



Review

Clinical effectiveness of individual patient education in heart surgery patients: A systematic review and meta-analysis



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ABSTRACT

The objective of this systematic review was to compare the effectiveness of individualized patient education interventions to standardized patient education interventions on the rate of readmission, performance of specific health behaviours, depression, anxiety, and cognition during the post-hospital discharge recovery period following cardiovascular surgery.

Design and data sources: Randomized controlled trials that included study participants who underwent their first bypass and/or valve replacement surgery; were eighteen years of age or older; and were recovering in the community.

Review methods: For all data analyzed, data was entered based on the principle of intention to treat. To be included in a given comparison, outcome data had to have been available for at least 80% of those who were randomized. Assessment of statistical heterogeneity was tested. Generic inverse variance methods based on random effects models were used to pool effect estimates across included studies.

Results: Seventeen trials involving 2624 study participants where individualized patient education was the primary interventional intent was included in this review. Four studies that included 930 participants reported on hospital readmissions. The sources of bias that remain unclear or were judged as containing high risk of bias most frequently across included trials were blinding of outcome assessment, incomplete outcome data, and selective reporting. An effect of the individualized patient education in reducing hospital readmission rates (Mean Difference: -1.28 , 95% CI -1.87 to -0.68 , $p < 0.00$), depression (Mean Difference: -23.32 , 95% CI -23.70 to -22.95 , $p < 0.00$), and anxiety (Mean Difference: -19.34 , 95% CI -20.46 to -18.23 , $p < 0.00$) was noted. While an increase in the performance of specific health behaviours (Mean Difference: 3.45 , 95% CI 3.27 – 3.63 , $p < 0.00$) and cognition (Mean Difference: 11.17 , 95% CI 10.66 – 11.68 , $p < 0.00$) was found. Most effect estimates were prone to statistical heterogeneity among the trials.

Conclusion: The findings from this systematic review suggest favorable effects on the readmission rates. However, a major limitation notes in the current body of evidence relates to the small number of or even lacking number of trials for clinically important outcomes. As well, the individualized patient education intervention is effective in promoting statistically significant changes in quality of life, performance of health behaviours, depression, and anxiety.

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What is already known about the topic?

- A quarter of all coronary artery bypass graft and/or valve replacement patients are being readmitted to hospitals with post-operative complications experienced during the first three months of recovery.

- Mixed results have been reported across studies that have examined the effectiveness of individualized patient education interventions.
- No meta-analytic review has been conducted to examine the effectiveness of individualized patient education in comparison to standardized patient education interventions.

What this paper adds

- This review demonstrates that individualized patient education intervention is effective in promoting statistically significant

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changes in quality of life, performance of health behaviours, depression, and anxiety.

- Findings from this meta-analysis reinforces the notion that non-white individuals remain under-represented in studies that evaluate cardiovascular surgical patient education interventions.

1. Introduction

Resources to promote recovery following common cardiovascular surgical procedures such as coronary artery bypass grafting (CABG), valve replacement (VR), and CABG in combination with VR are made available in the form of patient education initiatives and cardiac rehabilitation programs (Mohammadpour et al., 2015). However, over a quarter of all CABG and/or VR patients are being readmitted to hospitals with post-operative complications experienced during the first three months of recovery (Sibilitz et al., 2015). A possible reason for the development of post-operative complications during the post-discharge recovery period is insufficient self-care behavior performance.

Patient education is an essential health intervention to promote self-care behaviour change, but may often lack required effectiveness. Specifically, the mode, dose, and timing of delivery of the educational intervention may not be optimal in promoting self-care behaviours, resulting in the onset of complications and increased hospitalizations, leading to reduced health related quality of life. Patient education formats vary depending on the degree of standardization versus individualization (Redman, 2001). Patient education delivered in a standardized format involve the delivery of the same content to all patients, while individualized format encompass education being tailored to reflect the learning needs of the individual.

Learning needs are defined as the topical areas of interest perceived by the individual as important to learn (Redman, 2001). 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 (Redman, 2001). 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 (Redman, 2001). Enhanced change in cognitive state has been shown to reduce levels of depression and/or anxiety (Redman, 2001) which can result in an increase in the performance of self-care behaviors (Redman, 2001). Enhanced self-care behaviours speeds up recovery, resulting in a decreased likelihood for re-hospitalizations, thus, enhancing individuals overall health related quality of life (Orem, 2001).

Education based on an individual's perceived learning needs is the focus of this systematic review as it is commonly viewed as the most pragmatic and feasible intervention to administer within the clinical setting (Orem, 2001). Alternative interventions such as knowledge transfer through coaching, follow-up telephone calls, and group counselling are more costly and difficult to implement in financially unstable environments (Redman, 2001; Orem, 2001; Azer et al., 2011; Rollman et al., 2009; Barnason et al., 2003; Charlson et al., 2006; Hartford et al., 2002; Kummel et al., 2008; Lie et al., 2007; McHugh et al., 2001; Moore and Dolansky, 2001; Pluss et al., 2011; Sorlie et al., 2007; Utriyaiprasit et al., 2010).

An existing systematic review (Brown et al., 2011) has been completed to examine the effect of patient education on mortality, onset of total cardiovascular events, revascularization, hospitalization, and health care costs in the management of coronary heart disease. This review included trials that enrolled study participants who had suffered a myocardial infarction (MI), underwent revascularization, or who had angina pectoris or coronary heart

disease. Mixed results were reported in relation to outcomes that include: health related quality of life, self-care, and mood following CABG and/or VR surgery.

The aim of this systematic review was to determine the effects of individualized patient education interventions compared to standardized education on rate of re-hospitalizations, performance of self-care behaviors, changes in mood (depression/anxiety), and cognitive states during the post-hospital discharge recovery period following cardiovascular surgery.

2. Methods

2.1. Design

A systematic review of randomized controlled trials was conducted, using a meta-analytic approach for the synthesis of the estimates on the effectiveness of individualized patient education. Studies that included patients undergoing first CABG and/or VR procedure, were eighteen years or older, and received standardized education for the determination of its effectiveness were included. This systematic review is based on a Cochrane Review, in which the protocol outlining the plan for conducting the review has already been published (Fredericks and Yau, 2013). No amendments have been made to the final review compared to the original protocol (Fredericks and Yau, 2013).

The investigation conforms with the principles outlined in the Declaration of Helsinki (Cebeci and Çelik, 2008).

2.2. Inclusion and exclusion criteria

2.2.1. Target population

Studies that incorporated individuals who underwent their first CABG and/or VR procedure, who were eighteen years of age or older, and who were recovering in the community or in a convalescent home were included within this review. Individuals were excluded if they had previous CABG and/or VR surgeries, underwent emergency surgery, and/or received a heart transplant or ventricular assist device. These individuals tend to have divergent learning needs and/or higher levels of complication risk compared to patients experiencing an elective CABG and/or VR for the first time.

2.2.2. Study designs

Studies that included randomized controlled trials were included in this systematic review. Cross-over trials were excluded as they are typically longitudinal studies that examine the effect of a number of different interventions. Thus, to be able to determine the effectiveness of individualized educational interventions, cross over trials were excluded.

2.2.3. Types of interventions

Studies that included an individualized patient education intervention provided to individuals following cardiovascular surgery were included in this review. Studies that were excluded are those that did not examine a post-operative patient education intervention. Individualized patient education interventions are education-based interventions in which the education is individualized to reflect the individual's learning needs. They differ from individualized psychological/behavioural support and cognitive behavioural therapy in that the intervention consists of teaching rather than counselling and support (Mohammadpour et al., 2015; Hartford et al., 2002; Beckie, 1989; World Medical Association, 2001; Cebeci and Çelik, 2008; Hannan et al., 2003; Pennsylvania Health Care Cost Containment Council, July 2015; Lipsey and Wilson, 1993; Smith and Dimsdale, 1989; Spielberger, 2010). Individualised patient education interventions were considered

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