Optimizing Cardiovascular Patient Education at Discharge

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Clinical Nurse Leader Project: Cardiovascular Patient Education at Discharge

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NURS 958: Clinical Nurse Leader Capstone

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Abstract

**Background:** Without a clear understanding of proper discharge instructions or a lack of educational material, patients may leave the hospital feeling conflicted as to what to do. In 2021 a research study noted that patients who do not have enough information prior to discharge have decreased compliance, decreased patient safety, increased risk of hospital readmission, and poor overall satisfaction (DeSai, Janowiak, Secheli, et. al., 2021). This quality improvement project sought to increase patient knowledge related to exercise and nutrition following a cardiovascular event that led to a hospital admission.

**Methods:** For the purpose of this quality improvement project, the PDSA or Plan, Do, Study, Act framework was used to guide this quality improvement intervention. This project took place on the Intermediate Care Unit [IMCU]. The unit includes a Cardiovascular Step-Down Unit which is where the patients who are included in this project were admitted.

**Interventions:** This intervention included the use of an educational pamphlet that focuses on nutrition and exercise recommendation for patients who were admitted following a cardiovascular event. For the purpose of this quality improvement project the cardiovascular events that are included are myocardial infarction, and coronary artery bypass graft surgery. All patients over the age of eighteen, both male and female, were included in this project. Patients with cognitive impairments or who do not fit the inclusion criteria were excluded from the intervention. At the time of admission, a paper survey was given to those patients that fit the inclusion criteria. Patients were asked questions related to their own perception of exercise and nutrition.

**Results:** Twenty patients were surveyed and given educational material to review. Out of twenty patients, only twelve understood the definition of the “Heart Healthy” diet prior to the review of educational materials. After the review, eighteen out of twenty, or 90% of patients were able to recall the correct definition of the “Heart Healthy” diet. This shows a greater than 25% increase in patient knowledge in relation to nutrition guidelines. This quality improvement project was able to provide patients with educational materials and discharge information related to nutrition and exercise. The results of the survey did show an understanding of nutrition and exercise guidelines in relation to cardiovascular health following an open-heart cardiovascular surgery. The aim of this project was to increase patient understanding by at least 25% from the baseline. Although not all measures that were surveyed increased by 25%, most measures signified at least a 10% increase in patient understanding of exercise and nutrition guidelines.

**Conclusion:** The results of the project showed an increased understanding in exercise, and nutrition, after a cardiovascular event. This project is useful for organizations as it can increase patient understanding, patient satisfaction, and could possibly decrease the likelihood of patient readmissions due to increased knowledge on health promotion. For this project to continue, stakeholders on the unit must engage and provide the educational pamphlet and materials to patients prior to discharge. If this occurs frequently, the HCAHPS measures can be monitored, by unit, to see if patient understanding and satisfaction has increased. The next steps of this project are to continue to educate patients on nutrition and exercise by providing educational materials that patients can utilize at home after discharging from the organization.

**Keywords:** cardiovascular discharge education, exercise, nutrition, cardiovascular guidelines, cardiovascular complications, post-operative cardiovascular health maintenance, health promotion, discharge education
Introduction

Problem Description

The patient survey known as Hospital Consumer Assessment of Healthcare Providers and Systems, or HCAHPS, measures patients’ experiences and the overall hospital care they received (Medicare.gov, n.d.). The survey includes measures that are related to communication and responsiveness of staff, discharge information, cleanliness and quietness of the hospital, and the overall rating of patient care (Medicare.gov, n.d.). A local seacoast hospital is rated overall a three out of five stars based off patient survey results that are collected (Medicare.gov, n.d.). On the Intermediate Care Unit, or IMCU, at a local seacoast organization, discharge communication, or lack of, is extremely prevalent based off HCAHPS survey results.

On the IMCU, patients are often discharged with specific information that is related to cardiac care. Due to the unit specializing in telemetry and post-operative open-heart surgery, patients are often instructed to walk three times a day, follow a cardiac healthy diet, and use an incentive spirometer as often as possible. Although patients are given information related to their discharge instructions, there is limited information given to them related to health promoting topics. For example, patients are not given any exercise guidelines when they discharge from the hospital. The American Heart Association has clear exercise recommendations for adults following cardiac surgery that patients could benefit from if it was provided in an educational packet, or pamphlet (Piercy, Troiano, 2018). Furthermore, patients are told to follow a cardiac healthy diet after discharging; monitor sodium intake in order to stay below a certain level, avoid foods high in fat, and drink plenty of water are the three major educational topics. However, if patients are not being given any educational information on what foods are high in sodium or alternatives to fried foods, they are likely not aware of food restrictions.
Without a clear understanding of proper discharge instructions or a lack of educational material, patients may leave the hospital feeling conflicted as to what to do. In 2021 a research study noted that patients who do not have enough information prior to discharge have decreased compliance, decreased patient safety, increased risk of hospital readmission, and poor overall satisfaction (DeSai, Janowiak, Secheli, et. al., 2021). Research has shown that patient non-adherence with medical discharge instructions can lead to unfavorable outcome and therefore, improved patient education documents and discharge information is vital in reducing readmission rates (DeSai, Janowiak, Secheli, et. al., 2021). In order to better care for patients on the IMCU, it is important to identify the top discharge communication barriers. Following the analysis of the discharge communication barriers, the creation of discharge pamphlets that highlight specific details related to cardiac care following discharge should be created and implemented in order to improve patient compliance, understanding, satisfaction scores, and reduce the risk of hospital readmissions.

**Available Knowledge**

In order to assess the available knowledge, databases such as PubMed and the Cochrane Library were searched. A search in each database was conducted. Key words included exercise, nutrition, guidelines, cardiovascular complications, post-operative cardiovascular health maintenance, health promotion, discharge education, and management of cardiovascular disease. Inclusion criteria focused on cardiovascular events included coronary artery bypass graft, and myocardial infarction. In addition, only English papers were included between the years 2015 through 2022. Exclusion criteria focused on patients who were under the age of eighteen or with cognitive impairment. The search revealed eighty-eight total papers. After duplicates were removed, there were eighty-four papers to review. Out of those eighty-four papers, seventy-three
papers did not fit the inclusion criteria. Eleven full-text articles were assessed for eligibility. All eleven studies were included in the quantitative synthesis of available knowledge.

Cardiovascular open-heart surgery is known to be associated with high levels of complication rates due to the nature of the procedure (Hill, Nesterova, Lomivorotov, et. al., 2018). Research has shown that health promotion programs that focus on nutrition and exercise can impact the overall quality of life after an open-heart surgery. Health promotion has been shown to be an effective strategy in reducing health disparities in vulnerable populations (Safabakhsh, Arbabisarjou, et. al., 2016). In 2016, a clinical trial study was conducted in order to determine the impact of a health promotion program on behavior in patients after a Coronary Artery Bypass Graft [CABG] (Safabakhsh, Arbabisarjou, et. al., 2016). The study included eighty participants; all participants were divided into two separate groups. An experimental group was educated on topics such as diet, exercise, and stress management while a control group was not (Safabakhsh, Arbabisarjou, et. al., 2016). The results of the clinical trial study revealed that participants in the experimental group had an increased understanding of stress management and diet (Safabakhsh, Arbabisarjou, et. al., 2016). From the data analysis, the study was able to conclude that health promotion programs are beneficial for patients who suffer from coronary artery disease, otherwise known as CAD (Safabakhsh, Arbabisarjou, et. al., 2016). The experimental group showed improved awareness of healthy behaviors and well-being in the quality of life after the interventions concluded (Safabakhsh, Arbabisarjou, et. al., 2016).

In 2014, a literature review was conducted in order to identify how lifestyle changes, such as diet and exercise, can impact long-term outcomes in patients who undergo a Coronary Artery Bypass Graft [CABG] surgery (Coyan, Reeder, Vacek, 2014). The review found that exercise modifications resulted in significant increases in functional status and quality of life.
(Covan, Reeder, Vacek, 2014). For patients to be successful postoperatively, researchers noted that an individualized and feasible exercise routine is needed to achieve maximal recovery benefit and the prevention of progressive atherosclerotic disease (Covan, Reeder, Vacek, 2014). Health promotion programs that include exercise and nutrition content have been shown to decrease the risk of postoperative health disparities in patients who undergo a CABG. Proper education after a CABG has been shown to not only reduce risk factors in the patient population but, it has also been shown to reduce either fatal, or non-fatal cardiovascular events. Although the evidence provided in recent studies shows that nutrition and exercise education can decrease postoperative complications and increase patient well-being, there is an increased need for research. Overall, the evidence based from research shows that proper education regarding nutrition and exercise is imperative in order to decrease cardiovascular risk factors, complications and other potentially fatal cardiovascular events. In addition, the evidence suggests that education regarding nutrition and exercise can improve the overall well-being of the patient population.

In 2018, a systematic review that focused on the cost-effectiveness of cardiac rehabilitation programs was conducted (Shields, Wells, et. al., 2018). The systematic review included fifty-seven articles; all of which looked at the cost of cardiac rehabilitation and the overall impact these programs have on patient outcomes. Researchers concluded that cardiac rehabilitation programs are cost-effective and exercise interventions within these programs yield a higher rate of return when compared to other components of cardiac rehabilitation delivery (Shields, Wells, et. al., 2018). Although this intervention does not include participating in a cardiac rehabilitation program, there are certain educational pieces incorporated in the intervention that cardiac rehabilitation programs also include such as education regarding proper
exercise. Therefore, comparing the intervention to cardiac rehabilitation program education was deemed beneficial to determine the appropriate cost benefit analysis of this intervention. In 2005, a researcher implemented a one-hour nurse educator delivered teaching session at the time of discharge for patients with systolic heart failure (London, 2010). The cost of care for patients who received the one-hour of education was $2,823 dollars less than those who did not receive the education (London, 2010). Research showed improved clinical outcomes, increased self-care measure adherence, and reduced cost of care for the specific patient population (London, 2010). In addition, a review in 2008 examined the economics of standardized patient education materials (London, 2010). The research found patients were able to better manage their self-care which in turn allowed them to use fewer services (London, 2010). The use of fewer services allowed the organization to increase access for others who require more care (London, 2010). Research has shown that patient education regarding nutrition, exercise, and health promotion during discharge can be a cost-effective tool for the organization (London, 2010). More importantly, research has noted that patient education can be associated with a decrease in rehospitalizations while positively impacting the overall well-being of a patient (London, 2010).

Although research has shown to support the use of educational material, there is limited research to show how statistically significant education at discharge is for this specific patient population. Regardless, research supports the idea of proper nutrition and exercise guidelines for this patient population. The evidence suggests that education postoperatively that focuses on health-related quality measures can increase the well-being of this patient population. Due to nutrition and exercise being health-related quality measures, it can be inferred that discharge education regarding these measures can be supported. With the evidence that is presented in research, the design of the quality improvement project can be supported.
Rationale

The framework for this quality improvement project that guided this initiative was the PDSA framework. The plan was to implement a pamphlet that includes nutritional guidance and exercise recommendations. The nutritional advice in the pamphlet included foods to avoid or eat in moderation as well as foods to incorporate frequently. A sample grocery list as well as meal ideas was provided. Exercise guidelines coincided with the American Heart Association guidelines. During the implementation, data that came from the post-discharge survey was tracked. It was important to compare the post-discharge survey to the survey that was given prior to the pamphlet. After data was collected, analysis of the data occurred.

Global Aim

The global aim of this quality improvement initiative was to increase knowledge of exercise and nutritional guidelines prior to discharge for post-operative heart surgery patients. The specific aim was to improve patient discharge

Specific Aim

The specific aim of this initiative was to improve patient discharge material related to nutrition and exercise guidelines prior to discharge to prevent post-operative complications, enhance knowledge about proper cardiovascular care, and improve patient satisfaction scores by at least twenty-five percent from the baseline by the end of July 2022.

Methods

Context

This project took place on the Intermediate Care Unit [IMCU]. The unit includes a Cardiovascular Step-Down Unit which is where the patients who are included in this project were admitted. Staff on the unit include nurses, physicians, environmental services, nutrition and dietary aids, physical and occupational therapy, and case workers. Limited funding was needed
for this quality improvement initiative. Materials, such as the specific educational pamphlets
were printed for patients to utilize (Appendix B). Additional materials that were printed and
designed were the admission and discharge surveys (Appendix C). Those are the only costs that
were associated with this improvement project. All other aspects of the project were time related
costs, such as taking time to teach and educate patients. In addition, time was taken to survey the
patients on admission and discharge. Overall, research does support taking the time to educate
patients during admission because it seems to reduce costs once those patients are discharged.
With this being said, it can be inferred that consulting with team members and educating patients
as much as possible during the admission is a positive cost to the organization that could yield
large benefits.

**Intervention**

This intervention included the use of an educational pamphlet that focuses on nutrition
and exercise recommendation for patients who were admitted following a cardiovascular event.
For the purpose of this intervention the cardiovascular events that are included are myocardial
infarction, and coronary artery bypass graft surgery. All patients over the age of eighteen, both
male and female, were included in this project. Patients with cognitive impairments or who do
not fit the inclusion criteria were excluded from the intervention. At the time of admission, a
paper survey was given to those patients that fit the inclusion criteria. Patients were asked
questions related to their own perception of exercise and nutrition. For example, patients were
asked how often and for how long should they be exercising after a coronary artery bypass graft
surgery. The results of the survey were recorded and tracked in Excel. Prior to a patient’s
discharge, a pamphlet and education session related to exercise, nutrition, and what actions to
take once they are discharged home was reviewed with the patient. Following the review of the
educational pamphlet, a post-discharge survey was given. Patients were asked the same questions as before and in addition, there was a free text section related to changes they will make based off the education that was conducted. This allowed for qualitative data to be tracked and collected.

The interdisciplinary team that was involved in the intervention included nursing staff, nutrition, physical therapy, and physicians. Not only was the interdisciplinary team included but, the patient and family members were also included in the intervention. The patient and the family are at the center of the care team and involving them is the most important part of the project. The patient education began as soon as they are admitted to the unit. In the admission paperwork, a survey was given for patients to complete. After the admission survey, the results were analyzed and tracked. The goal was to have a nutritionist review with patient’s proper food choices such as foods they should be consuming in moderation versus foods they can enjoy on a regular basis. For patients to understand proper body mechanics and exercise requirements, physical therapy must be involved in the education process as well.

**Study of the Intervention**

Research has shown that education at discharge can decrease readmission and mortality rates in the cardiovascular patient population. Although this data is supported, it is not a feasible way to assess the intervention that has been designed. The outcome of this intervention was for patients to verbalize and demonstrate understanding of proper nutrition and exercise recommendations prior to discharge. In order to properly assess this outcome, patients were given a survey at admission and prior to discharge that focuses on nutrition, exercise, and the promotion of a healthy well-being. If patients scored higher on the discharge survey after reviewing the education that was provided it reflected a positive impact.
Measures

The measures for this intervention included education related to nutrition and exercise. The main source of measurement for this intervention was the admission and discharge survey. The surveys were used to study the outcome of the intervention. Continuous data, such as the percent a patient scores on the survey was tracked. If a patient answered a question correctly, the question was scored appropriately whereas if the patient did not answer a question correctly, no score was given for that question. Therefore, the higher the score, the more a patient understood the education that was presented. This form of measurement was used at both the time of admission and discharge. In addition, the patient was asked to restate the educational material in their own words after completing the review of the educational pamphlet. This utilized the teach back method and demonstrated if patients understood the information that was presented to them prior to discharge.

Specific measures that were continuously tracked were patient understanding of how long and how frequently they should exercise, when to begin an exercise regimen, what type of exercise to engage in, and when to halt exercise and call a primary care provider. Other measures that were tracked were related to nutrition. These measures include what foods should they be eating in moderation, what foods are high in fat that they should be avoiding, best meal ideas to stay heart healthy, and changes to their diet that they will make based off the education they were given. These measures were questions that were on the admission and discharge survey and there was only one correct answer which allowed tracking of the data to be consistent throughout all participants. The answers were tracked at both admission and discharge which showed if there was an improvement after reviewing the educational materials presented to the patients.

The rationale behind this was to gather the most effective, and reliable data that supported the intervention. In order to properly gather reliable data, the methods and measures of
the intervention must stay consistent in both surveys. Scoring both the admission and discharge survey will show either a positive or negative trend within the data which can be measured consistently throughout the intervention process. In addition to gathering numerical data, the intervention measured patient understanding which provided evidence that either supports or disproves the educational material that is presented to the patient population.

Reliable data must be produced in order to assess the intervention properly. For this reason, a psychometric evaluation was done prior to a patient receiving the admission survey. If a patient had severe cognitive impairment or was unable to provide their name, date of birth, and reasoning for being admitted, the survey was not given. This allowed for consistency within the patient population.

**Analysis**

In order to properly analyze the data that was collected, data analysis was used. After the completion of the analysis, charts and graphs were presented to show if there was a significant change in patient understanding of exercise (Appendix A). These graphs were used to represent the data that was collected prior to discharge and after education. The graphs represent the scores of the participants prior to educational review versus the scores at discharge after the educational pamphlet review. In order to show a positive impact of the intervention, the bar graphs need to show an increase in the scores after review of the educational material.

**Ethical Considerations**

Ethical considerations to consider for this intervention included voluntary participation, informed consent, and confidentiality. All participants that were included in this intervention were free to choose to participate without any coercion and could withdraw from the study (Bhandari, 2021). Informed consent refers to all participants who are participating in the project to understand all of the information prior to participating (Bhandari, 2021). This includes
educating patients on the benefits of the project and the reasoning behind the project. It is imperative to provide participants with as much information related to the intervention as possible. In addition, letting participants know that their data such as patient information will be confidential, and no personal identifiers will be used while collecting research for the project.

Results

The beginning step of this project involved surveying patients on the Cardiovascular Surgical Step-Down unit at the time of admission. After gathering admission data, the next step of the project involved providing education to patients regarding cardiovascular nutrition and exercise following a cardiovascular surgical procedure. The educational materials that were presented followed the guidelines that the American Heart Association recommends for patients after a cardiovascular event. Prior to discharge, each patient that was surveyed and educated at the time of admission was then surveyed again on the same outcome measures.

The goal of this quality improvement project was to provide patients educational material regarding proper nutrition and exercise guidelines following a cardiovascular event which in turn would show an increase in patient understanding based off survey. Twenty patients were surveyed and given educational material to review. Of the twenty patients, fourteen were male while six were female. Two patients were between the ages of fifty and fifty-nine, while three patients were between the ages of sixty and sixty-nine. Six patients fell into the seventy to seventy-nine category and eight patients were between the ages of eighty and eighty-nine. Only one patient was about the age of ninety. Of the twenty patients, seventeen of them were Caucasian. Two patients were African American, and one patient preferred not to answer this question. Regarding education, two patients completed high school or obtained a General Educational Development [GED] degree and three patients graduated from technical school.
Four patients completed some college, while nine patients graduated with a Bachelor’s degree. Of the twenty patients, two patients graduated with a Master’s degree. Most of the patients that were surveyed have had a cardiovascular medical diagnosis for over four years; nine patients have been diagnosed with a cardiovascular medical diagnosis for four to six years, while six patients have had a cardiovascular medical diagnosis for ten to twenty years. Five patients that were surveyed have had a cardiovascular medical diagnosis for zero to three years.

During the data collection, each patient was given surveys that focused on nutrition and exercise guidelines. On the nutritional survey, fourteen out of twenty, or 70% of patients, answered the first question related to nutrition correctly. After reviewing educational material, sixteen out of twenty, or 80% of patients answered this first nutrition question correctly. The second nutrition question was related to the definition of the “Heart Healthy” diet. Twelve out of twenty, or 60% of patients answered this question correctly on the initial survey. After educational materials were presented and reviewed, eighteen out of twenty, or 90% of patients answered this question correctly and therefore, showed an increased understanding of the “Heart Healthy” diet that is recommended by The American Heart Association. The third question patients were asked to answer was related to selecting the best dinner option. Each patient was given four different dinner options and was asked to select the best dinner option. Initially fifteen out of twenty, or 75% of patients answered this question correctly. The second survey that was given after educational review showed seventeen out of twenty, or 85% of patients selected the correct dinner option. The last nutrition question on the survey asked patients to rate, on a scale of one to five, how willing they would be to implement changes in their diet after leaving the hospital. During the initial round of surveys prior to educational review, four out of twenty patients, or 20% of patients signified a willingness of one; not very willing at all to implement
diet changes. Zero out of twenty patients signified a willingness of two, or, not very willing to implement diet changes. Thirteen out of twenty, or 65% of patients signified a willingness of three, otherwise known as an indifference to implementing diet changes after discharging from the hospital. 5% of patients signified a somewhat willing attitude to implement diet changes otherwise known as a four out of five. 10% of patients signified a willingness to implement diet changes and signified a five out of five on the initial survey. There were no changes in patient willingness to implement diet changes for patients who scored a one or two out of five. The second survey did show a decrease in patients that were indifferent to implementing diet changes; 25% of patients signified a three out of five on the second survey. This is a 30% decrease from the initial survey that was given. In addition, an increase was seen in patients who scored a four and a five on the second survey. 20% of patients signified a four out of five willingness to implement changes in diet while 35% of patients signified a five out of five willingness to implement changes in diet.

The exercise portion of the survey was given directly after the nutrition survey. The first question of the exercise survey asked patients about their current exercise routine. Seven out of twenty patients stated they do currently exercise whereas thirteen out of twenty patients do not currently exercise. The answers to this question did not change on the second survey. The second question asked patients to select types of exercise that are best for cardiovascular fitness. 60% of patients selected the correct exercise options on the initial survey. On the second survey, 80% of patients selected the correct exercises. The third question asked patients to select the correct amount of time patients should exercise each day. On the initial survey, 55% of patients selected the correct amount of time to exercise each day. The second survey, after educational material was presented, 75% of patients selected the correct amount of time each patient should exercise.
each day. The fourth question asked patients to describe what they should do if they develop chest pain while exercising. 85% of patients answered this question correctly prior to reviewing educational material. After educational material was presented, 90% of patients selected the correct options for this question. The last question on the exercise survey asked patients to rate their willingness to implement an exercise regimen on a scale of one to five. 55% of patients selected a one, or no motivation to implement an exercise regimen after discharge. 5% of patients selected a two on the question or not very motivated to implement an exercise regimen. 25% of patients selected a three, or an indifference to implementing an exercise regimen after discharge. 10% of patients selected a four out of five, signifying somewhat motivated to begin an exercise regimen. 5% of all patients selected a one out of five, or very motivated to start an exercise regimen after discharge. On the second survey, only nine patients selected a one out five which is a 10% decrease from the initial survey. Three out of twenty patients selected a three out of five on the second survey which is a 10% decrease as well from the initial survey. Five out of twenty patients scored a four out of five on the second survey. This is a 15% increase from the initial survey that was given prior to educational materials being reviewed. Two patients selected a five out of five which is a 5% increase from the initial survey that was given to patients.

Elements that interacted with the interventions of this project were related to the patient’s willingness to participate, the time of day the surveys at admission and discharge were given, and the size of the unit the project was implemented on. Due to the unit being small, it became challenging to gather extensive survey results. The unit only discharges so many patients in a week due to the number of beds. If multiple patients have severe complications or need an extended stay after cardiovascular surgery, it is likely that the unit will not receive a new
admission that would allow the survey to be given to a new patient. In addition, some patients declined to participate in the survey.

The benefits of this project include improving patient education and understanding in relation to cardiovascular health following a cardiovascular surgery. The results of the survey showed an increase in patient understanding of the outcome measures at the time of discharge which supports the need for educational material related to exercise and nutrition for patients who undergo a cardiovascular surgical event. There were no financial costs related to this project, as the project related to surveying and providing educational material. Although there were multiple benefits of the project, there were also some problems with the survey. First, the size of the unit impacts how much data can be collected. In addition, patients can be admitted or discharged at any moment. Due to this, it can be difficult to capture the patient at the right moment which can lead to skewed results due to patients being discharged prior to the discharge survey being given.

Discussion

Summary and Key Findings

The global aim of this quality improvement project was to increase knowledge of exercise and nutritional guidelines prior to discharge for post-operative heart surgery patients. The specific aim of this quality improvement project was to provide discharge materials related to nutrition and exercise prior to discharge to prevent post-operative complications, enhance knowledge about proper cardiovascular care in relation to nutrition and exercise, and improve patient satisfaction scores. More specifically, the overarching goal of this project was to increase patient understanding of nutrition and exercise guidelines by at least 25% from the baseline.
The nutrition survey was presented to patients prior to review of educational material as well following educational material. Out of twenty patients, only twelve understood the definition of the “Heart Healthy” diet prior to the review of educational materials. After the review, eighteen out of twenty, or 90% of patients were able to recall the correct definition of the “Heart Healthy” diet. This shows a greater than 25% increase in patient knowledge in relation to nutrition guidelines. In addition, four patients signified a willingness to implement changes in nutrition after review of the educational materials; signifying a 20% increase from the first survey that was given. Although this increase does not support the goal of 25% from the baseline, it shows a large increase from the first survey that was presented to patients. In addition, this represents a greater number of patients wanting to implement lifestyle changes after educational material was presented and therefore it can be inferred that the information provided during the educational session will positively impact a patient after discharge.

The exercise survey was also presented prior to, and after, the review of educational material as well. When comparing the exercise surveys pre and post educational review, there were limited findings. Most patients that were surveyed answered similarly on both the first and second survey. For example, 55% of patients on the first survey selected the correct amount of time to exercise each day while on the second survey, only 75% selected the correct answer. This is only showing a 20% increase in patient knowledge. Additionally, during the first survey 85% of patients were able to identify what to do when chest pain occurs during exercise. On the second survey, there was only a 5% increase; 90% of patients answered this question correctly after the review of educational materials. Although the exercise surveys show improvement in patient knowledge, many patients were indifferent, or not willing to participate in an exercise program after discharge. 25% of patients were indifferent to beginning an exercise program prior
to educational review of exercise guidelines. After the review, 15% of patients were indifferent to an exercise program. This is only a 10% decrease from the baseline data that was collected. Although many patients were not willing to participate in exercise after discharge, 25% signified a somewhat willing attitude towards starting an exercise program after the educational review which is a 15% increase from the initial survey data.

This quality improvement project was able to provide patients with educational materials and discharge information related to nutrition and exercise. The results of the survey did show an understanding of nutrition and exercise guidelines in relation to cardiovascular health following an open-heart cardiovascular surgery. The aim of this project was to increase patient understanding by at least 25% from the baseline. Although not all measures that were surveyed increased by 25%, most measures signified at least a 10% increase in patient understanding of exercise and nutrition guidelines. Patient discharge teaching is an important process, and the outcome of this quality improvement project supports the notion that patient teaching regarding nutrition and exercise guidelines are beneficial for patients. A strength of this project that reflects an increase in patient understanding is the increased number of patients who were willing to implement dietary, lifestyle changes in order to be successful after discharge. After review of the educational materials, more patients were willing to implement dietary changes into their lifestyle when compared to baseline data that was collected. Although the exercise survey results did not show a similar pattern when compared to the nutrition results, there was still a slight increase in patient understanding. In addition, there was a slight increase in the number of patients who were willing to implement an exercise routine into daily life when compared to the baselines data that was collected. The results from both the nutrition and exercise survey support the global, and specific aim of this project.
Interpretation

This project sought to increase patient knowledge about proper cardiovascular care in relation to nutrition and exercise. The outcomes of this project supported the notion that cardiovascular education related to nutrition and exercise is important to the discharge process for patients who underwent a cardiovascular procedure. Most patients were able to correctly answer more questions on a survey that was given after reviewing educational materials when compared to surveys that were given prior to the review of educational materials.

In 2006, a study was conducted on the relationship between in-hospital information and patient satisfaction after acute myocardial infarction (Oterhals, Hanestad, et. al., 2006). The aim of the study was to show the correlation between overall satisfaction and the amount of information received during a hospital stay (Oterhals, Hanestad, et. al., 2006). Results of the study indicate it is necessary to provide educational materials to patients; patients included in this study want and need more information at discharge (Oterhals, Hanestad, et. al., 2006). This study that was conducted further supports the aim of this quality improvement project. More specifically, the results of the conducted study are similar to the results of this quality project and support the need for educational materials at discharge for patients.

This project impacts all cardiovascular patients who undergo a cardiovascular procedure. Patients are to receive discharge information related to exercise and nutrition prior to leaving the organization. In addition, this project also impacts staff in the organization. Staff must be willing to provide the educational materials related to nutrition and exercise to patients prior to discharge. In addition, this project would impact the microsystem as the implementation of this project would change the discharge process. Patients would need to review educational material and present any questions or concerns to staff prior to discharge.
The observed outcomes of this project supported the notion for patient discharge educational materials related to nutrition and exercise however, the project was anticipated to yield stronger results. For example, prior to implementing this project, it was anticipated that more survey results would be collected. The outcome of this project was only based off twenty survey participants which is less than what was anticipated. Due to the limited number of survey participants, the overall aim of the project was affected. Based off the results that were collected, participants had a stronger understanding of proper exercise; this was not anticipated. The first survey that was given to patients prior to reviewing educational material was expected to yield lower percentages. However, the results of the first survey were rather strong which made it difficult to show a 25% increase in patient knowledge related to proper cardiovascular exercise. Overall, the project outcomes that were observed support the aim of this project.

**Limitations**

This QI project had limitations that made the implementation difficult. First, there was limited stakeholder support and guidance for this project. Staff were not involved in the creation, planning, or implementation of the project which made it difficult to gather feedback on the project details prior to implementation. There was limited feedback on this project and no engagement in relation to survey or educational materials creation. In addition, the unit that the project was implemented on was smaller than most; only having ten beds. On some occasions, not all patients that were admitted would meet the inclusion criteria for this project; this was a limitation as well. Due to the number of daily discharges, the overall patient population that was surveyed was limited, therefore creating a limitation in the overall results of the project.

Over time, the project was revised. Patient education related to nutrition and exercise was given initially one time at the time of admission however, through data collection, it became
evident that surveying patients during the admission process was not attainable. Instead of providing the survey for patient at the time of admission, the initial survey was given to patients closer to discharge. After the initial survey was given, a review of cardiovascular nutrition and exercise was provided for patients. Following this review, the patients were asked to retake the initial survey. The revision was made due to patients having a long period of time from admission to discharge and therefore, information that was given a week prior during the admission was no longer at the forefront. In addition, in order to minimize limitations, the survey was only given prior to discharge, but not at admission. During admission, patients seemed unwilling to participate and most patients that did participate, were not willing to take a second survey after reviewing the educational material. Giving both surveys and educational material at one time, prior to discharge, yielded higher results and more patients were willing to participate and engage in the educational session.

There were a few limitations to the feasibility of the project. It was difficult to note when a patient was discharging as the plan of care can change drastically at any moment. Due to the uncertainty of patient discharge times, it was important to be present on the unit almost every day to survey patients. This was a limitation as there was no set process in order to survey patients prior to discharge. If a patient was discharged and was unable to review educational material and take the surveys, there was no way of following up with the patient. In order to limit this limitation, it was imperative to be present for at least two hours each day in order to survey and provide education to those patients that were discharging. Overall, the limitations of this project were expected and the efforts that were made to minimize and adjust for limitations were achievable which made the project implementation successful.
Conclusions

In conclusion, this quality initiative was successful. The results of the project showed an increased understanding in exercise, and nutrition, after a cardiovascular event. This project is useful for organizations as it can increase patient understanding, patient satisfaction, and could possibly decrease the likelihood of patient readmissions due to increased knowledge on health promotion. For this project to continue, stakeholders on the unit must engage and provide the educational pamphlet and materials to patients prior to discharge. If this occurs frequently, the HCAHPS measures can be monitored, by unit, to see if patient understanding and satisfaction has increased. In addition, stakeholders can monitor readmissions which could provide feedback for this project. The next steps of this project are to continue to educate patients on nutrition and exercise by providing educational materials that patients can utilize at home after discharging from the organization. Overall, if this project is to continue, patients will leave the organization feeling educated, informed, and confident in their ability to choose correct nutrition and exercise related to their cardiovascular diagnosis.
Appendix B

Your Guide To Nutrition

What should I eat?
Eating a variety of foods is best. Fruits, vegetables, whole grains, beans, nuts, lean meats, fish, and low-fat dairy products are best.

What foods should I avoid?
Avoid foods that are high in saturated fats and sodium. Foods that are high in these fats include processed foods, fried foods, and marinated meats. It is also important to monitor your sodium intake and stay away from excess cold cuts, pickles, and cured foods.

What now?
Make sure to cook more at home, eat a 'healthful' diet, and stay away from excessive red meat consumption. Most importantly, make sure to eat foods low in sodium, trans-fat and saturated fat.

Sample Meals
- Grilled chicken with roasted vegetables
- Greek salad with grilled chicken
- Salmon with quinoa and vegetables

Recommended Exercise

What exercise should I do?
Exercise that is best after heart surgery is light walking, swimming, and using a stationary bike.

How often should I exercise?
Exercise should be four to six days a week, around fifteen to twenty minutes.

What now?
Exercise should be enjoyable! Pick exercises that allow you to feel your best. Make sure to use your exercise tracker to log when you are exercising and how you are feeling while you are exercising.

Your Guide To Home

What should I do at home?
- Make sure to use your incentive spirometer
- Exercise each day, within your own limits
- Resume hobbies and social activities that you enjoy

- Weigh yourself daily and keep a record of your weight
- Check your pulse and blood pressure regularly. Ask your healthcare provider what a healthy range looks like for you.

- Make sure to take your medications as prescribed and keep all follow-up appointments

If you experience chest pain, nausea or vomiting, shortness of breath, a severe headache that doesn't go away, or pain in your jaw, teeth, arm or ears call your healthcare provider or dial 911 immediately.
Appendix C

1. Informed Consent

CONSENT TO PARTICIPATE IN A QUALITY IMPROVEMENT PROJECT

TITLE:
Patient Discharge Education Related to Nutrition and Exercise following a Cardiovascular Surgical Procedure

PROJECT LEAD:
Olivia Marciano, Student Nurse, Direct Entry Master’s in Nursing Program

ADVISOR:
Dr. Elizabeth Evans, DNP, RN, CNL, Associate Professor at University of New Hampshire

SOURCE OF SUPPORT:
This project is being performed as a partial fulfillment of the requirements for the degree of Master of Science in Nursing at University of New Hampshire.

PURPOSE:
You are being asked to participate in a quality improvement project that seeks to understand patient knowledge regarding nutrition and exercise information following a cardiovascular surgical procedure. In order to qualify for participation, you must be an adult person who underwent a cardiovascular surgical procedure.

PARTICIPANT PROCEDURES:
To participate in this study, you will be asked to complete an electronic survey that will assess the knowledge you have regarding exercise and nutrition related to cardiovascular health as well as basic demographic information.

RISKS AND BENEFITS
There are minimal risks associated with participating in this quality improvement project. A benefit for participating in the quality improvement project will be sharing this information with key stakeholders who can improve the discharge education process for patients with cardiovascular disease.

COMPENSATION:
There are no direct or immediate benefits for completing this survey. However, the information that is gathered will be used in order to improve care for patients with similar medical conditions.

RIGHT TO WITHDRAW:
If you agree to complete the survey, you may withdraw to answer any questions and if you change your mind, you may withdraw from completing the survey at any time.

I understand that should I have any questions about this electronic survey, I may contact Olivia Marciano at opm1000@wildcats.unh.edu or Elizabeth Evans at Elizabeth.Evans@unh.edu

VOLUNTARY CONSENT:
By consenting with the electronic survey, you verify that:
You are at least 18 years of age.
You have undergone a cardiovascular surgical procedure.
You have a cardiovascular medical diagnosis.
You understand the purpose of this quality improvement project.
You freely and voluntarily choose to participate in this survey.

Yes (participant proceeds) or No (participant will exit, and receive “Thank You” page).

2. **Demographic Information**
   a. Gender: male or female
   c. Race: White, African American, Hispanic/Latino, American Indian or Alaska native, other Pacific Islander, Other, Prefer not to answer
   d. Educational Background; Select All That Apply: less than HS, HS or GED, some college, technical school, Bachelors Degree, Masters Degree, Doctoral Degree
   e. Years since first cardiovascular medical diagnosis: 0-3, 4-6, 7-10, 10-20, 20 and above.
   f. Discharge Disposition: home, home alone, home with others, home with VNA services, Skilled Nursing Facility, Rehabilitation Facility, Long Term Care, Other

3. **Nutrition Survey**

1. **Please select all options are that are TRUE (Select All That Apply):**
   1. You should eat smaller servings of red meat
   2. Limit foods that are high in unsaturated fats, like olive oil or canola oil
   3. There is no need to decrease your sodium (salt) intake
   4. Try cooking more meals at home

2. **What is the “Heart Healthy” Diet according to the Heart Healthy Guidelines:**
   1. Promotes fruits, vegetables, whole grains, low-fat dairy, lean protein, nuts, and oils
   2. Promotes all food in moderation
   3. Promotes all foods that come from the ground and are natural
   4. Promotes fruits, vegetables, and all meats and fats

3. **Please select the best dinner option:**
   1. A cheeseburger with french fries and coleslaw
   2. Baked chicken with green beans and quinoa
   3. Fried chicken sandwich with french fries
   4. Greek salad with grilled chicken

4. **On a scale of 1 to 5, how willing are you to implement changes in your diet:**
   1. Not at all willing
   2. Not very willing
   3. Indifferent
   4. Somewhat willing
   5. Very willing

5. **What changes will you make in your diet, if any, based off the information provided today:**
   1. Free Text Paragraph
4. Exercise Survey

1. Do you currently do any cardiovascular exercise outside of exercise your job may require:
   1. Yes
   2. No

2. What types of exercise are best for cardiovascular fitness (Select All That Apply):
   1. Slow biking
   2. Jogging, fast paced
   3. Walking at a pace that is comfortable to you
   4. Football
   5. Swimming

3. How long should you exercise for each day:
   1. 5 minutes
   2. 15 minutes
   3. 20 minutes
   4. 60 minutes

4. What should you do when you develop chest pain while exercising (Select All That Apply):
   1. Keep exercising, push through and the pain will go away
   2. Stop, and rest
   3. Call your primary care provider
   4. Call 911

5. On a scale of 1 to 5, how motivated are you to start an exercise program:
   1. Not at all motivated
   2. Not very motivate
   3. Indifferent
   4. Somewhat motivated
   5. Very motivated

6. What changes will you make, if any, based off what you learned today about exercise:
   2. Free Text Paragraph
References


