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REVIEW ARTICLE

Health-Related Quality of Life after Coronary Revascularization: A systematic review with meta-analysis

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Abstract *Objective:* To conduct a systematic review and meta-analysis to summarize evidence and determine the impact of coronary revascularization (CR) on cardiac patients' Health-Related Quality of Life (HRQoL), highlighting factors that may affect this outcome in patients.
Methods: A systematic search of Medline (Pubmed), EMBASE, Cochrane Library, Sciverse (Science Direct and Scopus) and PsycInfo was conducted to identify studies published from January 2000 to December 2012. Data were analyzed using MIX 2.0 Pro and SPSS 20.
Results: Thirty-four longitudinal studies met the inclusion criteria; these studies included 15,992 patients, of whom 8,027 had undergone PCI, 6,348 had undergone CABG and 1,617 had received medication treatment. Moderate long-term effect sizes were revealed for both CR procedures. Both percutaneous coronary interventions (PCI) and coronary artery bypass graft surgery (CABG) had significantly greater effects on HRQoL than did medication; however, the CR procedures did not differ significantly from each other. Moderators included the type of instrument used to assess HRQoL and the study quality. Benefits related to physical functioning were greater than those related to psychosocial functioning in patients treated with CABG.

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Conclusions: Empirical research highlights the positive effect of CR on patient HRQoL. Researchers should carefully select the instrument they use to measure HRQoL, as this may affect the results and thus conclusions. More RCTs and between-group studies employing pre-post designs should be conducted before clear conclusions can be drawn.
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1. Introduction

The field of coronary heart disease has advanced considerably in the last decade. Through the use of interventional (percutaneous coronary interventions; PCI) and surgical (coronary artery bypass graft surgery; CABG) procedures, symptom relief and survival rates have increased globally.[1]

The comparative effectiveness of CABG versus PCI in patients who are eligible for either procedure is poorly understood,[2] although a recent review suggested that older patients and patients with diabetes treated with CABG had increased survival rates relative to patients treated with PCI.[3]

In addition to survival and symptom relief, health-related quality of life (HRQoL) among patients with cardiovascular disease is a critical issue.[4] Based on the World Health Organization's definition, health is not only a biomedical but also a biopsychosocial issue.[5] Although no consensus definition exists, HRQoL includes physical, psychological and social well-being.[6,7] Enhancing coronary patients' HRQoL should be a component of the priorities of a medical team.

Few systematic reviews over the past ten years have examined the effect of coronary interventions on HRQoL. Jokinen and colleagues[8] reviewed 21 randomized control trials (RCT) evaluating CABG and concluded that post-surgical patients experienced improved HRQoL regardless of which procedure they had undergone (On- vs Off-Pump CABG), especially when the procedure was performed by experienced surgeons. Furthermore, the results of a RCT conducted by Jokinen and colleagues (2010) suggested that preoperative HRQoL predicted posttreatment HRQoL, with long-lasting beneficial effects and HRQoL increasing to a level comparable to that of the general population post-treatment. Noyez et al. (2011)[9] reviewed 29 articles addressing the effects of cardiac surgery. They concluded that many studies had presented only postoperative QoL data, which limited the derivation of conclusions concerning the beneficial effect of heart surgery on QoL. They also highlighted the need for good clinical trials with longer follow-up periods (periods greater than one year). Sun et al. (2012)[10] and Cormack et al. (2012)[11] reviewed 13 RCTs and 28 longitudinal studies, respectively, that had investigated CABG. Both reviews concluded that CABG patients may experience a decline in cognitive functioning during the weeks immediately following treatment but that this decline reversed at twelve months postsurgery. Finally, Blankenship et al.[12] reviewed 25 studies and concluded that the effect of PCI on QoL was greater than that of medical (drug) treatment; however, this benefit decreased over time. Moreover, the effect of PCI on QoL during the month immediately following treatment was greater than that of CABG; however, in the long-term, both procedures lead to similar improvements in QoL. Blankenship et al.[12] also suggested that patients of all ages benefited equally regardless of which revascularization procedure was performed, although they found that women reported lower HRQoL than men following PCI. Unemployment status, smoking and medical comorbidities were associated with lower QoL following PCI.[12]

Soo Hoo et al. (2014)[13] reviewed 18 studies of PCI and supported Blankenship et al.'s (2013)[12] conclusion that all individuals, regardless of age, reported improvements in HRQoL and that age, therefore, could not be considered as a moderator, especially when other comorbidities were taken into consideration.

Abah and colleagues (2015)[14] reviewed 44 mostly retrospective studies on the influence of heart surgery (CABG, PCI, Valve) on HRQoL on older patients. The results showed that the majority of patients demonstrated improvement, while 8-19% demonstrated a decline, in HRQoL following heart surgery.

Although these reviews may provide insights into the effect of CR on HRQoL in cardiac patients, a number of issues need to be addressed prior to making recommendations for clinical practice. For instance, Sun et al. (2012)[10] and Cormack et al. (2012)[11] focused only on one aspect of HRQoL, cognitive functioning; thus, a clear conclusion about the effect of CR on other aspects of HRQoL cannot be drawn. Blankenship et al.'s (2012)[12] study, while of good quality, was solely a literature review and lacked rigorous systematic methodology (e.g., many studies included were of low quality and/or provided only posttreatment data for the effect of CR on HRQoL); thus, conclusions from this study may be biased. Noyez et al.'s (2011)[9] and Abah et al.'s (2015)[14] work focused on surgical treatment of various heart problems (e.g., aortic or mitral valve surgery) instead of only on treatment of coronary artery disease. Hence, further investigations are needed to establish clear conclusions regarding the effect of CR on HRQoL. Finally, no prior reviews have provided effect sizes for the association between CR on HRQoL, as they did not use meta-analytic techniques to illustrate the extent of the effect of CR and its moderators. Thus, a systematic review and meta-analysis was needed update the literature and, due to the nature of these methodologies, simultaneously provide a more complete understanding of the impact of CR and its potential moderators on HRQoL.

The main aim of the present systematic review was to determine the impact of CR on HRQoL and identify factors

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