TITLE: Peer supporters for cardiac patients with diabetes

INTRODUCTION

Chronic diseases are of increasing concern in today's society; while they contribute substantially to morbidity and mortality, they are largely manageable through lifestyle changes (Australia Institute of Health Welfare 2010). As health resources become more and more stretched, practitioners and researchers have investigated means by which chronic diseases can be more effectively and economically managed. Peer support, which enables patients to connect to others who have had similar experiences, can have positive benefits for patient satisfaction and motivation (Heisler & Piette 2005). While the use of peers to assist healthcare professionals in promoting self-management has the potential to deliver real economic benefits to the health system, peer training, an important component of peer support programs, can be resource-intensive, potentially counteracting any economic gains (Riegel & Carlson 2004). The World Health Organisation (2008) reviewed the use of peer support programs for people with diabetes and found numerous patient gains had been achieved (e.g. glycaemic control, quality of life), but they suggested that there was a need for more research in the area. A systematic review (Foster *et al.* 2007) found lay-led interventions in some chronic diseases, such as fatigue and chronic pain, led to small improvements, but not clinically significant, in patients' confidence in managing their conditions. Another review by Griffths *et al.* (2007) also supports lay-led education programs for patients with chronic diseases, demonstrating improvements in patients' confidence in managing their conditions. However, the review also identified that these programs have found no decrease in hospital admissions or reduction in use of healthcare resources with the authors recommending further evaluation of these programs (Griffths *et al.2007*). Few reports were found of research incorporating peer support in cardiac rehabilitation (Colella & King 2004), and for patients with two co-morbidities. The focus of this paper is to report a study

incorporating peer support in an educational program for people who have type 2 diabetes and are admitted into coronary care following a cardiac event.

Cardiac conditions and type 2 diabetes have similar risk factors with each responsible for significant morbidity (Australia Institute of Health Welfare 2010), and higher hospital readmission rates are found for cardiac patients with type 2 diabetes than those without diabetes (Wu & Chang 2008a). Increased morbidity or mortality is likely if both conditions are not addressed, because such patients have the potential to be overwhelmed by having to manage two conditions, as well as a lack of self-confidence in doing so. Accordingly boosting self-management skills becomes an important area to address. Discussions with such patients in the Coronary Care Unit (CCU), reported in a previous study by the authors, found patients lacked confidence and experienced feelings of hopelessness in managing their conditions, which further limited their ability to self-manage their illnesses (Wu *et al.* 2008b). These findings indicated the need for a targeted intervention for patients to develop the necessary skills to manage their conditions. Patients were introduced to a self-management program that provided information on managing both conditions, which was commenced in the CCU by a nurse and followed-up after discharge with the use of peers who were supported by the nurse. Introducing such programs as soon as possible after a critical cardiac event may increase the likelihood of success due to a greater willingness of patients to address management of their chronic conditions.

When considering inexpensive and user friendly approaches to deliver a self-management program, telephone and text-messaging have been widely suggested (Kim 2007; Krishna *et al.* 2008; Fjeldsoe *et al.* 2009; Dale *et al.* 2009; Cole-Lewis & Kershaw 2010). These approaches were also strongly suggested from our previous studies. However, research on

the applicability of incorporating this form of technology in supporting self-management programs for cardiac patients with diabetes remains incomplete, and further research on incorporating forms of information technology is recommended (Jackson *et al.* 2006). Thus the overall aim of this study was to develop and evaluate a program that integrates information for cardiac patients with diabetes. The delivery mode of the program incorporates telephone and text-messaging, follow up by peer supporters as the patients transition from hospital into home.

METHODS

Study design

A two-armed randomised controlled trial was used to: 1) develop and 2) evaluate the effectiveness of the Peer Support based Cardiac-Diabetes Self-Management Program (Peer-CDSMP). Study period for this two-phase study was from August 2009 to December 2010. Participants were randomly allocated using a table of random numbers to either intervention or control group. Participants in the intervention group received usual education as well as the Peer-CDSMP, which comprises face-to-face sessions in hospital by a Research Nurse and telephone and text-message follow-up by peers. The control group received usual education only. The usual education provided in the coronary care unit (CCU) for patients with diabetes included education about their cardiac condition and referral as necessary to the diabetes educator (Wu *et al.* 2011a).

Research questions:

Do participants in the intervention group who receive the Peer-CDSMP compared to those in the control group have higher: self-efficacy levels, knowledge levels, and self-care behaviour levels at 4 weeks following discharge?

Phase I - Program Development

The initial CDSMP, based on Bandura's theory (Bandura 1977, 2004) of self-management, was developed and successfully piloted in an earlier project (Wu *et al.* 2011b). This program was modified in the current study by the addition of a DVD depicting models of successful self-management, and the use of peers in collaboration with research nurses for program follow-up. The Peer-CDSMP commenced in the CCU and continued as patients transitioned to home.

According to Bandura (2004), individuals process information through four means: mastery, social modelling, verbal persuasion, physical and emotional status, and these were all utilised in the course of the program. A registered nurse (Research Nurse) conducted the initial three face-to-face sessions while the patient was in the hospital, with a focus on developing the basic skills of self-management. Trained peers who used telephone calls and text-messaging to follow-up patients after discharge from hospital were also provided with ongoing support. This follow-up reinforced material presented during face-to-face sessions and further utilised the four avenues of information processing, particularly social modelling and verbal persuasion.

Reference Group

A reference group (expert panel) was formed for the purposes of informing and reviewing program materials. The panel consisted of seven members included a cardiologist, nursing unit managers, a nurse educator, a diabetes educator, and a cardiac rehabilitation coordinator. Panellists reviewed and commented on program development, including DVD production entitled "*Refocusing your life: Cardiac-Diabetes Self-Management Program*".

Peer selection and training

The peers engaged in the follow-up part of the Peer-CDSMP were former patients with similar medical conditions who were provided with training to assist them in supporting new patients. Potential peers, who were considered competent in the management of their conditions were identified by the nominated cardiologist and subsequently trained by the researchers utilising the peer training materials.

Sample

Sample size: A total of thirty patients were required based on the number needed to detect a large effect size as found in our previous study (Wu *et al*. 2009) when comparing the outcome of knowledge between the two study groups, and allowing for 20% attrition rate with an alpha of 0.05 and power of 0.9 (Cohen 1992).

Inclusion and exclusion criteria**:** Patients who met the inclusion criteria and were admitted to CCU during study period in an acute hospital in Brisbane, Australia, were recruited for this study. Participants were included in the study if they were aged over 18 years, admitted to CCU with a critical cardiac event, had a previous diagnosis of type 2 diabetes, had a mobile phone, and were able to read and speak English. The study site for the initial part of the study was the Coronary Care Unit (CCU) at an acute hospital and then the participant's home for the follow up by telephone and text messages. Patients were excluded if they were: unable to read and speak English, critically ill, unconscious, or on respiratory ventilation.

Phase II – Evaluation

Data Collection

Measures

Demographic data, baseline and 4-week follow-up data were collected during the study period. Data pertaining to self-efficacy, self-management behaviour, and knowledge were

collected, utilising the following validity and reliability well established questionnaires: *The Diabetes Management Self-Efficacy Scale (DMSES)* (Australian English version) (McDowell *et al.* 2005), *Diabetes Knowledge Questions* (DKQ) (Persell *et al.* 2004) and Summary of Diabetes Self-Care Activities (SDSCA) (Toobert *et al.* 2000).

Procedure

After baseline data were collected, participants were randomly assigned to either the control or intervention group. The routine education in addition to the Peer-CDMSP for participants in the intervention arm was provided in the CCU once patients were physically stabilised, with three face-to-face sessions (minimum 2 sessions) conducted by the Research Nurse (week 1). After discharge (week 2) patients were followed up by peers who used one telephone call, and two text-messaging reminders after the telephone follow up (weeks 3 and 4) (Wu *et al.* 2011a). Allocation was concealed by using sealed, numbered, opaque envelopes to both control and intervention groups. A flow chart outlining the recruitment, random group allocation and data collection of all participants during the study period is presented in Figure 1.

Insert Figure 1 here

Data Analysis

Data were managed and analysed using the Statistical Package for Social Sciences computer program (SPSS 18.0). Descriptive statistics to summarise the sample characteristics used frequencies and percentages for categorical data, with means and standard deviations for continuous data. Given small sample size, non-parametric Mann-Whitney *U* test was used to determine between group changes over time in the participants' outcome variables of

knowledge, self-efficacy and self-care behaviour. A 0.05 significance level was used for all analyses.

ETHICAL APPROVAL

The participating health service and the university Human Research Ethics Committees granted ethical approval. Confidentiality and anonymity were assured. All participants were volunteers who provided written consent and were aware that they could freely withdraw from the study at any time. Standard storage procedures are being followed to ensure confidentiality and security of data. Confidentiality agreement was obtained from the trained peers.

RESULTS

Sample Characteristics

While a total of 30 patients were recruited for this study, two patients were transferred to other hospitals and therefore excluded. There was a significant difference between groups for gender ($p < .05$) with the intervention group having a lower proportion of males and the control group having fewer females. There were no significant differences between study groups for marital status, diagnosis or age (see Table 1).

Differences between groups for baseline outcome variables

There were no statistically significant differences in baseline outcome data of knowledge, self-efficacy and self-care behaviour levels between the control and intervention groups, further indicating the similarity of both groups.

Insert Table 1 here

Outcomes

Mean difference scores between Time 1 and Time 2 outcome measurements were calculated to enable analysis of between group changes over time. Mann-Whitney *U* tests indicated a significantly higher level of knowledge (Z = 1.9, p =.05) for the intervention group but no significant difference ($p > .05$) between the two study groups over time for self-efficacy and self-care behaviour (Table 2).

Insert Table 2 here

Power analysis for non-significant outcomes (self-efficacy, self-care behaviour) was conducted to minimize the probability of type II error that is, accepting no significant differences between groups when the truth of a difference exists (Portney & Watkins 2009). The effect size for self-efficacy mean difference was between small to medium (.33), and effect size for self-management behaviour difference scores was small (.20) (Cohen, 1992).

DISCUSSION

Evaluation of the refinement of the Cardiac-Diabetes Self-Management Program (CDSMP), and the methods for delivery of the program was a major goal of this study. The inclusion of a DVD, depicting models of successful self-management aimed to enable patients to more readily comprehend how self-management can be achieved. The integration of peer supporters with as telephone and text-message follow-up aimed to improve the delivery of the program.

The significantly higher mean differences in knowledge scores at week four for the intervention compared to the control group provides partial support for the short term effectiveness of the Peer-CDSMP. The significant improvement in knowledge indicates effectiveness of the program in assisting cardiac patients with diabetes to learn about their

conditions. Furthermore this improvement suggests that providing an educational intervention program while patients are in hospital is useful, as this is when they have greater motivation to receive information (Heisler & Piette 2005) and are more likely to make appropriate lifestyle changes.

Greater knowledge is important for both diabetes and cardiac disease. Evidence also shows patients who do not receive diabetes education are more likely to develop complications (Heisler 2007; Boren *et al.* 2011; Norris *et al.* 2001). In addition, knowledge provided in cardiac rehabilitation helps patients to manage their life after myocardial infarction, including symptoms, lifestyle changes, and medical treatment etc (Piepoli *et al.* 2010). Patients with better knowledge have better understanding about their diseases, know how to manage their conditions better (Piepoli *et al.* 2010; Norris *et al.* 2006) and have less emergency admissions (Norris *et al.* 2006). Thus the success of the innovative program incorporating peers and text-messaging in the current study in improving patients' knowledge for managing both of their diseases indicates the potential for improving self-management of their diseases.

However the absence of significant improvements in self-efficacy and self-care behaviour in this study indicates caution is needed on the benefits of the CDSMP program incorporating peers and text-messaging. Although there were no significant improvements in self-efficacy and self-care behaviour for the intervention group following the Peer-CDSMP, self-efficacy is an important factor in changing patients' behaviour for successful diabetes self-management (Krichbaum, Aarestad, Buethe 2003; Norris *et al.* 2001; Marks & Allegrane 2005) and cardiac rehabilitation programs (Joekes *et al*. 2007; Beswick *et al.* 2005). Furthermore findings of improved self-efficacy leading to better health outcome were also reported in a systematic review of self-management programs (Krichbaum *et al*. 2003).

However most of these studies were undertaken in community settings, therefore a larger study build on results of this study is needed to determine effectiveness of whether enhancing self-efficacy and self-care behaviours in such programs that is commencing in a hospital setting and to be carried out at community.

Although participants in the intervention group of this Peer-CDSMP did not show significant improvements in all outcome variables, feedback and comments received from participants after their training indicate the feasibility and potential benefit of the program. A peer training manual had been developed for preparing their involvement in the study. The feedback and comments received from the trained peers were mostly positive indicating the usefulness of the training materials as well as highlighting that the design and layout were easy to follow. Peers were pleased to have the opportunity to share their experience with other patients. Furthermore, the peers expressed appreciation of the ongoing support provided from the researcher; they felt they were given an opportunity to discuss any concerns they had in their role with researchers. Comments received from the Expert Panel of clinicians' revealed great interest in being involved in this study. The process of developing and working with the expert panel of clinicians resulted in their appreciation of being involved in the DVD and their willingness to be involved in future studies.

Limitations

Limitations of the study include concerns pertaining to sample size, intervener effects (trained research nurse), consistency between research staff and training of peers and significant differences of in proportion of gender between groups.

Given the small to medium effect size for self-efficacy and small effect size for self-care behaviour, there was insufficient statistical power to detect significant differences between

the intervention and control groups for these scales. Therefore, no final conclusion about the effect of the intervention on these outcomes could be reached until a larger, sufficiently powered study is undertaken (Portney & Watkins, 2009).

The main research staff (intervener) delivering and coordinating the program was a highly trained research nurse, who had coronary care working experience. Variation in the program was minimised by having the same person deliver the Peer-CDSMP to the patient while in hospital (Muir Gray 2001). The training of peers being conducted by same research nurse further enhanced the integrity of the intervention, although the use of 5 peers for the telephone and text-messaging follow-up is likely to have had an impact on consistency in delivering the follow-up part of the program. This intervener effect (Sidani & Braden 1998) highlights the importance of consistency among staff and among peers and the need for a more detailed training manual.

A limitation regarding training peer supporters was also identified. More time in the training sessions to provide for role playing may have been beneficial to ensure familiarity with the process of supporting patients. Furthermore because the peers were also patients themselves with ongoing medical needs, they may not be able to provide continuous support to participants during the study period. Thus more trained peers may be needed for future studies, raising issues of selection, training and ongoing support.

A further limitation was recognised in relation to a significant difference in the proportion of genders between groups. Thus it is unclear whether the study outcomes were influenced by the presence of significantly more males in the control group.

CONCLUSIONS

The study achieved the overall aim of further developing and evaluating the Peer-CDSMP. Results from this study indicate that patients in the intervention group attained improvement in knowledge. The absence of significant improvements in self-efficacy and self-care behaviour represents an inconclusive effect, with a bigger sample required to determine the effectiveness of Peer-CDSMP for enhancing self-efficacy and self-management by cardiac patients with diabetes.

RELEVANCE TO CLINICAL PRACTICE

An important clinical implication of this study is the importance of multidisciplinary involvement in the intervention program, including professionals and non-professionals (lay people). Peer support has shown potential in promoting self-management for patients with two comorbidities, however much more work in this area is needed. Defining an adequate number of peer supporters per individual patient, e.g. one per patient, how to best match each patient with their peer supporter, and ongoing support and sustainability of the trained peers are some areas that require further investigation.

Another application for practice is also suggested by the feasibility of the delivery mode incorporating telephone and text-messaging. This method can advance knowledge in a user-friendly, inexpensive yet effective technological way for promoting self-management of cardiac patients with diabetes. The text-messaging system used in this study did not require patients to send a message back to researchers; thus, limiting interaction. Consequently, an interactive text-messaging system which further engages patients' involvement in self-managing their conditions is suggested. Additionally, a DVD containing case studies to provide a 'role model' (a strategy to increase self-efficacy level) that patients can relate to could also be considered for incorporation into clinical practice.

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