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# Discharge education to promote self-management following cardiovascular surgery: An integrative review

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## Abstract

**Background:** Nurses have a key role in teaching cardiovascular (CV) surgical patients to manage their post-surgical care after discharge. There is evidence that effective patient teaching contributes to improved quality of life, decreased anxiety and depression and fewer post-CV surgery emergency department visits and hospital readmissions. Despite this, there are no guidelines or standards for how best to educate CV surgical patients for discharge.

**Aim:** To conduct a literature review of published research on discharge education for CV surgical patients to inform guidelines for educating CV surgical patients.

**Method:** An exhaustive search of CINAHL, Medline, Web of Science, Cochrane Database of Systematic Reviews, and ERIC was executed using the following search terms: cardiovascular, cardiac, cardio\*, heart, surg\*, transplant, discharge, self-manage\*, teach\*, educat\*, preop\*, patient, care. In addition, an ancestry search of all reference lists was completed. Studies were included if they were published between 2007 and 2012 and focused on preoperative CV surgery adult patient education.

**Results:** The search yielded 20 studies, 12 were excluded because they did not meet the inclusion/exclusion criteria. Eight studies were included in the final review. Three studies reported statistically significant decreases in reported anxiety and depression and increased subjective health. Four studies had mixed results with both positive and neutral findings. No studies reported negative findings in relation to preoperative education.

**Conclusion:** Patients and staff identified that patient education is essential. Standardized educational tools are appropriate as they can spare resources, but are only effective if used in conjunction with individualized education.

## Keywords

CV surgery, discharge education, discharge planning

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## Introduction

The World Health Organization predicts that deaths due to cardiovascular disease (CVD) will increase around the globe from 17 million in 2008 to 25 million in 2030.<sup>1</sup> CVDs, defined as all diseases of the circulatory system, including those of congenital origin,<sup>2</sup> are responsible for one of every three deaths in Canada and the United States.<sup>2,3</sup> The situation is equally serious in Europe, where CVDs cause over four million deaths.<sup>4</sup> Due to their high prevalence CVDs impose a high social and financial burden on individuals, families and healthcare systems around the world. In 2004–2005, three of the four most costly diseases in Canada were CVD related, costing taxpayers \$1.4bn for

hospital in-patient care<sup>3</sup> and another \$20.9bn for medical staff services, hospital costs, lost wages, and decreased productivity. CVDs cost the EU economy almost €196bn a

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year in direct health care costs (54%), informal costs associated with caring for people with CVD (22%) and lost productivity (24%).<sup>4</sup>

Surgical procedures like coronary artery bypass graft (CABG), balloon angioplasty, and valve repair and replacement are integral to the treatment of CVD.<sup>5</sup> Although these surgical procedures often improve survival rates, decrease symptoms and increase an individual's functional ability,<sup>6</sup> surgery is not curative and individuals with chronic CVD remain at increased risk for coronary events.<sup>7,8</sup> In addition to acute -operative care, these individuals must develop the knowledge and skills for self-management<sup>9,10</sup> to prolong their survival, improve their quality of life and reduce the need for additional interventions.<sup>11-14</sup> The concept of 'self-management' has its roots in Cognitive Learning Theory and reflects Thomas Creer's<sup>15</sup> belief that patients must be active participants in their own treatment. Although not well conceptualized nor well defined, self-management is commonly used in health education to refer to health promotion and patient education programs.<sup>16</sup> Nurses have a key role in preoperative education to help patients and their families prepare mentally and physically for the surgical process and learn how to effectively self-manage post-surgical symptoms once they are discharged home.<sup>17,18</sup>

While preoperative education programs have demonstrated favorable effect on post-surgical outcomes,<sup>19</sup> there are no guidelines or standards for how best to educate cardiovascular (CV) surgery patients for self-management after discharge. A preliminary search of the literature revealed that patient education is offered at various times and to different patient populations, including to preoperative in-patients and to post-surgery outpatients.<sup>20</sup> Importantly, Shuldham<sup>21</sup> and Goodman et al.<sup>22</sup> report that providing discharge education preoperatively is more effective in helping patients and caregivers cope with acute and chronic health issues than offering the same education at other times.

The aim of this literature review and synthesis was to address the question: what preoperative educational methods, content and timing maximize information retention and post-discharge self-management among CV surgery patients. The studies selected for this review were analyzed and their findings synthesized as a first step in helping to develop an evidence-informed preoperative patient teaching program for CV surgery patients.

For the purpose of this review, 'CV surgery' refers to any surgery that includes CABG or any open-heart surgeries such as valve repair or replacement, congenital or transplant surgeries.

## Methods

An exhaustive literature search of Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, Web of Science, Cochrane Database of Systematic Reviews,

and ERIC was systematically executed using the following search terms alone and in combination: cardiovascular, cardiac, cardio\*, heart, surg\*, discharge, self-manage\*, teach\*, educat\*, preop\*, patient, care. An ancestry search of all potentially relevant articles was also completed.

## Inclusion and exclusion criteria

Research reports published between 2007 and 2012 with a focus on preoperative CV surgery patient education with adults were included in the review. Studies published in languages other than English were excluded; however, the reference lists of those that appeared to be pertinent had an ancestry search done to check for relevant articles published in English.

## Searching for relevant articles

The review was executed in May and June of 2012, as part of a quality improvement project at the Mazankowski Heart Institute in Edmonton, Canada. The initial search yielded 20 studies, 12 of which were excluded because they did not meet the inclusion/exclusion criteria. Eight studies were included in the final review (see Appendix 1 for a condensed review of all eight studies reviewed). Seven were quantitative studies<sup>23-28</sup> and one was a qualitative study<sup>29</sup> done as part of a larger quantitative study, which was included in this review.<sup>22</sup>

## Findings

### Sample sites and countries

Data for one of the eight studies were collected from two sites<sup>25</sup> and the remaining seven studies were single site studies.<sup>23,24,26-30</sup> Three studies were done in China,<sup>23,25,28</sup> one was done each in Iran,<sup>23</sup> Norway<sup>27</sup> and Turkey.<sup>24</sup> The primary and secondary studies by Goodman et al.<sup>29,30</sup> were done in the United Kingdom.

### Sample sizes

Sample sizes for the quantitative studies ranged from 40 to 188,<sup>23-25,27-29</sup> while the qualitative study had 19 participants.<sup>30</sup> Of the quantitative studies, three described their statistical power analysis, with two of these<sup>25,27</sup> reporting adequate sample sizes after a power analysis of 80% at level of significance of 0.05. The third study<sup>29</sup> reported performing a power analysis of the sample size used and noted that although their sample size was low, it was not so low as to significantly alter the power analysis. The remaining four quantitative studies<sup>23,24,26,28</sup> did not report a power analysis. The qualitative study<sup>30</sup> used a purposive sample, but there was no reference to the adequacy of their sample size. Despite only two articles reporting adequate sample sizes all papers were included in the review.

## Population

There were two types of CV surgical patients studied in the eight articles reviewed: isolated CABG patients<sup>23,24,27–29</sup> and patients undergoing CABG or any of the following open-heart surgeries: valve surgery, congenital and other open-heart surgeries.<sup>25</sup> All participants were aged 18 years or older; however, two studies instituted additional age and sex restrictions. One of these studies included adults under the age of 68<sup>27</sup> and the other study specified men between 40 and 65 years.<sup>23</sup> Only patients undergoing CABG for the first time were recruited in three studies<sup>24,26,27</sup> and one study included CABG patients with higher surgical risk scores on the EuroSCORE.<sup>28</sup>

## Research design

Data for the sole qualitative study was generated through narrative discovery interviews with participants.<sup>30</sup> Of the remaining quantitative studies, six were two-group randomized controlled trials that used convenience sampling<sup>23,25,27–29</sup> and the remaining study used a two-group prospective quasi-experimental design.<sup>24</sup> One of the eight studies did not describe their intervention in sufficient detail, making it difficult to determine whether the methodology was appropriate or not.<sup>23</sup> This same study assessed the intervention group before the control group rather than implementing both groups simultaneously.<sup>23</sup> The other seven studies appeared to have used appropriate controls, measurements and assessments.<sup>24–30</sup>

**Physical health and symptoms.** Each of the seven quantitative studies reported on various aspects of physical health and symptoms post-surgery.<sup>23–29</sup> Three studies used the Short Form 36 Health Survey Questionnaire.<sup>23,27,29</sup> Other validated and reliable tools such as the power spectral analysis<sup>26</sup> and the Brief Pain Inventory Short Form<sup>25</sup> were used to measure various qualities of physical health pre and post cardiovascular surgery. The two remaining studies did not report using specific tools but measured physical signs and symptoms such as lower leg edema, constipation and respiratory difficulties.<sup>24,28</sup> Other physical parameters assessed in one of the studies included blood pressure, body mass index, cholesterol level, smoking rate and blood glucose.<sup>29</sup>

**Anxiety, depression, and quality of life.** Anxiety was measured using a variety of tools, including the Hospital Anxiety and Depression Scale (HADS),<sup>25,29</sup> Zung's Self-Rating Anxiety Scale,<sup>28</sup> Beck Anxiety Inventory<sup>27</sup> and the Scale of Perceived Stress.<sup>26</sup> Depression was measured in two of the studies via HADS<sup>25</sup> and Zhung's Self-Rating Depression Scale.<sup>28</sup> Quality of life was measured in two of the studies using the Nottingham Health Profile questionnaire<sup>23</sup> and the Coronary Revascularization Outcome Questionnaire.<sup>29</sup>

Patient knowledge and attitudes were measured using a tool that included questions pertaining to coronary artery disease, CABG, coronary artery disease risk factors, and lifestyle;<sup>23</sup> the validity and reliability of this tool were not discussed. Patients' self-care ability was measured using the Self Care Agency Scale.<sup>24</sup>

**Duration of hospitalization.** Length of postoperative hospital stay was reported by three studies and was measured in days.<sup>27,28,30</sup> One study reported the length of stay in the cardiovascular intensive care unit (CVICU) in days.<sup>26</sup> This study also measured the frequency of spirometer use while in the CVICU.<sup>26</sup> Other studies reported post-discharge readmission rates<sup>24</sup> and number of days to extubation.<sup>26</sup>

## Results

### Quantitative studies

The results of the studies in this review are mixed, with three studies reporting positive results on all outcomes measured,<sup>23,27,28</sup> including decreased patient anxiety,<sup>27,28</sup> less depression,<sup>27</sup> better subjective health,<sup>23,27</sup> higher quality of life<sup>23</sup> and fewer physical complications such as leg edema, urinary retention, constipation, and cardiovascular and respiratory problems.<sup>28</sup> The teaching intervention in these studies involved videos combined with one-on-one pre- and post-discharge educational sessions<sup>27</sup> and individualized education and counseling sessions prior to surgery.<sup>28</sup> Educational content included procedural information related to pre and postoperative events plus behavioral instructions such as deep breathing for pulmonary care and pain management,<sup>27,28</sup> information about the CABG procedure, rehabilitation, and some psychosocial preparation for discharge home.<sup>28</sup> No studies reported negative results associated with preoperative cardiovascular education.

Four studies reported mixed results with both positive and neutral findings.<sup>23–25,29</sup> The positive findings included decreased anxiety and depression,<sup>25</sup> less time spent in the CVICU<sup>25</sup> and fewer post-discharge readmissions.<sup>24,29</sup> In addition to lower readmission rates, Goodman and colleagues<sup>29</sup> determined that preoperative cardiovascular surgery education is cost effective. Specifically, they noted that the experimental group who received preoperative education had reduced costs associated with their initial hospitalization (cost difference of £1817) and post discharge care. Because the control group was readmitted more often after discharge, Goodman reported that there was a £9092 increased cost to the healthcare system.<sup>29</sup> Other positive findings included less reported pain while sleeping,<sup>24,25</sup> and decreased lethargy, weakness, insomnia, anorexia, leg edema, kinetophobia, constipation, flatulence, respiratory difficulties and leg and chest infections, and higher self-care scores.<sup>24</sup> Other studies reported no differences in average reported pain, activity, walking,<sup>25</sup> heart rate,<sup>26</sup> anxiety,

depression, body mass index, length of hospitalization and quality of life.<sup>29</sup>

Liou<sup>26</sup> observed that the total time for individualized teaching was significantly less for video instruction compared with pamphlet instruction; however, there were no statistical differences in perceived level of stress between these teaching modalities.<sup>26</sup>

### Qualitative studies

The only qualitative study in this review explored patient and staff experiences of participating in Goodman's<sup>29</sup> original study of patient education prior to CV surgery.<sup>30</sup> The findings revealed perceptions of preoperative CV surgery education from the perspective of patients and their families, CV nurses and CV surgeons.

Interviews with patients revealed that after participating in preoperative cardiovascular surgery education, many patients could not identify the reasons for the education session and that many were unable to recall what they had been taught. Patients did value the psychological and physical preparedness they derived from the education but did not believe that pre-surgery was the appropriate time to address their CVD lifestyle risk factors. Patients did appreciate the support they received from the nurses and specifically noted that post-surgery home visits provided an opportunity to ask specific questions about their own health care and when they could be referred back to the medical team if warranted. Despite this individualized attention, patients continued to request better communication with the healthcare team. Patients in the study reported that they received information about their surgery from sources other than hospital CV health care professionals.<sup>30</sup> These included diabetic clinics, general practitioners or previous cardiac rehabilitation programs.<sup>30</sup>

The nurses noted that patients received conflicting information from these various sources and during Goodman's<sup>29</sup> intervention. In addition, patients had different understandings of how the healthcare system functions and therefore had varying perceptions of what to expect from the surgery itself and the outcomes. Nurses also observed that patients thought CABG was a cure for their heart disease and heard from patients that they would rather take medications than change their lifestyle. The nurses concluded that patients did not seem engaged in the educational sessions and seemed to have varying degrees of motivation to learn. Surgeons in the study agreed that lifestyle modifications should be addressed as soon as CVD is identified and that education and support for lifestyle changes should not wait until a patient is on the surgical wait list. Although the surgeons did want risk factors such as weight and smoking addressed more thoroughly, they did think that nurses were better able to see patients holistically in their own homes versus in an outpatient clinic, ultimately encouraging the use of home visits.

All study participants concurred that the educational material used in the intervention was generic standardized information regarding CABG surgery and that a more individualized approach may have been more intriguing and more memorable.

### Discussion

The intent of this literature review was to examine recent literature to determine what is known about preoperative CV surgical education. The results of this review highlight that there are no negative effects associated with this type of patient education. Various teaching processes were identified through interventions in the studies in the review. These included standardized to individualized methods, using written, audiotape or video modes of delivery; one-session versus several sessions both preoperatively and pre and postoperatively; and including only patients or patients and caregivers. Standardized education pertains to learning resources that are created for general distribution, typically in the form of booklets or pamphlets, videos or audiotapes.<sup>31</sup> Alternatively, individualized education involves patients in the development of learning goals and deciding what they deem is most important for them to focus on.<sup>32</sup> These results replicate findings in previous reviews on CABG patient education.<sup>31</sup> Of note, six of the seven studies in this review utilized a combination of individualized and standardized education;<sup>23-29</sup> however, all of the studies employed a single teaching method in their intervention (e.g. written material or video tape). This stands in contrast to the findings of a systematic literature review of CABG patient education,<sup>31</sup> which concluded that multiple educational methods used in combination resulted in larger effect sizes.

In summary, preoperative teaching was associated with improved quality of life<sup>23,29</sup> and decreased depression and anxiety<sup>25-28</sup> in the postoperative phase and one longitudinal study reported effects lasting up to two years post-procedure.<sup>27</sup> This suggests that effective pre-surgical education is important for the physical and psychological well-being of individuals who live with chronic CVD.

### Significance for practice

**Goals for CV surgery education.** The goal of CV surgery education is to enable patients and their families to self-manage their care at home and decrease post-surgical complications and hospital readmission rates. Important patient outcomes include improved information retention, high patient satisfaction<sup>28</sup> and increased adherence to therapy.<sup>33</sup> Physical and psychological recovery and improved quality of life can occur in a more timely fashion than when there is no education.<sup>31</sup> Based on her findings, Utriyaprasit<sup>33</sup> contends that educating patients and their families about what to expect after discharge, including rehabilitation, helps to

decrease fears, depression and anxiety as they can anticipate what is going to happen physically and mentally and are therefore better prepared to handle these situations.

**Needs assessment.** Effective pre-CV surgery education requires a needs assessment of a patient's understanding of CV health and surgery to determine the individual's learning needs.<sup>34</sup> 'Tailoring discharge teaching information to the unique learning needs of CV surgery patients and their caregivers may improve information acquisition and retention and positively influence the transition home for these individuals' (from Spyropoulos et al., p. 13<sup>35</sup>). Two needs assessment questionnaires were developed by Spyropoulos et al.<sup>35</sup> to assess the self-identified needs of patients and their caregivers. This may help health care professionals to understand: each patient's unique requirements and determine what modifiable lifestyle risk factors can or should be addressed; individuals' ability to cope and manage their chronic disease(s) at home; and their expectations of themselves, their care givers, and the health care system. According to Prochaska's Transtheoretical Model of Change,<sup>36</sup> which is similar to Mico and Ross's<sup>37</sup> Model for Health Education used in Babae's study,<sup>23</sup> behavioral change requires time and each individual will require a different amount of time but will go through similar stages of change.<sup>38</sup> By completing a needs assessment, a nurse or other health care professional is able to determine whether a patient is ready for drastic or minute changes, which should ultimately direct how the education is provided.

**Educational material.** Since the goals of CV surgical education of patients are to facilitate self-care and reduce post-discharge hospital readmission rates, it is important to determine what contributes to readmissions. According to Lahey et al.<sup>39</sup> readmission diagnoses were atrial fibrillation (23%); angina, congestive heart failure or ventricular tachycardia (20%); leg wound (15%); sternal wound (5%); pneumonia (5%); gastrointestinal complaints (5%); neurologic event (2%) and miscellaneous (2.5%). While the rates of readmission diagnoses may vary, awareness of the causes of potential postoperative complications may help health care professionals prepare patients for potential adverse medical events and teach them how to manage situations such as angina and wound care. Knowing who they can call in the event of a problem may prevent an unnecessary emergency room visit and reduce stress on patients, their families and the health care system.

Participants in Goodman's<sup>30</sup> qualitative study identified that the acute phases just prior to CV surgery and immediately afterward are not opportune times to address lifestyle modifications. The surgeons interviewed in the study agreed that lifestyle modifications need to be addressed well in advance of surgery. The

information that patients wanted in the pre- and postoperative phases relate to knowing who they can call if they have questions or concerns. The patients also wanted information on how to recognize problems postoperatively, how to perform physical activities that aid rehabilitation, medication management, managing emotions<sup>31</sup> and coping with weakness, insomnia, anorexia, leg edema, constipation, flatulence and respiratory difficulties.<sup>24</sup> These areas need to be addressed in any CV surgical education program.

**Teaching methods.** Two types of teaching methods, individualized and standardized, were reported in this review. Individualized education involves patients in the development and prioritization of learning goals.<sup>32</sup> Fredericks<sup>31</sup> describes individualized education as any educational intervention that uniquely addresses a person's learning needs. In contrast, standardized education refers to learning resources that are created for general distribution, typically in the form of booklets or pamphlets, videos or audiotapes. The latter typically focus on topics that nurse educators determine to be of general interest to all patients.<sup>31</sup>

In a literature review of patient education for patients undergoing CABG, Fredericks<sup>31</sup> found that individualized education was associated with statistically significant improvements in the information retention and self-management skills compared with both standardized patient education and no education. These results highlight the importance of identifying learning needs and developing an individualized approach to patient teaching. Although the use of standardized methods across a variety of modalities (e.g. videos, reading material and audiotapes) have been shown to improve patient knowledge, there is potential to enhance the uptake of information by tailoring them to an individual's learning needs. This could be accomplished by having patients repeat back what they have understood from the teaching materials, leading to a discussion between the patient and health care professional.<sup>30</sup> This combination of teaching methods could amplify the results of standardized educational tools used alone.

**Frequency and length of education.** This literature review revealed that preoperative CV surgical education did not have any negative effects and demonstrated more positive effects than no preoperative education. Fredericks<sup>20</sup> found no difference in effect if education was offered preoperatively or postoperatively. Although standardized educational materials spare health care professionals' time, when used alone they do not produce optimal results. Liou and colleagues<sup>26</sup> determined that the major difference between utilizing a video or a booklet for education is the amount of nursing time required. In their study, an educational intervention that involved showing a video followed by individualized teaching required less nursing time and had the

same outcomes on measures of anxiety and autonomic responses as did offering an educational booklet plus individualized education. This is important as nursing time must be used effectively to spare costs while at the same time preserving quality. With all types of education, patients may have questions at any time pre- or postoperatively and having someone available to answer in person or via the telephone is imperative to decreasing anxiety and improving self-management.<sup>30</sup> None of the studies in this review determined how many teaching sessions are necessary for the best outcome and thus more research is required to determine how much time is required for CV surgical education.

## Conclusion

CV surgery education has been demonstrated to improve patient outcomes post-discharge. Self-management skills are rarely innate and patients and families require education to acquire the knowledge and skill to manage their care at home post-CV surgery.

This literature review was completed to determine what content, timing, and teaching methods will enhance the success of CV surgical patients. The review revealed that using mass produced pamphlets and videos in conjunction with individualized, face-to-face patient education enables patients to identify their own priorities and achieve improved outcomes such as decreased anxiety and depression, lower readmission rates, and have fewer physical complications post-surgery.

The scarcity of recent literature regarding CV surgical patient education coupled with the positive results determined by this review indicate that further research is required to discover what material should be taught to patients at certain time points prior to surgery and in the post-surgical time period. More research is needed to determine how best to provide individualized care and how to educate nurses and other health professionals to provide this care. We are confident that these efforts will lead to improved patient knowledge, satisfaction and quality of life.

### Implications for practice

- Needs assessment: Effective Pre-CV surgery education requires a PRE-Operative needs assessment of patient's understanding of CV health and surgery.
- Teaching Methods: A combination of teaching methods could amplify the results of standardized tools alone.
- Point of Contact: Having someone available to answer in person or via telephone is imperative to decreasing anxiety and improving self-management.

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## Conflict of interest

The authors declare that there is no conflict of interest.

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## Appendix I. Studies in the review.

Reference Country	Study aim(s)	Intervention	Method, population/sample; outcome variables	Major findings
Babae et al. <sup>23</sup> Iran	Evaluate the ability of a health education program to improve the QOL for patients undergoing CABG surgery.	Intervention based on Ross and Mico's Health Education Planning Model and employed a booklet with information about lifestyle, anatomy and physiology of the heart, and the CABG procedure Control group received standard care	RCT N = 80 Males 40–65 years old with atherosclerosis diagnosed by angiography requiring CABG. QOL; subjective report of physical function	Significant improvement in QOL and in subjective reports of physical function
Cebeci and Celik <sup>24</sup> Turkey	Study the effect of pre-op discharge training and counseling on post-op CABG patients' self-care ability and amount/types of problems experienced after discharged	Intervention group received individualized education and counseling plus an information booklet Control group received standard care	Prospective and quasi-experimental N = 109 Males and females First time CABG recipients	Intervention group scored higher on self-care, had fewer problems post-discharge and fewer readmissions
Guo et al. <sup>25</sup> China	Determine whether a pre-op education intervention reduces anxiety and depression and improves recovery	Education to patients and family provided through a pamphlet and verbal advice. The pamphlet ( <i>Your Heart Surgery</i> ) covered pre-op tests and preparation; what to expect post-op in the ICU and the cardiac surgical ward; recovery at home; and a contact number to call with post-discharge problems	RCT N = 153 Gender? Age? First time cardiac surgery patients CABG?	Intervention group had greater decrease in anxiety and depression scores and better sleep. This group spent an average of four hours less in the ICU, but there were no differences in total post-op hospital stay. No group differences in average pain, current pain, and activity
Goodman et al. <sup>29</sup> United Kingdom	Evaluation of nurse-led education and counseling program	Intervention – individualized education that allows patients to ask questions and voice concerns. Cardiac risk assessment to help patients learn what lifestyle changes are needed Individualized counseling re: lifestyle modifications using motivational interviewing techniques Nurse reviewed a manual that was then given to patients; the manual covered risk factors, prep for surgery and what to do if they have chest pain Patients were able to telephone the team with any questions between visits Control group received standard care	RCT N = 188 Patients listed for CABG with at least one poorly controlled risk factor	There was no change in overall risk factors prior to CABG but the intervention did reduce overall healthcare utilization. Statistically significant improvement in BP and cholesterol but not BMI No change in length of hospital stay, QOL or post-op complications Slight improvement in physical QOL Cost minimized in the intervention group due to fewer readmissions

## Appendix I. (Continued)

Reference Country	Study aim(s)	Intervention	Method, population/sample; outcome variables	Major findings
Goodman et al. <sup>30</sup> United Kingdom	Investigate patients and staff experiences and perspectives using an educational program pre-CABG	Discovery interviews done three months post-CABG and focused on participants' experiences and perspectives	Discovery interviews N = 19 Participants were part of a previous RCT	Participants reported being given standard information that was not individualized Participants appreciated having a nurse come to their home to answer their individual medical questions and refer back to the medical team if needed. While they appreciated the support from the nurses, they wanted better communication and physical assessment and did not find the waiting period for a CABG to be a suitable time to address risk factors for CAD Participants reported getting information from other sources (e.g. family physician, diabetic clinic or previous cardiac rehab courses) Participants' understanding of the health care system was much different from that of the providers A key nursing perspective was that the success of the program was influenced by the patients' attitudes toward their health and research
Liou et al. <sup>26</sup> China	Evaluate the effect of different types (video versus booklet) of pre-op CV education have on autonomic responses and anxiety levels	Group 1: video Group 2: booklet	RCT N = 91 First time CABG patients	Perceived stress scores and recovery outcomes were similar between groups; no differences in heart rate between groups Total instruction time was significantly shorter using the video
Sørli et al. <sup>27</sup> Norway	Evaluate the efficacy of an information intervention on emotional recovery following CABG	Intervention group received video plus individualized instruction at admission and at discharge Control group received standard education and no video Pre-op education included procedural and sensory information related to diagnostic and pre- and post-op events plus some behavioral instructions Post-op education included lifestyle changes and self-management techniques for at home and work	RCT N = 109 Patients younger than 68 years, with stable angina, first CABG, no severe comorbidities	The intervention group reported: less anxiety and better subjective health at discharge; better subjective health throughout entire two-year follow-up; less anxiety up to one year; less depression six months to two years after discharge

(Continued)

## Appendix I. (Continued)

Reference Country	Study aim(s)	Intervention	Method, population/sample; outcome variables	Major findings
Zhang et al. <sup>28</sup> China	Evaluate the effect of nurse-initiated pre-op education and counseling program on post-op complications and anxiety symptoms following CABG	Intervention group received standard pre- and post-op care plus a structured education and counseling course three days prior to surgery Course material included hospitalization and CABG processes, post-op pain control, pulmonary care (abdominal breathing and effective coughing), rehabilitation (nutrition, medication administration, early mobility) and psychological counseling Control group received standard care	Prospective RCT N = 40 High-risk surgical with a EuroSCORE of 6 or more going for CABG	Intervention group reported statistically significant physical problems and mean anxiety scores

CABG: coronary artery bypass graft; pre-op: preoperative; post-op: postoperative; ICU: intensive care unit; BP: blood pressure; BMI: body mass index; QOL: quality of life; CV: cardiovascular; RCT: randomized control trial