DEVELOPMENT OF A PREOPERATIVE TEACHING MANUAL FOR PATIENTS WAITING FOR CARDIAC SURGERY: A GUIDE TO CARDIAC SURGERY

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A report submitted to the School of Graduate Studies in partial fulfilment of the requirements for the degree of

Master of Nursing

Faculty of Nursing

Memorial University of Newfoundland

December 2021

St. John's, Newfoundland and Labrador

Abstract

Background: Cardiovascular disease is a major health concern and the leading cause of morbidity and mortality in both developed and developing countries. In Newfoundland and Labrador, one in three people will be affected by the disease at some point in their lives. **Purpose:** The purpose of this practicum project was to develop a comprehensive resource manual for patients waiting for cardiac surgery at Eastern Health. This preoperative teaching tool aims to help and support patients and families in preparation for heart surgery. **Methods:** An integrative literature review was conducted to assess the impact of comprehensive educational interventions on cardiac patient outcomes. Consultations were held with key stakeholders within the cardiac program at Eastern Health (n=7) and patient consultations (n=3). An environmental scan was conducted to scope out available resources for patients waiting for cardiac surgery in Canada and at the practicum site. **Results:** Two main themes were identified in the literature: health outcomes and educational interventions. Preoperative education has been used to improve patient outcomes by providing relevant health care information, coping skills, and psychosocial support before surgery. The consultations identified the strengths and weaknesses of existing educational resources at the practicum site. Education for patients is lacking and there is a need for an updated resource. The environmental scan identified available resources for cardiac surgery patients in Canada and challenges concerning lack of accessibility at Eastern Health. There is a need for increased availability and access. Based on these findings, an educational resource was developed. The resource is a 60-page booklet and includes four chapters and four appendices. It was designed to help patients and their family understand cardiac surgery. **Conclusion:** This resource can be utilized to prepare patients who may experience long wait times by providing accessible and flexible preoperative education to patients and families.

Keywords: cardiac surgery, resource manual, nursing, preoperative education, Knowles Theory

Acknowledgements

Dr. Ann Noseworthy, Practicum Supervisor, Memorial University of Newfoundland and Labrador. I want to thank you for your support, guidance, encouragement, feedback, and commitment throughout the development of my project.

Jennifer Matthews and Cassie Chisholm, Eastern Health. I wish to thank you for your time, knowledge, expertise, and guidance during my practicum.

To all of my key stakeholders and consultants, thank you for your time and contributions to the development of my project. Your feedback was very valuable to the development of the resource manual.

To my husband, David, for your encouragement and support. You never stopped believing in me. I truly could not have done this without your love and support.

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Cardiovascular disease (CVD) is the broad term that encompasses a variety of illnesses including coronary artery disease, cerebrovascular disease, rheumatic heart disorder, and congestive heart failure (World Health Organization [WHO], 2021). CVD is a major health concern and the leading cause of morbidity and mortality in both developed and developing countries (WHO, 2021). An estimated 17.9 million people died from CVDs in 2019, representing 32% of all global deaths (WHO, 2021). In Canada, approximately 2.4 million Canadians are living with cardiac disease and it is the second leading cause of death and one of the top-five reasons for hospitalization in the nation (Canadian Institute for Health Information [CIHI], 2019). Despite advances in prevention, treatment, and surgery, the mortality rate of these diseases continues to rise. In Newfoundland and Labrador (NL), one in three people will be affected by the disease at some point in their lives (Newfoundland & Labrador Centre for Health Information, 2015).

Numerous conditions may necessitate the need for cardiac surgery. The term cardiac surgery and heart surgery are often used interchangeably. Heart surgery is any surgery done on the heart muscle, valves, arteries, aorta and/or other large arteries connected to the heart. The most common reason for an adult to undergo cardiac surgery is myocardial revascularization due to CVD (Niknejad et al., 2019). The term open heart surgery or coronary artery bypass graft surgery (CABG) has emerged as one of the most common surgical procedures for treatment of CVD. CABG often includes the patient being connected to a heart-lung bypass machine, or bypass pump during surgery. Current statistics reveal that almost 40,000 cardiac surgeries occur in Canada on an annual basis (CIHI, 2019). Outpatient cardiac surgery has grown phenomenally in the past decade, with more than two thirds of all surgical procedures carried out on an outpatient basis, allowing patients to wait at home for their surgery (Hollingsworth et al., 2014).

On March 11, 2020, the WHO declared the coronavirus (COVID-19) disease as a world-wide pandemic (Hassan et al., 2020). Due to the COVID-19 pandemic response, elective surgery cases in Canada were drastically reduced or stopped completely (Urbach & Martin, 2020). Cardiac surgeons from across Canada were forced to make drastic changes to their clinical practices. This includes prioritizing and delaying elective cases and altering therapeutic strategies in high-risk patients (Hassan et al., 2020). This has placed a significant strain on the patients and health care systems across Canada. Eastern Health (EH) is the largest integrated health authority in NL. The Health Science Center (HSC) located within EH, is an acute care facility serving the people of the entire province and is the only hospital that provides cardiovascular surgery in NL. As a result of the pandemic response in NL, the majority of all elective surgeries were stopped to build capacity for a possible surge of COVID-19 patients (Quinn, 2020). Due to this decision, the wait list for elective heart surgery has grown. An increase in the length of the waitlist has ultimately led to an increase in waiting time for cardiovascular surgery, and this can be very stressful for patients and their families. This time of uncertainty can cause physiological and psychological problems, such as anxiety and depression. In addition, it can cause social issues, such as economic instability and the breaking down of relationships. These issues can be further complicated by deteriorating health and fears of the future (Indratula et al., 2013).

Practicum Project

Many patients and families are overwhelmed with anxiety by the prospect of undergoing open-heart surgery (Guo et al., 2014). Preoperative education has been used to improve patients' experiences by providing relevant health care information, coping skills, and psychosocial support before surgery (Guo et al., 2014). Access to this education is an important factor in improving health outcomes of patients undergoing surgery (Marcus, 2014). Having a resource

readily available is important to support these patients. As a Master of Nursing student, with a focus in nursing education, I decided to focus my final practicum project on developing a preoperative teaching resource for these patients. The idea for this practicum project was developed through consultations followed by an informal need's assessment within EH. These discussions highlighted the lack of an up to date, supportive educational resource that is accessible to patients waiting for cardiac surgery in NL. This waiting period is extremely important and can have a major impact on an individual's overall health outcomes (Indratula et al., 2013).

The overall goal of this practicum was to develop a comprehensive resource manual for patients waiting for cardiac surgery at EH. The development of an evidenced based preoperative teaching manual aims to help and support patients and their families in preparation for open heart-surgery and recovery. It is hoped that this resource will facilitate communication between the patient and the health care team, and result in an overall increase in patient, nurse, and provider satisfaction with preoperative cardiac care. The plan for this practicum project was developed in consultation with my supervisor, Dr. Ann Noseworthy, the cardiac waitlist manager, Jennifer Matthews, and the Regional Director Cardiac and Critical Care, Cassie Chisholm. The key practicum objectives were to:

1. Describe the current available resources for outpatients waiting for heart surgery at the HSC in St. John's, NL.
2. Identify current challenges to preoperative education for these patients.
3. Develop a resource for outpatients waiting for heart surgery at the HSC in St. John's, NL.
4. Develop an implementation plan based on the review of the literature and consultations with key stake holders.

5. Demonstrate advanced nursing practice competencies throughout the N6660 and N6661 practicum.

Overview of Methods

Three methods were used to achieve the objectives of this practicum project. They included a literature review, consultations with key stakeholders, and an environmental scan of existing cardiac surgery resources. An integrative literature review was conducted using certified databases to search and identify relevant articles to increase my knowledge on preoperative cardiac surgery patient education on preparedness for surgery, patient health outcomes, and to analyze what effective, evidence based educational interventions were being used. The project consultations and environmental scan were conducted simultaneously. A number of key consultants were identified for this project including clinical staff and patients.

Summary of the Literature Review

In order to develop an evidence-based resource a literature review was completed. The purpose of the literature review was to examine current evidence related to preoperative education provided to patients waiting for cardiac surgery. A systematic review of the literature was conducted in consultation with the librarian to formulate key questions and search terms. Online library databases included CINAHL, PubMed, Google Scholar, and Cochrane Library. Search terms included “cardiac surgery”, “education”, “patient education”, “intervention”, “pre-operative”, “recovery”, “enhanced recovery”, “ERAS” and “teaching”. Search results were limited to academic journals, English language, and publication date within the last 10 years. The goal was to conduct a comprehensive search of all current published peer-reviewed articles.

Forty-nine abstracts were reviewed to search for relevance by identifying the phenomena of interest, methodology, and target population; further reading was granted if the study met inclusion criteria. Literature reported was largely analytic in nature, but the search did yield some qualitative studies. The literature review consisted of two qualitative studies and 17 quantitative studies, including four literature reviews, eleven analytic studies and two descriptive design. In total 19 articles were included in the literature review. The studies selected to be included in this review were published between 2011 and 2020. The kept articles main focus was on improving patient outcomes through a variety of preoperative educational interventions. See Appendix I for the full version of the integrative literature review. To evaluate the quality and strength of the studies, the PHAC (2014) critical appraisal tool kit was used to appraise the quantitative studies and the Joanne Briggs Institute (JBI) (2017) critical appraisal checklist for qualitative research was used to appraise the qualitative research studies.

Two main themes were identified in the literature: health outcomes and educational interventions. The review suggested that there is a wealth of evidence in the scholarly literature to validate that preoperative teaching of patients about to undergo surgery can reduce their anxiety and possibly improve patient outcomes. The object of this review was to present the best available evidence related to preoperative cardiac surgery patient education on preparedness for surgery, patient health outcomes, and to analyze what effective, evidence based educational interventions were being used.

Health Outcomes

Anxiety. Pre-operative anxiety is one of the most common emotional responses that a patient can experience when undergoing a surgical treatment. It is usually caused by worries of the unknown and general concerns with the risks of the operation (Kalogianni et al., 2016).

Although anxiety is a predictable part of the surgical experience, inadequate management is common and can have profound implications (Shahmansouri et al., 2014). Evidence in the literature supports that preoperative teaching of patients about to undergo surgery can reduce anxiety. Eight of the articles included in the review, including seven randomized controlled trials (RCTs) and one systematic review, support that pre-operative education reduced anxiety (Ertürk & Ünlü, 2018; Kalogianni et al., 2016; Lai et al., 2021; Niknejad et al., 2019; Pazar & Iyigun, 2020, Ramesh et al., 2017, Shahmansouri et al., 2014; Zhang et al., 2012). A majority of the RCTs were moderate to strong study designs of medium to high quality.

Depression. Cardiac surgery is one of the most stressful psychological burdens placed upon a patient. Loghmani and Minfared (2018) reported that a high percentage of patients suffer from severe depression before surgery, which may continue after surgery has been completed. In an RCT conducted to determine the effect of preoperative training on postoperative depression in patients undergoing open heart surgery, Loghmani and Minfared (2018) hypothesized that education reduces depression in patients undergoing cardiac surgery. In this study, the findings were statistically significant, and the authors concluded that education reduced severe depression by 50% in the test group although did not affect mild to moderate depression ($p < 0.001$, 95% confidence).

Post-operative delirium. Delirium is a common complication for patients undergoing cardiac surgery. The incidence of delirium is estimated at 26 to 52% and can dramatically increase the mortality and morbidity of patients undergoing cardiac surgery (Xue et al., 2020). Due to limited data about the effect of individualized preoperative education on the incidence of postoperative delirium, Xue et al. (2020) conducted a RCT of strong design and high quality to investigate the effect of preoperative personalized education on postoperative delirium of

patients undergoing cardiac surgery. The experimental group received individualized education by a group of trained educators and included a set of education leaflets and an ICU tour. The incidence of the delirium of the experimental group was significantly lower than that of the control group (10.4% vs. 24.2%, P=0.038). This study concluded that a preoperative individualized education intervention can reduce the incidence of post-operative delirium and promote recovery of patients receiving cardiac surgery.

Length of stay. Several articles throughout the review attempted to determine if preoperative education prior to cardiac surgery can impact patient readmission and length of hospital stay (Guo et al., 2012; Kalogianni et al., 2016; Xue et al., 2020). A study by Xue et al. (2020) found no statistical difference between the two groups in length of hospital-stay and other complications but concluded that mechanical ventilation time and ICU stay of the experimental group was significantly lower (MV time: 13.7±7.6 vs. 18.6±9.8 h, P=0.002; ICU stay: 31.3±9.1 vs. 36.5±10.4 h, P=0.003). The findings in a high quality RCT conducted by Kalogianni et al. (2016) were consistent with the findings of Xue et al. (2020). Both studies found no significant difference in the length of hospital stay. However, Kalogianni et al. (2016) found no significant difference in ICU stay. In a third RCT by Guo et al. (2012), it was found that participants in the intervention group spent four hours less in the ICU than the control group (p=0.05). However, no difference was found in overall post-operative hospital stay. The preoperative education group stayed 14 days in hospital compared with 12 days for the usual care group (p=0.17).

Post-operative complications. Six of the articles in the review attempted to determine if preoperative education prior to cardiac surgery had an impact on postoperative complications **(**Ertürk & Ünlü, 2018; Guo et al., 2012; Kalogianni et al., 2016; Pazar & Iyigun, 2020, Xue et al., 2020; Zhang et al., 2012). The majority of these studies were strong design of moderate to

high quality. Post-operative complications included outcomes such as pain, comfort levels, ventilator synchrony, and hemodynamic stability. Five of the studies concluded that preoperative education is proven to be effective in promoting patient compliance to positive lifestyle changes. These behavioral changes had a positive impact on risk factors for heart disease and aided in a reduction of postoperative complications (Ertürk & Ünlü, 2018; Kalogianni et al., 2016; Pazar & Iyigun, 2020, Xue et al., 2020; Zhang et al., 2012).

Educational Interventions for Patient Education

Throughout the review a variety of educational interventions for cardiac surgery patients were presented in the literature. The main focus of these articles included the most effective educational interventions for cardiac patients. The impact of patient education has been studied extensively worldwide. Health care delivery and education can be challenging for providers. It can be challenging for nurses and other health professionals to ensure that patients have the necessary information to make informed decisions regarding their health. Often, patients and their families are given a considerable amount of information about their health and must make important decisions from these facts. There are obstacles that can prevent accurate delivery of health care information. These obstacles include literacy, culture, language, and physiological barriers. It is up to the health care team to assess and evaluate the patient's values, learning needs, and readiness to learn. Even with the best intentions, patient education that fails to educate can lead to adverse events or poor outcomes. (Beagley, 2011)

Learning needs. Patients learning needs differ according to disease progression, changes over time and can be influenced by patient's cultural and spiritual traditions (Huriani, 2019). In a descriptive study conducted by Huriani (2019), learning needs after acute myocardial infarction were assessed utilizing the Cardiac Patient Learning Needs Inventory (CPLNI). Huriani (2019)

concluded that the learning needs of patients with myocardial infarction are high. In addition, accurate assessment of learning needs is important, and it is believed that symptom management and medication information are the most crucial areas of learning for this population. Similar findings were discussed in a qualitative research study by Peterson et al. (2014). This study concluded that patients with CVD felt they did not receive adequate information from their healthcare provider about their disease. Participants in this study felt that patient education materials should provide both basic information about the clinical aspects of their disease and practical advice on how to achieve and maintain important behavioral changes.

Patient education. Traditionally, information is given to patients to understand the experiences that they will encounter during surgery. Patient education refers to all educational activities directed at patients. It is the process by which health professionals impart information to patients, their family members and/or their caregivers (de Melo Ghisi et al., 2014). It has been formally defined as "the process by which health professionals and others impart information to patients that will alter their health behaviors or improve their health status" (de Melo Ghisi et al., 2014, p. 161). Similarly, Kalogianni et al. (2016) defines patient education as "providing the patient with health-related information, psychosocial support and the opportunity to learn selected skills in preparation for surgery" (p. 448). Health education is one of the most important responsibilities of nurses and is an essential health intervention to promote self-care behavior change, but research has shown that it may often lack required effectiveness (Fredricks & Yau, 2017).

Teaching Strategies and Delivery Methods of Teaching

Patient education can be applied in a variety of approaches and formats. Patient education delivered in a standardized format involves the delivery of the same content to all patients, while

individualized format encompass' education being tailored to reflect the learning needs of the individual (Fredricks & Yau, 2017). The majority of studies discussed throughout the review were medium to high quality RCTs which have been further validated with systematic literature reviews. These studies looked at specific educational interventions. This included teaching strategies and methods of delivery for patient education, whether it be individual, one-on-one, or group training (de Melo Ghisi et al., 2014; Filomeno et al., 2020; Fredricks & Yau, 2017; Friedman et al., 2011; Guo et al., 2012; Kaloglianni et al., 2016; Lai et al., 2021; Niknejad et al., 2019; O'Brien et al., 2013). In addition to the quantitative research, qualitative research has allowed insight into patient perceptions of education and experiences of waiting for cardiac surgery (Indratula et al., 2013; Peterson et al., 2014)

Peterson et al. (2014) conducted a study using a three step, mixed methods approach to develop and evaluate a self-management educational workbook for patients with CVD. Initially, using a qualitative approach, interviews (n=61) using grounded theory methods were conducted to identify needs and patient perceptions. The second step of the study included the development of an educational workbook, incorporating themes that emerged from the qualitative interviews. In the final step, evaluation of the workbook was completed through a behavioral RCT designed to motivate increased physical activity. In this RCT, 225 post-coronary angioplasty patients received a copy of the workbook. Participants were instructed to use the workbook over 12 months and provide valid feedback during the evaluation. 89% of participants reported that they read the workbook. To evaluate the workbook, researchers focused on physical activity to assess health behavior change. Using the Paffenbarger Physical Activity and Exercise Index, physical activity levels were measured from baseline to 12 months. The data revealed that the workbook provided practical health information; enhanced behavior-specific self-efficacy; and reinforced

that healthy behaviors decrease risk. Participants who read the workbook had an increase in physical activity at 12-months compared with non-readers (p=0.093) and among Black/Hispanic participants, workbook readers' increases were significant (592 vs. −645, p=0.035). This mixed methods study concluded that a self-management educational workbook can provide relevant, disease-specific health information for cardiac patients.

Guo et al. (2012) conducted an RCT of 153 adult patients undergoing cardiac surgery who were randomized to either the usual care group or to preoperative education group comprising of usual care plus an information leaflet and verbal advice. The preoperative education group reported a greater decrease in anxiety score (mean difference -3.6 points, 95% confidence interval -4.62 to -2.57; P<0.001); a greater decrease in depression score (mean difference -2.1 points, 95% CI -3.19 to -0.92; P<0.001) and less interference from pain in sleeping (mean difference -0.9 points, 95% CI -1.63 to -0.16; P=0.02). This form of preoperative education intervention is effective in reducing anxiety and depression among Chinese cardiac surgery patients.

While there is strong evidence suggesting that educational activities during the cardiac surgery journey can have a positive impact on patient outcomes, literature on the educational strategies and effective methods of preoperative education teaching has not been clearly identified. Consistent with the findings of Ramesh et al. (2017), very few published studies evaluate the effectiveness of preoperative education on postoperative outcomes in cardiac surgery patients. Many studies supported the use of educational sessions with a focus on the preoperative, intraoperative and postoperative phase. The majority of literature included in the analysis supported preoperative educational interventions as a possible technique to relieve patients' physiological and psychological symptoms. Patients who are waiting for surgery

receive education through a variety of interventions. This review recommended future research to pinpoint the optimal educational interventions for patients. Further research on the use of a multimode educational approach would be valuable to all patient populations. While we know a multitude of interventions exist, the research could not confirm which setting, mode and method of delivery was the most effective. A significant gap in the literature is that currently, no data exists to guide health care providers on the optimal setting, mode of delivery, intensity, duration and content for provision of patient education for cardiac patients (de Melo Ghisi et al., 2014).

Many studies have investigated whether patient education interventions are successful in improving postoperative outcomes and whether physical and psychological healing is improved after cardiac surgery. Preoperative education has been studied to identify its impact on a wide range of outcomes. For most people, the idea of surgery creates a sense of stress and anxiety Niknejad et al., 2019; Ramesh et al., 2017). The use of preoperative education in a surgical setting is a favorable intervention with positive patient outcomes. The literature review validated that waiting for cardiovascular surgery can be very stressful for patients and their families. In addition, the literature also validated that a multitude of educational interventions can have a positive impact on these patients. (Niknejad et al., 2019; Ramesh et al., 2017, Shahmansouri et al., 2014).

The literature review demonstrated that preoperative education has been used to improve patients' experiences by providing relevant health care information, coping skills, and psychosocial support before surgery. Many research studies have investigated whether preoperative, and/or postoperative education interventions were successful in improving postoperative outcomes and increasing physical and psychological recovery after cardiac surgery. Other studies have attempted to determine the most effective educational strategies and

methods of delivery. A global pandemic has affected the world throughout the year 2020-2021 and cardiac wait times are at an all-time high. In an attempt to assist patients waiting for cardiac surgery, the focus of this literature review was to assess the impact of comprehensive educational interventions on cardiac patient outcomes. The evidence shows that patient education is expected to decrease the physical and psychological impacts of some cardiac surgery outcomes such as anxiety and postoperative complications. Not only can it improve patients' outcome, it may lead to an increase in patient and family satisfaction. Further research surrounding effective educational strategies and methods of teaching is required for these patients. Many patients go into their surgeries with high levels of anxiety that could be reduced if they were educated on what they were about to experience and what to expect.

Summary of Consultations

The main purpose of the consultations was to gain additional information on perioperative patient education needs for patients waiting for cardiac surgery. The main purpose of conducting consultations with key members of the healthcare team and a patient population was to determine if an educational resource manual would be beneficial to patients and health care providers. This information was used to inform the content, delivery, and implementation of a cardiac education resource manual. A copy of the completed consultation and environmental scan report can be found in Appendix II. A number of key consultants were identified for this project including clinical staff and patients. The sample included internal stakeholders (n=7) and a patient sample (n=3).

In order to determine the strengths and challenges of the current educational resources available at the practicum site, key stakeholders within the cardiac surgery and critical care programs were consulted. A semi-structured 15-minute consultation interview was conducted. A

consultation tool for key stakeholders was created and used as a guide throughout the interview. In addition, a volunteer, convenience sample of three patients who had recently waited for cardiac surgery were contacted. As the education resource is intended to be designed for patients waiting for cardiac surgery, it was important to engage these patients in the consultation process. Three patients who previously had cardiac surgery within the last 12 months were contacted by the waitlist manager to discuss this project and determine their interest in participating in the consultation process. Once these individuals agreed to an interview, they were contacted by the researcher via telephone to complete a 15-30 minute interview. A consultation tool and survey for patients was created and used to guide the interview. All stakeholders were deemed valuable to the project. Consultation feedback from key stakeholders was extremely important in terms of project development.

Clinical Consultations

All clinical stakeholders had been in their respective positions for several years. Their dedication to patient care and the future direction of the cardiac surgery program at EH was clearly evident throughout the consultations. All consultants were aware there was a cardiac surgery resource but only three could speak specifically to that resource. The others felt they were not well versed on available resources for patients and there was uncertainty surrounding how to find and access those resources. When asked if they felt there was a need for an updated, accessible resource, all agreed that there was a significant need.

A majority of the consultants pointed out that patients and other Regional Health Authorities (RHAs) are not able to access the current educational resources on the internet. Given that the HSC within EH is the major cardiac care hospital for the province, it was identified that patients in other facilities lack support and education. Currently patient education

is the “sole responsibility of the HSC”. When asked on their input surrounding the delivery and distribution of educational resources, all clinical stakeholders agreed that this resource needs to be readily available and not only an internal resource. It was suggested that it should be available on the cardiac care information page of the EH website in a downloadable format.

Input was requested surrounding the content of the resource. A majority of the clinical stakeholders felt that the current resource was inclusive but could be strengthened and changed with current evidence-based literature, better examples, and improved formatting. The stakeholders identified the following topics as the most important: ‘prehabilitation’ information such as the dos and don'ts of waiting for surgery, mental health support and psychological care, and post-operative recovery. Further discussions included topics such as a decrease in overall patient health status and patient complexity. All consultants agreed that patients are showing signs of deconditioning while waiting for surgery as the patients are unsure of what they should and should not do while waiting, in addition to the mental anguish and a long recovery period.

Finally, the consultations identified that EH does not have a formal committee or resource person that is dedicated to creating education materials for patient education. It was also discovered that an attempt to update the current resource in collaboration with McGill University and EH’s Enhanced Recovery After Surgery (ERAS) nurse was established approximately 18 months ago but was never completed. That project is still on hold. The results and information generated via the clinical consultations were a significant contribution to the development of the resource manual.

Patient Consultations

Themes that were identified throughout the patient consultation process are consistent with the findings in the literature review. Themes included the physical and psychological

impacts of waiting for cardiac surgery, lack of current educational resources for patients, and patient learning needs. Waiting for cardiac surgery is a stressful time and many patients and families feel overwhelmed with anxiety by the prospect of undergoing open-heart surgery. The consultations validated the need for more education on the physical and psychological impacts of waiting for cardiac surgery. The consultations supported that preoperative education can be used to improve patients' experiences by providing relevant health care information, coping skills, and psychosocial support before surgery. All participants agreed that anxiety could be reduced if patients were educated on what they were about to experience and what to expect. While the evidence in the literature supports that preoperative teaching of patients about to undergo surgery can reduce anxiety, two of the patients agreed that the educational resources made them feel more anxious about their surgery. While they felt prepared for the surgery, they identified that support for patients waiting for cardiac surgery is lacking. This further validated the need for an updated resource. Although anxiety is a predictable part of the surgical experience, inadequate management, such as lack of education, can have profound implications (Shahmansouri et al., 2014).

The findings of the consultations identified the strengths and weaknesses of existing educational resources for patients waiting for cardiac surgery at the practicum site. These findings validated that in general, patients do read and appreciate the existing education materials. However, the patient consultations indicated that current education and support for patients is undeniably lacking. All participants validated the need for an updated educational resource and input was provided on the type of information that should be included in this resource. The consultations supported that patients undergoing cardiac surgery have a multitude of learning needs in which up to date education and mental health support is needed for optimal

patient outcomes.

Finally, throughout the consultations it was evident that every patient has different learning needs. Depending on the patient, it is important to assess patient learning needs as a way to identify priority learning objectives. This was portrayed when we discussed patient preference in individual vs. group education. The inclusion of learning needs into the design of the patient education teaching session is a key element in the process of teaching and learning, as they reflect the patient's personal health experience. Thus, it is important that a health education resource provides the opportunity for patients to select the information they are interested in learning about and ensuring the resource is tailored to patients' personal learning needs. This supports the use of a multimodal approach and should be based on personalized learning needs.

Summary of Environmental Scan

The goal of conducting an environmental scan was to examine the resources currently provided to patients waiting for cardiac surgery at the practicum site as well as educational resources available to patients who undergo cardiac surgery at other locations. An environmental scan was conducted to scope out available resources for patients waiting for cardiac surgery in Canada, specifically focusing on patient resource manuals that were available on the internet. The websites that were scanned included:

- Eastern Health (EH) (NL)
- St. Mary's Hospital (Kitchener, Ontario)
- University of Ottawa Heart Institute (UOHI) (Ottawa, Ontario)
- McGill University Health Centre (MUHC) (Montreal, Quebec)
- Montreal Heart Institute (Montreal, Quebec)

To begin the environmental scan, the written perioperative education resources utilized for patients waiting for cardiac surgery at the HSC were reviewed. These materials were considered and utilized in the creation of the updated resource as it contains pertinent context with respect to current operating standards of this facility, including specific hospital policies and surgical processes. Subsequently, a scan was conducted to collect data by viewing websites and contacting organizations of these websites. The content, layout, and design of four perioperative cardiac surgery education resource manuals from other institutions were thoroughly examined. These institutions included: St. Mary's Hospital, University of Ottawa Heart Institute (UOHI), McGill University Health Centre (MUHC) and the Montreal Heart Institute. An internet search revealed that cardiac surgery resources which included current research and best practices were readily available from these institutions. Detailed note taking was used to compile data for analysis. Data obtained from websites included in the environmental scan was organized in Excel and analyzed using a content analysis approach. The findings are discussed below.

At the practicum site, three paper-based education resources are available to cardiac surgery patients. The available resources include pamphlets or small booklets such as 'getting ready for heart surgery', 'going home after heart surgery, and 'healthy heart diet guidelines'. Once accepted for cardiac surgery and placed on the waitlist, these resources are mailed to the patient. The paper-based resources provided to patients at the practicum site are available on EH's Intranet, which is only accessible by staff on an EH server. Thus, the cardiac education tools that are available for health care providers and patients in other RHAs in the province, including Central, Western and Labrador-Grenfell Health, is very limited. These booklets are fairly comprehensive with respect to providing the important information prior to surgery. In addition to the paper-based cardiac resource, EH cardiac and critical care website was reviewed.

This website provides only a description of the services the cardiac and critical care program offers to support the diagnosis and management of heart disease and critical illness. There were no patient education resources available on the website.

Multiple sites across Canada have produced an educational resource for patients waiting for cardiac surgery. These institutions represent major cardiac surgery centers within Canada. Upon completion of the environmental scan, it was found that all sites provide digital access to these documents in PDF format. Patients and their families, as well as other health care professionals can readily download and utilize these resources. In addition, it was found that these hospitals provide valuable education in other formats, such as videos and online presentations.

The environmental scan was used to inform the development of an accessible, up to date perioperative education resource for patients waiting for cardiac surgery in NL. The content, layout and design elements of existing resources from other healthcare institutions served as a guide in the development of the comprehensive education resource for the practicum site. The environmental scan identified the current challenges concerning lack of accessibility and established the need for increased availability and access for these patients. The pre-existing paper-based materials for patients waiting for cardiac surgery required updating. Although these paper-based education resources are available within EH, there are challenges accessing them outside of the HSC. The practicum site lacked a digital footprint surrounding cardiac patient education.

Theoretical Framework

This practicum project was guided by Adult Learning Theory developed by Knowles (1980). This theory states that adults are self-directed learners who are motivated by present

problems and personal experience. Adults determine their own learning needs and educational activities should include independent study (Knowles et al., 2005). Throughout the consultations for this project it was evident that every patient has different learning needs. Depending on the patient, it is important to assess patient learning needs as a way to identify priority learning objectives.

After identifying the common themes in the literature review and topics identified in the consultation process, it was determined that the principles of Knowles Adult Learning Theory would be incorporated into the development of the educational resource. The inclusion of learning needs into the design of the education manual is a key element in the process of teaching and learning. Additionally, adult learners should actively participate in the development and planning phases of learning. Thus, it is important that a health education resource provides the opportunity for patients to select the information they are interested in learning about and ensuring the resource is tailored to patients' personal learning needs. This supports the use of a resource manual as an educational tool and is consistent with Knowles adult learning theory.

Summary of the Resource

After conducting an integrative literature review, consultations, and an environmental scan, the goals and objectives of this practicum were established. Patient education is a vital component of health care that enables people with chronic disease to better self-manage their disease (Peterson et al., 2014). Researchers across the literature demonstrated that education targeted towards patients experiencing cardiac surgery should include the following topics: cardiac disease and surgery, hospital routines, symptom and complication management, medications, recovery and self-monitoring instructions, healthy lifestyle maintenance, hospital contact information, follow-up procedures, and connections to previous patients (Fredericks &

Yau, 2017; Huriani, 2019). I was able to develop a resource manual for patients waiting for cardiac surgery based on these recommendations. This resource is deemed to be beneficial to patients, families, and health care providers. The resource can be seen in Appendix III. The following section describes the process employed to develop this manual and a brief discussion of the design and content that can be found in the resource.

The development of the education manual was guided by Peterson et al. (2014). Peterson et al. (2014) described a reproducible three-step approach to design and evaluate educational material that can be used to develop new resources for chronic disease groups. Utilizing an interview-based qualitative approach to develop materials to address the learning needs of patients, Peterson et al. (2014) were able to provide culturally relevant, disease-specific education that was proven to be effective. This was similar to the approach utilized in the development of this manual. Resource manuals offer flexibility, accessibility, and portability to patients. Patients requiring education have the opportunity to review the information on their own time, at their own pace, and use the manual as a reference to continue learning or review when necessary (Peterson et al., 2014). Written information was chosen as a way to improve patient knowledge and reduce confusion. This is especially significant if it is provided to the patient prior to the first clinic appointment and provides patients with a good understanding of what to expect following surgery (Friedman et al., 2011).

During the consultations for this project, I discovered that in 2020, EH had begun to develop a positive working relationship and collaboration with the Cardiac Surgery Team at the UOHI. In collaboration with the UOHI, permission was granted to utilize their patient educational material during the development of the new resource for EH. This was incorporated throughout the development of this practicum project resource. I was able to contact their

advanced practice registered nurse of cardiac surgery who aids with developing and maintaining the patient education resource.

Through collaboration, consultation, research and nursing leadership, a resource manual was developed to help patients and their families understand and preparation for heart surgery. The education topics included in the resource satisfy the learning needs that were identified throughout the consultation interviews. The purpose of this manual is to help the patient prepare for admission to the HSC for heart surgery. It will be provided by mail once they have been placed on the cardiac surgery waiting list. Additionally, it will be accessible on the EH public website. The resource includes four chapters and four appendices: Chapter 1 – Learn about your heart surgery; Chapter 2 – Preparing for your heart surgery; Chapter 3 – Admission for heart surgery; and Chapter 4 – Going home after your heart surgery. The four appendices include: Healthy Eating; Managing Stress; Medications; and Additional Resources. This resource was able to fulfil my goal of educating patients so that they can play an active role in their own well-being.

Discussion of Advanced Nursing Practice Competencies

A significant objective of this practicum project was to demonstrate Advanced Nursing Practice (ANP) qualities. The Canadian Nurses Association (CNA) (2019) and Hamric et al. (2013) identified key competencies that advanced practice nurses utilize in their practice. The progress of this practicum project has allowed me to demonstrate competence in several ANP competencies. I was able to identify a need for a comprehensive educational resource for patients waiting for cardiac surgery. The development of a preoperative education resource for patients has presented the opportunity to incorporate the advanced practice competencies of research, leadership, communication and collaboration into my practicum project. These competencies

have further developed my nursing knowledge as an APN and allowed for personal and professional growth.

Research

According to the CNA (2019), conducting and incorporating research is essential to ANP. Research utilization and use of research methods are both important research competencies for APNs. Indicators for this competency domain include generating, synthesizing, and applying research into practice (CNA, 2019). The competency of research utilization has been demonstrated through completion of the literature review. The results of the literature review were used to inform the research methods. Additionally, the research utilization competency was met through data collection and analysis which was conducted during the consultations and environmental scan (CNA, 2019). This research was used in the development of the resource manual. The goal of this resource was to enhance the preoperative care provided and improve patient outcomes and has successfully met the goals and objectives of this research project.

Leadership

Leaders are able to identify a need for change and then develop a process and strategies to ensure that the appropriate changes are made. As change agents, leaders look for ways to improve the delivery of patient care and find new operational ways to practice (CNA, 2019). Nurses at all levels need strong leadership skills to contribute to patient safety and provide high levels of care. This practicum has provided a progressive leadership experience. I was fortunate to be able to advocate on behalf of former and future patients. By establishing learning needs and objectives throughout this project, and identifying a need for improved patient education, I have exhibited leadership skills and qualities. I was able to identify patient needs within the cardiac care program and liaise with internal and external partners to foster collaborative relationships.

By conducting interviews, I worked collaboratively to develop partnerships with key stakeholders. Using the CNA's leadership competency, I was able to advocate for the importance of adequate cardiac care education for the benefit of patients, as well as health care providers.

Communication and Collaboration

The CNA (2019) believes effective communication with patients', families, and healthcare providers are important aspects of an APN. I feel that I have adequately used these competencies throughout the development of this practicum project. Initially, through effective communication, partnerships were developed throughout the consultations with a goal to facilitate change within Eastern Health. This included consultations within EH and UOHI. I conducted consultations with key stakeholders and patients and utilized this information throughout the development of the resource. Secondly, both communication and collaboration were frequently used to ensure that the resource manual contained the most relevant, up to date information that was reflective of what it needed. Finally, throughout my practicum project I remained in constant communication and collaboration with my practicum supervisor, Dr. Ann Noseworthy. This demonstrated communication and collaboration throughout both N6660 and N6661.

Next Steps: Implementation and Evaluation Plan

After designing this manual as a resource for patients waiting for cardiac surgery, the next steps include implementation and evaluation of the project to determine the effectiveness and efficacy. In order to successfully implement the resource manual, it must be approved by administration at the practicum site. The initial step will include a presentation of the project and proposed implementation plan to Cassie Chisholm, Regional Director, Cardiac & Critical Care, and Jennifer Matthews, Cardiac Waitlist Manager. Following approval, the resource's content

will then be reviewed. A focus group will be organized to review the manual. This focus group will include the individuals involved in the consultations – such as nurse educators and APNs. APNs refers to nurses working in advanced practice roles, such as clinical nurse specialists and nurse practitioners. This will provide further feedback on the resource and ensure all topics are adequately addressed. Once finalized, a pilot study of this project will be completed for six months, in order to perform a process and outcome evaluation. It will be important to evaluate user uptake and satisfaction. This project will require the use of EH resources, therefore will need approval from the Evaluation Proposals Approval Committee. The mandate of this committee is to review all third-party evaluation/quality initiative proposals that require access to EH resources. I will utilize and engage EH's communications team as they would need to assist with the digital footprint and the ability to make this readily available on the internet.

The resource manual will be mailed to patients once they are placed on the cardiac surgery waitlist. After surgery, the evaluation team will reach out to conduct follow up patient satisfaction surveys for evaluation of the resource. I believe it will be beneficial to present this resource to a wider audience as a way to inform a larger majority of health care providers. This includes but is not limited to family practice physicians, community health nurses, and social workers. All these health professionals should be aware and educated on resources that are available to cardiac patients. Long term goals for this project include presenting the final product and findings of this research to EH and Memorial University of NL. I believe this is an important next step as both are committed to continued improvement of quality patient care and safety through research.

Conclusion

A thorough review of current literature, as well as the data collected from consultations and the environmental scan, indicated that preoperative education can be used to improve patients' experiences. Given the large population of patients undergoing cardiac surgery in NL, and the supportive literature provided surrounding the experienced anxiety and stress related to surgery, it can be said with confidence that this practicum project will be beneficial to patients and health care providers at EH. There was a need to create an updated, accessible resource to educate patients and their families. I am confident that this resource will improve patient education, outcomes and increase satisfaction. The Master of Nursing program has provided me with the necessary skills to complete the development of a resource manual for this practicum project. The methods used throughout N6660 and N6661 demonstrated ANP competencies, while also developing an education resource guided by a theoretical framework and research.

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Appendices

Appendix I: Literature Review Report

Perioperative Patient Education for Patients Waiting for Cardiac Surgery: A Literature Review

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Perioperative Patient Education for Patients Waiting for Cardiac Surgery

Many patients and families are overwhelmed with anxiety by the prospect of undergoing open-heart surgery. Preoperative education has been used to improve patients' experiences by providing relevant health care information, coping skills, and psychosocial support before surgery (Guo et al., 2014). Access to this education is an important factor in improving health outcomes of patients undergoing surgery (Marcus, 2014). Having a resource readily available is important to support these patients. As a Master of Nursing student, with a focus in nursing education, I decided to focus my final practicum project on developing a preoperative teaching resource for these patients. The idea for this practicum project was developed through consultations with the cardiac waitlist manager and the regional director of cardiac care, followed by an informal need's assessment within Eastern Health. These discussions highlighted the lack of an up to date, supportive educational resource that is accessible to patients waiting for cardiac surgery in Newfoundland and Labrador (NL). This waiting period is extremely important and can have a major impact on an individual's overall health outcomes (Indratula et al., 2013).

The purpose of this integrative literature review is to examine current evidence related to preoperative education provided to patients waiting for cardiac surgery. This literature review will discuss the physical and psychological impacts of waiting for cardiac surgery, current preoperative teaching strategies and methods of delivery that are used, and evidence based educational interventions are effective. This will assist in creating a comprehensive resource for patients waiting for cardiac surgery at Eastern Health to meet the overall goal of this practicum. The development of an evidenced based preoperative teaching manual aims to help and support patients and families in preparation for open heart-surgery and recovery. It is hoped that the resource will facilitate communication between the patient and the health care team, and result in

an overall increase in patient, nurse, and provider satisfaction with preoperative cardiac care. To situate this review, I will provide a brief background into the issue. This is followed by a review of the literature including the search strategy, common themes, summary of the evidence, and gaps in the literature. Articles included in the literature review can be found in the literature summary table (Appendix A) and will be critically appraised using the Public Health Agency of Canada [PHAC] (2014) guidelines to draw conclusions and assess evidence value for this practicum project.

Background and Significance

Cardiovascular disease (CVD) is the broad term that encompasses a variety of illnesses including coronary artery disease, cerebrovascular disease, rheumatic heart disorder, and congestive heart failure (World Health Organization [WHO], 2021). CVD is a major health concern and the leading cause of morbidity and mortality in both developed and developing countries (WHO, 2021). An estimated 17.9 million people died from CVDs in 2019, representing 32% of all global deaths (WHO, 2021). In Canada, approximately 2.4 million Canadians are living with cardiac disease and it is the second leading cause of death and one of the top-five reasons for hospitalization in the nation (Canadian Institute for Health Information [CIHI], 2019). Despite advances in prevention, treatment, and surgery, the mortality rate of these diseases continues to rise. In NL, one in three people will be affected by the disease at some point in their lives (Newfoundland & Labrador Centre for Health Information, 2015). Numerous diseases and conditions may necessitate the need for cardiac surgery. The term cardiac surgery and heart surgery are often used interchangeably. Heart surgery is any surgery done on the heart muscle, valves, arteries, or the aorta and other large arteries connected to the heart. The most common reason for an adult to undergo cardiac surgery is myocardial revascularization due to

CVD (Niknejad et al., 2019). The term open heart surgery or coronary artery bypass graft surgery (CABG) has emerged as one of the most common surgical procedures in treatment for CVD. CABG often includes the patient being connected to a heart-lung bypass machine, or bypass pump during surgery. Current statistics reveal that almost 40,000 cardiac surgeries occur in Canada on an annual basis (CIHI, 2017). Outpatient cardiac surgery has grown phenomenally in the past decade, with more than two thirds of all surgical procedures carried out on an outpatient basis, allowing patients to wait at home for their surgery (Hollingsworth et al., 2014).

On March 11, 2020, the WHO declared the coronavirus (COVID-19) disease as a world-wide pandemic (Hassan et al., 2020). Due to the COVID-19 pandemic response, elective surgery cases in Canada have been drastically reduced or stopped completely (Urbach & Martin, 2020). Cardiac surgeons from across Canada have been forced to make drastic changes to their clinical practices. This includes prioritizing and delaying elective cases and altering therapeutic strategies in high-risk patients (Hassan et al., 2020). This has placed a significant strain on the patients and the health care system. Eastern health is the only hospital that provides cardiovascular surgery in NL. As a result of the pandemic response in NL, the majority of all elective surgeries were stopped to build capacity for a possible surge of COVID-19 patients (Quinn, 2020). Due to this decision, the wait list for elective heart surgery has grown. An increased in the length of the waitlist has ultimately led to an increase in waiting time for cardiovascular surgery, and this can be very stressful for patients and their families. This time of uncertainty can cause physiological and psychological problems. In addition, it can cause social issues that are often complicated by deteriorating health and fears of the future (Indratula et al., 2013).

Caring for an individual undergoing cardiac surgery involves a multidisciplinary team approach utilizing the skills of a variety of health care professionals. Stages of cardiac care

includes preoperative, intraoperative and post-operative care. Patients undergoing cardiac surgery have a multitude of learning needs. When these needs are properly addressed, patients can achieve an uncomplicated recovery. In preparation for surgery, preoperative health education of the cardiac surgery patient will play a vital role in the patient's intraoperative outcomes and post-operative recovery process. Enhanced recovery pathways such as “prehabilitation” is the term applied to any intervention administered before surgery to reduce surgery-related morbidity, decrease the length of hospital stay, expedite the return of organ function, and facilitate the patient's return to normal life (Iqbal et al., 2019). Providing sufficient, timely and comprehensive pre-operative education for cardiac surgery patients sets the stage for preventing post-operative complications and improving patient outcomes. Therefore, it is imperative that patients waiting for cardiac surgery receive updated and accurate teaching to be optimally prepared for heart surgery. (Martin et al., 2006)

Search Strategy

Literature review: A systematic review of the literature was conducted in consultation with the librarian to formulate key questions and search terms. Online library databases included CINAHL, PubMed, Google Scholar, and Cochrane Library. Search terms included “cardiac surgery”, “education”, “patient education”, “intervention”, “pre-operative”, “recovery”, “enhanced recovery”, “ERAS” and “teaching”. Search results were limited to academic journals, English language, and publication date within the last 10 years. The goal was to conduct a comprehensive search of all current published peer-reviewed articles.

Literature Review

Forty-nine abstracts were reviewed to search for relevance by identifying the phenomena of interest, methodology, and target population; further reading was granted if the study met

inclusion criteria. To evaluate the quality and strength of the studies, the PHAC (2014) critical appraisal tool kit was used to appraise 16 quantitative studies (Appendix B). Two main themes were identified in the literature: health outcomes and educational interventions. The studies selected to be included in this review were published between 2011 and 2020. The kept articles main focus was on improving patient outcomes through a variety of preoperative educational interventions. Literature reporting is largely analytic in nature but the search did yield some qualitative studies. This literature review consisted of two qualitative studies and 17 quantitative studies, including four literature reviews, eleven analytic studies and two descriptive design (Appendix A).

The review suggests that there is a wealth of evidence in the scholarly literature to validate that preoperative teaching of patients about to undergo surgery can reduce their anxiety and can possibly improve patient outcomes. The object of this review is to present the best available evidence related to preoperative cardiac surgery patient education on preparedness for surgery, patient health outcomes, and to analyze what effective, evidence based educational interventions are being used. In order to get an understanding of this overall experience, **s**pecific review questions were developed. They included:

1. What physical and psychological symptoms do patients experience during the preoperative period? Is education effective in improving these symptoms?
2. What current education tools and interventions are being used? Which form of preoperative education results in the greatest improvement in understanding of the operative procedure and postoperative recovery?

This literature review will include two objectives based on the questions above. The first objective will discuss health outcomes. The second objective will discuss educational

interventions discussed in the literature, including teaching strategies and methods of delivery, in an attempt to determine which interventions are the most effective for patients waiting for cardiac surgery.

Health Outcomes

Anxiety

Pre-operative anxiety is one of the most common emotional responses that a patient can experience when undergoing a surgical treatment. It is usually caused by worries of the unknown and general concerns with the risks of the operation (Kalogianni et al., 2016). Patients about to experience open heart surgery tend to have especially high levels of anxiety (Lai et al., 2021). Although anxiety is a predictable part of the surgical experience, inadequate management is common and can have profound implications (Shahmansouri et al., 2014). Evidence in the literature supports that preoperative teaching of patients about to undergo surgery can reduce anxiety. Eight of the articles included in this review, including seven randomized controlled trials (RCTs) and one systematic review, support that pre-operative education reduced anxiety (Ertürk & Ünlü, 2018; Kalogianni et al., 2016; Lai et al., 2021; Niknejad et al., 2019; Pazar & Iyigun, 2020, Ramesh et al., 2017, Shahmansouri et al., 2014; Zhang et al., 2012). A majority of the RCTs were moderate to strong study designs of medium to high quality.

One study of weak design and medium quality was conducted to investigate the effects of pre-operative individualized education for open-heart surgery patients on post-operative anxiety and pain severity (Ertürk & Ünlü., 2018). This uncontrolled before-after (UCBA), quasi-experimental design study was conducted in two stages. The researchers used the State-Trait Anxiety Inventory (STAI) to assess anxiety and the visual analog scale (VAS) to assess pain. Individualized education was given for 30–90 minutes depending on the patient's needs. The

study concluded that pre-operative mean scores for state anxiety displayed statistically significant differences ($P < 0.05$) and there was a statistically significant relationship between mean pre- and post-operative state anxiety scores and mean pain scores. There was no significant difference detected between mean pre- and post-operative state anxiety scores and the individualized education given before surgery had potential effects on their post-operative pain levels in both sexes.

Similarly, in a RCT by Kalogianni et al. (2016) that included 395 patients who were admitted for elective cardiac surgery, the STAI was used to estimate the effectiveness of a nurse-led preoperative education intervention on anxiety and postoperative outcomes. Postoperative outcomes included complications in the intensive care unit (ICU) and in the ward, duration of tracheal intubation, length of ICU stay, length of hospital stay and hospital readmission within 30 days. There were significant findings in this study which included that nurse-led preoperative education reduced anxiety and postoperative complications of patients undergoing cardiac surgery, although was not effective in reducing readmissions or length of stay. Similarly, Niknejad et al. (2019) used the STAI in their RCT study to measure anxiety. The findings by Niknejad et al. (2019) were similar in that preoperative education had a positive impact on the anxiety level in the candidates for CABG.

Zhang et al. (2012) conducted a prospective RCT on patients undergoing CABG to evaluate how preoperative patient education provided by nurses can influence postoperative complications and anxiety. Patients in the control group received routine education by nurses one or two days before surgery, and patients in the intervention group received structured education by the specially trained nurses three days before surgery. Zung's self-rating anxiety scale was used to evaluate anxiety on admission and on day three after surgery. It was found that the mean

anxiety score was lower in the intervention group. In addition, the subjects in the intervention group reported lower respiratory and cardiovascular complications as well as lower incidence of extremity edema, urinary retention, and constipation. Zhang et al. (2012) concluded that preoperative structured education reduces anxiety and other complications in patients who underwent CABG. Similarly, a medium quality RCT was conducted by Pazar and Iyigun (2020) to evaluate the effects of preoperative education provided to patients before they undergo cardiac surgery. They used the Tension & Anxiety subscale of the Proof of Mood Scale to measure anxiety. Consistent with the findings of Zhang et al. (2012), this study found that patients in the intervention group who received preoperative education had lower anxiety.

Shahmansouri et al. (2014) examined the impact of a brief psychoeducation group intervention on fear and anxiety in patients undergoing CABG. Participants in this RCT were randomized into two groups. The psychoeducation intervention group received education by a psychotherapist in a group format of 5-6 patients in a classroom setting. The education consisted of a discussion of fear and anxiety in a psychotherapeutic atmosphere and relaxation techniques. The baseline program was given in sessions lasting 60 to 90 minutes the day after hospital admission. The goal was to reduce fear and/or anxiety by increasing patient knowledge and promoting healthy behavior change in CABG participants. The findings concluded no significant differences in anxiety scores between the psychoeducation and routine care groups however adding psychoeducation to routine care had a significant and positive effect on fear.

To summarize, preoperative teaching of patients about to undergo surgery can reduce anxiety. A systematic review and meta-analysis strengthened the findings of the majority of the RCTs that have been described (Ramesh et al., 2017). Ramesh et al. (2017) wanted to assess the effect of preoperative education on postoperative outcomes among patients undergoing cardiac

surgery. Six studies included in their review involving 829 patients reported an improvement in anxiety after receiving preoperative education. Analysis with a random effects model concluded that preoperative education significantly reduced anxiety scores (standardized mean difference = -0.96, 95% CI: -1.37, -0.54) in patients undergoing cardiac surgery and demonstrated a statistical difference between the groups ($Z= 4.52$, $P<0.0001$). This literature review was of medium quality, as it cited low quality evidence in their review for anxiety. This was due to study design limitations and inconsistency.

Depression

Cardiac surgery is one of the most stressful psychological burdens placed upon a patient. Loghmani and Minfared (2018) reported that a high percentage of patients suffer from severe depression before surgery, which may continue after surgery has been completed. In an RCT conducted to determine the effect of preoperative training on postoperative depression in patients undergoing open heart surgery, Loghmani and Minfared (2018) hypothesized that education reduces depression in patients undergoing cardiac surgery. Eighty patients were randomly divided into two groups (control and test). Before the surgery, the rate of depression within the two groups was measured by Beck's standard test. The test group received training in two sessions. The first session was 20 to 30 minutes before surgery and included a lecture, use of an educational booklet and a visit to the ICU. Topics included the nature of the disease, type of disease, cause of disease, techniques and complications of surgery. These preoperative measures and care activities were conducted in special care units. The second training session was conducted one day before surgery. The outcomes were measured one month after the surgery. The rate of depression of the two groups was measured and compared. The study findings were statistically significant and the authors concluded that education reduced severe depression by

50% in the test group although did not affect mild to moderate depression ($p < 0.001$, 95% confidence).

Post-Operative Delirium

Delirium is a common complication for patients undergoing cardiac surgery. The incidence of delirium is estimated at 26 to 52% and can dramatically increase the mortality and morbidity of patients undergoing cardiac surgery (Xue et al., 2020). Due to limited data about the effect of individualized preoperative education on the incidence of postoperative delirium, Xue et al. (2020) conducted a RCT of strong design and high quality to investigate the effect of preoperative personalized education on postoperative delirium of patients undergoing cardiac surgery. Patients were randomly allocated into the experimental group and the control group. The experimental group received individualized education by a group of trained educators (ICU nurses) and included a set of education leaflets and an ICU tour. The incidence of the delirium of the experimental group was significantly lower than that of the control group (10.4% vs. 24.2%, P=0.038). While there were some limitations due to the inability for blindness, potential contamination between study groups giving the potential for biases, and the possibility of different education styles by different educators, the study concluded that preoperative individualized education intervention can reduce the incidence of post-operative delirium and promote recovery of patients receiving cardiac surgery.

Length of Stay

Several articles throughout this review attempted to determine if preoperative education prior to cardiac surgery can impact patient readmission and length of hospital stay (Guo et al., 2012; Kalogianni et al., 2016; Xue et al., 2020). A study by Xue et al. (2020) found no statistical

difference between the two groups in hospital-stay and other complications but concluded that mechanical ventilation time and ICU stay of the experimental group was significantly lower (MV time: 13.7±7.6 vs. 18.6±9.8 h, P=0.002; ICU stay: 31.3±9.1 vs. 36.5±10.4 h, P=0.003). The findings in the high quality RCT conducted by Kalogianni et al. (2016) were consistent with the findings of Xue et al. (2020). Both studies found no significant difference in the length of hospital stay. However, unlike Xue et al., (2020), Kalogianni et al. (2016) found no significant difference in ICU stay. In a third RCT by Guo et al. (2012), similar to Kalogianni et al. (2016) and Xue et al. (2020), found that participants in the intervention group spent four hours less in the ICU than the control group (p=0.05). However, no difference was found in overall post-operative hospital stay. The preoperative education group stayed 14 days in hospital compared with 12 days for the usual care group (p=0.17).

Post-Operative Complications

Six of the articles in this review attempted to determine if preoperative education prior to cardiac surgery had an impact on postoperative complications **(**Ertürk & Ünlü, 2018; Guo et al., 2012; Kalogianni et al., 2016; Pazar & Iyigun, 2020, Xue et al., 2020; Zhang et al., 2012). The majority of these studies were strong design of moderate to high quality. Post-operative complications included outcomes such as pain, comfort levels, ventilator synchrony, and hemodynamic stability. Five of the studies concluded that preoperative education is proven to be effective in promoting patient compliance to positive lifestyle changes. These behavioural changes had an impact on risk factors for heart disease and aided in a reduction of postoperative complications (Ertürk & Ünlü, 2018; Kalogianni et al., 2016; Pazar & Iyigun, 2020, Xue et al., 2020; Zhang et al., 2012). While Guo et al. (2012) concluded that an education intervention was effective in reducing anxiety and depression, their intervention had no impact in the severity of

average pain experienced (p=0.13) and current pain experienced (p=0.14). In the UCAB by Ertürk and Ünlü (2018), the individualized education given to patients before surgery was found to have potential effects on their post-operative pain levels therefore it can be concluded that preoperative education has a positive impact on postoperative complications.

Educational Interventions for Patient Education

Throughout this review a variety of educational interventions for cardiac surgery patients were presented in the literature. The main focus of these articles included the most effective educational interventions for cardiac patients. The impact of patient education has been studied extensively worldwide. Health care delivery and education can be challenging for providers. It can be challenging for nurses and other health professionals to ensure that patients have the necessary information to make informed decisions regarding their health. Often, patients and their families are given a considerable amount of information about their health and must make important decisions from these facts. There are obstacles that can prevent accurate delivery of health care information. These obstacles include literacy, culture, language, and physiological barriers. It is up to the health care team to assess and evaluate the patient's values, learning needs, and readiness to learn. Even with the best intentions, patient education that fails to educate can lead to adverse events or poor outcomes. (Beagley, 2011)

Gainer et al. (2017) conducted a qualitative study on decision making among vulnerable patients referred for cardiac surgery. Prior to their study, it was believed that patient's values and preferences were rarely sought. Their aim was to determine an optional approach to decision making for frail, elderly individuals undergoing cardiac surgery. Using a qualitative approach through focus groups of both providers and former patients, five main themes were identified: educational barriers, educational facilitators, patient autonomy and perceived autonomy, patient

and family expectations of care, and decision making advocates. The findings suggested that identifying barriers and facilitators to patient and caretaker engagement in decision making is a key step in the development of a patient-centered decision-making approach.

What is Patient Education?

Traditionally, information is given to patients to understand the experiences that they will encounter during surgery. Patient education refers to all educational activities directed at patients. It is the process by which health professionals impart information to patients, their family members and/or their caregivers (de Melo Ghisi et al., 2014). It has been formally defined as "the process by which health professionals and others impart information to patients that will alter their health behaviors or improve their health status" (de Melo Ghisi et al., 2014, p. 161). Similarly, Kalogianni et al. (2016) defines patient education as "providing the patient with health-related information, psychosocial support and the opportunity to learn selected skills in preparation for surgery" (p. 448). Health education is one of the most important responsibilities of nurses and is an essential health intervention to promote self-care behavior change, but research has shown that it may often lack required effectiveness (Fredricks & Yau, 2017).

Learning Needs

Patients learning needs differ according to disease progression, changes over time and can be influenced by patient's cultural and spiritual traditions (Huriani, 2019). In a descriptive study conducted by Huriani (2019), learning needs after acute myocardial infarction were assessed utilizing the Cardiac Patient Learning Needs Inventory (CPLNI). Huriani (2019) concluded that the learning needs of patients with myocardial infarction are high. In addition, accurate assessment of learning needs is important and it is believed that symptom management

and medication information are the most crucial areas of learning for this population. Similar findings were discussed in a qualitative research study by Peterson et al. (2014). This study concluded that patients with CVD felt they did not receive adequate information from their healthcare provider about their disease. Participants in this study felt that patient education materials should provide both basic information about the clinical aspects of their disease and practical advice on how to achieve and maintain important behavioral changes.

Nurses are ideally placed to provide cardiac surgery patients and their families with the pre-operative health education advice, information and support. Filomeno et al. (2020) and de Melo Ghisi et al. (2014) reported that nurses are the most frequent educators and are often employed to introduce and promote educational strategies. Nurses must consider the learning needs of their patients prior to teaching. Learning needs are defined as the topical areas of interest perceived by the individual as important to learn (Redman, 2006). The inclusion of learning needs into the design of the patient education teaching session is a key element in the process of teaching and learning, as they reflect the patient's personal health experience. Theoretically, incorporating patients' perceived learning needs, beliefs, and/or values into the design of patient education interventions should yield significant outcomes through the acquisition of relevant knowledge, resulting in a change in cognitive states (Fredricks & Yau, 2017). The customization of learning is supported by the findings of Fredricks and Yau (2017) who found that tailored education interventions led to more significant improvements in a patient's adoption of self-care behaviors ($p < .05$) than structured education interventions. Thus, it is important that a health education resource provides the opportunity for patients to select the information they are interested in learning about and ensuring the resource is tailored to patients'

personal learning needs. This supports the use of e a multimodal approach for certain individuals and should be based on personalized learning needs.

Preoperative vs. Postoperative Education

The value of preoperative teaching has long been recognized. Pre-operative preparation of patients has a physiological and a psychological component. As was previously discussed, heart surgery can cause emotional, cognitive and physiological reactions in patients (Ertürk & Ünlü, 2018). An important aspect of the psychological preparation is effective pre-operative education. Filomeno et al. (2020) and de Melo Ghisi et al. (2014) determined that both preoperative and postoperative education interventions can result in positive outcomes in cardiac surgery patients. The development and implementation of evidence-based pre and postoperative teaching materials help patients and caregivers prepare for cardiac surgery and self-care after discharge. de Melo Ghisi et al. (2014) confirmed that a multimodal approach to patient education is the best one if implemented in all three of the following times: preoperative, postoperative and/or both.

Cardiac Rehabilitation. Rehabilitation of patients following CABG has been widely studied (Højskov et al., 2019). Resources to promote recovery following common cardiovascular surgical procedures are made available in the form of patient education initiatives and cardiac rehabilitation programs (Fredricks & Yau, 2017). Cardiac rehabilitation is considered a core component of patient education and is a comprehensive risk reduction program. Healthcare facilities should recommend and organize individualized, well-structured cardiac rehabilitation programs since it is a safe and cost-effective way to improve patient outcomes (Filomeno et al., 2020).

Barriers to Education

Patient education involves more than telling people what to do or giving them instructional materials to read; age, gender, social, economic, cognitive, and environmental factors must also be considered (de Melo Ghisi et al., 2014). Studies confirm that younger patients learn better, and women may be better informed and more active in the decision-making process than men. In addition, economically challenged patients will face additional barriers to learning (de Melo Ghisi et al., 2014). Even with good access to providers, patients with cognitive impairments and low literacy will need interventions tailored to their needs. Different factors may affect patients' ability to learn or engage in interventions, and these factors should be addressed in educational programs**.** A variety of teaching strategies can be used to provide effective patient education, however the learning needs of each patient must be taken into account and cannot be applied in the same way to every patient. Educational materials should be adapted to the population in which they will be used (Peterson et al., 2014). Educational strategies will only be as effective as their audience and there is no "one size fits all" approach.

Teaching Strategies and Delivery Methods of Teaching

Patient education can be applied in a variety of approaches and formats. Patient education delivered in a standardized format involves the delivery of the same content to all patients, while individualized format encompass' education being tailored to reflect the learning needs of the individual (Fredricks & Yau, 2017). The majority of studies discussed throughout this review are medium to high quality RCTs which have been further validated with systematic literature reviews. These studies looked at specific educational interventions. This included teaching strategies and methods of delivery for patient education, whether it be individual, one-on-one, or group training (de Melo Ghisi et al., 2014; Filomeno et al., 2020; Fredricks & Yau, 2017;

Friedman et al., 2011; Guo et al., 2012; Kaloglianni et al., 2016; Lai et al., 2021; Niknejad et al., 2019; O'Brien et al., 2013). In addition to the quantitative research, qualitative research has allowed insight into patient perceptions of education and experiences of waiting for cardiac surgery (Indratula et al., 2013; Peterson et al., 2014)

Peterson et al. (2014) conducted a study using a three step, mixed methods approach to develop and evaluate a self-management educational workbook for patients with CVD. Initially, using a qualitative approach, interviews (n=61) using grounded theory methods were conducted to identify needs and patient perceptions. The second step of the study included the development of an educational workbook, incorporating themes that emerged from the qualitative interviews. In the final step, evaluation of the workbook was completed through a behavioral RCT designed to motivate increased physical activity. In this RCT, 225 post-coronary angioplasty patients received a copy of the workbook. Participants were instructed to use the workbook over 12 months and provide valid feedback during the evaluation. The average age was 63 ± 11 years; 81% were non-Hispanic Caucasian, 12% Hispanic and 10% Black. The cohort was 29% female, and 7% had not completed high school. 89% of participants reported that they had read the workbook. To evaluate the workbook, researchers focused on physical activity to assess health behavior change. Using the Paffenbarger Physical Activity and Exercise Index, physical activity levels were measured from baseline to 12 months. The data revealed that the workbook provided practical health information; enhanced behavior-specific self-efficacy; and reinforced that healthy behaviors decrease risk. Participants who read the workbook had an increase in physical activity at 12-months compared with non-readers ($p=0.093$) and among Black/Hispanic participants, workbook readers' increases were significant (592 vs. −645, $p=0.035$). This mixed

methods study concluded that a self-management educational workbook can provide relevant, disease-specific health information for cardiac patients.

Indratula et al. (2013) conducted a qualitative descriptive study to explore the lived experiences of individuals awaiting coronary artery bypass grafting in Thailand. Eleven northern Thai individuals volunteered to participate. Data were gathered through in-depth interviews and analyzed using content analysis. Two major themes arose in their findings: uncertainty of life and striving to balance well-being. This study found that the extended period of waiting for surgery and the ongoing progression of CAD symptoms created uncertainty that had profound effects on the lives of the participants. Important implications for practice were identified in this study. The qualitative findings concluded that nurses or other healthcare providers must provide patients with education and good support while waiting for CABG. Second, thoroughly understanding the challenging experiences faced by individuals awaiting CABG can assist nurses or other healthcare providers to assess and develop specific programs to improve patients' experiences and health outcomes. Finally, further research is warranted to examine the development and impact of programs to reduce uncertainty of life in the care of individuals awaiting CABG (Indratula et al., 2013).

In a descriptive study by O'Brien et al. (2013), a cross sectional survey was conducted to elicit responses regarding patients' experiences of both preoperative written information received and post-operative services they received while in acute care. The survey also asked about anxiety experienced while on the wait list for surgery, and whether the person subsequently received cardiac rehabilitation. While this study was a weak design of medium quality due to low response rate, single setting, and the possibility that the sample was not representative of the full age range of patients, the findings concluded that written preoperative education provides

patients with a good understanding of what to expect following surgery and preoperative verbal education can assist in reducing anxiety in some patients. 88% indicated that the booklet had assisted them for the post-operative phase and 30.4% experienced stress and anxiety related to the post-operative expectations. 47.3% felt the information provided in the post-surgery education sessions would have been more beneficial before surgery.

Guo et al. (2012) conducted an RCT of 153 adult patients undergoing cardiac surgery who were randomized to either the usual care group or to preoperative education group comprising of usual care plus an information leaflet and verbal advice. The preoperative education group reported a greater decrease in anxiety score (mean difference -3.6 points, 95% confidence interval -4.62 to -2.57; $P<0.001$); a greater decrease in depression score (mean difference -2.1 points, 95% CI -3.19 to -0.92; $P<0.001$) and less interference from pain in sleeping (mean difference -0.9 points, 95% CI -1.63 to -0.16; $P=0.02$). This form of preoperative education intervention is effective in reducing anxiety and depression among Chinese cardiac surgery patients.

Niknejad et al. (2019) conducted a RCT to study the effects of an orientation tour on preoperative anxiety in candidates for CABG. Seventy patients were randomly assigned to a control or intervention group. Control group patients were individually informed by a nurse or a trainer about the routine surgical procedure the day before surgery. The intervention group took part in an orientation tour and were also informed about the procedure individually the day before surgery. The 40-minute tour was conducted by an anesthesia technician, a nurse, and one of the researchers. One limitation of this study was that anxiety levels were not compared at different time points. This study concluded that a preoperative orientation tour had a positive

impact on the anxiety level in the candidates for CABG and can be used as a remarkably effective technique for reducing anxiety and accelerating recovery.

Similarly, a study by Lai et al. (2021) aimed to assess the effect of a preoperative education intervention on patient and family satisfaction levels in the ICU, as well as anxiety and depression. In this RCT, patients who were randomized to the intervention group were provided with a preoperative multifaceted education package one day before surgery, in addition to the standard of care routinely provided. This educational intervention was comprised of a 15-minute educational video and an ICU tour. The primary outcome of satisfaction score was measured using the Chinese 23-item patient satisfaction with the ICU (PS-ICU23) and the 24-item family satisfaction with the ICU (FS-ICU24). The study concluded that providing preoperative information about ICU to elective cardiac patients improved patient and family satisfaction levels.

Filomeno et al. (2020) conducted a scoping literature review that included 19 primary studies addressing nurse-led interventions for patients undergoing cardiac surgery across various settings with similar findings. Included in this review was the RCT by Kaloglianni et al. (2016). The findings concluded that mixed preoperative education interventions can result in positive outcomes in cardiac surgery patients. Methods of delivery included education booklets, lectures and group discussions, lifestyle and verbal counselling, cardiac rehab programs, multimedia instruments, pamphlets in conjunction with videos and face to face patient education. A multimodal approach gives the best outcomes and regardless of the intervention, they should be individualized to meet the patient's needs. The development and implementation of evidence-based pre and postoperative teaching materials help patients and caregivers prepare for cardiac surgery and self-care after discharge.

Consistent with the findings of the discussed throughout this section, Friedman et al. (2011) and de Melo Ghisi et al. (2014) conducted systematic reviews surrounding patient education. The aim of the systematic review by Friedman et al. (2011) was to determine effective teaching strategies and methods of delivery for patient education. In this review, 23 systematic reviews and meta-analyses with data outcomes including patient knowledge, anxiety, and satisfaction were analyzed. The studies were assessed using the AMSTAR tool. Two primary outcomes were identified including teaching strategies and methods of delivery. Findings provided guidance for establishing provincial standards for the delivery of patient education. Patient education teaching strategies included traditional lectures, discussions, simulated games, computer technology, written material, audiovisual sources, verbal recall, demonstration, and roll playing. The methods of delivery were centered on how to deliver the teaching strategies. This included but was not limited to, instructor-centered, interactive, individualized, and experiential learning. Recommendations concerning the efficacy of the teaching strategies and delivery methods were provided.

The goal of the systematic review by de Melo Ghisi et al. (2014) was to investigate the impact of education on patients' knowledge and health behavior change in CVD patients and described the nature of educational interventions delivered. The results suggest that educational interventions within cardiac care increase patients' knowledge and facilitate behavior change. The analysis showed that educational interventions were related to increases in physical activity, healthier dietary habits and smoking cessation, but revealed unclear relation in response to cardiac symptoms, medication adherence and psychosocial well-being. Although the results were mainly positive and supportive regarding the benefit of education intervention, studies included in the review varied significantly with regard to educational interventions characteristics. This

can be considered a significant gap as no data exists to guide healthcare providers on the optimal setting, mode of delivery, intensity, duration and content for provision of patient education for cardiac patients.

Summary

Many studies have investigated whether patient education interventions are successful in improving postoperative outcomes and whether physical and psychological healing is improved after cardiac surgery. Preoperative education has been studied to identify its impact on a wide range of outcomes. For most people, the idea of surgery creates a sense of stress and anxiety. The use of preoperative education in a surgical setting is a favorable intervention with positive patient outcomes. This literature review validates that waiting for cardiovascular surgery can be very stressful for patients and their families. In addition, the literature also validates that a multitude of educational interventions can have a positive impact on these patients.

While there is strong evidence suggesting that educational activities during the cardiac surgery journey can have a positive impact on patient outcomes, literature on the educational strategies and effective methods of preoperative education teaching has not been clearly identified. Consistent with the findings of Ramesh et al. (2017), very few published studies evaluate the effectiveness of preoperative education on postoperative outcomes in cardiac surgery patients. Many studies supported the use of educational sessions with a focus on the preoperative, intraoperative and postoperative phase. The majority of literature included in the analysis supported preoperative educational interventions as a possible technique to relieve patients' physiological and psychological symptoms. Patients who are waiting for surgery receive education through a variety of interventions. This review recommends future research to pinpoint the optimal educational interventions for patients. Further research on the use of a

multimode educational approach would be valuable to all patient populations. While we know a multitude of interventions exist, the research could not confirm which setting, mode and method of delivery was the most effective. A significant gap in the literature is that currently, no data exists to guide health care providers on the optimal setting, mode of delivery, intensity, duration and content for provision of patient education for cardiac patients (de Melo Ghisi et al., 2014).

Some of the research studies included in this review did not provide statistically significant results and this highlights the importance of continued research in this area. Qualitative research on this topic has provided great insight into patient perceptions and the experiences of waiting for cardiac surgery. Further research on preoperative education in cardiac surgical patients should include education strategies and methods of teaching that are individualized, structured and patient specific (Friedman et al., 2011). Further qualitative research in addition to higher quality RCTs are necessary in the area of preoperative patient education to determine its effectiveness and to develop the most effective educational strategies for both the inpatient and outpatient setting. Only one of the studies included in this review evaluated the educational intervention over the long-term (Peterson et al., 2014). Patient interviews using a diverse patient population over a period of time can provide further insight and patient perception in this area. Due to increases in wait list and wait times for elective heart surgery patients, long term educational interventions (3-6 months) should be considered. Articles surrounding Enhanced Recovery After Surgery (ERAS) were reviewed in the literature search for this review, but they did not address this significant gap in the literature. When cardiac surgery patients receive timely, up to date, and accurate education, it optimally prepares them for heart surgery.

Educational Resource Intervention

Cardiac Surgery Patient Education Resource Manual

Patient education is a vital component of health care that enables people with chronic disease to better self-manage their disease (Peterson et al., 2014). There are a variety of effective teaching strategies for the delivery of education that aid in increasing knowledge, decreasing anxiety, and increasing satisfaction. Given the large population of patients undergoing CABG surgery in NL, and the supportive literature provided in this review surrounding the experienced anxiety and stress related to surgery, there is a need to create a resource to educate these patients. The literature supports that CABG surgery used to treat CVD can improve quality of life, increase survival and have an impact on an individual's mental health. Most CVDs can be prevented by addressing behavioral risk factors such as tobacco use, unhealthy diet and obesity, physical inactivity and harmful use of alcohol (WHO, 2021). Peterson et al. (2014) placed emphasis on psychological factors such as stress reduction and smoking cessation. Researchers across the literature demonstrate that education targeted towards patients experiencing cardiac surgery should include the following topics: cardiac disease and surgery, hospital routines, symptom and complication management, medications, recovery and self-monitoring instructions, healthy lifestyle maintenance, hospital contact information, follow-up procedures, and connections to previous patients (Fredericks & Yau, 2017; Huriani, 2019). Preoperative education can ensure that the patient is prepared and optimized for surgery and should be considered a priority nursing task.

Peterson et al. (2014) described a reproducible three-step approach to design and evaluate educational material that can be used to develop new resources for chronic disease groups. Utilizing an interview-based qualitative approach to develop materials to address the learning

needs of patients, they were able to provide culturally relevant, disease-specific education that was proven to be effective. Resource manuals offer flexibility, accessibility, and portability to patients. Patients requiring education have the opportunity to review the information on their own time, at their own pace, and use the manual as a reference to continue learning or review when necessary (Peterson et al., 2014). Written information can improve patient knowledge and reduce confusion, especially if it is provided to the patient prior to the first clinic appointment and provides patients with a good understanding of what to expect following surgery (Friedman et al., 2011). Apart from key stakeholder consultations, and an environmental scan, the findings from this literature review will be used in the development of a resource manual for patients scheduled for cardiac surgery. The goal of this manual is to improve patient education, decrease patients' stress, anxiety and postoperative complication, improve patients' outcome and satisfaction, and thus decrease length of stay after surgery.

Conclusion

Preoperative education has been used to improve patients' experiences by providing relevant health care information, coping skills, and psychosocial support before surgery. Many research studies have investigated whether preoperative, and/or postoperative education interventions were successful in improving postoperative outcomes and increasing physical and psychological recovery after cardiac surgery. Other studies have attempted to determine the most effective educational strategies and methods of delivery. A global pandemic has affected the world throughout the year 2020-2021 and cardiac wait times are at an all-time high. In an attempt to assist patients waiting for cardiac surgery, the focus of this literature review was to assess the impact of comprehensive educational interventions on cardiac patient outcomes. The evidence shows that patient education is expected to decrease the physical and psychological

impacts of some cardiac surgery outcomes such as anxiety and postoperative complications. Not only can it improve patients' outcome, it may lead to an increase in patient and family satisfaction. Further research surrounding effective educational strategies and methods of teaching is required for these patients. Many patients go into their surgeries with high levels of anxiety that could be reduced if they were educated on what they were about to experience and what to expect.

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Appendix II Literature Summary Table

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
A systematic review of patient education in cardiac patients: do they increase knowledge and promote health behavior change? (de Melo Ghisi et al., 2014) **Objective:** To investigate the impact of education on patients' knowledge; to determine if educational interventions are related to health behavior change in cardiac patients; and to describe the nature of educational interventions.	**Setting**: Literature published from database inception until August 2012 was searched using the MEDLINE, PsycINFO, CINAHL, EMBASE and EBM computerized databases Initial searching yielded 6476 records, and 3 records were identified through the snowball hand-search. After the screen, 343 full-articles were assessed for eligibility. Inclusion and exclusion criteria was used. A flow diagram depicting the search results, reasons for exclusion, and study selection was included.	Systematic Literature Review • A literature search of several electronic databases was conducted for published articles from database inception to August 2012. • Eligible articles included cardiac patients, and described delivery of educational interventions by a healthcare provider. • N=42; 23 (55%) were randomized controlled trials, and 16 (38%) were considered ''good'' quality. • **Outcomes:** knowledge, smoking, physical activity, dietary habits, response to symptoms, medication adherence, and psychosocial well-being. • Articles were reviewed by 2 authors independently	• Eleven studies (26%) assessed knowledge and 10 showed a significant increase with education. • Educational interventions were significantly and positively related to physical activity, dietary habits, and smoking cessation. • The nature of interventions was poorly described and most frequently delivered post-discharge, by a nurse, and in groups • Overall results of this review suggest that educational interventions within cardiac care increase patients' knowledge and facilitate behavior change.	**Strengths:** • Analytic studies included • Quality of studies provided • Appropriate databases used for review • 2 reviewers **Limitations:** • Studies included self-reported outcome measures, which can be subject to bias • Generalizability is limited as only English articles were included. • No meta-analysis	Study quality: **Medium** (PHAC, 2014) This systematic review supports the benefits of educational interventions in CAD, through increases in patients' knowledge. Findings support the benefits of educational interventions in CHD, though increase in patients' knowledge and behavior change. Future reporting of education interventions should be more explicitly characterized, in order to be reproducible and assessed.

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
Effects of pre-operative individualized education on anxiety and pain severity in patients following open-heart surgery (Ertürk & Ünlü, 2018) **Objective:** To investigate the effects of pre-operative individualized education for open-heart surgery patients on post-operative anxiety and pain severity.	**Setting**: adult cardiovascular surgery service and intensive care unit of a foundation university hospital between January and October of 2014. **Subjects**: n=109 average age 59.62; 69 7% were male 92.7% were married, 49.5% graduated from primary school 71.6% coronary heart disease. **Inclusion:** Turkish-speaking patients who were 18 years old and over and underwent open-heart surgery.	Uncontrolled before-after, Quasi-experimental design Data collection: First stage • Pre-operative • State-Trait Anxiety Inventory (STAI) Second stage • STAI • Visual analog scale (VAS) - pain Individualized education was given: • 30–90 min depending on the patient's needs • Physical and psychological preparation before the operation • The process of going to the operation • Features of the operating room and the intensive care unit. Tools: Demographic data collected	Anxiety: Pre-operative sources of anxiety were found mainly as lack of knowledge (70.6%), being away from family (21.1%), risk of death (16.5%), and pain (15.6%) 95.4% of the participants were satisfied with preoperative education Significant difference between the participants' age groups and mean pre-operative state anxiety scores ($P < 0.05$). Pre-operative state anxiety scores of the participants aged between 58 and 69 were significantly lower than those of the participants in the 70–83 years old and 22–45 years old age groups. Female patients more likely to experience anxiety Mean pre-operative state anxiety score was 34.34 ± 9.03 (minimum = 20, maximum = 62)	**Strengths:** • Addressed validity of survey tool in scholarly work **Limitations:** • No control group to compare against the pre- and post-operative state anxiety scores of the patients who were provided with individualized education and routine care. • Recruitment strategies were not clearly identified • Lacks adequacy of control of information bias – no information about the researchers	**Study design: Weak** **Study Quality: Medium** (PHAC, 2014) Pre-operative mean scores for state anxiety displayed statistically significant differences ($P < 0.05$). No significant difference was detected between mean pre- and post-operative state anxiety scores. There was a statistically significant relationship between mean pre- and post-operative state anxiety scores and mean pain scores. The individualized education given before surgery had potential effects on their post-operative pain levels in both sexes

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
		State-Trait Anxiety Inventory (STAI) Visual Analog Scale (SAS) <u>Outcomes:</u> Anxiety Pain	Mean post-operative state anxiety score was 35.94 ± 8.92 (minimum = 21, maximum = 65). Mean trait anxiety score was 37.98 ± 8.28 (minimum = 22, maximum = 62). No significant difference was identified between mean pre- and post-operative state anxiety scores ($P > 0.05$) <u>Pain:</u> There was a statistically significant relationship between mean pre- and post-operative state anxiety scores and mean VAS pain scores ($P < 0.05$). A significant difference between mean VAS pain scores according to gender ($P < 0.05$); mean VAS pain scores of female participants (1.98 ± 1.09) were higher than those of males (1.43 ± 0.89).		

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
Educational interventions in the perioperative period of the patient undergoing cardiac surgery: a scoping review of the literature (Filomeno et al., 2020). **Objective:** to map the various types of educational interventions that nurses use, in order to guarantee an improvement in patients undergoing cardiac surgery outcomes.	**Setting**: 10 different countries, but the most of them were from Iran **Inclusion criteria:** publication date 2009 to include the most recent literature of the past 10 years • articles written in Italian and / or English • primary experimental studies: True experimental research designs such as RCT (Randomized Controlled Trial) and Quasi-experimental research design. • nurse-led interventions Keywords were used	Scooping Literature review • Articles included between 2019-2020 • N=19 primary studies addressing nurse-led interventions for patients undergoing cardiac surgery, across various settings • the majority were RCT; others included Quasi-experimental, longitudinal, and Quantitative experimental study	• Preoperative and postoperative education interventions can result in positive outcomes in cardiac surgery patients • The development and implementation of evidence-based pre and postoperative teaching materials, help patients and caregivers prepare for cardiac surgery and self-care after discharge • Interventions that have proven most favorable in reducing psychological distress such as anxiety and depression include information booklet and verbal counselling at the moment of discharge may be useful • Lifestyle counselling intervention demonstrated an improvement in health outcomes and a reduction in readmissions. • Brochures, videos, verbal counselling and psychological interventions were used more frequently and with the best outcomes.	**Strengths:** • Comprehensive search conducted • Analytic and descriptive studies included • Quality of studies provided • Appropriate databases used for review **Limitations:** • No mention of critical appraisal tool validity or reliability • The authors noted generalizability as a limitation based on culturally differences of incivility	**Study quality: Medium** (PHAC, 2014) A multimodal approach in patient education is the best one if implemented in all three of the following times: preoperative, postoperative and/or both. Types of interventions should be individualized according to the patient's needs

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
Clinical effectiveness of individual patient education in heart surgery patients: A systematic review and meta-analysis (Fredericks & Yau, 2017) **Objective**: to compare the effectiveness of individualized patient education interventions to standardized patient education interventions	Inclusion criteria • were eighteen years or older • undergoing first CABG and/or VR procedure • received standardized education for the determination of its effectiveness • RCTs - meta-analytic approach	Systematic Review – • N=17 RCT studies included 2624 study participants • Cross-over trials were excluded • Studies that included an individualized patient education intervention provided to individuals following cardiovascular surgery were included • Individualized patient education interventions included: complications, activities, medication, nutrition, symptom management and control, and psychological symptoms. • The education included brochures, pamphlets, online, books, audiotape, videotape, and/or Skype • Range between one to seven sessions in terms of number of times delivered, with variability in the length of time for delivery of each individualized education session	• Individualized patient education interventions are effective for patients following CABG and/or VR. • A health care provider who is trained to deliver patient education interventions can provide the education • Professionals should be taught how to use open communication strategies • These education sessions should ideally begin immediately following surgery or when the patient is able to consciously interact with their health care provider.	**Strengths:** • Comprehensive search conducted • Analytic (RCT) studies included • Quality of studies provided • Appropriate databases used for review • Cochrane Collaboration's tool for assessing risk of bias was used **Limitations:** • Small number of studies included	**Study quality: High** (PHAC, 2014) Favorable effects on the readmission rates Individualized patient education intervention is effective in promoting statistically significant changes in quality of life, performance of health behaviours, depression, and anxiety. Study quality: **High** (PHAC, 2014)

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
Effective teaching strategies and methods of delivery for patient education: a systematic review and practice guideline recommendations (Friedman et al., 2011) **Objective**: The objective of this study was to determine effective teaching strategies and methods of delivery for patient education (PE).	Inclusion criteria: • English language • Systematic reviews or meta-analyses that examined teaching strategies and methods of delivery for PE. • Teaching intervention versus standard care (control) and/or teaching intervention versus another teaching intervention.	A systematic review N= 23 systematic reviews and meta-analyses with data outcomes: patient knowledge, anxiety, and satisfaction Studies assessed using the AMSTAR tool <u>Outcomes:</u> Teaching strategies Methods of delivery	<u>Teaching strategies:</u> identified are traditional lectures, discussions, simulated games, computer technology, written material, audiovisual sources, verbal recall, demonstration, and role playing. Teaching strategies that increased knowledge, decreased anxiety, and increased satisfaction included computer technology, audio and videotapes, written materials, and demonstrations. Various teaching strategies used in combination were similarly successful Structured, culturally appropriate- and patient-specific teachings were found to be better than ad hoc teaching or generalized teaching. <u>Methods of delivery:</u> focused on how to deliver the teaching strategies.	**Strengths:** • Comprehensive search conducted • Included high quality systematic reviews and meta-analyses • External review process • Effect size and statistical significance was appropriate **Limitations:** • Tools to measure outcomes not always validated	**Quality: High** (PHAC, 2014) Findings provide guidance for establishing provincial standards for the delivery of PE. Recommendations concerning the efficacy of the teaching strategies and delivery methods are provided.

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
A preoperative education intervention to reduce anxiety and improve recovery among Chinese cardiac patients: a randomized controlled trial (Guo et al., 2012) **Objective**: To determine whether a preoperative education intervention designed for Chinese cardiac patients can reduce anxiety and improve recovery.	**Setting:** cardiac surgery wards of 2 hospitals in Luoyang, China **Subjects:** all adult patients undergoing elective cardiac surgery were eligible. Emergency and Reoperations were excluded. 153 participants randomized, 135 (88.2%) completed the trial	Randomized Control Trial (RCT) Block Randomization was used Intervention: n=76 to preoperative education group comprising usual care plus an information leaflet and verbal advice. Control: n=77; usual care Tools: Hospital Anxiety and Depression Scale (HADS) Brief Pain Inventory-short form (BPI-sf) Outcomes: Anxiety Depression Pain Length of Intensive Care Unit stay Postoperative hospital stay Measurement was conducted before randomization and at seven days following surgery	Intervention: Greater decrease in anxiety score (mean difference -3.6 points, 95% confidence interval -4.62 to -2.57; P<0.001) Greater decrease in depression score (mean difference -2.1 points, 95% CI -3.19 to -0.92; P<0.001) No difference between groups in: average pain, current pain, and interference in general activity, mood and walking ability. Patients randomized to the preoperative education group reported less interference from pain in sleeping (mean difference -0.9 points, 95% CI -1.63 to -0.16; P=0.02). Evidence to suggest a reduced number of hours spent in the Intensive Care Unit among preoperative education patients (P=0.05) but no difference in length of postoperative hospital stay (P=0.17).	**Strengths:** • Adequate control of confounding • Moderate retention (>80%) • Valid and reliable Tools used • Assessors were blinded **Limitations:** • Possible contamination between two groups – sharing of materials • Different educators utilizing different education techniques or styles.	**Design strength: Strong** **Quality: Moderate** (PHAC, 2014) This form of preoperative education is effective in reducing anxiety and depression among Chinese cardiac surgery patients. Based upon existing evidence and international practice, preoperative education should be incorporated into routine practice to prepare Chinese cardiac patients for surgery.

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
Myocardial infarction patients' learning needs: Perceptions of patients, family members and nurses (Huriani et al., 2019). **Objective:** to identify and compare patient with myocardial infarction, their family member, and cardiac nurse perceptions on the learning needs of patients with myocardial infarction in the acute, sub-acute, and post-acute phases.	**Setting**: Padang, Indonesia **Subjects**: 288 patients with myocardial infarction, 145 family members, and 40 cardiac unit nurses	Descriptive Study - Survey Tools: Cardiac Patient Learning Need Inventory (CPLNI); demographic infromation Data Analysis: descriptive statistical analysis and ANOVA; Games-Howell post-hoc testing	Findings: • the learning needs of patients with myocardial infarction were high • cardiac patient learning needs was highest in the group of patients in the cardiac ward • differences in patient, family member, and nurse perceptions related to information required by patients with myocardial infarction • Medication information domain was priority among patient • symptom management domain was priority among family member. • Information given immediately after the event and when the patient is ready to receive it is expected to be better absorbed by the patient and to affect long-term patient behavior. • an accurate assessment of learning need should be performed prior to health education.	**Strengths:** • Valid and reliable Tools used • High response rate • Moderate data collection methods • Representative sample **Limitations:** • Single setting • Potential bias related to sample	**Design strength: Weak** **Quality: Moderate** (PHAC, 2014) • Patients, family members, and nurses have different perceptions regarding the learning needs of patients with myocardial infarction. • Patient-centered, individualized education and attention to learning should be priority.

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
Experiences of Thai individuals awaiting coronary artery bypass grafting: A qualitative study (Indratula et al., 2013) **Objective:** to explored the lived experiences of individuals awaiting coronary artery bypass grafting in Thailand.	**Setting**: University hospital in Chiang Mai, Thailand. **Subjects**: N= 11; 6 men and 5 women who successfully underwent CABG. All participants had triple-vessel CAD with ejection fractions of 47–70.2%; two or more comorbid conditions Exclusion: experiencing an emergency CABG or receiving urgent or repeated CABG	A qualitative, descriptive approach underpinned by the naturalistic inquiry. Data Collection: In-depth interviews; At least two interviews were conducted with each participant; each initial and subsequent interview lasted 1–2 h and 30–50 min; If required, a third interview was conducted until sufficient depth of information relevant to the participant's waiting experience was obtained. Data Analysis: Qualitative content analysis	Findings: The three most commonly-reported comorbid conditions were: dyslipidemia (n = 11), hypertension (n = 9), and diabetes (n = 6). Key Participant Themes: 1. Uncertainty of life - a dynamic emotional state of being unsure or insecure in life, but its occurrence depended on the individual situation. Two subthemes include: • Fear of death • Fear of disability 2. Striving to balance well-being (not included in this paper)	**Strengths:** • Adherence to qualitative methodology • Purposive sampling • Consent obtained • Data saturation achieved • Trustworthiness, Confirmability and credibility of the data was maintained • Information confirmed with participants **Limitations:** • Transferability - findings might not be applicable to those outside of Thailand	**Medium credibility** (Lincoln and Guba, 1985) JBI Checklist (2017) Overall Appraisal The findings provide insight into the experiences of individuals awaiting coronary artery bypass grafting and will assist nurses and other healthcare providers in creating timely programs and appropriate interventions to reduce uncertainty of life while awaiting surgery.

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
Can nurse-led preoperative education reduce anxiety and postoperative complications of patients undergoing cardiac surgery? (Kalogianni et al., 2016) **Objective:** to estimate the effectiveness of a nurse-led preoperative education on anxiety and postoperative outcomes.	**Setting:** cardiac surgery department of a general hospital in Athens, Greece **Subjects:** n=395 patients who were admitted for elective cardiac surgery.	Randomized Control Trial (RCT) Random allocation Intervention: n=205; all patients in the intervention group received a booklet with information about the cardiac surgery and perioperative process. The educational intervention included a mixture of content: procedural, psychoeducational and skills Control: n=190; usual care - standard information was unstructured, verbal and limited Tools: State–trait anxiety inventory (STAI) Outcomes: • Level of state anxiety • Complications in the ICU and in the ward • Duration of tracheal intubation • Length of ICU stay • Length of hospital stay • Hospital readmission	Intervention: Greater decrease in anxiety score (mean difference -3.6 points, 95% confidence interval -4.62 to -2.57; P<0.001) Greater decrease in depression score (mean difference -2.1 points, 95% CI -3.19 to -0.92; P<0.001) No difference between groups in: average pain, current pain, and interference in general activity, mood and walking ability. Patients randomized to the preoperative education group reported less interference from pain in sleeping (mean difference -0.9 points, 95% CI -1.63 to -0.16; P=0.02). Evidence to suggest a reduced number of hours spent in the Intensive Care Unit among preoperative education patients (P=0.05) but no difference in length of postoperative hospital stay (P=0.17).	**Strengths:** • Adequate control of confounding and information biases • Strong retention (>95%) • Strong statistical tests including linear regression • V&R tools • Valid & Reliable Tools used • Large sample • No one lost to follow up or excluded from analysis **Limitations:** • Single center study • Different educators utilizing different education techniques or styles.	**Design strength: Strong** **Quality: High as per** PHAC (2014) Preoperative education delivered by nurses: • reduced anxiety • reduced postoperative complications of patients undergoing cardiac surgery • Was not effective in reducing readmissions or length of stay.

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
Effect of preoperative education and ICU tour on patient and family satisfaction and anxiety in the intensive care unit after elective cardiac surgery: a randomised control trial (Lai et al., 2021) **Objective**: To assess the effect of a preoperative multifaceted education intervention on patient and family satisfaction levels in the ICU and measures of perioperative patients' anxiety and depression.	**Setting**: Prince of Wales Hospital, Hong Kong **Subjects**: n=100 elective cardiac surgery patients and their family members	Randomized Control Trial (RCT) - two armed, parallel Blinded Block randomization with 1:1 allocation <u>Intervention:</u> n=50 Preoperative education including video + ICU tour in addition to standard treatment <u>Control:</u> n=50; Standard treatment <u>Tools:</u> PS-ICU23 and FS-ICU24 questionnaire Hospital Anxiety and Depression Scale <u>Outcomes</u>: • Patient and family satisfaction levels with ICU • Preoperative Anxiety & Depression Outcomes measured Days 1 pre surgery and day 3 post surgery.	<u>Findings:</u> Preoperative education was associated with higher overall patient (mean difference (MD) 6.7, 95% CI 0.2 to 13.2) and family (MD 10.0, 95% CI 3.8 to 16.3) satisfaction scores. Weak association between preoperative education and a reduction in patient's anxiety scores over time (MD −1.7, 95% CI −3.5 to 0.0). No evidence of a treatment effect on patient's depression scores over time (MD −0.6, 95% CI −2.3 to 1.2).	**Strengths:** • High retention (95%) • Valid & Reliable Tools used • Random assignment to groups • Similar demographic characteristics in both groups • Strong intervention integrity **Limitations:** • Lack of sophisticated tests – control of confounding was limited • Single hospital – limited generalizability of the findings	**Design strength: Strong** **Quality: Medium (PHAC, 2014)** Providing preoperative information about ICU to elective cardiac patients: • Improved patient and family satisfaction levels • May decrease patient anxiety • Does not decrease patient depression

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
The effect of preoperative training on postoperative depression in patients undergoing open heart surgery (Loghmani & Monfard, 2018) **Objective**: to evaluates the effect of preoperative training on depression in patients undergoing cardiac surgery	**Setting**: Shahid Mondares Hospital, Iran **Subjects**: n=80 patients who were undergoing cardiac surgery	Randomized Control Trial (RCT) Intervention: n=40; training method included lecture, use of the educational booklet and visit the ICU Control: n=40; routine care Tools: 4 stages of data collection Demographic questionnaire Beck's Standard Test Outcomes: Depression • measured pre-surgery and 1 month after surgery	Findings: Training reduced severe depression by 50% but did not affect mild to moderate depression. Significant difference between depression between control and intervention group. ($p<0.01$, 95% CI)	**Strengths:** • High retention (95%) • Valid & Reliable Tools used • Random assignment to groups • Similar demographic characteristics in both groups **Limitations:** • Lack of sophisticated tests (linear regression) – control of confounding was limited	**Design strength: Strong** **Quality: Medium (PHAC, 2014)** Education reduces the physical as well as mental and psychological problems of individuals. Communication and education increases patient hopefulness, facilitates recovery and reduces depression.

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
Effects of an orientation tour on preoperative anxiety in candidates for coronary artery bypass grafting: A randomized clinical trial (Niknejad et al., 2019) Objective: to explore the effects of an orientation tour on preoperative anxiety in candidates for coronary artery bypass grafting (CABG).	**Setting**: Shahid Chamran Hospital in Isfahan **Subjects:** N=70 patients who were candidate for CABG	Randomized Control Trial (RCT) randomly assigned Intervention: n=35 patients were informed about the procedure individually the day before surgery. An anesthesia technician, a nurse, and one of the researchers led the tour, which lasted 40 minutes: 10 minutes for visiting an unoccupied operating room during an evening shift, 5 minutes for visiting the intensive care unit (ICU), 10 minutes for vising the surgical unit, getting acquainted with personnel and patients there, and answering questions about CABG, and 15 minutes for speaking with inpatients. Control: n=35 patients were individually informed by a nurse or a trainer about the routine surgical procedure in the unit the day before surgery. Tools: State-Trait Anxiety Inventory (STAI). Outcomes: Anxiety	Anxiety: No significant difference between the intervention group (42.43 ± 13.24) and the control group (45.11 ± 10.19) with respect to the pre-intervention state anxiety level (P = 0.340) No significant difference between the intervention (43.71 ± 12.04) and control (45.03 ± 8.76) groups with respect to the pre-intervention trait anxiety level (P = 0.600). Before surgery: • the trait anxiety level was significantly lower in the intervention group (35.40 ± 10.24) than in the control group (46.91 ± 9.51) (P < 0.001). • the state anxiety level was significantly lower in the intervention group (34.83 ± 11.15) than in the control group (47.69 ± 11.30) (P < 0.001)	**Strengths:** • appropriate statistical analysis • Adequate control of confounding • High retention (95%) • Valid & Reliable Tools used • Random group assignment **Limitations:** • Anxiety levels were not compared at different points in time, could be considered in future studies.	**Design strength: Strong** **Quality: Medium** (PHAC, 2014) The preoperative orientation tour had a positive impact on the anxiety level in the candidates for CABG. An orientation tour can be used as a highly effective technique for relieving anxiety and accelerating recovery. It can also help minimize treatment costs associated with a long-term recovery.

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
Pre-surgery education for elective cardiac surgery patients: A survey from the patient's perspective (O'Brien et al., 2013) **Objective**: to evaluate cardiac surgery patients' perception of the effectiveness and timing of pre-admission multidisciplinary written information and post-operative verbal education provided by occupational therapy.	**Setting:** Melbourne, Victoria, Australia • Cardiothoracic surgery unit at The Alfred **Subjects:** • N= sent to 375 people who had cardiac surgery in 2009-2010. • 210 CABG (56%), 97 Valve (25.9%), 46 CABG with valve replacement (12.3%) 22 other cardiac surgery • (5.8%) • 263 (70.1%) were men; 112 (29.9%) were women • Mean age was 66 years (range: 20–91 years). • N=118 surveys returned (response rate of 31.4%)	Descriptive, Cross-sectional • A survey was designed to elicit responses regarding patients' experiences of both preoperative written information received and post-operative services they received from occupational therapy while in acute care. • It also asked about anxiety experienced while on the wait list for surgery, and whether the person subsequently received cardiac rehabilitation <u>Data Collection:</u> • Written survey • The survey comprised 11 questions requiring a dichotomous (Yes/No) response, and 7 prompt questions, depending on the initial response	**Key Results** • 105 (89%) recalled receiving and reading the pre-surgery information booklet and felt prepared. • 2 participants indicated that they did not read it. • 9 (7.6%) respondents indicated that they did not understand the information provided • 104 agreed that they followed the recommendations • 98 (88%) indicated that the booklet had assisted them for the post-operative phase • 30.4% experienced stress and anxiety related to the post-operative expectations • 47.3% felt the information provided in the occupational theory education sessions would have been more beneficial before surgery.	**Strengths:** • Adequate statistical tests used **Limitations:** • Low response rate • Single Setting • participants did not reveal their age • and it is possible that sample was not representative of the full age range of patients • Measurement instrument not based on standardized, reliable outcome measurements • self-assessment bias from survey completion	**Study design: Weak** **Study quality: Medium** (PHAC, 2014) Written preoperative education provides patients with a good understanding of what to expect following surgery. Preoperative verbal education can assist in reducing anxiety in some patients.

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
The effects of preoperative education of cardiac patients on hemodynamic parameters, comfort, anxiety and patient-ventilator synchrony: A randomised, controlled trial (Pazar & Iyigun, 2020). **Objective:** to evaluate the effects of preoperative education regarding haemodynamic parameters, patient comfort and anxiety, and patient-ventilator synchrony provided to patients before they undergo cardiac surgery.	**Setting:** Cardiovascular surgery clinic in Turkey **Subjects:** N=200 who underwent cardiac surgery and mechanical ventilation	Prospective Randomized Control Trial (RCT) • block randomization method Intervention: n=100; received preoperative education on mechanical ventilation and communication panel Control: n= 100; no education Data was collection post op day 2 while the patients were on mechanical ventilation support in the ICU. Tools: • Evaluation form on patient-ventilator synchrony • Tension & Anxiety subscale of the Proof of Mood Scale • Paranesthesia Comfort Questionnaire (PCQ) • Comfort Evaluation Form (CEF) Outcomes: • Ventilator synchrony • Hemodynamic stability • Anxiety	Ventilator synchrony: difference between the patient-ventilator synchrony levels of the participants in the intervention and the control groups were statistically significant ($p < 0.01$) Hemodynamic stability: differences between the hemodynamic measurements of the patients in both groups, which were measured after the patients woke up and before extubation, were also statistically significant ($p < 0.05$). Anxiety: The difference between the intervention and the control groups was statistically significant (anxiety felt when the patient saw the endotracheal tube, communication difficulties with endotracheal tube, discomfort due to endotracheal tube, feeling of thirst due to endotracheal tube and shortness of breath due to endotracheal tube $p < 0.001$).	**Strengths:** • Strong statistics • Adequate control of confounding • High retention (95%) **Limitations:** • Validity and reliability of data collection tools not tested • Single hospital – limited generalizability of the findings • Effectiveness of the education was assessed by the researchers • Unblinded design	**Design strength: Strong** **Quality: Medium** (PHAC, 2014) Patients in the intervention group (education) had: • Higher patient-ventilator synchrony • Comfort • Hemodynamic stability • Lower anxiety

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
		• Comfort	Comfort: The difference between the PCQ scores and the anxiety scores during mechanical ventilation, which were obtained from the patients in the intervention and control groups, were statistically significant ($p < 0.001$) therefore education given to participants in the intervention group in the preoperative period was effective.		
Developing self-management education in coronary artery disease (Peterson et al., 2014). **Objective:** to develop and evaluate a novel coronary artery disease (CAD) self-management educational workbook.	**Setting**: New York, United States **Subjects**: Qualitative: N=61 post-angioplasty patients 3 years after enrollment in a previous behavioral study. Quantitative: N=225 225 post-coronary angioplasty patients; average age was 63 ± 11 years; 81% were non-Hispanic Caucasian, 12% Hispanic and 10% Black; 29% female, and 7% had not completed	Mixed-method Approach – 1) conducting qualitative interviews to identify needs and perceptions of disease in a cohort with CAD 2) developing the self-management workbook employing Social Cognitive Theory and incorporating patient-generated themes that emerged from the qualitative interviews 3) Implementing the workbook as a tool within a larger behavioral intervention study and evaluating patients' use and experience with the workbook at the end of 12	Qualitative Results:4 Main Themes: • Feelings of vulnerability and fear of uncertainty and death • Experiencing a "turning point" in life that helped some people to change health behaviors • Social support from family, friends and other CAD patients that helped them cope • Beliefs that "nothing helps" CAD or beliefs that CAD has been "cured" by coronary angioplasty e both of which were associated	**Strengths:** • Bandura Social Cognitive Theory as theoretical framework **Limitations:** • Purposive sampling for interviews.	**Design strength: Strong** **Quality: Medium** (PHAC, 2014) A self-management educational workbook developed using qualitative methods can provide relevant, disease-specific health information for patients with CAD. • Patients with coronary disease often perceive that they do not have adequate information

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
	high school.	months. <u>Quantitative Data Analysis:</u> • The workbook, Living with Heart Disease: Taking Control after Angioplasty is a 29-page, colorfully illustrated spiral-bound booklet containing seven chapters. • distributed the workbook to a second post-coronary angioplasty cohort, all enrolled as participants in a behavioral randomized controlled trial (RCT) designed to motivate increased physical activity over 12 months. • Enrolled participants immediately following coronary angioplasty and followed them for one year. Participants in both the control group and intervention group received a copy of the workbook. Contacted participants by telephone at bimonthly	with unsuccessful behavioral change. Participants reported that the workbook: • provided practical health information (n = 75) • enhanced their confidence (n = 34) • reinforced the concept that health behaviors decrease risk (n = 7) • provided stories about people like them who face similar challenges (n = 2) <u>Quantitative Results</u> • After 12 months, the workbook provided practical health information; enhanced behavior-specific self-efficacy; and reinforced that healthy behaviors decrease risk. • Participants who read the workbook had greater within-patient increases in physical activity at 12-months compared with non-readers (p= 0.093)		from their health care provider about etiology, prognosis and ongoing challenges of living with their disease, including symptom management. • Patient education materials should provide both basic information about the clinical aspects of a particular disease and practical advice on how to achieve and maintain important behavioral changes. • Educational materials should be adapted to the population in which they will be used. This can be accomplished through the development and pilot-testing of self-management materials that are grounded in user needs and perceptions.

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
		intervals and instructed them to read a specific chapter of the self-management workbook. • 89% of participants reported that they had read the workbook.	• Black/Hispanic participants, workbook readers' increases were significant (592 vs. 645 kilocalories per week, p = 0.035). • For those who read the workbook, mean self-efficacy over 12 months was 8.5 1.6 vs. 8.9 1.4 among those who did not read the workbook (p = 0.06). • Within-patient change in self-efficacy from baseline to 12 months, there were no differences between the two groups (p = 0.68).		

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
Effect of Preoperative Education on Postoperative Outcomes Among Patients Undergoing Cardiac Surgery: A Systematic Review and Meta-Analysis (Ramesh et al., 2017) **Objective:** to assess the effect of preoperative education on postoperative outcomes among patients undergoing cardiac surgery.	• Inclusion criteria articles 1995-2015 • English language • Adult patients undergoing any form of cardiac surgery inclusive of CABG surgery or valve replacement or repair. • Search terms included patient education, preoperative education, anxiety, fear, pain, discomfort, surgical outcomes, postoperative outcomes, cardiac surgery, cardiac surgical procedures, and coronary artery bypass graft surgery • Duplicate studies and records were excluded	Systematic review and meta-analysis. 14 RCTs were included 10 RCT's included in meta-analysis 2,071 patient's total Data analysis: RevMan software and created the Supplementary Appendix using the GRADE approach. <u>Outcomes:</u> Anxiety n=6 studies 829 pts Depression n=4 studies/435 pts Pain n=4 studies/704 pts Length of stay n= 5 studies/ 1275 pts	<u>Analysis:</u> Random effects model <u>Findings:</u> **Anxiety:** preoperative education significantly reduced anxiety scores (standardized mean difference = −0.96, 95% CI: −1.37, −0.54) in patients undergoing cardiac surgery and there were statistically significant between groups differences (Z = 4.52, P < .0001) **Pain**: no significant statistical difference (standardized mean difference = −0.00, 95% CI: −0.15, −0.15; Z = 0.00, P = 1.00) between patients. **Depression:** no significant statistical difference (standardized mean difference = −0.64, 95% CI: −1.70, 0.43; Z = 1.16, P = .24) between patients. **Length of Stay:** no significant statistical difference (standard mean difference = −0.05, 95% CI: −0.34, −0.23; Z = 0.38, P = .70) between patients.	**Strengths:** • Appropriate databases used for review • Comprehensive search conducted • Analytic (RCTs) studies included • The risk of bias of included studies was assessed **Limitations:** • Low-quality studies included • The authors noted generalizability as a limitation - reduced ability to generalize results • No mention of critical appraisal tool validity or reliability • Some results were inconclusive	**Study quality: Medium** (PHAC, 2014) Preoperative education significantly reduced anxiety scores in patients undergoing cardiac surgery. Evidence on other outcomes (eg, pain, depression, length of stay) still remains inconclusive. Evidence of the effect of preoperative education in patients undergoing cardiac surgery remains inadequate.

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
Effects of a psychoeducation intervention on fear and anxiety about surgery: randomized trial in patients undergoing coronary artery bypass grafting (Shahmansouri et al., 2013). **Objective:** to examine the impact of a brief psychoeducation group intervention on fear and anxiety in patients undergoing the coronary artery bypass grafting (CABG).	**Setting:** Tehran Heart Center, Iran S**ubjects**: n= 60 consecutive patients undergoing CABG	Randomized Control Trial (RCT) Intervention: n=29; psychoeducation group including discussion of fear and anxiety and relaxation techniques + routine care Control: n=31; routine care Tools: • Bypass Grafting Fear Scale (BGFS) • Spielerger State Inventory (STAI) Questionnaire • Given to patients on day after hospital admission and a day before the operation to measure fear and anxiety Outcomes: Fear Anxiety	**Fear:** Intervention: mean (SD) fear score decreased from 4.6 (1.7) at baseline to 2.8 (1.2) before the operation ($p < .001$). Control: a nonsignificant trend from 3.7 (1.9) to 4.1 (2.1) ($p > .05$). The mean difference in fear score before the operation was significantly lower in the psychoeducation group than the routine care group (mean difference -1.3; 95% CI, -2.1, -.2; $p < .05$). **Anxiety:** There were no differences in anxiety scores before the operation between the psychoeducation and routine care groups.	**Strengths:** • Strong assessment of internal validity • Blinding not possible, but biases minimized • Strong statistics • Adequate control of confounding • High retention (95%) • Valid & Reliable Tools used **Limitations:** • Small sample size, larger study population needed	**Design strength: Strong** **Quality: Medium** (PHAC, 2014) Adding psychoeducation to routine care has a positive effect on fear but not anxiety scores.

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
Preoperative individualized education intervention reduces delirium after cardiac surgery: a randomized controlled study (Xue et al., 2020) **Objective:** to investigate the effect of preoperative personalized education on postoperative delirium of patients undergoing cardiac surgery.	**Setting:** Shanghai, China **Subjects:** n = 133**;** patients admitted for CPB surgery • 220 patients were recruited and screened; 156 enrolled and 133 completed the study • Similar baseline characteristics	Randomized Control Trial (RCT) <u>Intervention:</u> n=67; Education intervention using trained ICU nurses, education leaflets, and ICU experience education and ICU tour. <u>Control:</u> N=66; routine care by physicians and nurse; introduction to surgery and general routine education. <u>Tools:</u> Confusion Assessment Method for the ICU (CAM-ICU) <u>Outcomes:</u> Delirium In-hospital death Mechanical ventilation time Time to discharge Time of ICU Stay Post-operative complications	**Delirium:** Intervention group: 10.4% Control group: 24.2 % P=0.038 **Mechanical Ventilation Time** Intervention group: 13.7 Control group: 18.6 P=0.004 **ICU Stay** Intervention group: 31.3 Control group: 36.5 P=0.003 No significant difference between groups in hospital stay and other complications	**Strengths:** • Blinding not possible, but biases minimized • Strong statistics • Adequate control of confounding • High retention (95%) • V&R tools • Valid & Reliable Tools used **Limitations:** • Possible contamination between two groups – sharing of materials • Different educators utilizing different education techniques or styles.	**Design strength: Strong** **Quality: High** (PHAC, 2014) Preoperative individualized education intervention can reduce the incidence of post-operative delirium and promote recovery of patients receiving cardiac surgery.

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion
Impact of nurse-initiated preoperative education on postoperative anxiety symptoms and complications after coronary artery bypass grafting (Zhang et al., 2012). **Objective:** to evaluate the effect of nurse-initiated preoperative education and counseling on postoperative complications and anxiety symptoms following CABG.	**Setting:** Shandong, People's Republic of China • Liaocheng People's Hospital, and Liaocheng Clinical School of Taishan Medical University • Subjects: n=40; patients who were admitted waiting for elective CABG surgery • High surgical risk candidates with EuroSCORE of 6 and above • 112 patients were screened	Prospective Randomized Control Trial (RCT) <u>Intervention:</u> N=20 received standard preoperative and postoperative care + structured education and counselling course supervised by nurses 3 days before surgery. The course was composed of 3 major areas: 1. Pulmonary care techniques including abdominal breathing and effective coughing. 2. Postoperative rehabilitation 3. Psychological counseling <u>Control:</u> N=20 received standard preoperative and postoperative care on admission 1-2 days before surgery. <u>Tools:</u> Zung's 8 self-rating anxiety	• There was no statistically significant difference in the baseline characteristics or operational data between the 2 groups (P > .05). • Edema, urinary retention, constipation, respiratory infection, and deep venous thrombosis in the study group was lower than in the control group (P > .05) • The mean postoperative SAS scores in the intervention group was lower than in the control group <u>SAS scores, mean (SD)</u> **Before surgery** Intervention: 49.6 (7.3) Control: 50.5 (9.4) P= 0.11 **After surgery** Intervention 40.1 (6.5) Control 48.9 (7.3) P=.01 • The proportion of patients with a SAS score greater than 40 in the study group was also	**Strengths:** • Blinding not possible, but biases minimized with data collection (assessors blinded to participant groupings) • Strong statistics • Adequate control of confounding • High retention (95%) **Limitations:** • Reliable and validity of SAS scale not discussed • Small Sample Size	**Design strength: Strong** **Quality: Medium** (PHAC, 2014) Nurse-initiated preoperative education and counselling is associated with: • a reduced rate of perioperative complications • a reduced level or anxiety following CABG.

Name, Author, Date, Study Objective	Sample/Groups (Size, Setting, Characteristics)	Design and Methodology	Key Results and Findings	Strengths/Limitations	Conclusion

		scale (SAS).
		
		<u>Outcomes:</u>
		
		• Anxiety
		• Post-op complications
		  • Death
		  • Major cardiovascular events
		  • Respiratory
		  • Other
			lower than in the control group.
			
			<u>SAS >40</u>
			Before surgery
			9 (45%) 10 (50%)
			P=.50
			
			After surgery
			3 (15%)
			9 (45%)
			p=.041		

Appendix III

Consultation and Environmental Scan Report

Memorial University

Jessica Hammond

Cardiovascular Disease (CVD) is a major health concern and the leading cause of morbidity and mortality in both developed and developing countries (World Health Organization [WHO], 2021). An estimated 17.9 million people died from CVDs in 2019, representing 32% of all global deaths (WHO, 2021). Despite advances in prevention, treatment, and surgery, the mortality rate continues to increase. Outpatient surgery has grown phenomenally in the past decade. More than two thirds of all surgical procedures are carried out on an outpatient basis, allowing patients to wait at home for their surgery (Hollingsworth et al., 2014). On March 11, 2020, the WHO declared the coronavirus (COVID-19) disease as a world-wide pandemic (Hassan et al., 2020). Due to the COVID-19 pandemic response in Canada, elective surgery cases have been drastically reduced or stopped completely (Urbach & Martin, 2020).

After completing a literature review on the best available evidence related to preoperative cardiac surgery patient education that includes preparedness for surgery, patient health outcomes, and effective, evidence based educational interventions, it was found that a variety of educational interventions are currently being used (de Melo Ghisi et al., 2014). The literature reviewed found patients undergoing cardiac surgery have a multitude of educative needs (Fredricks & Yau, 2017). Preoperative education has been used to improve patients' experiences by providing relevant health care information, coping skills, and psychosocial support before surgery (Guo et al., 2014). The literature found that tailored preoperative education should be used to improve patients' experiences by providing relevant health care information, coping skills, and psychosocial support before surgery (Fredricks & Yau, 2017).

Access to this education is an important factor in improving health outcomes of patients undergoing surgery (Marcus, 2014). When these needs are properly addressed, patients can achieve an uncomplicated recovery. In preparation for surgery, preoperative health education of

the cardiac surgery patient plays a vital role in the patient's intraoperative outcomes and post-operative recovery. Coronary Artery Bypass Graft Surgery (CABG) used to treat CVD can improve quality of life, increase survival and have an impact on mental health. Preoperative education can ensure that the patient is prepared and optimized for surgery and should be considered a priority nursing task. In a study by Friedman et al. (2011), written information improved patient knowledge, reduced confusion, and provided patients with a good understanding of what to expect following surgery, especially if it was provided to the patient prior to the first clinic appointment.

The cardiac care program at Eastern Health (EH) relies primarily on the provision of verbal perioperative education for patients from the time of pre-surgical consultations to the time of discharge. This verbal education is typically supplemented with a few paper-based resources. The development of an updated evidenced based preoperative teaching tool aims to help and support patients and families in preparation for open heart-surgery. This is a foundational opportunity to provide accessible and flexible perioperative cardiac surgery education to patients and families. An inclusive resource manual gives patients opportunity to review the information on their own time, at their own pace, and use the manual as a reference to review when necessary. It is hoped that the resource will facilitate communication between the patient and the health care team, and result in an overall increase in patient, nurse, and provider satisfaction with preoperative cardiac care. The development of this project aligns with EH's strategic plan under the areas of Access and Population Health (EH, 2020). This educational resource will compliment EH's promise of improving patient access, with an ultimate goal to provide the right intervention for the right client at the right time and place. In addition, this includes a focus on population health and an overall goal to improve the health and well-being of whole populations.

Goal and Objective(s) for the Consultations

Consulting with key stakeholders and gaining feedback was extremely important in terms of project development. The main purpose of the consultations was to gain additional information on perioperative patient education needs for patients waiting for cardiac surgery. The main purpose of conducting consultations with key members of the healthcare team was to determine if an educational resource manual would be beneficial to patients and health care providers. In addition, these findings will be used to inform the content, delivery, and development of a cardiac education resource manual in N6661. The consultation process occurred over the course of two weeks and was guided by the following objectives:

1. To identify existing educational resources and training sessions that are currently being used at the practicum site (Cardiac Care Program within EH).
2. Identify the need for an updated cardiac surgery educational resource.
3. To gather information from key stakeholders on any existing policies or educative materials that are used. This will evaluate the need for an updated learning resource.
4. Identify what key content to include in a perioperative education resource for cardiac surgery patients.
5. Examine the benefits and challenges of education delivery for patients undergoing cardiac surgery.
6. Determine EH policies and procedures for developing, implementing and evaluating a patient education resource.

Consultation Methodology

Ethical Considerations

The Health Research Ethics Authority (HREA) Screening Tool was used to determine if review by an ethics board was necessary (Appendix F) (HREA, 2009). As the development of an educational resource is considered a quality improvement project, approval from the HREA and the institutional review board was not required for this project. The consultations were informal, and agreement to participate was obtained with verbal consent. Participation was voluntary noting that the responses will be taken into consideration when developing the educational resource. Participants were advised that their confidentiality would be maintained during the consultations and development of the project. There was no potential harm associated with participation. Permission to consult with patients was obtained from the cardiac care director and wait list manager. This resource will be introduced as a pilot project in EH only until evaluation has occurred, with the intent to be shared among all the regional health authorities (RHAs) within the province once approval is granted within these areas. A request for organizational approval of the resource will be obtained from the Research Proposal Approval Committee (RPAC) in EH prior to implementation.

Setting and Sample and Data Collection

The Health Science Center (HSC) is the only cardiac surgery hospital in NL. It is located in St. John's and is included within the Eastern Regional Health Authority. This busy cardiac center performs over 600 heart surgeries on an annual basis. Due to COVID-19 restrictions, the setting for all consultations took place at the HSC via teams or telephone. A number of key consultants were identified for this project including clinical staff and patients. The sample included internal stakeholders (n=7) and a patient sample (n=3).

Clinical consultations (n=7). In order to determine the strengths and challenges of the current educational resources available at the practicum site, key stakeholders within the cardiac surgery and critical care programs were consulted. An informative letter regarding the practicum project and the reason for consultation was sent to key stakeholders via email (Appendix D). This letter provided a general overview of the project and ensured anonymity and confidentiality was preserved. A semi-structured 15 minute consultation interview was conducted (Appendix E). Internal stakeholder interviews included the Cardiac Care Program Managers (n=4), Cardiovascular Intensive Care Unit Nurse Educator (n=1), and the 5 South A Cardiology Nurse Educator (n=1). After these interviews were completed, the cardiac surgery Nurse Practitioner (n=1) was identified as a key stakeholder, as she manages both pre and postoperative patient care for these patients. All stakeholders were deemed valuable to the project. Consultation feedback from key stakeholders was extremely important in terms of project development.

Patient Consultations (n=3). As the education resource is intended to be designed for patients waiting for cardiac surgery, it was important to engage these patients in the consultation process. A volunteer, convenience sample of three patients who had recently waited for cardiac surgery were contacted. It was determined that three patients was an appropriate sample for this project. Access to patients on the cardiac waitlist was obtained from the cardiac waitlist manager. A select number (3) who previously had cardiac surgery within the last 12 months were contacted by the waitlist manager to discuss this project and determine their interest in participating in the consultation process. Once these individuals agreed to an interview, they were contacted by the researcher via telephone to complete a 15-30 minute interview. They were read an informative letter regarding the practicum project and the reason for consultation (Appendix A). The interview consisted of open-ended questions and a survey (Appendix B, C).

Data Management and Analysis

Proper data management and analysis is important to ensure confidentiality and is key for the organization of data. Any data collected was properly maintained and secured on a password protected computer. Once permission was obtained from the key informants, the writer recorded detailed notes during the interviews. Quality of data was further assured by verbally stating responses back to the participants during the interview process (Polit & Beck, 2012). The notes taken during the interview were typed into a word document following the interview. Content analysis was used to analyze the data collected during the consultations. A thematic analysis was used to discover similarities of the open-ended survey questions. The word document created from the detailed notes was reviewed for common themes and key concepts. Participants were notified of thematic data sharing with Dr. Noseworthy to ensure rigor and validate findings. In addition, all patient data was stored without identifying factors to ensure anonymity. Demographic information was not shared. Following analysis of data all questionnaires were destroyed to ensure confidentiality of the data.

Findings

The following results provide an overview of the findings from the consultations.

Patient Interview Response Summary

Three patients who had recently experienced cardiac surgery were consulted. The sample was comprised of two males and one female, with an average age of 68 years old and a range of 67 to 68 years old. Surgeries included CABG, Aortic Valve Replacement (AVR), and Mitral Valve Repair (MVR). The average wait time was 7.3 months with a range of three to 10 months. The consultation interviews typically ranged from 20 to 30 minutes in length and concluded

when the consultee and writer felt there were no further points of discussion to be noted.

Interview findings. All patients who were consulted reported that they had read the written pamphlets or booklets that were provided to them about their heart surgery. One patient stated that they did not read all of the material and had only read it briefly. The survey found that two patients agreed that they received sufficient education and the educational resources (pamphlets and booklets) had prepared them for their surgery. One participant disagreed with that statement. When surveyed if they understood the educational resources that were provided, one strongly agreed, one agreed, and one disagreed. When asked what they liked about the resources that were provided to them, the majority felt it provided some good information but felt it didn't prepare them while they waited. One patient felt the information included in the booklet was 'common sense'. All three patients felt that the pamphlets or booklets could be updated and improved.

When asked " if they looked for health information outside of what had been provided to them", one patient discussed the use of internet websites such as John Hopkins University, the Ottawa Heart Institute and a you tube video of a cardiac surgeon performing a MVR. While the other patients denied looking for health information outside of what was provided to them, one participant stated their family did. Their family had utilized the internet to research the surgery but was unsure of what websites they had accessed. After discussing the resources that were provided, I attempted to get a better understanding of educational needs of cardiac patients. I asked the participants would they prefer group or individualized education sessions. Two of the participants said they would prefer a group session while the other would prefer an individual session. The individuals who stressed the group session said they felt it would provide support and one participant felt they could help others in the group.

In the survey, all participants agreed that it would be beneficial to access EH's educational resources on the internet. The participants were asked what information was missing or what information they felt should have been provided. One participant could not say anything in particular they would add. The second participant felt that the resource was a good starting point but thought that the resource should be available on the internet and easier to navigate. More specifically, it should include videos of specific procedures with good presenters. In addition, a more structured "do's and don'ts" resource should be provided to patients while waiting for cardiac surgery. The third participant voiced that they didn't know a whole lot about the actual surgery and that they wished they were able to spend more time with the surgeon prior to the procedure. They only spoke to the surgeon a couple days before the procedure and felt that more information leading up to the surgery would have been useful. Two of the participants said that more discussion surrounding recovery and length of surgery should be included.

The participants were given the opportunity to voice any questions or concerns that they would like to discuss. All three participants responded. One participant voiced that they had support from their family physician and cardiologist which helped them during their waiting period. The other two participants provided an extensive amount of feedback. One participant was told by their cardiologist that it needed to be scheduled and completed ASAP, yet they waited three months. During this time they experienced black outs spells and were very scared. To summarize their concern, the "wait time right up until recovery was stressful and they felt helpless". This was similar to the feelings of the third participant and consistent with the survey. Two of the responses agreed that the educational resources made them feel more anxious about their surgery. While they felt prepared for the surgery, support for patients waiting for cardiac surgery is lacking. Both participants discussed feeling anxious, worried and stressed about their

surgery. Both felt that peer support and having the ability to speak to someone who has endured a similar experience would be very beneficial and could validate their feelings. After all of the interviews, the participants said the caring and compassionate treatment they received in the hospital was above and beyond. They felt that further mental health support and follow up for patients is extremely important –in addition to better preoperative resources on all aspects of the surgery. When surveyed about their overall satisfaction with the education they received before surgery, one participant was satisfied while two disagreed that the education they received prepared them for their surgery and post-operative recovery.

Clinical Stakeholder Interview Response Summary

All participants included in this sample have been in their respective positions for several years and are deemed valuable to this research project. Their dedication to patient care and the future direction of the cardiac surgery program at EH was clearly evident throughout the consultations. Consultations with these individuals were approximately 15 minutes in length. To begin, consultants were asked if they were aware of the current educational resources for patients waiting for cardiac surgery. All were aware there was a resource but only three could specifically speak to that resource. Others felt they were not well versed on available resources for patients and there was uncertainty surrounding how to find and access the resources. When asked, do you think there is a need for an updated, accessible resource, all agreed that there is a significant need.

Early in the interviews and during the environmental scan, it was discovered that EH's educational resources are not available outside of the organization. The majority of the consultants pointed out that patients and other RHAs are not able to access this resource on the internet. Given that the HSC within EH is the major cardiac care hospital for the province, it was

identified that patients in other facilities lack support and education as currently patient education is the "sole responsibility of the HSC". When asked on their input surrounding the delivery and distribution of educational resources, all participants agreed that this resource needs to be readily available and not just an internal resource. It was suggested that it should be available on the cardiac care information page of the EH website in a downloadable format. This would give the ability to email the document and consistent to what is being done in other institutions. When asked about the strengths of the current resources, the majority felt that the current resource was pretty inclusive but could be strengthened and changed with current evidence based literature, better examples, and improved formatting. When asked about the challenges of the current resources, responses included that they are old, outdated, inaccessible, and that an updated resource is needed. In addition, one consultant pointed out that EH does not have a formal committee or resource person that is dedicated to creating education materials for patient education. Two consultants identified that an attempt to update this resource in collaboration with McGill University and EH's Enhanced Recovery After Surgery (ERAS) nurse was established 18 months ago but was never completed due to COVID-19 and prolonged vacancy in the ERAS position. This is currently still on hold.

The next question was regarding the content of the resource. When participants were asked what content would be most important to include in a perioperative education resource for patients waiting for cardiac surgery, three consistent responses were identified. It was felt that the most important focus areas include: 'prehabilitation' information such as do's and dont's while waiting for surgery, mental health support and psychological care, and post-operative recovery. Further discussions included topics such as a decrease in overall patient health status and patient complexity. Patients are showing signs of deconditioning while waiting for surgery

as they are unsure of what they should and should not do while waiting, in addition to the mental anguish and a long recovery period. This was consistent with the findings when asked what do you hear from patients about what they would like to know, as patients wish they knew how they would be after the surgery and how difficult the recovery would actually be. All consultants agreed that there's a significant need for mental health support for these patients.

Results: Consultations

Themes that were identified throughout the patient consultation process are consistent with the findings in the literature review. Themes included the physical and psychological impacts of waiting for cardiac surgery, lack of current educational resources for patients, and patient learning needs. Waiting for cardiac surgery is a stressful time and many patients and families feel overwhelmed with anxiety by the prospect of undergoing open-heart surgery. The consultations validated the need for more education on the physical and psychological impacts of waiting for cardiac surgery. The consultations support that preoperative education can be used to improve patients' experiences by providing relevant health care information, coping skills, and psychosocial support before surgery. All participants agreed that anxiety that could be reduced if patients were educated on what they were about to experience and what to expect. While the evidence in the literature supports that preoperative teaching of patients about to undergo surgery can reduce anxiety, two of the patients agreed that the educational resources made them feel more anxious about their surgery. While they felt prepared for the surgery, support for patients waiting for cardiac surgery is lacking. This further validated the need for an updated resource. Although anxiety is a predictable part of the surgical experience, inadequate management, such as lack of education, can have profound implications (Shahmansouri et al., 2014).

The findings of the consultations identified the strengths and weaknesses of existing

educational resources for patients waiting for cardiac surgery at the practicum site. These findings validate that in general, patients do read and appreciate the existing education materials. However, the patient consultations indicated that current education and support for patients is undeniably lacking. All participants validated the need for an updated educational resource and input was provided on the type of information that should be included in this resource. Providing sufficient, timely and comprehensive preoperative education for cardiac surgery patients sets the stage for preventing postoperative complications and improving patient outcomes. Stages of cardiac care should include the preoperative, intraoperative and postoperative phase. The consultations support that patients undergoing cardiac surgery have a multitude of learning needs in which up to date education and mental health support is needed for optimal patient outcomes. A resource manual offers flexibility, accessibility, and portability to patients. Patients requiring education have the opportunity to review the information on their own time, at their own pace, and use the manual as a reference to continue learning or review when necessary

Finally, throughout the consultations it was evident that every patient has different learning needs. Depending on the patient, it is important to assess patient learning needs as a way to identify priority learning objectives. This was portrayed when we discussed patient preference in individual vs. group education. The inclusion of learning needs into the design of the patient education teaching session is a key element in the process of teaching and learning, as they reflect the patient's personal health experience. Thus, it is important that a health education resource provides the opportunity for patients to select the information they are interested in learning about and ensuring the resource is tailored to patients' personal learning needs. This supports the use of a multimodal approach and should be based on personalized learning needs.

Overall, throughout the consultation process of this practicum project I did not face any major obstacles. However, I attempted to contact three additional stakeholders, including two additional NPs and a critical care RN. As this course occurs during summer holidays, they were unavailable and I was unable to connect with them during the consultations. This was a challenge that I had not fully anticipated, however, in the future I would ensure to account for this. If possible, I would reach out to key stakeholders earlier to leave room for delays. I was still able to collect valuable data despite this challenge, and there is potential to add more data in the future.

Goal and Specific Objective(s) for the Environmental Scan

The goal of conducting an environmental scan was to examine the resources currently provided to patients waiting for cardiac surgery at the practicum site as well as educational resources available to patients who undergo cardiac surgery at other locations. Ultimately, these findings will guide the development of a perioperative education resource for adult patients experiencing cardiac surgery within EH.

The objectives for the environmental scan are:

1. To determine what educational resources are available within EH for patients waiting for cardiac surgery.
2. To determine what educational resources are available for patients waiting for cardiac surgery at other locations, and how are these educational resources being delivered.
3. Assess the current educational resources for educational content, design and layout.
4. Identify, assess, and understand any potential barriers and/or resources to the implementation and evaluation aspect of this project.

Environmental Scan Methodology

An environmental scan was conducted to scope out available resources for patients waiting for cardiac surgery in Canada, specifically focusing on patient resource manuals that were available on the internet. The websites that were scanned included:

- Eastern Health (EH) (Newfoundland)
- St. Mary's Hospital (Kitchener, Ontario)
- University of Ottawa Heart Institute (UOHI) (Ottawa, Ontario)
- McGill University Health Centre (MUHC) (Montreal, Quebec)
- Montreal Heart Institute (Montreal, Quebec)

To begin the environmental scan, the written perioperative education resources utilized for patients waiting for cardiac surgery at the HSC were reviewed. These materials will be considered and utilized in the creation of an updated resource as it contains pertinent context with respect to current operating standards of this facility, including specific hospital policies and surgical processes. Subsequently, a scan was conducted to collect data by viewing websites and contacting organizations of these websites. The content, layout, and design of four perioperative cardiac surgery education resource manuals from other institutions were thoroughly examined. These institutions included: St. Mary's Hospital, University of Ottawa Heart Institute (UOHI), McGill University Health Centre (MUHC) and the Montreal Heart Institute. An internet search revealed that cardiac surgery resources which included current research and best practices were readily available from these institutions. Detailed note taking was used to compile data for analysis. Data obtained from websites included in the environmental scan was organized in Excel and analyzed using a content analysis approach. The findings are discussed below.

Results: Environmental Scan

Current Education Resources at the Practicum Site

At the practicum site, three paper-based education resources are available to cardiac surgery patients. The available resources include pamphlets or small booklets such as ‘getting ready for heart surgery’, ‘going home after heart surgery, and ‘healthy heart diet guidelines’. Once accepted for cardiac surgery and placed on the waitlist, these resources are mailed to the patient. The paper-based resources provided to patients at the practicum site are available on EH’s Intranet, which is only available on an EH server. This is only accessible by staff within EH and is accessible on the Intranet. Thus, the cardiac education tools that are available for health care providers and patients in other Regional Health Authorities (RHA) in the province, including Central, Western and Labrador-Grenfell Health, is very limited. These booklets are fairly comprehensive with respect to providing the important information prior to surgery. Topics in the booklets include: surgery preparation and planning, smoking, diet, exercise, in-hospital stay, discharge, and recovery. However, the material is presented over three different resources. It would be beneficial to provide patients with one educational resource with up to date research, including concerns surrounding long wait times and how patients can optimize their health during this time.

In addition to the paper-based cardiac resource, EH cardiac and critical care website was reviewed. This website provides only a description of the services the cardiac and critical care program offers to support the diagnosis and management of heart disease and critical illness. There were no patient education resources available on the website.

Current Education Resources at Other Sites

Multiple sites across Canada have produced an educational resource for patients waiting for cardiac surgery. These institutions represent major cardiac surgery centers within Canada. Upon completion of the environmental scan, it was found that all sites provide digital access to these documents in PDF format. Patients and their families, as well as other health care professionals can readily download and utilize these resources. In addition, it was found that these hospitals provide valuable education in other formats, such as videos and online presentations.

After review of the UOHI website, the findings concluded that there are multiple resources available for patients waiting for cardiac surgery. Their goal is to help patients and their families understand specific heart conditions and medical procedures, as well as how to improve their heart health. Specifically, they have a resource titled 'Waiting for Cardiac Surgery. The purpose of this guide is to help prepare for admission at UOHI. This information is intended to be read once a patient has been placed on the surgery waiting list. During the consultations for this project I discovered that in 2020, EH has begun to develop a positive working relationship and collaboration with the Cardiac Surgery Team at the UOHI. Since spring 2020, there have been four locum cardiac surgeons from the UOHI travel to NL to assist with the cardiac surgery backlog. A cardiac surgeon travels to NL for one week per month completing approximately 10 surgeries. Given this recent development and through further collaboration with the UOHI, permission was granted to utilize their patient educational material during the development of the new resource for EH (Appendix G). This will be incorporated throughout the development and planned evaluation/implementation of this valuable resource. I was able to contact their advanced practice registered nurse of cardiac surgery who aids with developing and maintaining

the patient education resources. If needed, further collaboration will be conducted as I develop the new resource.

This environmental scan will be used to inform the development of an accessible, up to date perioperative education resource for patients waiting for cardiac surgery in NL. The content, layout and design elements of existing resources from other healthcare institutions will serve as a guide for the development of the education resource for the practicum site. The environmental scan identified the current challenges concerning lack of accessibility and established the need for increased availability and access for these patients. The pre-existing paper-based materials for patients waiting for cardiac surgery requires updating. Although these paper-based education resources are available within EH, there are challenges accessing them outside of the HSC. The practicum site currently lacks a digital footprint surrounding cardiac patient education.

Conclusion

The results and information generated via the consultations and environmental scan have many implications for the development of the resource manual proposed for this practicum project. Via the consultation process with patients and key stakeholders in the cardiac surgery program at EH, all consultants agreed on the importance and value of this resource. Completing the consultations also confirmed important information obtained from the literature review. Several themes were derived from the data that will be used to inform the content and development of the educational resource. The environmental scan conducted at the practicum site revealed that the only source of education for patients waiting for cardiac surgery is through paper-based booklets provided by the healthcare team. Going forward, the findings demonstrated a significant need for the development of an updated and accessible educational resource manual for individuals waiting for cardiac surgery. These findings will be used to further inform the

content and development of this project. In conclusion, it can be said with confidence that this practicum project will be beneficial to both patients and health care providers. Consultations and an environmental scan helped to identify the benefits and challenges of implementing a new resource with an organization. The consultation and environmental scan provided valuable insight that will aid in the development of this educational resource manual to meet the objectives of N6660 and N6661.

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Appendix A

Consultation of Patients Waiting for Cardiac Surgery

Information Letter for Patients

Dear *{insert participants name},*

My name is Jessica, I am a Registered Nurse completing my Master of Nursing degree at Memorial University under the supervision of Dr. Ann Noseworthy. The overall goal for my practicum project is to develop an educational resource for patients waiting to have heart surgery. I know that waiting for heart surgery can be long and you may have many question about your surgery. I am interested in you prepare for your surgical journey so we can help you throughout this experience.

I am in the process of conducting an environmental scan to inform the development of this resource. I am writing to ask you if you would kindly answer a few questions about the education you may have already received about your surgery as I feel your input would be very valuable to the overall project. You may answer all or just some of the questions below. Please share any additional information or personal experiences you may have in regards to this subject.

Your name will not be shared with anyone and your answers to these questions will only be used to improve patient education. This should only take about 10-15 minutes of your time. I can answer any questions you might have at any time. This will not affect your care in any way and you can stop at any point, for any reason. Submitting information will indicate agreeing to participate as a consultant and that you understand the contents of this letter. If you have any questions, feel free to reach me by phone at 709-777-8041 or Jessica.hammond@easternhealth.ca

Thank you for your time.

Kind Regards,

Jessica Hammond
Registered Nurse

Appendix B

Consultation Tool for Patients

Date:

Guiding Questions:

1. Have you read any of the written pamphlets or booklets about your heart surgery provided to you by the hospital? If no, is there a reason why you have not looked through them at this time? If yes, what did you like about them?
2. Could the pamphlets or booklets be improved? If so, how?
3. Have you ever looked for health information outside of what has been provided to you? If so, do you know which resources you utilized? Did you find them more helpful?
4. Do you prefer group or individualized education sessions?
5. Is there other type of information related to your heart surgery that could have been provided that would have been beneficial while you waited for cardiac surgery?
6. Any further thoughts or questions that you would like to discuss?

Appendix C

Consultation Survey for Patients

The educational resources (pamphlets and booklets) provided prepared me for my heart surgery.

5	4	3	2	1
Strongly Agree	**Agree**	**Neither Or N/A**	**Disagree**	**Strongly Disagree**

I have recieved sufficient education about my surgery.

5	4	3	2	1
Strongly Agree	**Agree**	**Neither Or N/A**	**Disagree**	**Strongly Disagree**

I understood the educational resources that were provided

5	4	3	2	1
Strongly Agree	**Agree**	**Neither Or N/A**	**Disagree**	**Strongly Disagree**

I would have like to receive more written information about my surgery and wait time

5	4	3	2	1
Strongly Agree	**Agree**	**Neither Or N/A**	**Disagree**	**Strongly Disagree**

It would be beneficial to access Eastern Health's educational resources on the internet.

5	4	3	2	1
Strongly Agree	**Agree**	**Neither Or N/A**	**Disagree**	**Strongly Disagree**

The educational resources I received made me feel more anxious about my surgery

5	4	3	2	1
Strongly Agree	**Agree**	**Neither Or N/A**	**Disagree**	**Strongly Disagree**

Overall, I am satisfied with the education I received before my surgery.

5	4	3	2	1
Strongly Agree	**Agree**	**Neither Or N/A**	**Disagree**	**Strongly Disagree**

Appendix D

Information Letter for Clinical (Nurses, physicians)

Dear *{insert participants name},*

My name is Jessica Hammond and I am a Registered Nurse working in the cardiac care program. I am currently completing my Master of Nursing degree at Memorial University under the supervision of Dr. Ann Noseworthy. The overall goal for my practicum project is to develop an educational resource for patients waiting to have heart surgery. Due to the COVID-19 pandemic, surgical wait times are at an all-time high and patients are experiencing longer than usual wait times for cardiac surgery. I have a profound interest in improving patient education and I am working on a project surrounding the learning needs of patients waiting for cardiac surgery.

I am in the process of conducting an environmental scan to inform the development of this resource. Specifically, I would like to further understand your thoughts pertaining to the strengths and challenges of the ways in which education is currently delivered to patients at this institution. I am writing to ask you if you if I could seek your insights on the development of a perioperative education resource for patients waiting for cardiac surgery.

If you are willing, I would like to arrange a time to be able to speak with you, either by phone or teams. Our discussion should take no longer than 15-20 minutes and will be used for the sole purpose of informing the development of a perioperative education resource manual. Your name will not be shared with anyone and your answers to these questions will only be used to improve patient education.

At your earliest convenience, I would be very appreciative if you could provide me with a date and time that would work for you to have this discussion. If you have any questions, feel free to reach me by phone at 709-777-8041 or Jessica.hammond@easternhealth.ca.

Thank you for your time.

Kind Regards,

Jessica Hammond
Registered Nurse

Appendix E

Consultation Tool for Clinical Staff

Name:

Position:

Date:

Guiding Questions:

1. Are you aware of the current education resources for patients waiting for cardiac surgery? Do you think there is a need for an updated, accessible resource?
2. What are the strengths of the current education resources?
3. What are the challenges with the current education resources?
4. What content would be most important to include in a perioperative education resource for patients waiting for cardiac surgery?
5. What are your thoughts on the delivery and distribution of educational resources?
6. What do you hear from patients about what they would like to know?
7. Do you have any other suggestions or questions surrounding this project?

Appendix F

Health Research Ethics Authority Screening Tool

	Question	Yes	No
1.	Is the project funded by, or being submitted to, a research funding agency for a research grant or award that requires research ethics review	❒	x
2.	Are there any local policies which require this project to undergo review by a Research Ethics Board?	❒	x
	IF YES to either of the above, the project should be submitted to a Research Ethics Board. **IF NO** to both questions, continue to complete the checklist.	❒	❒
3.	Is the primary purpose of the project to contribute to the growing body of knowledge regarding health and/or health systems that are generally accessible through academic literature?	❒	x
4.	Is the project designed to answer a specific research question or to test an explicit hypothesis?	❒	x
5.	Does the project involve a comparison of multiple sites, control sites, and/or control groups?	❒	x
6.	Is the project design and methodology adequate to support generalizations that go beyond the particular population the sample is being drawn from?	❒	x
7.	Does the project impose any additional burdens on participants beyond what would be expected through a typically expected course of care or role expectations?	❒	x
LINE A: SUBTOTAL Questions 3 through 7 = (Count the # of Yes responses)		0	
8.	Are many of the participants in the project also likely to be among those who might potentially benefit from the result of the project as it proceeds?	❒	x
9.	Is the project intended to define a best practice within your organization or practice?	x	❒

10.	Would the project still be done at your site, even if there were no opportunity to publish the results or if the results might not be applicable anywhere else?	x	❒
11.	Does the statement of purpose of the project refer explicitly to the features of a particular program, Organization, or region, rather than using more general terminology such as rural vs. urban populations?	x	❒
12.	Is the current project part of a continuous process of gathering or monitoring data within an organization?		x
LINE B: SUBTOTAL Questions 8 through 12 = (Count the # of Yes responses)		3	
	SUMMARY **See Interpretation Below**		

Interpretation:

- If the sum of Line A is greater than Line B, the most probable purpose is **research**. The project should be submitted to an REB.
- If the sum of Line B is greater than Line A, the most probable purpose is **quality/evaluation**. Proceed with locally relevant process for ethics review (may not necessarily involve an REB).
- If the sums are equal, seek a second opinion to further explore whether the project should be classified as Research or as Quality and Evaluation.

These guidelines are used at Memorial University of Newfoundland and were adapted from ALBERTA RESEARCH ETHICS COMMUNITY CONSENSUS INITIATIVE (ARECCI).

Appendix IIII

Resource Manual

Memorial University

Jessica Hammond

A Patient Guide to Cardiac Surgery

2021

Eastern Regional Health Authority

https://www.easternhealth.ca/

Table of Contents

Overview

This guide is especially written for you, the patient undergoing cardiac surgery, and for your family and friends. It is designed to help you understand what your cardiac surgery, recovery and rehabilitation involves and the important role you play in your recovery.

The purpose of this guide is to help you prepare for admission to the Health Science Center. This information is for you to read once you have been placed on the surgery waiting list.

Information provided by this booklet is for educational purposes. It is not intended to replace the advice or instruction of a professional healthcare practitioner, or to substitute medical care. Contact a qualified healthcare practitioner if you have any questions concerning your care.

I would like to thank the Ottawa Heart Institute for their support throughout the development of this resource. Permission was granted for use of their material including the design, layout, content, and images.

You have been referred for heart surgery at the Health Science Center

Your test results have been reviewed and discussed by a team of cardiologists and cardiac surgeons. These experts have determined that heart surgery will provide the most benefit to your health and lifestyle.

The goal of this booklet is to keep you informed and to answer your questions. We will work with you to develop a plan for your recovery and build towards a healthy heart lifestyle for you and your loved one(s).

Having heart surgery can be a significant event in your life. It may affect you and your family in many ways. This booklet is designed to help you and your family understand your condition and what you can expect.

Contact Information

Having Heart Surgery can be stressful for patients and their families. The good news is that you are not alone. It is normal to worry and feel stressed. Talk to other people who have had heart surgery and share your concerns with them. Speak to us if you have questions or concerns. We hope that this booklet will help prepare and guide you. We will also be there each step of the way.

Please contact the Cardiac Care Nurse Coordinator if:

- There is a change in your condition that you are unable or unsure how to manage at home.
- You need to provide an update on your condition.

Call (709) 777-6945 (long distance – 1-888-737-6328) during regular business hours, Monday to Friday, except for holidays.

Please leave a message if you are unable to reach the cardiac care coordinator in person. Be sure to leave the correct day and evening telephone number(s) where you can be reached for the return call.

For urgent matters or if you have unrelieved chest pain, call 911, or have someone drive you to the nearest Emergency Department. DO NOT drive yourself.

Bring this booklet with you each time you come to the hospital and keep it with you during your stay

My Appointments

Appointment	Date	Time
Pre Admission Clinic		
Cardiac Clinic		
My Surgery		

My Medications

Important Phone Numbers

Area/Person	Phone Number
Health Science Center	(709) 777-6300 (Switchboard)
Cardiac Care Coordinator for Surgery	(709) 777-6945
Pre-Admission Clinic	(709) 777-6028
Day Surgery Unit	(709) 777-7662
Cardiovascular Intensive Care Unit (CVICU)	(709) 777-7561
Cardiac Surgery Unit (5SA)	(709) 777-6944
Social Worker	(709) 777-8471
Dietician	(709) 777-7055
Cardiac Rehab	(709) 777-5587

Chapter One: Learn about your Heart Surgery

This booklet is a guide for you and your family. It will cover important information about your surgery. It has information about the heart, coronary artery bypass surgery, valve surgery and risk factors associated with coronary artery disease. This booklet will also tell you about your hospital stay, medications, exercise and nutrition. You will also find some useful suggestions for your recovery.

About Your Heart

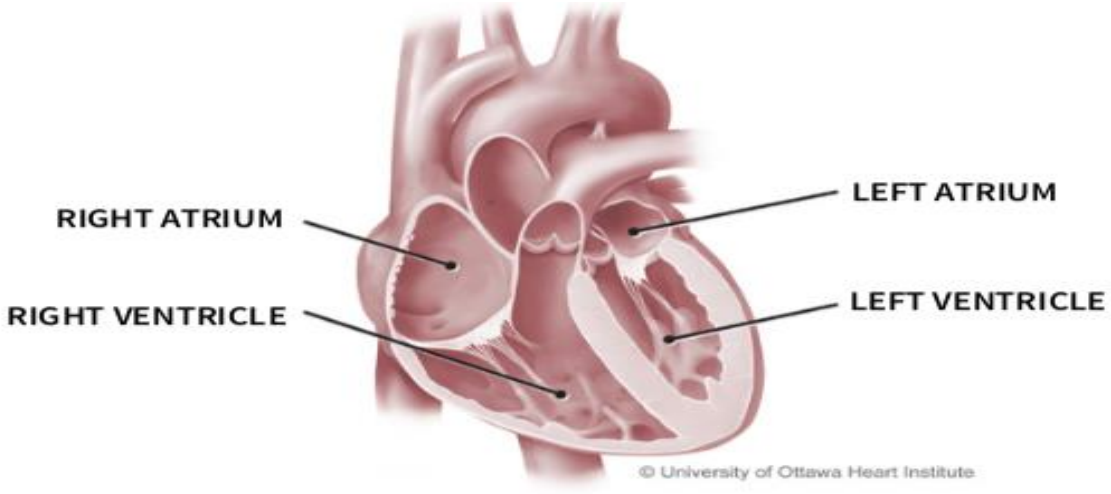
The Heart

Your heart is a muscle, which is about the size of your fist. It is located in the middle of your chest, a little to the left. It sends blood around your body, like a pump. This blood provides your body with the oxygen and nutrients it needs. It also carries away waste. Your heart is made up of 4 different areas. Each of these areas is called a chamber.

Heart Valves

The heart contains four chambers and four one-way valves. The two upper chambers are called the atria. The two lower chambers are called ventricles.

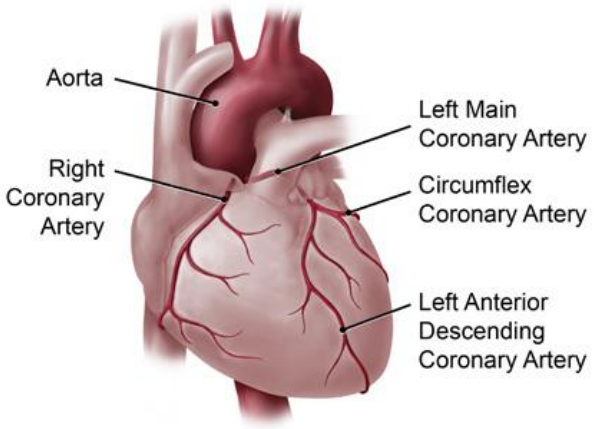
Blood moves through the heart's chambers using 4 valves (tricuspid, pulmonary, mitral and aortic). Much like a door, each valve opens to let blood flow in and then closes to keep blood from flowing backward.



University of Ottawa Heart Institute, 2019

Coronary Arteries

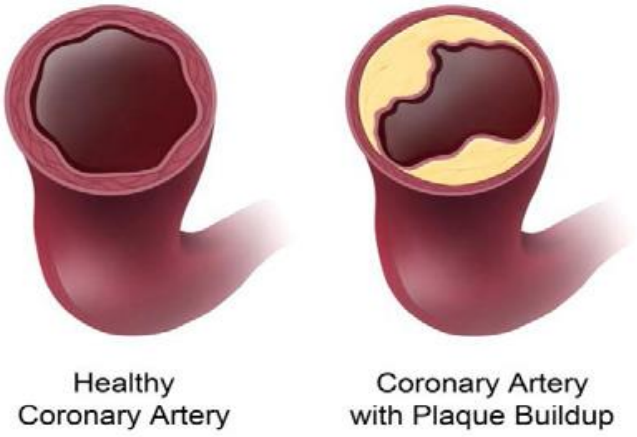
Coronary arteries supply oxygen and nutrient-rich blood to the heart muscle itself. There is a right and left coronary artery. The left coronary artery divides further into the left anterior descending artery and the circumflex artery.



University of Ottawa Heart Institute, 2019

Coronary Artery Disease

Coronary artery disease occurs when the coronary arteries become narrowed with deposits of fat and cholesterol. This can either decrease or completely stop the blood supply to part of the heart. The result can be angina or a heart attack.



University of Ottawa Heart Institute, 2019

What are the Symptoms of coronary artery disease?

A person with one or more blocked arteries may feel pain and periodic discomfort in the chest, radiating to the neck and/or arms (usually on the left side). Other warning symptoms may include; a choking feeling, chest pressure, shortness of breath, jaw or shoulder pain, or even "heartburn". This pain is caused by a lack of oxygen getting to the heart muscle. Symptoms can be triggered by physical exertion, eating, changes in temperature, extreme emotion or may be present even at rest. The symptoms (angina) may last 3 to 5 minutes until the cause is relieved; otherwise symptoms may last longer. If this continues, it can starve the heart muscle cells of oxygen and eventually lead to a heart attack.

About Your Surgery

Coronary Artery Bypass Graft Surgery

- A test called an angiogram is used to determine the need for this surgery.
- Bypass surgery improves blood flow to the heart. It is called "bypass" because arteries or veins are taken from another part of your body and used to create new routes around (bypassing) narrowed and blocked arteries.
- In most situations, more than one artery or vein will be used.
- A section of a vein from your leg and/or an artery in your chest or forearm will be used. Your condition may require more than one bypass depending on the number of blocked arteries.
- After the bypass is done, blood can flow through the new artery and around the blocked coronary artery to deliver oxygen and nutrients to your heart muscle.
- You will have at least one incision on the chest and perhaps one on the legs and/or one on the forearm
- This may eliminate or reduce your chest pain (angina), increase your ability to be physically active, help to improve your quality of life and in some patients, prolong life. Your surgeon will decide on the exact number of coronary arteries to be bypassed during your operation.
- Most commonly the surgery will take 3-6 hours.

Heart Valve Surgery

The heart has 4 valves: the aortic, mitral, tricuspid, and pulmonic valves. Heart valves are delicate, yet very durable. Each heart valve opens and closes over 100,000 times every day. The main job of heart valves is to make sure blood flows in the right direction as it is pumped through the heart.

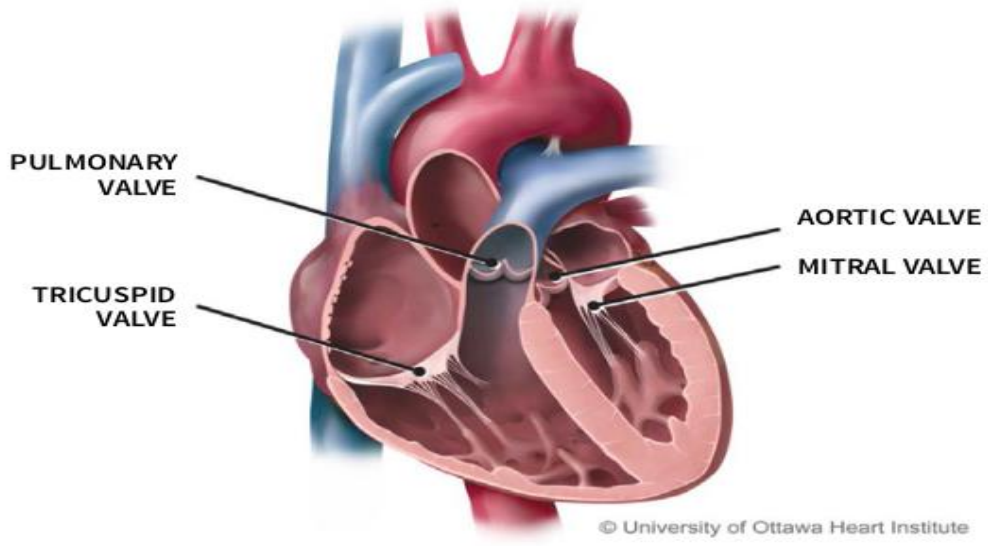
Each valve has either two or three leaflets that open and close with the flow of blood. When you have a valve problem, the blood flow becomes disrupted and your heart can get enlarged, leading to problems with heart failure.

Problems with heart valves include not opening properly (stenosis) because it has become thickened and stiff or not closing properly (regurgitation or insufficiency) because it is weak or torn.

Valves may be abnormally formed at birth, or can become damaged later in life due to conditions such as:

- Infection
- Rheumatic Fever
- Heart attacks
- Normal aging process that causes calcium build up

The heart valves that most often require surgery are the mitral valve, aortic valve and the tricuspid valve.



Heart valve problems may be fixed by either repairing or replacing the valve. Your surgeon will discuss the best treatment and the surgical approach that will be used, with you and your family.

Heart valve surgery is required when:

- The valve cannot maintain the regular flow of blood through the heart
- The heart begins to enlarge and not work properly
- Symptoms of shortness of breath, dizziness and fatigue increase

Heart valve surgery may involve:

- Repairing the valve leaflets to allow the valve to open and close properly
- Inserting a supporting ring to support the valve leaflets
- Removing the valve and replacing it with a tissue or mechanical valve

Tissue Valves

Tissue valves are chemically treated or engineered animal valves that are very similar to natural heart valves. They usually do not require you to be on blood thinner medication for the long term. However, they are not as durable as mechanical valves and may deteriorate over time and need to be replaced.

Mechanical Valves

Mechanical valves are made of durable metals, carbon, ceramics and plastics. They are longer lasting than tissue valves but require that you take an anticoagulant (blood thinner) medication for the rest of your life and have frequent blood tests to check the effectiveness of the drug. Your surgeon will discuss options with you. In some cases, a repair may not be possible and the valve will need to be replaced.

Combined Valve and Bypass Surgery

In some instances, a patient may need both valve surgery and coronary artery bypass surgery at the same time. Your physician will discuss this with you.

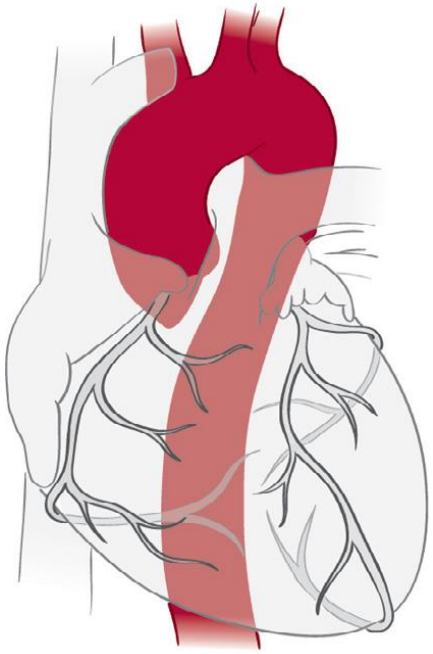
Aortic Surgery

The aorta is the largest blood vessel in your body. Its main job is to pump blood from the heart to all of the organs. If the aorta becomes enlarged or dilated, surgery is performed to replace this enlarged section.

A tube or graft made of a polyester material replaces the aorta. Occasionally, the aortic valve is repaired or replaced during the same operation. Your surgeon will discuss this with you before the surgery.

Preparation for aortic surgery is the same as for bypass or valve surgery.

Continuous monitoring is very important for patients with aortic diseases. This will be arranged by your specialist.



University of Ottawa Heart Institute, 2019

Are there Risks Associated with Heart Surgery?

There are approximately 600 heart surgery operations done in St. John's each year. Most heart surgeries are successful, but it is important to weigh the benefits and risks of having surgery. Your heart surgeon will discuss your risks and possible complications of surgery with you.

Chapter Two: Preparing for your Heart Surgery

Read the information in this guide and share it with your family. Make a list of questions to ask your doctor.

My Surgery

Date: _____

Doctor: _____

Surgery procedure:_____

Wait Times for Surgery

The Province of Newfound and Labrador uses a waiting list management strategy to make sure people get their surgery at the right time.

The strategy includes:

- A system that keeps track of all wait times for heart surgery in Newfoundland and Labrador
- Information about your specific condition, to make sure you get your surgery at the right time
- An opportunity to call the Cardiac Care Coordinator between 8:00 a.m. and 4:00 p.m. at 709-777-6945 if you have questions about the wait time.

Predicted Timelines

Some people will wait for surgery in hospital (either at Health Science Center, or another area hospital). Others will wait at home for their surgery. The average wait time for heart surgery can be days to months. It depends on each person's condition. You will be scheduled for surgery depending on how quickly it needs to be done. Some people may wait longer than others.

You should have **regular** check-ups with your family doctor during your wait for surgery.

If you have sudden changes in your condition, you should get medical attention right away.

Some patients are admitted for surgery on the day of their operation because they have been assessed in the Pre-Admission Clinic before their surgery. Other patients are admitted a day or two before the operation. Either way, the preparation is the same.

If you will be waiting at home for your heart surgery, your surgeon will arrange for you to have a pre-surgery clinic appointment. This appointment will take place within 6 weeks of your surgery date.

Chance of Cancellation

We will make every effort not to change your surgical date. There is always a chance, however, that it may change. Sometimes events occur without warning. If your surgical date needs to be changed, the wait list coordinator will let you know as soon as possible. They will arrange for a new date to be booked.

Surgery can improve symptoms and even prolong life but it does not get rid of the disease. Risk factors for coronary artery disease are high blood pressure, high cholesterol, smoking, diabetes, and a family history of the disease. In order to minimize blockage in your newly grafted arteries and to prevent further blockage in your own coronary arteries, education about the risk factors is important. This is called Secondary Prevention. A person should continue to utilize methods to reduce their cardiac risk factors lifelong.

It can't be emphasized enough that long term control of risk factors, as well as, taking your medications will ensure the best possible outcome of your surgery.

The Health Care Team

Your Surgery team is made up of different health care professionals. These experts work together to provide you the best care possible:

- **Cardiologist**: a doctor who is expert in the care of patients with heart problems; he or she is the one who referred you to the interventional cardiologist. The interventional cardiologist will perform your cardiac catheterization also known as the 'dye test'.
- **Cardiac Surgeon**: a doctor who will perform your surgical procedure. Will meet with you before your surgery and perform the surgery. You will see him/her at your 4-6 week follow-up visit.
- **Anesthesiologist**: Will see you before your surgery. Cares for you in the Operating Room, keeps you "asleep", and manages your blood pressure during surgery.
- **Cardiac Intensivist**: a doctor that is responsible for all aspects of your care in the Cardiovascular Intensive Care Unit (CVICU).
- **Registered Nurse First Assist (RNFA)**: specially trained Registered Nurse working in the Operating Room. Will see you before your surgery to assess your limbs for removing the artery and/or vein. They will assist the surgeon with your surgery.
- **Nurse Practitioner**: Nurses who will help you through the process before and after the surgery. They will coordinate your care, teach you about the procedure and what to do before and after, and will be available to answer your questions.
- **Registered Nurses**: Nurses who provide specialty care to you post-operatively in the early period after surgery and while you are in the hospital. They will be involved in teaching you about your medications and self-care.
- Other members of the medical team will work closely with your heart doctor and surgeon. These include: residents (doctors in-training) and medical students (supervised by our doctors). Other health care professionals may be consulted for your care as needed.

YOU are the most important member of the Cardiac Surgery care team.

You can play an active role in your health by:

- Having a good understanding of your health and your procedure.
- Following the care advice, we give you.
- Learning about your medications (how to take them, side effects).
- Using this guide to prepare yourself for your procedure.
- Actively taking part in your care in hospital and at home.
- Sharing your concerns and asking us your questions.

Risk Factors

Diet

Good nutrition before your surgery is important and may help you recover and heal more quickly after your surgery. It is important to make sure that your body is getting the right nutrition at this time. For healthy eating tips see the “Top 10 tips for healthy eating” in Appendix A.

Canada’s Food guide provides basic information for healthy eating www.healthcanada.gc.ca/foodguide

You should try to limit the amount of salt and salty foods you eat. A high salt intake can cause high blood pressure and make your body retain more water. This makes your heart work harder.

Being overweight can also be a problem for your heart. It causes the heart to work harder to pump blood and oxygen.

If your appetite is poor while you are waiting for your surgery or you notice that you are losing weight without trying to, tell your physician.

Exercise

It is important to stay active in the days and weeks leading up to your heart surgery. Do not try to increase your activity level. Avoid activities that lead to shortness of breath or chest pain.

If you were not physically active before, ask your family doctor before starting an exercise program before surgery. You may continue to work leading up to your surgery unless your surgeon tells you otherwise.

Exercise has many benefits. It can help you lose weight, improve your circulation, reduce stress and strengthen your heart muscle. Being in better physical shape will make your recovery easier.

Limit your work to activities that do not cause angina, shortness of breath, or fatigue. Abnormal responses to exercise may include: nausea, headache, dizziness, chest pain or palpitations. If you notice any of these, stop and rest until the symptoms decrease. If these symptoms persist or if you feel unwell - call 911 or go to your nearest emergency room. DO NOT drive yourself.

Heart attack symptoms for women

The most common heart attack symptom in women is the same as in men – some type of chest pain, pressure or discomfort that lasts more than a few minutes or comes and goes. But chest pain is not always severe or even the most noticeable symptom, particularly in women. Women often describe it as pressure or tightness. And, it's possible to have a heart attack without chest pain.

Women are more likely than men to have heart attack symptoms unrelated to chest pain, such as:

- Neck, jaw, shoulder, upper back or abdominal discomfort
- Shortness of breath
- Pain in one or both arms
- Nausea or vomiting
- Sweating
- Light-headedness or dizziness
- Unusual fatigue
- Indigestion

Women tend to have symptoms more often when resting, or even when asleep, than they do in men. These symptoms may be vague and not as noticeable as the crushing chest pain often associated with heart attacks. This might be because women tend to have blockages not only in their main arteries but also in the smaller ones that supply blood to the heart — a condition called small vessel heart disease or coronary microvascular disease.

Diabetes

If you have diabetes, you should:

- Continue your medication and insulin as prescribed.
- Initiate more frequent self-monitoring of your blood glucose while you are waiting for surgery. If you don't have a meter, speak with your pharmacist to get started.

Blood glucose targets fasting and before meals should be:

- between 4 – 7 mmol/l
- Within 2 hours of a meal 5 – 10 mmol/l.
- Checking at different meals and different times of day, will provide important information on potential areas that need to be addressed.
- If your results are not in target, please contact your family practitioner or your diabetes team.
- Medication may need to be adjusted or added while you are waiting for surgery.
- If you are unable to reach your usual team or don't have one, please contact the Diabetes Education Centre at Eastern Health at 709-752-3624 . The Diabetes Education Centre provides on-going support, education and skill building for individuals and families living with diabetes

Stress

Reduce stress as much as possible. Identify the greatest sources of stress in your life and start planning ways to deal with them. See page 59 for some top tips to manage stress.

High Blood Pressure

If you have high blood pressure, keep track of your blood pressure readings and take your blood pressure medication as prescribed by your doctor.

Cholesterol

If you have high cholesterol, make sure you take your cholesterol medication as prescribed by your doctor.

Smoking

Smoking is a risk factor for heart disease. Quitting smoking is one of the most important things you can do while waiting for surgery. Ask your doctor about medications to help with your efforts to quit.

There are many benefits to stopping smoking in the days or weeks before your surgery. These include improved healing and better lung function. In short, it will help improve your recovery. Continuing to be a non-smoker after your surgery will improve your overall health. It will help you to keep both the short and long term positive outcomes of not smoking.

For more information, contact: smokershelpline.ca or call 1 (800) 363-5864 or visit www.smokershelp.net.

Alcohol

Drinking alcohol before surgery can affect your recovery. Make sure you tell the staff exactly how much alcohol you have had in the days leading up to your surgery. This will help the doctor, or nurse practitioner to adjust your medicines properly.

Alcohol withdrawal can cause:

- Agitation
- Confusion
- Nausea and vomiting
- Increased sweating
- Tremors
- Headaches
- Feelings of anxiety

Weaning your body from alcohol before surgery can also help with pain control and developing normal sleep patterns after surgery.

You may find the following resource "Alcohol: Cutting Back or Quitting Drinking" helpful while you wait for surgery.

https://www.ementalhealth.ca/Newfoundland-and-Labrador/Alcohol-Problems/

Alcohol dependency is a serious condition involving physical, emotional, cognitive and spiritual elements. Some people are able to recover from alcohol dependency on their own. However, many people have better results with counseling or treatment. For more information, contact the Canadian Mental Health Association (CMHA) for more information at **1-833-456-4566 or www.cmha.ca.**

Getting Ready for Surgery

At Home Preparations

Please designate one support person to act as spokesperson before your surgery. If you work outside the home, arrange to be off work for about three months. Confirm your sick leave benefits, including employment insurance or social assistance while not working.

What to Pack for Your Hospital Stay

Have your family bring these items to the CVICU on the day of surgery.

□ Toothbrush and toothpaste

□ Hair comb

□ Deodorant

□ Other toiletries (scent-free)

□ Glasses

□ Dentures and denture cleaning tablets and their protective cases

□ Hearing aid(s) and batteries

□ Housecoat/pajamas – must open fully in front (no “pull over the head” items)

□ Undergarments (underwear, bra with an extension)

□ Rubber-soled slippers with closed toe and heel

□ CPAP machine (for patients with sleep apnea)

□ Clothes to wear on the day of discharge, including a shirt that buttons up the front

□ Home medicines (in their original containers)

Please leave your valuables at home! The hospital cannot be responsible for belongings.

Managing Your Medications

Keeping an updated list of your medications will help you improve communication with your health care team and reduce the risk of complications.

You can use the medication list provided in this guide (see Appendix C) to help you track your medications. You will need this list during your appointment at the Pre-Admission Clinic and when you are admitted for your surgery.

List all of your medications on the form provided, including:

- Prescription medications that you take regularly
- Prescription medications that you take only as needed, such as nitroglycerin or pain medications
- Any herbal medication, such as ginseng or gingko biloba
- Other medications, such as vitamins, laxatives, aspirin or Tylenol®

Keep this form up to date. Ask your nurse, doctor or pharmacist if you need help to complete each section. Keep it with you at all times and bring it to all your appointments so that medical professionals are aware of the medications you are taking.

Length of Hospital Stay

- Five (5) days for bypass surgery
- Six-seven (6-7) days for valve surgery

You will need someone to bring you home on your day of discharge after surgery and stay with you. You may be ready to go home 5 days or earlier after your surgery.

If you and/or your family need a place to stay in St. John's, you may call the Eastern Health Accommodations - Extended Stay St. John's located at 222 Lemarchant Road.

Telephone: 709-777-6831 or 709-777-6832

Email: hostel.accommodations@easternhealth.ca

Single room rate - $38 per night (one-person occupancy)

Double room rate - $45 per night (two-person occupancy; $10 for additional person)

Family room rate - $65 per night (up to four-person occupancy; $10 for additional person

Chapter Three: Admission for Heart Surgery

Although every patient's situation is unique, the information below will give you a general idea of what you can expect throughout your admission and surgery.

Pre-Admission Clinic (PAC)

The goal of the PAC is to help prepare you and your family for your upcoming surgery. Once you have a date for your surgery, you may be scheduled to visit the Pre-Admission Unit (PAU). The PAU is located on the 1st floor next to registration.

Appointment Date:_____Time:_____

Plan to spend at least 4 hours at the clinic. Please bring 1-2 family member(s) or support person(s) with you to this appointment. You will receive a lot of information about your hospital stay and recovery.

On the day of your clinic visit, please:

- Eat and drink as usual. You may bring lunch with you if your appointment is before noon, or eat lunch before you arrive if your appointment is in the afternoon.
- Take your usual medicines.
- Wear loose-fitting, comfortable clothes. Wear socks instead of panty hose.

Please bring the following items with you to the clinic:

- This guide
- MCP Card
- All of your medicines in their original containers. This includes any herbals, naturopathic, or vitamin products.
- Any documents or information from your doctor
- Your reading glasses
- Any walking aids that you regularly use. This will help with planning your care after surgery.

What happens during my clinic visit?

- The nurse will complete your health history. The nurse will also teach you the things you will need to do to prepare for surgery, and what you will need to do after surgery.
- You will see the anesthesiologist.
- You will have some tests completed, including:
    - Bloodwork
    - ECG
    - Chest x-ray
    - Urine sample

What to Expect Before Surgery

The weeks/days before surgery:

- Take your medicines as instructed
- Stop shaving below the neck 2 weeks before your surgery date.
- Pack according to the instructions below.
- Remove all jewelry before arriving to hospital.
- Remove all nail polish from your fingers and toes. We recommend that you remove artificial nails.

The night before surgery:

- Take a 15 minute shower.
- Do not eat after midnight.
- You may drink clear fluids (water or apple juice) until 5:00 am.
- Do not chew gum, eat hard candy, or smoke after midnight.
- Men may shave their face only. Women do not shave at all.
- Shower with an antiseptic soap
- You may receive visits from your surgeon, a resident, the anesthesiologist and the nursing coordinator.
- You may have additional diagnostic tests if not already completed

The day of surgery:

- Another shower with an antiseptic soap. Put on fresh, clean clothes after your shower.
- Do not wear make-up, perfume, or deodorant on the day of surgery.
- Brush your teeth, but do not swallow the water.
- Wear your dentures, eyeglasses, and hearing aids as needed. These will be removed before surgery. Bring all your cases and protective devices.
- Bring everything on the packing list (see page)
- After your surgery, your family or support person(s) may bring your belongings to CVICU.
- You will receive medicine to help you relax before you go to the operating room
- After you arrive in the operating room, two intravenous lines will be started. You will be asleep shortly after this.

Skin Preparation and Hair Clipping

- Pre-operative skin preparation reduces the risk of infection.
- Your skin preparation will include 2 showers, 15 minutes each. One will take place the night before your surgery and the other on the morning of your surgery. Please put on fresh, clean clothes, or a new hospital gown after your final shower.
- Shortly before your surgery, the hair on your chest, arm(s) and leg(s) may need to be clipped by a nurse.

Arriving at the Hospital

You may have your loved ones come with you on the day of surgery. Please arrive on time. When you arrive at the hospital, you will be directed to the Day Surgery admission area. You will be registered by a clerk.

In Day Surgery, you will be shown to a stretcher area where you will change into a hospital gown. A nurse will come in to admit you, review your health history, medicines, and take your vital signs. The nurse will go over a pre-operative checklist with you.

When it is almost time for you to go for your surgery, staff from the operating room will come to your stretcher, put an oxygen mask over your mouth and nose, and wheel you over to the operating room.

Your loved ones will be shown to the Intensive Care waiting room. They will be asked to take all of your belongings with them, as there is no place to store them in the Day Surgery area.

What Your Family and Contact Person Can Expect

Your family members and designated contact person can stay with you before you go to the operating room.

To protect your health, your family members cannot visit you if they have a cold, fever, diarrhea, cough or any other sign of infection.

Anesthesia

Like all surgery involving general anesthesia, you will be instructed not to eat or drink anything after midnight before your surgery.

The anesthesiologist will review your current medications and inform you or your nurse as to which ones you should take with a small sip of water on the morning of your surgery.

Before you go to the operating room, you will receive medicines to help you relax and make you feel sleepy.

When you arrive in the operating room, you will meet several nursing and technical support staff in addition to your anesthesiologist.

If you have any concerns about pain, angina, difficulty breathing, nausea or anxiety, please share these concerns with your anesthesiologist.

Intravenous Anesthesia

Before putting you to sleep, the anesthesiologist will insert several intravenous lines when you arrive in the operating room.

Breathing Tube and Machine

After you are asleep, you will be connected to a breathing machine (ventilator) by a breathing tube placed in your mouth and down your trachea (windpipe).

Your anesthesiologist will take great care in inserting the breathing tube in your mouth. However, you should be aware that in extremely rare cases some minor chipping or grinding of upper teeth may occur. This is why we ask about dental caps, dentures or loose teeth.

Blood Products

The heart-lung machine has a tendency to damage red blood cells, clotting cells and clotting proteins. If this happens, you may require blood products from Canadian Blood Services. The current risk of contracting AIDS, HIV or hepatitis is very small. These blood products are given only when necessary and when the benefits outweigh the risks. You will be told before you go home whether you received these blood products. The blood bank leaves a card on your chart for your records.

Should you have any further questions regarding anesthesia, please ask your nurse to have the anesthesiologist come and speak with you

What to Expect During Your Surgery

The surgery will usually take 4-6 hours. It will depend on the type and complexity of surgery you are having.

When your surgery is finished, your surgeon will visit your family in the CVICU waiting area.

You will be taken to the CVICU to recover from your surgery. The CVICU is a highly specialized and technical environment which provides care to patients undergoing cardiac surgery. Once you are settled in the CVICU, your family will be allowed to visit you all together for the first visit after surgery. After this, only 2 visitors will be allowed at the bedside at a time.

Questions I have about getting ready for surgery:

Questions my loved ones have for the Surgeon and staff:

What to Expect After Surgery

Cardiovascular Intensive Care Unit (CVICU)

After your surgery you will be transferred to the Cardiovascular Intensive Care Unit (CVICU). Many things will happen in the CVICU.

- The intensive care team will stabilize and help you recover from the surgery. You will be kept asleep until you have warmed up and your vital signs are stable. You will be given medicines to keep you comfortable.
- Your family will be allowed to visit for a short time before you wake up. They will get an update on how you are doing and the expected plan for your recovery while you are in the CVICU. You will probably not remember that your family visited that day. You will be more alert the morning after surgery.
- You will be attached to many wires and tubes that will monitor your recovery. It is important that you and your family do not touch any of these wires or tubes. As you recover, these wires and tubes will be removed.
- You will have chest tubes below your sternal incision. These tubes help to drain extra fluid from the surgical area. These tubes can be quite uncomfortable while they are in place. The tubes generally remain in place for 1-2 days, depending on the amount of drainage.
- You will have blood work, an ECG, and a chest x-ray.
- Your healthcare team will complete frequent assessments on you. They will teach and support you as you begin to return to normal and everyday activities.

Please have your family give your belongings to the CVICU nurse. Have your family make sure the nursing staff has all of the correct contact number(s).

After the first visit, only 2 family members are allowed to visit for short periods at the bedside. Family members will need to call using the phone outside of the ICU waiting area. The CVICU staff will confirm if it is okay to come in and visit.

You can expect to be in the CVICU for 24 hours. You will be transferred to the Cardiac Surgery unit on the 5th floor (5SA) for the rest of your recovery period.

If you or your loved ones have any questions or concerns, please remember to ask the staff about them.

Special Care Unit/Ward (5SA)

Visiting Hours: 11:00 a.m. to 9:00 p.m. Quiet hour (no visitors) is 2:00 p.m. to 3:00 p.m. Only two visitors at a time at bedside. Family members who are ill should stay at home.

When you are awake and stable, you will be transferred to the Special Care Unit on 5SA. This typically occurs the day after surgery. Many things will happen on the nursing ward:

- You may receive oxygen by mask or nasal prong as needed.
- You will begin to return to your normal physical activities.
- You will still be connected to a few wires and tubes. As you continue to recover, the rest of these wires and tubes will be removed.
- During your recovery time, we will concentrate on teaching you all the skills needed to help you prepare for recovery at home. This includes walking, deep breathing and coughing exercises.
- You will progress with your diet gradually. If you feel nauseated, let your nurse know.
- You will have blood work, ECG's, chest x-rays, and any other required tests completed throughout the rest of your recovery.
- Your healthcare team will complete frequent assessments on you. Your healthcare team will support you to move towards being safely independent.

Sternal Precautions

What is a sternotomy or breastbone incision?

A sternotomy or breast bone incision is a surgical incision made through the center bone of your chest, called the sternum. Your surgeon will cut through the bone to be able to access your heart during surgery. The bone is then closed up using metal wire.

In order for your sternum bone to heal properly it will be very important for you to follow sternal precautions after your surgery. These precautions can help your bone heal and avoid infection. Do not lift, push or pull more than 5 to 10 pounds with your arms for 6 to 8 weeks. This will allow your sternum (breastbone) time to heal properly. Your surgeon will let you know when you can return to regular use of your arms, usually within 6 to 8 weeks after your surgery.

Common Concerns after Surgery

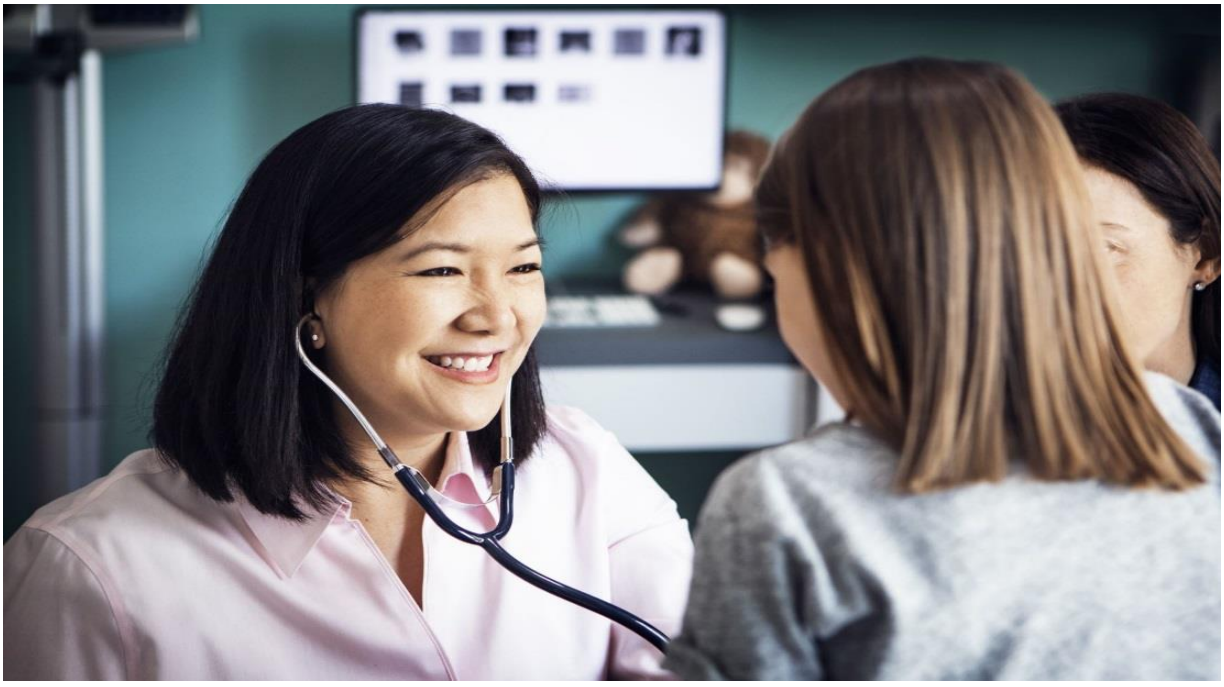
Pain

Some pain is to be expected after surgery. Depending on the type of surgery you have, you may have one or more incisions on the following areas: Sternum (breastbone in the middle of your chest), your arm(s), and/or leg(s).

You will be asked to rate your pain on a scale from 0 - 10. “0” means you are feeling no pain and “10” means you are having the worst pain that you can imagine. Our goal is to keep your pain at “3” or less at all times. We want you to be able to cough and move with relative comfort as you recover. If you are in too much pain, you will not be able to breathe fully or perform the exercises we will be giving you.

It is important to take your pain medication regularly during this time so that you will be comfortable while doing recovery activities. Make sure you let the nurse know if you are uncomfortable.

We will encourage and assist you to splint your chest when coughing, sneezing, or laughing. You will receive a special pillow after your surgery to help splint your sternum at all times. Hugging your chest keeps your elbows into your body during activity. Women are encouraged to wear their bra after surgery. This will help to ease the pain, and protect your sternum.



Delirium

People who have had surgery are at risk for developing delirium during their recovery. You will receive a brochure during your stay in the CVICU. This brochure will help you learn more about how delirium can affect someone after surgery and how it is treated. It also describes ways family members can help.

Constipation

After heart surgery, some people have bloating in their belly, rectal discomfort, or constipation. Constipation can be caused by:

- Narcotic medicines to control pain
- Lack of physical activity
- Dehydration; Low intake of fluid in your diet

Symptoms may last until you are back to your normal activities. Your doctor or NP can prescribe stool softeners and laxatives to help promote regular bowel movements. If you need a prescription renewed for stool softeners or laxatives, please see your family doctor or NP.

Why am I so tired?

After surgery, you may feel exhausted. This may be due to being less active, lack of sleep, medicines, or the surgery itself.

Remember to increase your activity level gradually and rest when you are tired. This will help you regain your strength faster. The nurses and physiotherapist will help you to build up your level of activity. You will need to continue to build up your level of activity when you go home.

You may not feel you are more energetic each day. Judge your energy level weekly. Each week, you should feel as though you have more energy than the last. It is normal for it to take at least 4 to 6 weeks to gain back your energy.

Why am I depressed or sad?

After the surgery, you will have good and bad days. It is normal or feel sad or depressed at times. Feelings of irritability, fear, or anxiety are also common. You may feel that progress is slow at times. It is important to talk about your feelings with your family members and the health care team. This will allow the staff and your family to help you.

You may have these feelings for up to 6 to 8 weeks. Speak with your family doctor or nurse practitioner (NP) if you're depressed feelings:

- Last longer than this.
- Start to interfere with your relationships.
- Interfere with your ability to do your everyday activities

How long can I expect to be in hospital after surgery?

You will need to plan for what going home will be like before you have your surgery. You can expect to be in the hospital for 4-5 days after surgery. The activities you will be able to do when you first go home will depend on what you were able to do before surgery. You can expect to return to doing basic activities, such as: walking, climbing a flight of stairs, preparing light meals, and completing your normal morning routine.

It is important that you inform the healthcare team, early in your hospital stay if:

- You live alone or have no supports in the area
- You or your loved ones are unsure about your ability to cope at home
- You feel that you will need community health home care services

A very small number of patients may require extra recovery and need to go to a rehabilitation center before going home. If you need this, staff will speak to you and your loved ones about it during your hospital stay.

Exercises in Hospital

Exercises are an important part of your recovery. In the CVICU, and throughout your hospital stay, the staff will teach you to complete breathing, arm, and leg exercises. They will also show you how to get out of bed while still protecting your sternum.

Breathing Exercises using the Incentive Spirometer

The staff will instruct you how to use the incentive spirometer when you sit at the side of the bed for the first time.

- Make a firm seal on the mouth piece and take in a slow, relaxed deep breath using your diaphragm. Try not to shrug your shoulders.
- Make sure you do not cover the holes at the bottom of the columns with your finger.
- Hold your breath for as long as you can. Then release.

You are encouraged to perform deep breathing **10 times every hour while you are awake** for the duration of your stay in hospital.

Coughing

Coughing helps to clear phlegm from your lungs and will help to prevent lung infections. It is common after surgery to have extra phlegm in your lungs, especially for the first few days. When you cough:

1. Hold your special pillow firmly against your chest.
2. Take a deep breath in and cough out.
3. You should cough two to three times every hour that you are awake.

Your special pillow helps to support your incision and lessen the discomfort you may have with coughing.

Bed Mobility

For the first few days, you will be helped out of bed. Because of the incision in your breastbone, you will need to learn a special way to get out of bed and up and down out of a chair. Until you are comfortable with this technique, your nurse or physiotherapist will practice this with you every time.

• Bend your hips/knees and hold onto your pillow. Roll onto your side.

• Let your legs fall over the side of the bed, and pull with your legs to help you come to a sitting position.

While in bed, it is important to change your position every one to two hours (for example, lying on your right and left side).

Activity

Your activity level will be gradually increased during your stay. The day after your surgery, if you are able, you will sit in a chair and begin walking in the hallway with assistance. Before you go home, you will be able to walk around the ward and climb stairs only if you are required to climb them to get into your house or up to your bed.

You will be given specific guidelines for exercise and activity at home as well as information about cardiac rehabilitation.

Standing up from Chair, Bed, or Toilet:

1. Cross your arms over your chest while hugging your special pillow.
2. Without using your hands or arms, wiggle your bottom to the edge of the chair by leaning from one side to the other.
3. Be sure your feet are close to the chair.
4. Lean your whole body forwards to get your weight over your feet, and push into your feet to stand up. You may rock your body a few times to gain some momentum.

General Precautions:

- Do not use your arms to push when getting up and down.
- Do not reach behind yourself when going to sit down (e.g. do not reach for arm rests or seating surfaces).
- Hug a pillow or cross your arms before sitting and standing to reduce the risk of using your arms to push on and off surfaces (to brace your wound).
- Raise the height of your seat surfaces if needed, such as using a raised toilet seat (without arm rests), furniture risers, and / or cushions.
- If someone is assisting you, have them provide support around your back and rib cage.

Getting Out of Bed, from Lying to Sitting:

1. Cross your arms over your chest while hugging your special pillow.
2. Bend your hips and knees, and log roll (head, shoulders, hips, and knees – all turning at the same time) onto your side. Be sure to be all the way over onto your side!
3. Let your legs fall over the edge of the bed and pull with your feet while gently using your elbow to push your body off the bed into a sitting position (having the bed inclined can make it easier).
4. You may need to wiggle your bottom to the edge of the bed by leaning from one side to the other.
5. Sit on the edge of bed before standing up, following the technique described.

General Precautions:

- Do not use a bed rail to help with turns, positioning, or transfers.
- If someone is assisting you, be sure they are familiar with the technique to avoid getting hurt while helping you sit up.

Getting Into Bed:

1. Have the bed flat to reduce exertion.
2. Hugging a pillow, sit deep on the edge of the bed, near the top of the bed.
3. Lie onto your side, using your elbow to help lower yourself down.
4. Lift your legs onto the bed with knees in a bent position, so that you are lying on your side.
5. Roll onto your back with your head, shoulders, hips, and knees – all turning at the same time (log roll).

General Precautions:

- Use your legs to scoot up and down (not your arms).
- Have your knees bent and your feet flat on the bed and push off the bed with your legs extended to push yourself up in bed.

Speak to your physiotherapist or occupational therapist with any questions regarding the above techniques.

Chapter Four: Going Home after Your Heart Surgery

Discharge and Follow Up

How do I know I am ready for home after heart surgery?

- Your pain is well-controlled
- Your nausea is well-controlled
- You have had a bowel movement
- You are eating a heart healthy diet
- You are able to walk with or without a rollator walker
- You are able to shower with minimal help or supervision
- If you have stairs at home, you have practiced stairs in hospital
- You have a good oxygen level
- Your heart rate and rhythm have been stable
- Your blood pressure is within normal range
- You have a normal temperature
- Your incisions are healing well
- Your bloodwork results are within expected range

If you have any concerns about going home after your surgery, ask your nurse to refer you to a social worker. They can help you with:

- Home-based physiotherapy or nursing requirements
- Community resource information
- Coordinating any community care that you may need upon discharge
- Drug-related costs
- Any other concerns you may have with respect to going home

If you require assistance making arrangements for help when you go home after your surgery, you can speak with a social worker before coming to the hospital, by calling (709) 777-8471

Medications at Home

It is important that you understand when and how to take each medicine before you go home. You will need to keep taking most of your medications after your surgery. Your health care team may make some changes to your prescriptions.

It is very important that you fill your prescription the day you go home. Your pharmacist can make sure you only have the medicines you should continue to take. Please take all of your home medicines with you when you are getting your prescription filled. They should be in their original containers. Your pharmacist will review all of your medication with you when you pick them up.

Do not start taking herbal, naturopathic medicines, or vitamins without talking to your family doctor or nurse practitioner (NP). Some of these products can interact with your prescription medicines, or change how they work.

Our goal is for you to understand why you are taking each medicine and how it will work in your body. If you would like more information, please ask to speak with the clinical pharmacist. After you leave the hospital, your community pharmacist is another valuable resource for medicine information.

If you require a refill of your medication, please contact your family doctor or nurse practitioner. Do not change, stop or add any medications without first discussing it with your family physician or specialist.

Appendix A: Healthy Eating – Healthy Heart Diet Guidelines

Top 10 Tips for Healthy Eating

Making healthy food choices doesn't have to be overwhelming. These tips will get you on your way.

1. Cook at home more often. Cooking at home makes it easier to avoid processed foods. It can be as simple as scrambled eggs, whole grain toast, tomato and cucumber slices.
2. How you eat is as important as what you eat. Enjoy mealtimes and the food you eat! Don't multitask. Avoid distractions like your computer or TV while you eat. Sit down and enjoy a meal at the table. If you live with others, make family dinner a priority.
3. Listen to your body. Eat when you're hungry and stop when you feel satisfied.
4. Eat at regular times. Eat breakfast within 1 to 2 hours after waking up. Don't wait too long between your meals. It's harder to make healthy choices when you're hungry.
5. Plan healthy snacks. Try whole grain crackers and peanut butter or hummus, a piece of fruit and a few unsalted nuts, or frozen berries and plain yogurt.

6. Eat a variety of vegetables and fruit at every meal. Enjoy brightly colored whole vegetables and fruit. Fresh or frozen, try them in different ways—raw, roasted, or sautéed.

7. Eat whole grains more often. Switch to brown rice, whole wheat pasta, dark rye bread or oatmeal. Try something new in your soup, salad or casserole like quinoa, bulgur or barley.

8. Eat fish at least twice a week. Trout, salmon, tuna and sardines are some tasty options. Try fresh frozen or canned.

9. Include legumes like beans, chickpeas, lentils, nuts and seeds more often. Add them to salads, soups and grain dishes such as rice, quinoa or couscous. Legumes can replace meat in your meals. Try a vegetarian chili.

10. Don’t be afraid of fat. You need fat for good health and it adds flavor to your cooking. Use plant-based fats such as olive or canola oil.

Appendix B: Managing Stress

Tips for Managing Stress

1. Exercise regularly. Exercising at least three to five times a week helps to relax and condition your body and mind.
2. Breathe deeply. Take a few deep breaths. Notice how it changes how you feel.
3. Be aware of quick fixes. Try to avoid the tendency to consume more alcohol and recreational drugs in stressful times.
4. Notice your thoughts. Reflect on how you think about what's causing you stress. A trusted person or a counsellor can help you see things in a new way.
5. Relax the muscles in your body. Stress can make your body tense. Try to relax the areas where you carry the most stress.
6. Recognize what you can't control. Reflect on what you can control, and let go of things beyond your control.
7. Take a break. Give yourself permission to nap, listen to music, read, meditate or just have some quiet time.
8. Make time for things you enjoy. Set time aside for hobbies or learning something new.
9. Avoid exposure to stress. If possible, avoid unnecessary triggers for stress, such as distressing TV shows.
10. Evaluate your commitments. Consider how you spend your time and letting go of some commitments.

Appendix C: Medication

Medicine Instructions

The preadmission clinic nurse and anesthesiologist will review all of your medicines with you during your visit. It is important to take all of your regular medicines unless otherwise instructed below.

Medicines to stop before surgery	When to stop

Medicines to take the morning of surgery (with a sip of water only):

_____

_____

_____

Additional Resources

Heart And Stroke Foundation of Newfoundland & Labrador

1-888-473-4636
https://www.heartandstroke.ca/healthy-living

Heart Health

https://www.canada.ca/en/public-health/services/diseases/heart-health.html

Coronary Artery Disease Patient Guide

https://www.ottawaheart.ca/coronary-artery-disease-patient-guide/heart-healthy-living

Smokers Helpline: 1-800-363-5864

https://smokershelp.net/

Mental Health and Addictions

- Provincial Mental Health Crisis Line: 1-888-737-4668 or (709) 737-4668
- Mental Health and Addictions Systems Navigator: 1-877-999-7589 or (709) 752-3916
- CHANNAL Peer Support Warm Line: 1-855-753-2560 or (709) 753-2560

https://www.gov.nl.ca/hcs/mentalhealth-committee/mentalhealth/

Canadian Mental Health Association (CMHA)

1-833-456-4566

www.cmha.ca

Notes: