

Introduction

Within the current in-patient cardiovascular surgical (CVS) setting, education is provided for all patients who have had coronary artery bypass graft (CABG) and/or valvular replacement (VR) surgery (Jaarsma et al. 2000). The intended outcome of these education programs is the increased performance of self-care behaviours following hospital discharge (Johansson, Salantera, Heikkinen, Kuusisto, Virtanen, Leino-Kilpi, 2004). Self-care is a process involving selection and performance of appropriate treatment strategies to enhance or maintain functioning (Orem, 2001). The more self-care behaviours an individual engages in, the more likely they will reduce the onset of complications and hospital readmissions following their hospital discharge.

Description of the Problem

Typically, the content of patient education interventions are designed and delivered using either standardized or individualized techniques. Standardized patient education interventions involve delivering the same education material to all patients in its entirety in spite of whether or not it may be relevant or deemed to be useful by the individual. There is minimal patient autonomy in omitting or requesting more information regarding various sections of the education. Topics that have been addressed throughout standardized CABG and/or VR patient education interventions have included medication management, healthy heart diet, activity, signs and symptoms of infection, incision care, and complications (Jaarsma et al.). All patients receive the same information related to these topics, regardless of their personal learning needs.

Literature Review

The effect of standardized patient education interventions in enhancing performance of self-care behaviours following heart surgery have been evaluated (Moore, 1995, Marshall, Penckofer & Llewellyn, 1986; Steele, Ruzicki, 1987). Results indicated minimal or non-significant effects of education on compliance with self-care instructions (Steele & Ruzicki), physical functioning (Moore), specifically, mobility, ambulation, and body care/movement, and symptom frequency (Marshall et al.). These non-significant findings have been directly attributed to the standardized nature of the intervention.

An alternative to standardized patient education interventions is individualized education, in which educational content is based on the perceived learning needs of the individual (Frantz & Walters, 2001; Fox, 1998). Studies have shown incorporating patients' perceived learning needs into the design of patient education interventions results in significant outcomes such as increased knowledge (Jaarsma, Halfens, Huijjer Abu-Saad, Dracup, Diederiks, & Maastricht, 2000; Colagiuri, Colagiuri, deBlieck, & Naidu, 1994; Beckie, 1989; Wright Oliver, Kravitz, Kaplan, & Meyers, 2001), and enhanced symptom experiences (Jaarsma et al.; Wright et al.). However, inconsistent findings related to self-care behaviour performance have been reported, in which studies did not attempt to control for biases, and used designs that were not tightly controlled (i.e. non-random allocation techniques) (Beckie, 1989; Tranmer & Parry, 2004).

Study Rationale

Across Canada, although resources to promote recovery are made available, over a quarter of all CABG and/or VR patients are being readmitted to hospitals with post-operative complications experienced during the first 3 months of recovery (Guru et al, 2006). The most common causes of readmissions are post-operative infections (28%) and

heart failure (22 %) (Hannan et al. 2003). The rate of hospital readmission following CABG and/or VR has significant implications for health care resource utilization, continuity of care across the system, and exacerbation of underlying cardiac condition (Guru et al., 2006). A possible reason for the high rate of readmission is patients may not be adequately prepared to engage in self-care during their home recovery period (Fredericks, 2009; Fredericks, Sidani, Shugurensky, 2006; Harkness, Smith, Taraba, MacKenzie, Gunn, Arthur, 2004; Moore & Dolansky, 2001) resulting in the onset and/or exacerbation of complications, which can lead to hospital readmissions. Specifically, the quality of the patient education intervention received around the time of discharge may not be optimal in supporting patients up to 3 months following their hospital discharge. As a result, patients may not have the adequate knowledge to effectively engage in behaviours to prevent the development of complications leading to hospital readmissions. An individualized patient education intervention, delivered to patients at multiple points in time has been designed and evaluated.

Study Purpose

The purpose of this pilot study was to collect preliminary data to demonstrate the effectiveness of an individualized telephone education intervention delivered to patients following CABG and/or VR during their home recovery. The research question that guided this study was: 1) Is individualized telephone patient education more effective in reducing the rate of complications and hospital readmissions during the first 3 months following hospital discharge for CABG and/or VR than standardized patient education?

Method

Research Design

A prospective randomized, partially blinded, controlled single centre trial was used to determine the superiority of an individualized telephone intervention to usual patient education in decreasing the rate of complications and hospital readmissions, 3 months following hospital discharge for CABG and/or VR. Research ethics board approval was obtained prior to the start of the study.

Setting

The study took place at one site, the cardiovascular surgical (CVS) unit at the University Health Network (UHN) in Toronto.

Sample inclusion criteria

Patients were included if they underwent CABG and/or VR surgery for the first time, with no additional surgical interventions; spoke English; were oriented to person, place, and time (based on assessment by attending nurse or physician); and had access to a working phone following hospital discharge.

Individuals who had previously experienced an event (i.e. CABG and/or VR) were more likely to have been exposed to self-care patient education interventions related to post operative heart surgery care. Hence second or third time CABG and/or VR patients may use additional or modified self-care behaviours, gained through experience and/or patient teaching given during previous hospitalization, which may confound study findings. The identification of patients who recently underwent CABG and/or VR surgery for the first time was determined in consultation with the patient's attending nurse and/or physician. Individuals who were unable to speak the language in which the study was being conducted; and were cognitively not oriented to person, place, or time, are thought to not be able to provide informed consent and to participate in the individualized

telephone intervention. The identification of these characteristics was determined in consultation with the patient's nurse and/or attending physician. Study participants needed to have access to a working phone as the delivery of intervention sessions as well as the follow-up data collection took place over the phone. Access to a working phone was determined during the screening phase by the research assistant.

Patients were excluded if they underwent heart transplants as these individuals received a significantly higher amount of education both pre and post operatively. Furthermore, this sample was inherently different from patients who have undergone CABG and/or VR, as they had very different learning needs that may change over a number of years; experienced different complications, and had an increase rate of mortality following hospital discharge.

Sample size

A proposed sample size of 30 patients was put forward as this was a preliminary study. As data was collected up to 3 months following hospital discharge, it was anticipated that a 10% dropout rate would occur based on studies that have used a CABG and/or VR samples, and assessed outcomes during the home recovery period (Fredericks, Guruge, Sidani, Wan, 2010). The adjusted sample size was 34 study participants, rounded up to allow for equal numbers in each group (17 patients per group).

Data Collection

Demographic data related to age, sex, level of education, marital status, and co-morbidities were collected at pre-test to describe the sample. Patients learning needs were collected prior to intervention delivery. The outcomes of interest were complications, and hospital readmission rates.

Complications was assessed using a 14-item self-report dichotomous scale in which patients were asked to indicate whether (yes = 1) or not (no = 0) they had a particular complication. The scale addresses the following complications that are frequently reported in the literature (Harkness et al., 2005; Beckie, 1989): onset and/or exacerbation of infections (urinary tract, chest wound, other wound); respiratory (pneumonia, difficulty breathing, shortness of breath), cardiovascular (abnormal heart rate, stroke, heart failure), abdominal complications (diarrhea, bleeding when voiding, retaining fluid); and the development of immobility (difficulty moving). The total score is calculated by summing the scores across items and ranges between 0 to 14. Higher scores indicate a larger number of complications. The approximate time for scale completion was 5 minutes. Content validity was demonstrated through evaluations by a panel of experts, including two CVS nurse practitioners and 6 CVS patients. A content validity index of 0.76 was identified.

Readmission rates were determined through the use of the following open ended questions: 1) Have you been admitted to the hospital since your discharge following heart surgery? If the patient responds yes to the question, then the following two questions will be asked: How long did you stay in the hospital? and What was the reason for your hospital readmission?. These questions were pilot tested for clarity and comprehension using 6 CVS patients were found to be clear and worded appropriately to allow for easy comprehension.

Questions regarding concurrent effects of standardized education were mailed to study participants to maintain the blinding of the data collector. Concurrent effects of standardized education was assessed by 5 questions which identified if patients received

teaching other than the intervention during their hospitalization; the type of teaching that was received; and which education, the standardized or individualized telephone teaching intervention they found to be useful. This information was collected once, at the primary endpoint (3 months).

Experimental Intervention

The intervention of interest was an individualized patient education program delivered by telephone. The educational session was individualized to reflect patients identified learning needs, which was assessed using the Patient Learning Needs Scale (PLNS) (Galloway, Bubela, McCay, McKibbin, Ross, & Nagle, 1993). The PLNS is a self-report measure with a 6 point Likert scale, where responses range from 0 - not important to learn, to 5 - extremely important to learn. This tool was designed for use with surgical inpatients and outpatients. The topic areas identified on the PLNS are reflective of both CABG and VR patients' learning needs. Topics included: complications (specifically, how to recognize complications and how to decrease or avoid complications during post-operative recovery period), activities (in particular, what are appropriate physical activities that should or can be performed during the first 3 weeks of the post-operative recovery period), medication (particularly what are different strategies for medication management), symptom management (related to interventions for relieving incision and chest pain, nausea, vomiting, fatigue, sleep disturbance, constipation, and edema/water retention), and psychological symptoms (i.e. how to manage these emotional reactions). Patients were asked to rate how important each item is to know about before going home in order to manage their care at home. Galloway identified an appropriate convergent validity (Pearson $r = 0.78$) with a similar instrument

that assesses patient's learning needs. In addition, Cronbach's alpha ranged from 0.80 to 0.90 in a CABG sample (Galloway et al., 1993).

The individualized patient education telephone session began with an assessment of the individual patient's learning needs using the PLNS, in which the patient was contacted by a trained research nurse (interventionist), via telephone (at two points in time: 24-48 hours of the study participant's hospital discharge and again at 2 weeks post-hospital discharge), at a pre-arranged hour of the day.

The interventionist introduced herself to the patient, by identifying her name, position (research nurse), name of study, and purpose for call. She then asked the patient if they had any questions regarding the intent of the call. If questions arose, the interventionist responded as appropriate. The interventionist then proceeded by reading the instructions of the PLNS. This was followed by the completion of the scale over the phone by the patient. Specifically, individuals were asked to rate the degree to which they perceived the topics contained on the learning needs questionnaire to be important for learning. Any topic identified as being important or very important for learning was discussed with the patient. Depending on the topic identified, the interventionist used the education material contained in the protocol for delivering the individualized telephone teaching intervention to discuss the related self-care behaviours that the patient needed to perform to enhance their overall recovery experience. If all topics were identified by the patient as being important or very important to learn, then all content areas within the individualized telephone teaching intervention protocol were discussed with the patient. The average length of time for delivery of the patient education intervention, if all topics were identified as being important or very important to learn, was 20-30 minutes.

Control

Individuals in the control group received standard of care which encompassed standardized patient education delivered to patients during their hospitalization, in the form of an education booklet. The content addressed the following areas: salt intake, fluid restrictions, an overview of the function of common medications (such as beta-blockers, ace-inhibitors, Coumadin therapy, and analgesic therapy) along with an overview of strategies that patients could use to remember to take medication, activity performance (such as lifting objects, climbing stairs, walking, and sexual activity), and follow-up appointments. Patients were encouraged to review the booklet prior to their discharge. The individualized telephone teaching intervention evaluated in this study was provided above and beyond the usual standardized patient education. Therefore, to account for the additional/concurrent effect of usual standardized patient education, five questions were mailed to patients at the end of the final data collection time period. These questions identified whether or not patients received teaching other than the intervention during their hospitalization; the type of teaching that was received; and which education, the standardized or individualized telephone teaching intervention they found to be useful. The responses to these questions were incorporated into the data analysis. This potential confounding effect cannot be avoided as legally and ethically, nurses cannot withhold patient education from patients (College of Nurses of Ontario, 2010). Hence, the effect was controlled for during data analysis.

Procedure

Thirty-four patients were screened by a research nurse from the pool of patients hospitalized following cardiovascular surgery. Patients were screened on a consecutive format to avoid potential selection bias.

The unit staff were provided with a list of the study inclusion criteria and asked to identify eligible patients within 24-48 hours of admission to the CVS unit. The staff then approached potentially eligible patients to inform them of the study and ask if they would like to hear more about it. The trained research assistant responsible for enrolling patients then approached interested patients to explain the study in detail, answer any questions patients had, and obtained written informed consent.

After written informed consent was obtained, the patients were randomized 1:1. A randomization procedure for 34 patients was performed using a standard protocol. Thirty-four similar sequentially numbered opaque sealed envelopes were used for this process. Random permuted block design was used to generate random assignment to the experimental and control groups. A biostatistician generated the random assignments in specified permuted block sizes. The permuted block sizes were not disclosed to the study staff (i.e. data collectors) to minimize the likelihood of being able to predict the next randomization assignment in the series. The master randomization list was kept by a neutral third party in a restricted access, locked file cabinet to ensure blinded staff members (i.e. data collectors) were not inadvertently unblinded.

Following randomization, baseline demographic data were collected by the trained research assistant responsible for enrolling patients.

Analysis

Descriptive statistics were used to characterize the sample on demographic characteristics and as well as the outcome variables measured at each point in time. Chi-square analyses were used to examine differences between groups on complications and hospital readmission rates.

Results

Forty patients were assessed for study eligibility. Three were excluded as they did not meet the inclusion criteria, while an additional 3 individuals stated that they did not feel well enough to participate in the study. Thirty-four study participants who met the eligibility criteria were consented to participate in the study. Twenty-four patients completed the study (response rate = 70.5 %), with two individuals declining to participate, due to feeling unwell. Additionally, the research assistants were unable to contact eight participants during periods of data collection (Figure 1). Of particular interest, all of the patients who either dropped out of the study or were identified as loss to follow-up were from the Control group (Table 1). No statistically significant differences were noted between the two groups at baseline relating to their demographics and health status (Table 2). The participants had an average age of 66.2 years (SD = 8.5), were predominantly married (88.8 %) men (77.8 %) with high school diploma (40.7 %). The sample is representative of the target population (Fredericks, 2009; Fredericks, Sidani, Shugurensky, 2006; Harkness, Smith, Taraba, MacKenzie, Gunn, Arthur, 2004; Moore & Dolansky, 2001). On average, individuals reported 4.2 post-operative complications during the first week of hospital discharge, 4.0 complications at week 3, 2.5 complications at week 8, and 2.5 complications at week 12. The five most frequently reported post-operative complications during the first week of hospital discharge

included: retaining fluid (77.8%), difficulty moving (74.1%), difficulty breathing (66.7%), fatigue (18.5%), and abnormal heart rate (14.8 %). At week 12, the most frequently reported post-operative complications included fatigue (70.3 %) and difficulty moving (62.9 %). These complications are representative of the target population (Fredericks, Sidani, Shugurensky, 2006).

During the course of the first 3 months of home recovery, 4 (14.8%) of the study participants were readmitted to a hospital. Chi-square analyses indicate a statistically significant difference between the control and experimental group at 12 weeks post-hospital discharge in terms of readmission and number of complications noted, in which the experimental group had less readmissions ($n = 0$) and complications ($n = 3$), than the control group (number of readmissions: $n = 4$; number of complications: $n = 20$). No statistically significant differences in readmission rates and complications were noted at one, three, and eight weeks post-hospital discharge (Table 3).

Discussion and Implications

The findings from this study provides preliminary evidence to indicate the delivery of an educational intervention to patients during their home recovery at multiple points in time may be beneficial in reducing the number of hospital readmissions and complications at 3 months following hospital discharge. Even though a small sample size was used, the findings reinforces theoretical assumptions that suggest individualized patient education interventions, repeated over time, are more effective than standardized educational programs in enhancing patients' overall recovery experience (Guruge, 1999; Lauver et al., 2002).

As well, it is worth noting that loss to follow-up occurred only in the control group. This may be related to the intervention of interest, as Seeger (2012) suggested that individuals who receive an intervention immediately following a hospital discharge, diagnosis, or event; are more likely to keenly engage in the activities associated with the intervention of interest and thus, may exhibit enhanced patient related outcomes. This finding reinforces the importance of providing patient education interventions within the immediate post-hospital discharge period.

Furthermore, all of the study participants who were readmitted to hospitals were from the control group. This finding is similar to current trends (Guru et al., 2006) in that approximately a third of all individuals who are receiving only standardized, in-hospital patient education are being readmitted to hospitals for treatment and management of post-operative complications. This study serves as a foundation upon which a larger clinical trial should be designed and implemented. In particular, a study designed in a similar manner; using a larger sample size; multiple sites; and strategies such as mailing out study reminder post-cards or providing small (\$ 5.00 coffee gift cards upon completion of data at each point in time) incentives to promote study retention should be incorporated into the design of a future trial.

As the study findings were obtained from a small sample size, it may not be prudent to make significant revisions to existing patient education interventions at this time, until a more thorough examination of the effectiveness of this intervention is carried out. However, this study does provide nurses with further evidence that underscores the need to continue to revise existing standardized, in-patient education.

In conclusion, the findings with regards to the effectiveness of the individualized telephone interaction are promising. Preliminary findings suggest the experimental intervention is effective in reducing hospital readmission rates and complications during the initial home recovery period. However, continued examination of this experimental intervention is needed, using a larger sample from multiple sites.

Notes

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