory data. The addition of tools like the Katz Index and Lawton IADL can strengthen the predictability of frailty in patients along with other data already being collected in the preoperative phase.

Theoretical Framework

Origin of Theory

Kurt Lewin's Model of Change was utilized as the theoretical framework for this project. Lewin's change theory has been used in similar research projects to influence and guide planned change in practice (Evans, Ball, & Wicher, 2016). Doolin, Quinn, Bryant, Lyons, and Kleinpell (2011) used change theory in their practice change of allowing family presence during cardiopulmonary resuscitation. Gupta, Boland, and Aron (2017) used Lewin's Change Theory to research change in the clinical practice of physicians and the struggle with unlearning old behavior to implement evidenced based practice in a timely manner. Change Theory has also been used in previous studies to implement change in practice related to the implementation of electronic medical record documentation (Payne, 2013).

Lewin Change Model includes three stages of planned change. Stage I is unfreezing, Stage II is the change, transition, or moving, and Stage III is freezing or

refreezing (Doolin et al., 2011). Stage I, also known as unfreezing, is the process of recognizing the need for change and challenging current practice and processes (Evans et al., 2016). Unfreezing is also when researchers take the time to identify key stakeholders, build relationships, gather data, and problem identification (Doolin et al., 2011).

Transition, or change stage, is when a detailed plan is made for implementation of change and buy in from key stakeholders is needed to ensure the process is smooth (Evans et al., 2016). During the transition stage, communication among the team is important and must be kept clear and concise (Doolin et al., 2011). Freezing and re-freezing is the final stage and is when the team has accepted the practice changes and they are being established and stabilized. During refreezing, the team will need to provide positive feedback and encourage others as this is crucial in keeping individuals from reverting back to previous behaviors (Evans et al., 2016).

Lewin's Change Theory was utilized as the theoretical framework for this project. Stage I (Unfreezing) consisted of recognition of the problem, research completed to determine tools to utilize, and best practice. During Stage I the project leader also worked with CT surgery team members to assess current workflow and discuss potential workflow changes to ensure the success of the project. Stage II (Change) consisted of project planning, development of educational sessions, development of pre-survey and post survey, communication with CT surgery team members regarding population for educational sessions, and work flow integration. Stage III (Refreezing) consisted of completion of the educational sessions, incorporation of frailty screening into the current workflow, and increased knowledge of CT surgery team members on the concept of frailty and the use of frailty screening tools. During Stage III the project leader, with

assistance of the Quality Department, also assessed completion rates of frailty screening on cardiac surgery patients.

Conceptual, Theoretical, and Empirical Concepts

The Conceptual-Theoretical-Empirical (C-T-E) model was used to link Lewin's Theory to the project. The creation of the C-T-E allowed the project leader to apply the theory to the project directly which was a starting point for the project (Fawcett & Garity, 2009). The theoretical concepts in Lewin's Change Theory are: unfreezing, change or transition, and freezing or refreezing. These concepts are used to describe the stages of change when nurses or providers are implementing a practice change and allowed the project leader to apply the stages of change throughout the project. The empirical research methods are the final stage of the model and correlated with the steps of the project related to the specific stages of change. The C-T-E model for the project applying Lewin's Theory is outlined in Figure 3.

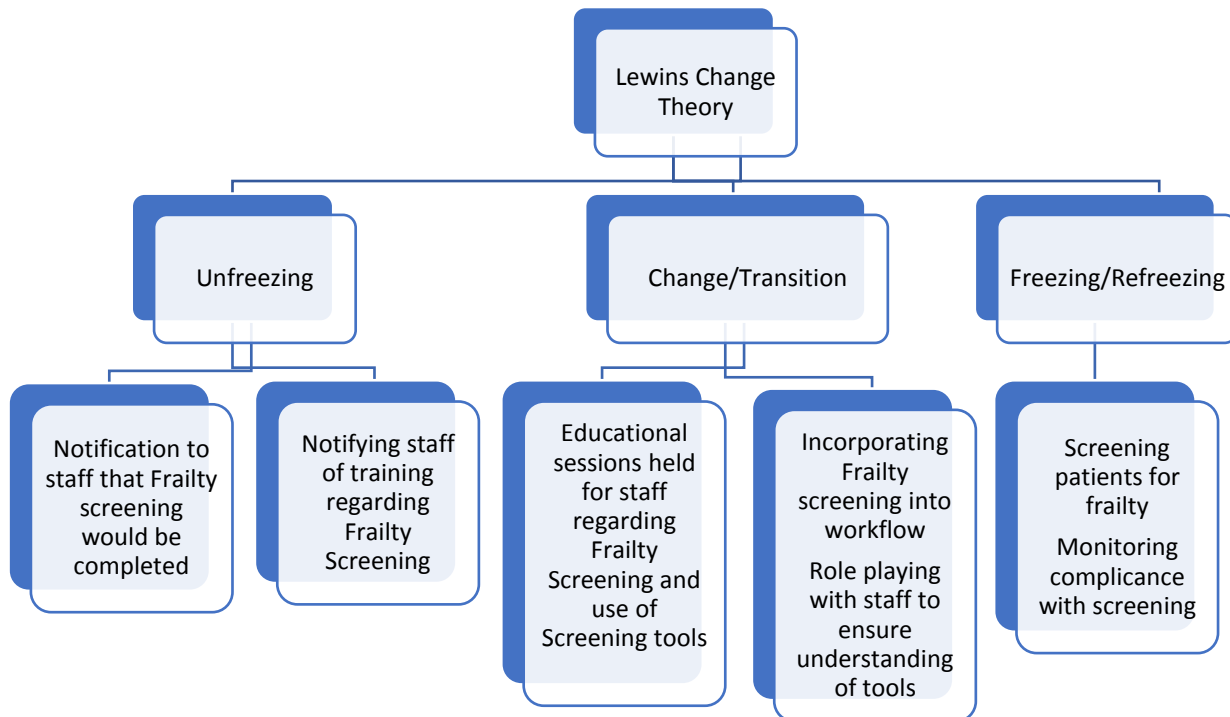


Figure 3. C-T-E

SECTION III

Project Method

Setting, Sample, and Design

Setting

This DNP project was implemented at a 235-bed tertiary care center in the Southeast United States, which serves seven surrounding counties. There were 235 cardiac surgery cases performed in 2016 and 257 cardiac surgery cases in 2017. The hospital has a 14 bed CVICU and 32 bed Cardiac Telemetry Unit where cardiac surgery patients receive postoperative care. The Cardiac Surgery Department consists of five cardiothoracic surgeons and nine ACP's who practice at the facility.

Sample

The population, for this DNP project, was CT surgery Team members including CT surgeons, ACP's, and Pre-Operative Nurses at one acute care project facility in the Southeastern United States. All CT Surgeons, ACP's, and pre-operative nursing staff were educated on the concept of frailty and administration of frailty tools (Katz-6 and Lawton IADL) in preoperative assessment of CT surgery patients. CT surgery Team Members will be encouraged to participate in pre-and post-surveys. Projected sample size included 31 participants. During the implementation a total of 26 CT Surgery registered nurses and 14 CT Surgery Providers (ACP's and Surgeons combined) received education on Frailty Screening in Cardiac Surgery patients. Twenty-one nurses, 81%, and 12 providers, 86% voluntarily completed the pre-survey and post-survey following the education. Inclusion criteria included the following: voluntary participation, attendance at an educational session, and completion of pre-survey and post survey. A

total of 21 nurses and 12 providers met inclusion criteria ($n=33$) and were included in the results section.

Design

This DNP project utilized a quantitative, educational, pre-post implementation survey evaluation design. The project sought to increase the knowledge and confidence regarding frailty and use of frailty screening tools of nurses and providers at project facility. Quality improvement models and DNP project steps were used during the design of the project.

Protection of Human Subjects

Prior to implementation approval was obtained from facility Nursing Advisory Committee, facility International Review Board (IRB), and from the University IRB. An information sheet was created at the request of the facility IRB outlining the components of the project and served as the informed consent. Completion of the pre-survey and post-survey (Appendix A) served as informed consent and no identifying components were obtained on the surveys. Participation in completion of the surveys was voluntary. Participation with this project had no foreseeable risks including physical, psychological, or social harm.

Instruments

The Katz-6 and Lawton Instrumental of Daily Living (IADL) Scale (Appendix B), are two evidenced-based tools that assess basic activities of daily living and are used as assessments for frailty in patients. The DNP project educated CT Surgery Team Members on the concept of frailty and the best practice of integrating these two frailty screening tools into the pre-operative assessment of CT surgery patients. The project

leader also met with CT Surgery Team Members and integrated frailty screening into current inpatient (Appendix C) and outpatient workflow (Appendix D) to ensure compliance with screening. Permission was received by each tools owner for integration into this project.

The outcomes for the project were measured by two tools designed by the project leader and reviewed for face validity. The tools measured confidence level and knowledge of frailty and frailty screening tools. Tools were administered prior to project implementation and after project implementation. Both tools include Likert-type scale questions. One tool was designed specifically for nursing staff participants and one tool was designed for CT Surgeons and ACP participants (Appendix A).

Data Collection and Implementation

Project design was approved by DNP Chair and project facility Nursing Advisory Committee and then facility and University Institutional Review Board (IRB) approval were obtained. Nurse Managers and Chiefs of surgery were contacted and times scheduled for education. Two dates were scheduled for both nurses and providers. Providers were scheduled on two mornings at 630 a.m. and nurses were scheduled at 7 a.m. and 12 noon on separate days. Due to high census and staffing issues, attendance at each scheduled opportunity was low. Due to low attendance, the project leader collaborated with nurse managers and chiefs and roaming in-services were held for two weeks to ensure dissemination of the information among the team.

The primary team received education immediately upon approval by IRB and screenings began on February 1, 2018. At the beginning of the educational sessions, the project leader informed all participants of the scope of the project, reviewed the

information sheet (Appendix E) and gave all participants a copy of the education and tools. Participation in the completion of the pre-survey and post-survey was voluntary and no identifying information was obtained. Participants were given an opportunity to complete the pre-survey and then the educational session began using a PowerPoint presentation, created by the project leader (Appendix F).

Participants were receptive to information and education shared and scholarly discussion was held with team members. Scenarios were completed which allowed participants to use the frailty screening tools and familiarize themselves with the use of the tools. Reference books were provided for each nursing unit, the outpatient office, and a copy was placed in the ACP inpatient office. Preoperative checklists were updated with the addition of the frailty screening as well as the addition of the tools to packets for the inpatient setting. Copies of the screening tool were placed on the nursing units and in the office for completion.

Upon completion of the education, frailty screening began in February 2018, with patients who were not assessed for frailty in the outpatient clinic being screened at preoperative appointments during education session by nursing staff prior to their surgery. CT surgery team members were eager to begin collecting frailty screening due to the potential impact on patient outcomes. The project leader met with the facility quality department and obtained the number of frailty screenings currently being completed, which was zero, and educated the quality nurse on the project and process. Katz-6 and Lawton scores were to be placed on scantrons for all cardiac surgery patients and the quality nurse provided the project leader with the number of screenings completed monthly from scantron data.

Implementation of frailty screening at the facility was monitored by the Project Leader and Project Committee Members weekly. The project leader was available for nursing staff and providers to assist with any questions or concerns regarding screening tools. Upon completion of the educational sessions, participants had the option to complete surveys. Surveys were collected, by the project leader, on February 27th and 28th, 2018.

Barriers

There were several unanticipated barriers noted during implementation. The first barrier was obtaining approval for use of a frailty screening tool. Initially, the Katz-15 was chosen for the frailty screening tool. However, after two months of attempts to gain approval for use, no official approval could be gained. The frailty screening tool was then changed to the Katz-6 Index and the Lawton IADL. Both tools were used with permission of their respected owners. Both tools were also reviewed for reliability and validity in the literature. Once implementation was initiated there were staffing concerns due to unanticipated illness, high acuity, and high census in the hospital. High staff turnover impacted the project implementation as, many staff were unavailable to attend educational sessions. Therefore, more roaming in-services were held to complete the education. The design of the project failed to anticipate frailty screening of patients seen in the office in the month prior to implementation. Those patients, who presented for surgery in February, were not screened in the office in January. An unanticipated finding was also the lack of knowledge of frailty and its impact by providers. In scholarly discussions, at the session for providers, surgeons were educated on the effects of frailty

in relation to patient outcomes but were unfamiliar with tools and use of tools to identify frailty.

Data Analysis

Completion rates of frailty screening prior to project implementation was zero and this information was obtained from Quality Nurse at facility. Completion rates for the month of February were collected by Quality Nurse and given to project leader in the form of total numbers of surgeries completed and number of surgeries completed with frailty screenings completed. Total number of frailty screenings in the month of March will also be collected by the Quality Nurse and shared with Project Leader at the end of March.

Upon completion of pre-survey, education, post-survey, and implementation of frailty screening, surveys were collected. The project leader worked with nursing and providers to answer questions regarding screening and use of screening tools. Meetings were held with administration to discuss frailty screening and the importance of screening and future implications. Weekly the project leader followed up with the CT Surgery team regarding the progression of screening and discussed interventions for patients who were not screened in the office prior to surgery due to implementation date. The project leader also met with the case management team to discuss the use of frailty screening results and its implications for risk of needing placement following surgery.

Once surveys were collected, the project leader analyzed data using IBM SPSS statistical software version 25. Descriptive statistics were used to analyze questions 3 and 4 from the surveys which sought to assess familiarity with frailty screening tools prior to and following educational intervention. Paired t-testing was used to assess data

obtained from questions 1, 2, 5, and 6 for changes in knowledge and confidence regarding frailty and use of frailty screening tools in participants.

Timeline and Budget

In planning for this project, a timeline (Figure 4) and Gantt chart (Figure 5) were created to assist with management of the project. The timeline and Gantt chart was utilized to keep the project on task. Gantt charts and timelines are utilized by multiple disciplines including businesses to assist with project planning (Zaccagnini & White, 2017).

	July 2017	August 2017	September 2017	October 2017	November 2017	December 2017	January 2018	February 2018	March 2018	April 2018
Frailty Screening in Cardiac Surgery Patients Planning	xxxxxxx	xxxxxx	xxxxxxxxx	xxxxxxx						
Research Project/ Tool Design	xxxxxxx	xxxxxx xxxxxxx	xxxxxxxxx	xxxxxxx						
Submit to project facility for approval				xxxxxxx	xxxxxxx	xxxxxxxxx				
IRB application				xxxxxxx	xxxxxxxxx	xxxxxxx	xxxxxxx			
Development of Educational opportunity Pre-Survey				xxxxxxx	xxxxxxxxx			xxxxxxx		
Educational Intervention								xxxxxxx		
Post Survey								xxxxxxx		
Frailty screening at project facility Evaluation							\	xxxxxxx	xxxxxx	
									xxxxxx	xxxxxx

Figure 4. Timeline for DNP Project

Frailty Screening

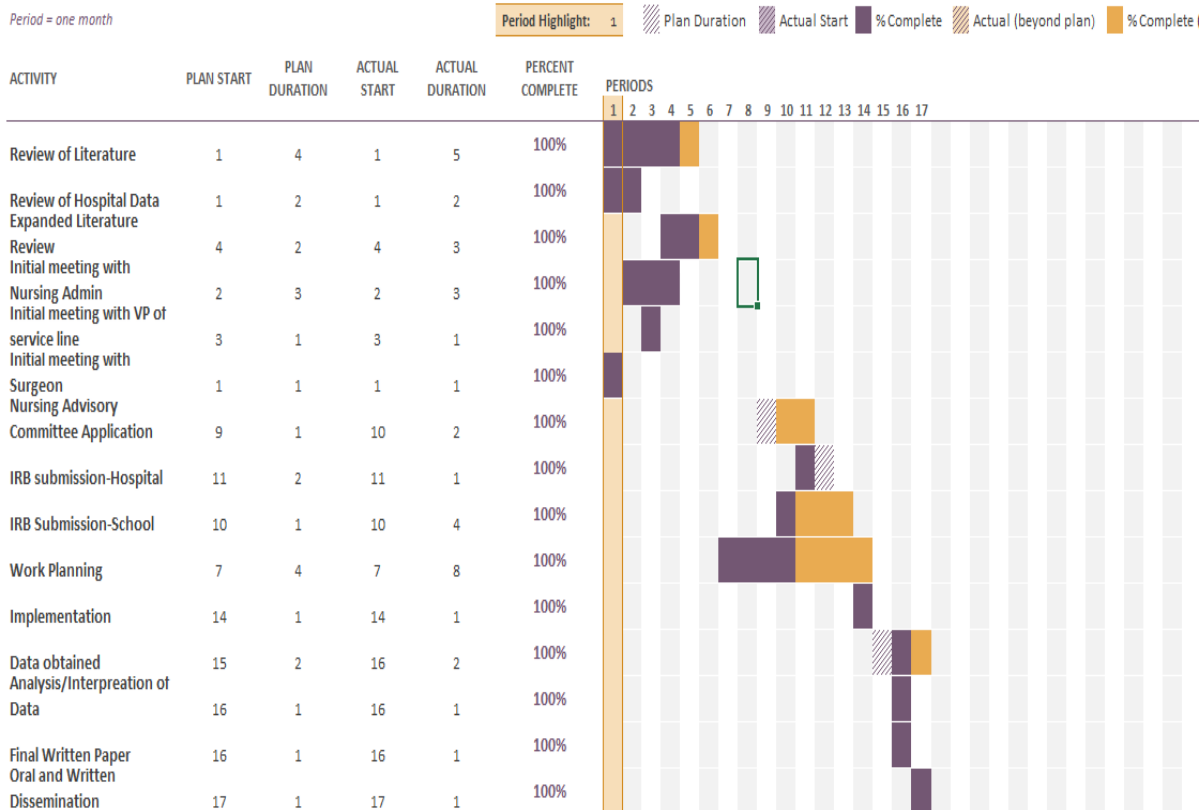


Figure 5. GANTT Chart

Project Budget

During the planning stage, a budget was created to estimate costs of the project (Table 2). Costs of training were already accounted for in the hospital budget and supply costs were incurred by the project leader.

Table 2

Budget for DNP Project

Budget Item	Description	Estimated Cost	Currently in Hospital Budget
Cost of training	Hourly rate X time	\$505.85	Yes
Supplies	Copies/Envelopes	\$23.20	No
Reference Books	Copies of all education provided and tools for each unit	\$10.90	No
Total		\$545.90	

Quality Improvement

A logic model (Appendix G) was completed for this project which consisted of inputs, constraints activities, outputs, short and long-term goals, and impact of the project. A logic model allows the project leader to use tables and diagrams to illustrate the project during development which can be shared with key stakeholders (Zaccagnini & White, 2017).

As part of the Affordable Care Act, there was a national strategy for quality improvement in healthcare (Zaccagnini & White, 2017). The plan included three aims: improved healthcare delivery, improved health of Americans, and a reduction in cost of healthcare without reduction in quality (Zaccagnini & White, 2017). Various quality improvement models are used in the business world and in healthcare. One very common QI tool, Demming's Plan, Do, Study, Act (PDSA) model was integrated into the design of this DNP project (Appendix H). Healthcare systems nationwide use this rapid

cycle improvement process and it was appropriate for the design of this project (Zaccagnini & White, 2017).

Project Closure

The project leader closed the initial implementation of the project on April 1, 2018. Surgeons and ACP's will continue frailty screening and plan to evaluate monthly completion rate. In six months the project leader plans to correlate frailty screening results to patient outcomes. Frailty screening is being added to data collected for Heart Team meetings on high risk patients from this point forward. Plans are also underway to evaluate both screening tools exploring which tool had best indication in relation to outcomes. These outcomes will impact decisions about future use of one or both tools.

SECTION IV

Results

The purpose of this DNP project was to provide education on the concept of frailty, including instruction on administration of two frailty screening tools, Katz Index of Independence in Activities of Daily Living (Katz-6) and Lawton Independent Activities of Daily Living (Lawton IADL), to increase knowledge and confidence levels in CT Surgery Team members at the project facility, and increase pre-operative completion rate of frailty screening tools in cardiothoracic surgery patients.

Sample

During the month of February 2018, a total of 26 Cardiothoracic (CT) Surgery registered nurses and 14 CT Surgery Providers (ACP's and Surgeons combined) received education on Frailty Screening in Cardiac Surgery patients. All CT surgery ACP's and Surgeons, who work at the project facility, participated in the educational sessions. Of the sample, 21 nurses ($n=21$) and 12 providers ($n=12$) completed the pre-survey and post survey. The total number (n) of participants for this project was 33. Due to Registered nurses having responsibility for completion of preoperative education to cardiac surgery patients, they were integral to the integration of the project. No additional demographic data of the sample was obtained in this project. Inclusion criteria included the following: voluntary participation, attendance at an educational session, and completion of pre-survey and post survey.

Findings

Descriptive statistics were used to assess familiarity with screening tools. Familiarity was measured using "yes" and "no" questions on the pre-survey and post-

survey questionnaire (Question #3 and Question #4) for both nurses and providers. It was predicted by the project leader that familiarity with screening tools would improve following the educational intervention. The pre-survey and post-survey results indicate familiarity with Katz-6 screening tool improved in both nurses (pre-survey 9.5%, post-survey 100%) and providers (pre-survey 33.3% and post-survey 100%) and is presented in a bar graph (Figure 6). Familiarity with Lawton IADL Scale in both nurses (pre-survey 0% and post-survey 100%) and providers (pre-survey 33.3% and post-survey 100%) also noted statistically significant improvement. (Figure 6).

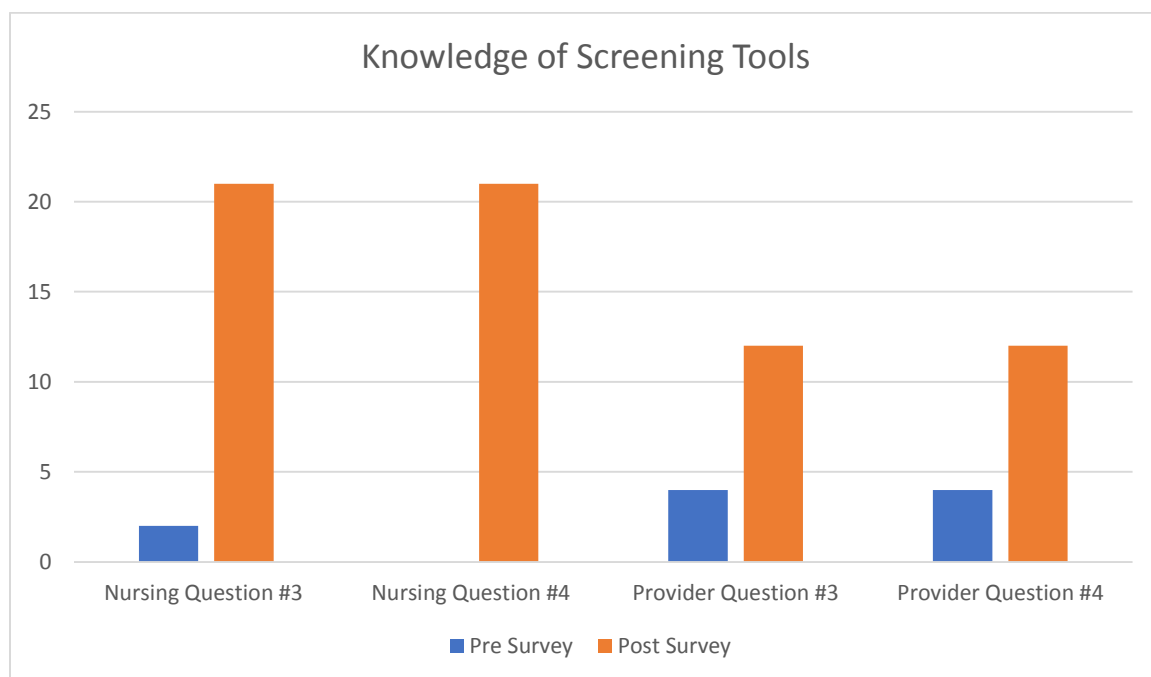


Figure 6. Knowledge of Screening Tools

Advanced statistical analysis was used to determine whether perceptions (confidence and knowledge) of nurses and providers in cardiac surgery at the project facility significantly changed following the educational intervention. Questions 1, 2, 5, and 6 on the pre-survey and post-survey collected response about (confidence and

knowledge) of the description and impact of frailty, and the use of the Katz-6 and the Lawton IADL scale. Questions were answered using a 5-point Likert scale ranging from 1-not confident, 2-somewhat confident, 3-neutral, 4-confident, and 5-very confident. The following statistical hypotheses were developed for this project:

- Let H_0 (Null Hypothesis): The evidence-based education program on the frailty **will not increase** the confidence and knowledge of Cardiothoracic Surgery Nurses regarding description and impact of frailty in the cardiac surgery population.
- H_a (Alternative Hypothesis): The evidence-based education program **will increase** the confidence and knowledge of Cardiothoracic Surgery Nurses regarding description and impact of frailty in the cardiac surgery population.
- Let H_0 (Null Hypothesis): The evidence-based education program on frailty screening tools (Katz-6 and Lawton Instrumental Activities of Daily Living (IADL) **will not increase** the confidence and knowledge of Cardiothoracic Surgery Nurses who complete the screening tools on Cardiothoracic Surgery patients.
- H_a (Alternative Hypothesis): The evidence-based education program on frailty screening tools (Katz-6 and Lawton Instrumental Activities of Daily Living (IADL) **will increase** the confidence and knowledge of Cardiothoracic Surgery Nurses who complete the screening tools on Cardiothoracic Surgery patients.
- Let H_0 (Null Hypothesis): The evidence-based education program on frailty **will not increase** the confidence and knowledge of Cardiothoracic Surgery Advanced

Care Providers (ACP's) and Surgeons regarding description and impact of frailty in the cardiac surgery population.

- H_a (Alternative Hypothesis): The evidence-based education program on frailty **will increase** the confidence and knowledge of Cardiothoracic ACP's and Surgeons regarding description and impact of frailty in the cardiac surgery population.
- Let H_0 (Null Hypothesis): The evidence-based education program on frailty screening tools (Katz-6 and Lawton IADL) **will not increase** the confidence and knowledge of Cardiothoracic Surgery ACP's and Surgeons completing the tools.
- H_a (Alternative Hypothesis): The evidence-based education program on frailty screening tools (Katz-6 and Lawton Instrumental Activities of Daily Living (IADL) **will increase** the confidence and knowledge of Cardiothoracic Surgery ACP's and Surgeons completing the tools.

The above null and alternative hypotheses were tested using the pre-survey and the post-survey questions concerning the CT Surgery nurses' and providers' confidence and knowledge. The hypotheses were tested with paired t-testing using IBM SPSS Statistical Software version 25. Statistical analysis with the paired t-test is useful for comparing the values of means from two related samples for statistical significance, and is useful in the pre- and post-test comparison scenario (Mertler & Vannatta, 2013). The post-survey data of the CT Surgery nurses' and providers' confidence and knowledge are presented using frequency tables and tables with means and p-values (Tables 3-18).

Major Findings

When comparing pre-survey results to post -survey results the mean (M) of each survey was compared and the *p-value* (α) was considered statistically significant at $\alpha < 0.05$.

The pre-survey mean value (nursing M=2.000, provider M=3.1667) in question one for nursing and providers was less than the mean value in the post survey (nursing M=4.5714, providers M=4.7500) therefore the study concludes that the educational intervention significantly (nursing $\alpha=0.000$, providers $\alpha=0.000$) improved confidence levels in the description of frailty in cardiac surgery patients.

Nurses and providers confidence regarding their knowledge of the impact of frailty on cardiac surgery patients was also found to be significantly (nursing $\alpha = 0.000$, providers $\alpha=0.015$) improved following the educational intervention when comparing the pre-survey (nursing M=2.1905, providers M=3.14167) and the post-survey (nursing M=4.6190, providers M=4.7500) results.

Confidence in nurses and providers regarding completion of the Katz-6 screening tool noted significant (nursing $\alpha= 0.000$, providers $\alpha=0.000$) improvement when pre-survey (nursing M=1.7143, provider M=4.6190) and post-survey (nursing M=2.3333, provider M=4.6667) results were compared.

Confidence regarding completion of the Lawton IADL by nurses and providers noted significant (nursing $\alpha=0.000$, providers $\alpha= 0.000$) improvement following education when pre-survey (nursing M=1.6667, provider M=2.3333) and post-survey (nursing M=4.6190, provider M= 4.666) results were compared. All null hypotheses were rejected in this study.

Table 3

Nursing Question #1

Question #1 Please rate your confidence level in describing frailty in Cardiac Surgery patients.	Pre-Survey <i>Frequency</i>	Post-Survey <i>Frequency</i>
Not Confident	8	0
Somewhat Confident	8	0
Neutral	3	1
Confident	1	7
Very Confident	1	13

Table 4

Nursing Question #1 Variables

Question#1	<i>M</i>	<i>α</i>
Nursing Pre-Survey	2.0000	.00
Nursing Post-Survey	4.5714	.00

Table 5

Nursing Question #2

Question #2 Please rate your confidence level in describing the impact of frailty in Cardiac Surgery patient outcomes.	Pre-Survey <i>Frequency</i>	Post-Survey <i>Frequency</i>
Not Confident	4	0
Somewhat Confident	11	0
Neutral	4	0
Confident	2	8
Very Confident	0	13

Table 6

Nursing Question #2 Variable

Question #2	<i>M</i>	<i>α</i>
Nursing Pre-Survey	2.1905	.000
Nursing Post-Survey	4.6190	.000

Table 7

Nursing Question #5

Question #5 What is your confidence level in completing the Katz-6 screening tool?	Pre-Survey <i>Frequency</i>	Post-Survey <i>Frequency</i>
Not Confident	14	0
Somewhat Confident	3	0
Neutral	0	0
Confident	4	8
Very Confident	0	13

Table 8

Nursing Question #5 Variables

Question #5	<i>M</i>	<i>α</i>
Nursing Pre-Survey	1.7143	.000
Nursing Post-Survey	4.6190	.000

Table 9

Nursing Question # 6

Question #6 What is your confidence level in completing the Lawton Instrumental Activities of Daily Living Scale?	Pre-Survey <i>Frequency</i>	Post-Survey <i>Frequency</i>
Not Confident	15	0
Somewhat Confident	2	0
Neutral	0	0
Confident	4	8
Very Confident	0	13

Table 10

Nursing Question #6 Variables

Question #6	<i>M</i>	<i>α</i>
Nursing Pre-Survey	1.6667	.000
Nursing Post-Survey	4.6190	.000

Table 11

Provider Question #1

Question #1 Please rate your confidence level in describing frailty in Cardiac Surgery patients.	Pre-Survey <i>Frequency</i>	Post-Survey <i>Frequency</i>
Not Confident	0	0
Somewhat Confident	5	0
Neutral	1	0
Confident	5	3
Very Confident	1	9

Table 12

Provider Question #1 Variables

Question #1	<i>M</i>	<i>α</i>
Provider Pre-Survey	3.1667	.000
Provider Post-Survey	4.7500	.000

Table 13

Provider Question #2

Question #2 Please rate your confidence level in describing the impact of frailty in Cardiac Surgery patient outcomes.	Pre-Survey <i>Frequency</i>	Post-Survey <i>Frequency</i>
Not Confident	0	0
Somewhat Confident	4	0
Neutral	2	0
Confident	3	3
Very Confident	3	9

Table 14

Provider Question #2 Variables

Question #2	<i>M</i>	<i>α</i>
Provider Pre-Survey	3.4167	.015
Provider Post-Survey	4.7500	.015

Table 15

Provider Question #5

Question #5 What is your confidence level in completing the Katz-6 screening tool?	Pre-Survey <i>Frequency</i>	Post-Survey <i>Frequency</i>
Not Confident	6	0
Somewhat confident	1	0
Neutral	1	0
Confident	3	4
Very Confident	1	8

Table 16

Provider Question #5 Variables

Question #5	<i>M</i>	<i>α</i>
Provider Pre-Survey	2.3333	.000
Provider Post-Survey	4.6667	.000

Table 17

Provider Question #6

Question #6 What is your confidence level in completing the Lawton IADL Scale?	Pre-Survey <i>Frequency</i>	Post-Survey <i>Frequency</i>
Not Confident	6	0
Somewhat Confident	1	0
Neutral	1	0
Confident	3	4
Very Confident	1	8

Table 18

Provider Question #6 Variables

Question #6	<i>M</i>	<i>α</i>
Provider Pre-Survey	2.3333	.000
Provider Post-Survey	4.6667	.000

Upon completion of the post-survey providers were also asked if the education obtained would change their current practice and 100% of participants ($n=12$) reported that this impacted their current practice.

Another outcome measured was completion of screening tools on all patients undergoing cardiac surgery at one and two months post implementation. Prior to implementation of the project, no patients were screened for frailty, as evidenced by the facility quality department measures. In the first month post implementation 12 of 21(57%) patients who underwent cardiac surgery, at the project facility, had frailty screening completed prior to surgery. Although the percentage of patients screened in the first month increased, it was not at 100%. The gap is attributed to patients who received pre-operative consultation in January 2018, prior to implementation of the DNP project. Another potential contributing factor to the less than 100% screening rate is several surgeries were rescheduled to the project facility from sister facilities during February due to operating room and intensive care capabilities. The changes were secondary to an increased patient census, diversion of patient admissions and high acuity of patients during the month.

Completion rate for March 2018, was 13 completed out of 15 total cases (87%) which noted improvement in completion rates from previous month. Although this was not at 100%, this was a 30% increase from the prior month. The gap was attributed to

patients who received preoperative consultation prior to February 2018. Discussion with team also noted that frailty screenings were completed, however several had failed to be documented in the medical record or either were not transferred to the scantron prior to surgery.

SECTION V

Discussion

Limitations

There were several limitations noted during implementation of this DNP project. The small sample size ($n=33$) affects the generalizability of the study. Demographics of participants were not included in this project and therefore one cannot exclude a gender bias. The educational level can be assumed for this study, as all participants have some form of college preparation to be employed in their roles, however, educational levels could have had some influence on initial pre-survey findings. Although this project must be interpreted with caution due to the small sample size the project was successful in improving confidence and knowledge of participants.

Sustainability

The project facility plans to continue frailty screening beyond completion of this project and after six months will evaluate whether integration of frailty screening correlated with decreased length of stay or decreased readmissions in cardiac surgery population. There are also plans to evaluate which tool, Katz-6 or Lawton IADL, was more predictive of negative patient outcomes and to decide whether to continue with the completion of both tools or narrow to using one. Future plans include implementation of frailty screening at all other cardiac surgery centers within the larger healthcare organization. Data regarding completion rates of frailty screening will continue to be reviewed at the monthly quality workgroup meetings. As new providers are on boarded education on frailty and frailty screening will be included in orientation. Frailty

education will continue with nursing staff to include all nurses in the office, Cardiac Telemetry and CVICU.

Implications for Nursing Practice

All levels of nursing can be impacted by understanding frailty and its impact on patient outcomes. Although this project was centered around cardiac surgery patients, there is an abundance of literature to support the impacts of frailty in relation to all patient outcomes. Bedside nurses must be informed to ensure patient safety and nursing management will need the knowledge to recognize acuity levels of patients and how frailty can impact nurse to patient ratios and length of stay. Advanced practice nurses are positioned to bring evidence based practice to the bedside. Doctoral prepared nurses are equipped to navigate a project to improve risk stratification by successfully adding frailty screening to preoperative assessments. Frailty is no longer defined by age alone. With the increase in acuity of patients, declining physical function from multiple disease processes, increased social vulnerabilities, and impaired cognitive function frailty must be assessed. Frailty assessment is another step toward fully informing patients and families of their prognosis, especially in relation to major surgical interventions. to ensure patients are fully informed of their prognosis especially in relation to major surgical interventions. Improving awareness regarding frailty and its implications on patient care are imperative to improve patient outcomes.

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Appendix A

Pre-Test and Post Test

**Frailty Screening in Cardiac Surgery Patients
Educational Opportunity
Nursing Pre-Test**

1. Please rate your confidence level in describing frailty in Cardiac Surgery patients. Please circle the best answer.

Very confident / Confident / Neutral / Somewhat confident / Not confident
5 4 3 2 1

2. Please rate your confidence level in describing the impact of frailty in Cardiac Surgery patient outcomes.

Very confident/ Confident/ Neutral/ Somewhat confident/ Not confident
5 4 3 2 1

3. Are you familiar with the Katz-6 also known as the Katz Index of Independence in Activities of Daily Living screening tool?

Please circle one: *Yes / No*
1 0

4. Are you familiar with the Lawton Instrumental Activities of Daily Living (IADL) Scale?

Please circle one: *Yes/No*
1 0

5. What is your confidence level in completing the Katz-6 screening tool?

Please circle the best answer.

Very confident / Confident/ Neutral / Somewhat confident / Not confident
5 4 3 2 1

6. What is your confidence level in completing the Lawton Instrumental Activities of Daily Living Scale?

Please circle the best answer.

Very confident / Confident/ Neutral / Somewhat confident / Not confident
5 4 3 2 1

**Frailty Screening in Cardiac Surgery Patients
Educational Opportunity
Nursing Post-Test**

1. Please rate your confidence level in describing frailty in Cardiac Surgery Patients.

Please circle the best answer.

Very confident / Confident / Neutral / Somewhat confident / Not confident
5 4 3 2 1

2. Please rate your confidence level in describing the impact of frailty in Cardiac Surgery patient outcomes.

Very confident/ Confident/ Neutral/ Somewhat confident/ Not confident
5 4 3 2 1

3. Are you familiar with the Katz-6 also known as the Katz Index of Independence in Activities of Daily Living screening tool?

Please circle one: *Yes / No*
 1 0

4. Are you familiar with the Lawton Instrumental Activities of Daily Living (IADL) Scale?

Please circle one: *Yes/No*
 1 0

5. What is your confidence level in completing the Katz-6 screening tool?
tool?

Please circle the best answer.

Very confident / Confident/ Neutral / Somewhat confident / Not confident
5 4 3 2 1

6. What is your confidence level in completing the Lawton Instrumental Activities of Daily Living Scale?

Please circle the best answer.

Very confident / Confident/ Neutral / Somewhat confident / Not confident
5 4 3 2 1

**Frailty Screening in Cardiac Surgery Patients
Educational Opportunity
Advanced Care Practitioner/Surgeon
Pre-Test**

1. Please rate your confidence level in describing frailty in Cardiac Surgery Patients. Please circle the best answer.

Very confident / Confident/ Neutral / Somewhat confident / Not confident

5 4 3 2 1

2. Please rate your confidence level in describing the impact of frailty in Cardiac Surgery patient outcomes.

Very confident / Confident/ Neutral / Somewhat confident / Not confident

5 4 3 2 1

3. Are you familiar with the Katz-6 also known as the Katz Index of Independence in Activities of Daily Living screening tool?

Please circle one: *Yes / No*

1 0

4. Are you familiar with the Lawton Instrumental Activities of Daily Living (IADL) Scale?

Please circle one: *Yes/No*

1 0

5. What is your confidence level in completing the Katz-6 screening tool? Please circle the best answer.

Very confident / Confident/ Neutral / Somewhat confident / Not confident

5 4 3 2 1

6. What is your confidence level in completing the Lawton Instrumental Activities of Daily Living Scale? Please circle the best answer.

Very confident / Confident/ Neutral / Somewhat confident / Not confident

5 4 3 2 1

**Frailty Screening in Cardiac Surgery Patients
Educational Opportunity
Advanced Care Practitioner/Surgeon
Post-Test**

1. Please rate your confidence level in describing frailty in Cardiac Surgery Patients. Please circle the best answer.

Very confident / Confident/ Neutral / Somewhat confident / Not confident

5 4 3 2 1

2. Please rate your confidence level in describing the impact of frailty in Cardiac Surgery patient outcomes.

Very confident / Confident/ Neutral / Somewhat confident / Not confident

5 4 3 2 1

3. Are you familiar with the Katz-6 also known as the Katz Index of Independence in Activities of Daily Living screening tool?

Please circle one: *Yes / No*

1 0

4. Are you familiar with the Lawton Instrumental Activities of Daily Living (IADL) Scale?

Please circle one: *Yes/No*

1 0

5. What is your confidence level in completing the Katz-6 screening tool?

Please circle the best answer.

Very confident / Confident/ Neutral / Somewhat confident / Not confident

5 4 3 2 1

6. What is your confidence level in completing the Lawton Instrumental Activities of Daily Living Scale? Please circle the best answer.

Very confident / Confident/ Neutral / Somewhat confident / Not confident

5 4 3 2 1

7. Do you think this information will change your practice?

Please circle one: *Yes/No*

1 0

Appendix B

Katz-6 and Lawton IADL

Katz 6

1. Do you require any assistance with taking a bath or shower? If yes please explain.
_____ **Yes 0/ No 1**
2. Do you need any help dressing yourself (except for tying shoes)? **Yes 0/ No 1**
3. Do you need any assistance going to the restroom such as help transferring on and off the toilet or removing clothes?
Yes 0/ No 1
4. Regarding your mobility, do you need any assistance getting in or out of bed, up from a chair or sitting down? **Yes 0/ No 1**
5. Do you have any incontinence of bowel or bladder? Do you use any incontinence products? **Yes 0/ No 1**
6. Do you need any help eating? **Yes 0/ No 1**

Katz 6 total score: _____

Score of 6 indicates full function (*Independent*), 4 indicates moderate impairment, and 2 or less severe impairment (*Dependent*). Moderate risk 4-3, High risk 2-0.

Lawton IADL

1. Are you able to use a telephone without assistance? **Yes 1/ No 0**
2. Are you able to complete your shopping without assistance? **Yes 1/ No 0**
3. Are you able to plan and prepare meals without any help? **Yes 1/ No 0**
4. Are you able to complete all housekeeping tasks at home without assistance? **Yes 1/ No 0**
5. Are you able to complete your laundry? **Yes 1/ No 0**
6. Do you travel independently on public transportation or drive your own car? **Yes 1/ No 0**
7. Do you require any help with taking your medications? If yes please explain. **Yes 0/ No 1**
8. Are you able to manage your finances, banking, pay bills, and maintain a budget? **Yes 1/ No 0**

Lawton IADL total score: _____

Score of 8 reveals high function (*Independent*) and 0 is low function (*Dependent*). Moderate Risk 5-3, High risk 2-0.

Slightly adapted from Katz, S., Down, T., Cash, h., & Grotz, R. (1970). Progress in development of the index of ADL. *The Gerontologist*, 10(1),

20-30.

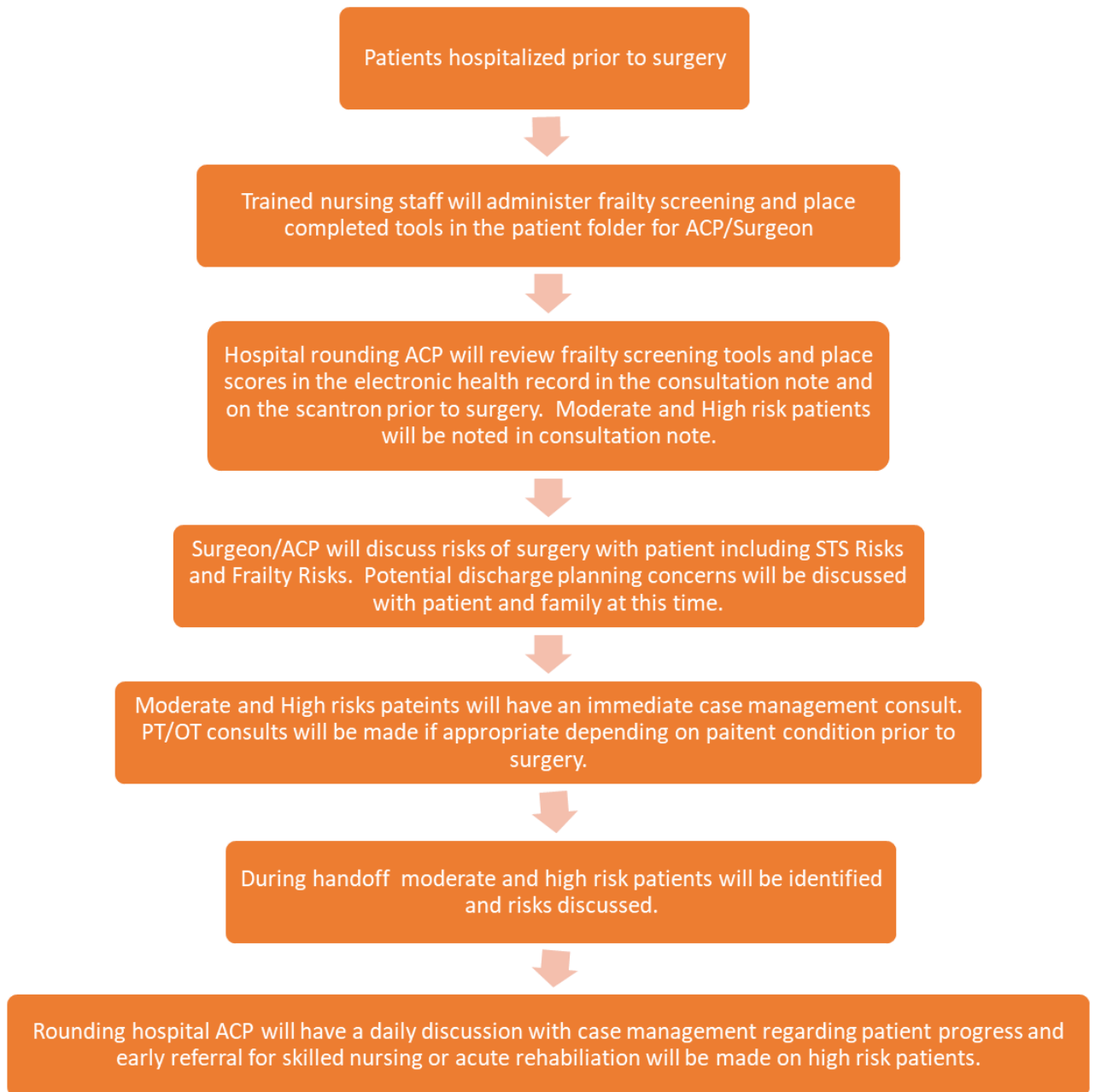
Slightly adapted from Lawton, M., & Brody, E. (1969). Assessment of older people: Self-maintaining and instrumental activities of daily living.

The Gerontologist, 9(3), 179-186.

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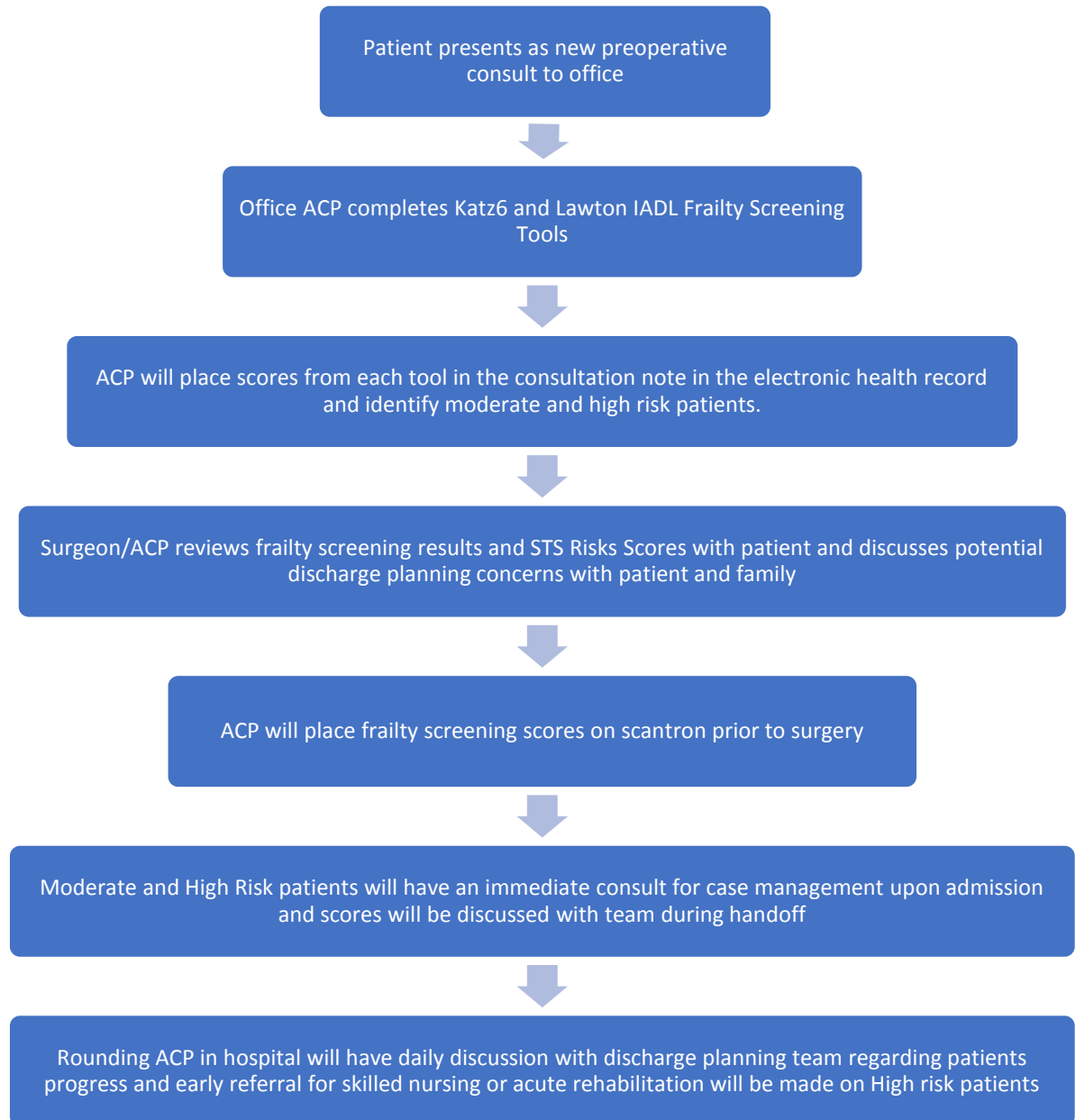
Appendix C

Inpatient Integration into Workflow



Appendix D

Outpatient Integration into Workflow



Appendix E

Information Sheet

Frailty Screening in Cardiac Surgery Patients: Improved Surgical Risk Assessment

Information Sheet

This is an evidence-based project conducted by April P. Hargett from Carolinas Healthcare System in conjunction with Gardner-Webb University. This project is designed to provide education on the importance of Frailty Screening in Cardiac Surgery Patients and how to administer the Katz Index of Independence in Activities of Daily Living and Lawton Instrumental Activities of Daily Living (IADL) Scale.

1. My participation in the project evaluation tools is voluntary. I understand that I will not be paid for my participation. I may withdraw and discontinue participation at any time without penalty. If I decline to participate or withdraw from the project, there will not be any punitive action taken nor will it affect my job in any way.
2. Participation involves an educational session on frailty screening and how to complete frailty screening tools. Participants will be asked to complete a pre-and posttest evaluation of competency. No identifying factors will be used in this project.
3. I understand that the project leader will not identify participants by name in any documents that are submitted for this evidence practice project and confidentially as a participant will remain secure.
4. Nursing managers or other nursing administration will not have access to raw notes or transcripts. This precaution will prevent my individual comments from having any negative repercussions.
5. Participants voluntarily agree to participate in this project by completing the pre-and post-survey.

Risks and benefits: There are no foreseeable risks or discomforts associated with the project.

Compensation: There will be no compensation for participation in the project.

Confidentiality: Participation is confidential. No identifiable information is collected in the survey.

Project Leader: April P. Hargett, MSN, AG-ACNP-BC

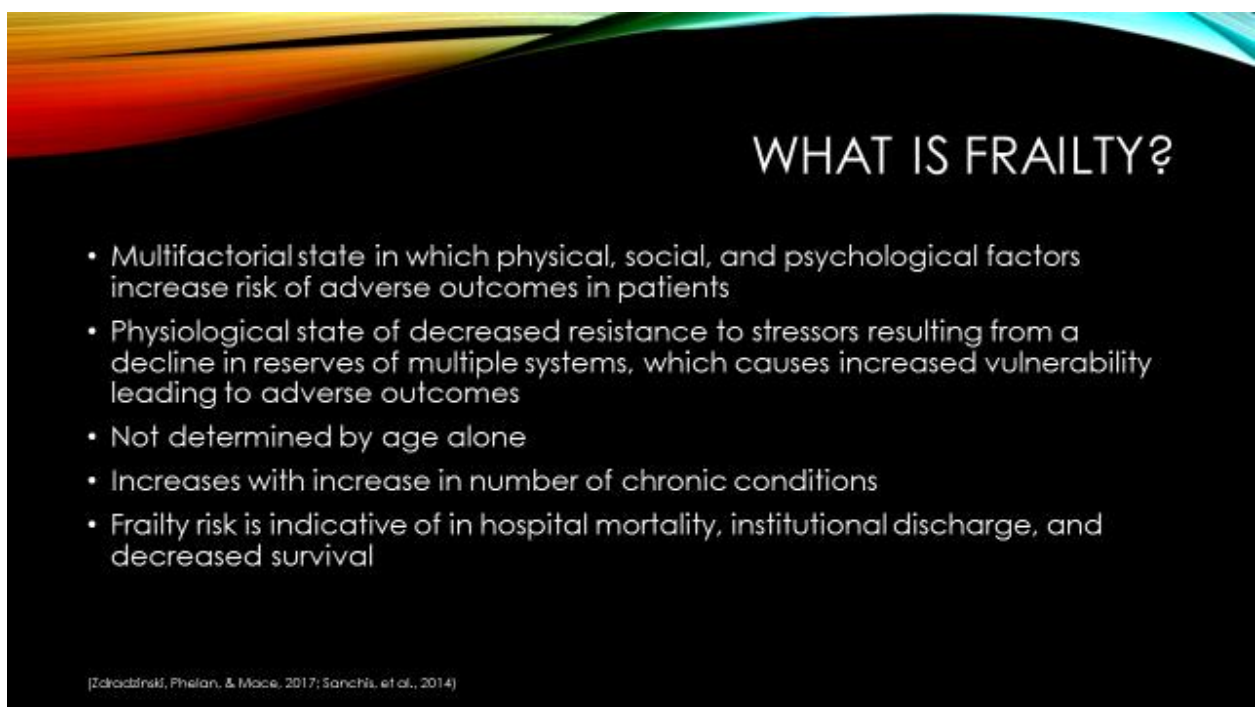
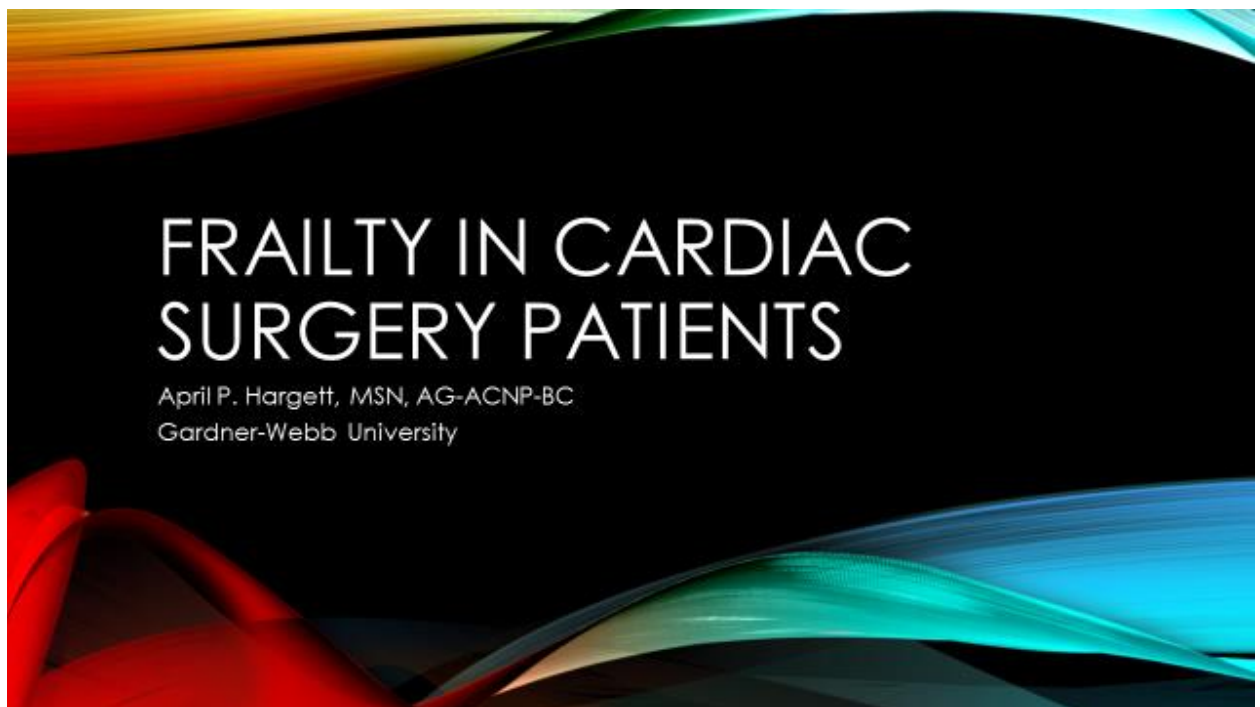
For more information: Contact the Project Leader, April P. Hargett @

ahargett1@gardner-webb.edu or call at 704-575-4503. You may also contact the DNP Project Chair at Gardner-Webb University, Dr. Anna S. Hamrick, DNP, FNP-C, ACHPN by email: ashamrick@gardner-webb.edu or by phone: 704-406-2460.

Voluntary participation: All Cardiothoracic Surgery Team Members are expected to participate in the educational session however submission of surveys is voluntary. Participation in the project which includes completing pre-and post-surveys is voluntary and participants may refuse to participate and/or may withdraw for any reason without penalty. Completion of the pre-and post-survey will imply consent for voluntary participation.

Appendix F

Slides for Educational Presentation



IMPACT OF FRAILITY

- Increased risk of
 - Prolonged length of stay and 30 day readmission
 - Postoperative complications
 - Mortality
 - Placement in skilled nursing facility versus acute rehabilitation prior to returning home
 - Depression
 - Malnutrition
 - Dementia
 - Delirium

[Lee, Buth, Martin, Yip, & Hirsch, 2010]

IMPORTANCE OF SCREENING

- Improve risk stratification
- Recommended by American College of Cardiology
- Allows for preoperative discussions regarding discharge planning concerns following surgery
- Enables preoperative interventions such as physical therapy and occupational therapy consults prior to surgery when appropriate
- Allows for discussion with patient and caregivers regarding access to care and access to assistance following surgery

[Asficio et al., 2017]

ACC RECOMMENDATIONS

- Replace "eyeball test" and "end of the bed-o-gram" (subjective data), with frailty screening tools (objective data)
- Frailty screening tools provide objective data
- Frail patients undergoing cardiac surgery have higher rates of post op mortality, morbidity, prolonged length of stay, and discharge to other facilities prior to returning home
- Present frail patients to multidisciplinary Heart Team for approval
- Pre-operative optimization
- Heightened postoperative navigation

[Affalo et al., 2017]

SCREENING TOOLS

- Katz 6
- Lawton Instrumental Activities of Daily Living Scale (IADL)
- Refer to script for administration of tools



KATZ-6

- Originally designed 45 years ago to assess functional status
- Easy to use
- Adaptable to clinical settings
- Used for ongoing assessment
- Improve patient safety, reveal subtle changes in status, prevent further decline
- **Score of 6 indicates full function (Independent), 4 indicates moderate impairment, and 2 or less severe impairment (Dependent)**
- **Moderate Risk 4-3, High Risk 2-0**

[Wallace & Shelkey, 2008]

LAWTON IADL

- Developed in 1969
- Assess complex ADL's necessary for community living
- Assess cognitive and physical functioning
- Easy to administer
- **Score of 8 reveals high function (Independent) and 0 is low function (Dependent).**
- **Moderate Risk 5-3, High risk 2-0**

[Graf, 2008]

OUTPATIENT WORKFLOW INTEGRATION

- **Outpatient**
 - **ACP Role**
 - Administer test at time of consultation
 - Place scores in the consultation note along with the STS Risk Scores
 - Ensure Katz 6 and Lawton IADL scores are placed on scantron
 - **Surgeon Role**
 - Reviewing risks with patient and include frailty screening results and implications of results
 - Discuss potential discharge planning concerns with patients

INPATIENT WORKFLOW INTEGRATION

- **Inpatient**
 - **Nursing Role-**
 - Preoperative worksheet will include frailty screening
 - Trained nurses will complete questionnaire with patient and place in folder
 - **ACP Role-**
 - Review frailty screening questionnaire
 - Place frailty scores in chart and on scantron prior to surgery
 - Discussed scores with team and consult case management immediately with any patient with moderate to high scores for discussion regarding discharge planning
 - **Surgeon Role-**
 - Review frailty screening results with patients and discuss potential discharge concerns
 - Moderate to High Risk patients will have an immediate referral to case management upon admission
 - PT/OT will be made aware of scores on all patients for further monitoring during admission and for discharge planning purposes.
 - Patients hospitalized prior to surgery will have PT/OT consult prior to surgery if appropriate according to patient's condition

ANTICIPATED OUTCOMES

- Increased knowledge of frailty and use of screening tools
- Increased completion of frailty screening of cardiac surgery patient with goal of 100%
- Improved risk stratification
- Decreased length of stay



QUESTIONS?



SMALL GROUP ACTIVITY

- Split into two small groups
- Case #1
- Case #2
- Reflection regarding role playing
- Completion of frailty screening tools



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Appendix G

Logistic Model

Inputs	Constraints	Activities	Outputs	Short Term	Long Term	Impact
Project Leader Pre/Post Surveys Data on Frailty screening prior to project Perceptions of staff as to original failure of implementation Budgeted Items Educational Materials	Obtaining permission for use of tools Staff Buy in Completion of pre/post surveys Timeframe for education Existing culture and resistance to change	Literature search for Evidenced based practice to support project Meeting with internal/external stakeholders Developed Educational Intervention Recruitment of participants Educational Sessions held and printed material distributed Integration of screening into workflow Implementation of screening	40 Initial participants in educational sessions 21 Nsg Surveys returned 12 Provider Surveys returned	Increased knowledge in staff regarding impact of frailty and use of screening tools Staff buy in for practice change Integration of screening tools into workflow	Increased completion rate of frailty screening Improved risk assessment	Improved patient outcomes Potential decreased length of stay in cardiac surgery patients

Appendix H

PDSA

Frailty Screening in Cardiac Surgery Patients: Improved Surgical Risk Assessment

PLAN a change or improvement

The Problem

1. To improve risk stratification frailty screening was discussed and was suppose to be implemented at project facility, however implementation failed.
2. Staff had a knowledge deficit regarding frailty screening tools and effect of frailty in regards to patient outcomes.
3. Frailty screening was not implemented into current workflow.
4. No Staff buy in regarding frailty screening

Aim/Goal The goals of this DNP project are to:

1. Improve risk stratification for cardiac surgery patients at project facility by educating nursing staff, Advanced Care Providers (ACP) and Cardiac Surgeons on the impact of frailty in this population and proper administration of the Katz-6 and Lawton IADL screening tools.
2. To measure if education regarding frailty and frailty screening tools can increase knowledge of CT Surgery staff and improve completion rates of screening in cardiac surgery patients.

Team

- CT Surgeons
- CT Surgery ACP's
- CT Surgery Nurses
- DNP student, project administrator

DO the improvement, make the change

The Interventions-

What Changes do you plan to make?

1. Collection of nurses, surgeons and ACP's knowledge by survey prior to education
2. Educational intervention regarding impact of frailty, and use of screening tools
3. Integration of frailty screening into inpatient and outpatient workflow
4. Monitor use
5. Analyze data

STUDY the results and examine data

Data:

- Nurses, ACP's, and Surgeons participating in this study noted increased knowledge and confidence following the educational intervention on frailty and its impact on the cardiac surgery population. Participants also noted improved confidence in utilization of the Katz-6 and Lawton IADL screening tools
- Total percentage of frailty screenings completed in cardiac surgery patients after implementation:

February	57%
March	87%

ACT to sustain performance and spread change

Next Steps:

- Frailty screening will be continued and evaluated monthly at QI meetings
- Data is planned to be collected by facility regarding correlation with patient outcomes and Katz and Lawton Scores in six months
- Oral and Written Dissemination at Project Administrators University
- Oral Dissemination at Project Facility to Chief of Cardiothoracic Surgery and at Quality Meeting
- Written Dissemination to Evidenced-based Practice and Research Council at project facility