



Moderators of the effect of psychological interventions on depression and anxiety in cardiac surgery patients: A systematic review and meta-analysis



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ARTICLE INFO

Article history:

Received 5 March 2015

Received in revised form

21 June 2015

Accepted 12 August 2015

Available online 14 August 2015

Keywords:

Depression and anxiety

Cardiac surgery patients

Psychological interventions

Evidence synthesis

Moderator effects

ABSTRACT

Cardiac surgery patients may be provided with psychological interventions to counteract depression and anxiety associated with surgical procedures. This systematic review and meta-analysis investigated whether intervention efficacy was impacted by type of cardiac procedure/cardiac event; control condition content; intervention duration; intervention timing; facilitator type; and risk of bias. MEDLINE, EMBASE, and PsycINFO were searched for randomized controlled trials comparing anxiety and depression outcomes, pre and post psychological and cardiac interventions. Twenty-four studies met the inclusion criteria for the systematic review ($N = 2718$) and 16 of those were meta-analysed ($N = 1928$). Depression and anxiety outcomes were reduced more in interventions that lasted longer, were delivered post-surgery, and by trained health professionals. Depression (but not anxiety) was reduced more when the experimental intervention was compared to an 'alternative' intervention, and when the intervention was delivered to coronary artery bypass graft patients. Anxiety (but not depression) was decreased more when interventions were delivered to implantable cardioverter defibrillator patients, and were of 'high' or 'unclear' risk of bias. In addition to estimating efficacy, future work in this domain needs to take into account the moderating effects of intervention, sample, and study characteristics.

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Coronary heart disease (CHD) is the leading cause of morbidity and death, globally (Hoyert & Xu, 2012; WHO, 2011). CHD treatment varies from taking medication and modifying behaviour, to invasive cardiac procedures that usually include catheterization, implantation of battery-operated devices, and open-heart surgery. Overall, the literature suggests that invasive cardiac procedures improve patient physical health and functioning. As a consequence, research has focused on evaluating patients' psychological well-being (Ai, Park, Huang, Rodgers, & Tice, 2007; Denollet, Schiffer,

& Spek, 2010; Pedersen & Denollet, 2006; Škodová et al., 2009). While the literature suggests that cardiac surgery patients experience better psychological well-being post-surgery (Höfer et al., 2005; Shephard & Franklin, 2001), a substantial subgroup of these patients (approximately 20%–30%) report a deterioration of physical functioning and increased psychological distress (Hawkes & Mortensen, 2006; Škodová et al., 2009).

Patients who have undergone, or are about to undergo, invasive cardiac procedures have been shown to be prone to high levels of distress. For example, up to 87% of implantable cardioverter defibrillator (ICD) patients may experience some degree of anxiety, while up to 38% of those patients may experience symptoms compatible to anxiety disorder (Bostwick & Sola, 2007). In addition, 15–20% of myocardial infarction (MI) patients experience

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symptoms of major depression (Hanssen, Nordrehaug, Eide, Bjelland, & Rokne, 2009; Thombs et al., 2006). In order to counteract depression and anxiety associated with cardiac procedures, cardiac patients may be provided with psychological interventions. Previous meta-analyses have investigated the efficacy of such interventions in reducing post-operative depression and anxiety in cardiac patients, and have yielded inconclusive results. For example, (Dusseldorp, van Elderen, Maes, Meulman, & Kraaij, 1999) found no benefit of 'psycho-educational' programmes on patient anxiety and depression, whereas (Whalley, Thompson, & Taylor, 2014) found significant benefits. Inconsistent results across meta-analyses may be due, in part, to variability in study foci, outcome variables, and patient population included, making generalizations of findings difficult. For instance, (van Dixhoorn & White, 2005) included only myocardial ischaemia patients, while (Whalley et al., 2014) excluded ICD patients and (Linden, Phillips, & Leclerc, 2007) primarily focussed on mortality and morbidity outcomes. An additional limitation of existing meta-analyses is the lack of subgroup analyses (moderator effects), even though the included psychological interventions are heterogeneous (Whalley et al., 2011). Concerns have also been raised (Thompson & Ski, 2013) as to what constitutes a 'psychological' intervention. This is an important concern given that some previous meta-analyses (Rees, Bennett, West, Davey, & Ebrahim, 2004; Welton, Caldwell, Adamopoulos, & Vedhara, 2009) have not made distinctions between psychological and non-psychological (e.g., physiotherapy, exercise, massage) components, making it thus difficult to isolate benefits solely attributable to the psychological components (Whalley et al., 2014). A clear understanding of intervention effects is more likely to be accomplished by isolating specific parameters impacting outcomes, which can reflect the possible underlying mechanisms through which effects are obtained (Michie, 2008).

This systematic review and meta-analysis aimed to add to the existing literature on the effectiveness of psychological interventions to reduce distress in cardiac patients and resolve some of the inconsistencies observed in previous meta-analytic syntheses of these data. Specifically, the current analysis aimed to assess the efficacy of psychological interventions to reduce anxiety and depression in patients undergoing cardiac procedures. We also aimed to identify the moderating factors (e.g., risk of bias, intervention duration, timing of the intervention, type of control group, delivery method) that diminish or magnify the effects of interventions on distress reduction in cardiac patients. A limitation of previous meta-analyses is the lack of a systematic test of moderators and such an analysis may account for the inconsistencies in the observed effect sizes across previous reviews.

1. Methods

1.1. Clarification of constructs

An important initial step in identifying the impact of psychological interventions on cardiac patients' distress was to adopt accepted criteria for the definition and operationalization of psychological interventions. In the current analyses, interventions had to be based on identifiable psychological theories or psychological techniques stemming from those theories (e.g., socio-cognitive theory, learning theory, psychodynamic). This inclusion criterion was adopted to ensure a level of quality control over the interventions in the studies included in the current analyses. We also stipulated that interventions were not to be combined with non-psychological (e.g., physiotherapy, massage, exercise) components likely to confound the effects of the psychological interventions. We use the term 'experimental interventions' to refer to the target

psychological interventions that were tested against a control condition, often 'usual care'. A small number of studies compared the experimental intervention against an alternative psychological intervention, instead of, or in addition to, a control condition. We use the term 'alternative interventions' to refer to the latter. We use the term 'distress' as a collective term for depression and anxiety (Mirowsky & Ross, 2002). We use the term 'moderators' to refer to intervention, study, and sample features, that were expected to affect the direction and/or strength of effect size estimates. Our meta-analysis focussed specifically on depression and anxiety outcomes, as measured by validated scales.

1.2. Eligibility criteria

To be included, studies had to be randomized controlled trials (RCTs) that: (1) assessed the efficacy of a psychological intervention, as defined above; (2) were published from 1980 onwards; (3) included individuals aged 18 years or older, having undergone or were about to undergo an invasive cardiac procedure; (4) included measures comparing pre and post-intervention depression and anxiety by means of validated scales; (5) were published in the English language; and (6) were published full-text. Studies were excluded if they: (1) included 'psychological' interventions that deviated from the above definition; (2) psychological interventions aiming to modify outcomes other than psychological distress (e.g., morbidity, mortality, adherence to medication, exercise, bodily symptoms); (3) were duplicates of another RCT; (4) were abstract-only reports; and (5) did not measure depression and anxiety by means of a validated scale. We focus exclusively on RCTs as this design is considered to be the 'gold standard' used to establish the efficacy of health-related interventions (Norman & Streiner, 1993). The year 1980 was chosen as the earliest date for studies since the first ICD transplantation took place then, and rehabilitation programmes comprising psychological components for this patient group were subsequently developed. We included studies of patients who had undergone, or were about to undergo, a cardiac procedure as we wanted to assess whether the timing of the intervention, relative to the cardiac procedure, would impact anxiety and depression outcomes. Studies measured depression and anxiety pre and post psychological and cardiac intervention. Inclusion was restricted to studies utilizing validated to enhance accuracy and comparability of findings.

1.3. Search strategy

We conducted an exhaustive search of electronic databases including MEDLINE, MEDLINE In-Process and Other Non-Indexed Citations, PsycINFO and EMBASE for the period from 1980 to July 2013. We also searched the reference lists of identified studies and Google Scholar. Search terms for electronic databases included a combination of index terms (e.g., types of cardiac and vascular invasive surgical procedures) and free text words (e.g., psychological interventions) combined with specific conditions (e.g., depression, anxiety, emotional or psychological distress). A number of authors were contacted, via email, in order to obtain additional information not reported in the published RCTs. An updated search was conducted in March 30, 2015 using the same search terms and databases, yielding four additional studies. Twenty-four RCTs met the inclusion criteria for the systematic review and 16 of those provided data suitable for the meta-analysis. Study selection and reasons for exclusion are presented in a flow chart (Fig. 1) based on PRISMA guidelines (Moher, Liberati, Tetzlaff, & Altman, 2009). Two independent coders screened the abstracts for eligibility (stage 1 inclusion), then the full copies of eligible titles were independently screened using a priori inclusion-exclusion criteria, and then, the

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