



Depression screening after cardiac surgery: A six month longitudinal follow up for cardiac events, hospital readmissions, quality of life and mental health



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ABSTRACT

Objectives: To report the 6-month longitudinal outcomes of routine depression screening in cardiac patients.

Methods: Routine depression screening consisted of the Patient Health Questionnaire (PHQ) administered 30-days after cardiac surgery at the Flinders Medical Centre, South Australia. Complete data was obtained on 481 patients who were subdivided into three groups; depressed-cardiac control determined by current anti-depressant use or history of depression in medical records ($n = 90$), depression screen-positives ($\text{PHQ} \geq 10$, $n = 46$) and depression screen-negatives ($\text{PHQ} \leq 9$, $n = 345$). These groups were re-assessed at 6 month follow-up for major adverse cardiac events (MACE), hospital readmission, quality of life (SF-12), symptomatic depression, and use of antidepressants, anxiolytics and psychotherapy.

Results: By six-month follow-up the depression screen-positive group was at a higher risk of MACE (adjusted odds ratio [OR] 2.16; 95% confidence interval [CI] .98–4.74). The depression screen-positive group was also at a higher risk of depressed mood (PHQ scores ≥ 10 : adjusted OR 6.54; 95% CI 3.16–13.53). The depression screen-positive group also reported significantly poorer QOL in five domains (all $p < .001$ with Bonferroni correction). The depression screen-positive group was more likely to be initiated on antidepressant and anxiolytic (ORs 5.89 and 4.74 respectively) at follow-up. The number needed to screen to achieve one additional depression remission case was 9 in the screen-positive group (versus the depression-control group).

Conclusion: Depression screening was associated with an increase in psychotropic medication use however depression, morbidity and quality of life remained poor at six months.

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1. Background

Major depression and clinically relevant depression symptoms affect between 15 and 40% of cardiac surgery patients [1–4]. In cardiac surgery patients, an association between depressive symptoms with incident morbidity and mortality [1,5–10] and poorer quality of life [11,12] parallels what has been reported in other cardiovascular disease populations [13–16]. To facilitate depression identification and initiate treatment, several learned cardiology societies endorse routine depression assessment by questionnaires, herein referred to as depression screening [17–19].

In 2008 the American Heart Association (AHA) Science Advisory Group recommended routine depression screening for all coronary

heart disease (CHD) patients [17]. The AHA's position was re-instated in 2011 by recommending depression screening among patients with recent coronary artery bypass graft (CABG) or myocardial infarction (Class IIA, Evidence Level B) [20]. Collectively such recommendations and others [17,18,21] have not been without controversy due to the absence of high level evidence from randomized controlled trials (RCT) informing such guidelines [22]. Furthermore, there is limited evidence for benefits from depression screening, such as improved CHD and depression outcomes [23,24]. Additionally there are also several clinical reports indicating that depression screening methodology is far from universal, suggesting the term routine is a misnomer, and pointing to difficulties with practical implementation of these initiatives [24–28]. Evidently, the benefits from routine depression screening, and impact upon CHD patient outcomes, remain unclear and are still being established. The topical nature of routine depression screening [22,29,30], in the context of substantial CHD morbidity burden attributable to depression [1,5–8,31], suggests it is timely to examine the practical implementation of these initiatives further.

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The present study extends beyond previous reports by reporting the six-month morbidity and quality of life outcomes of cardiac surgery patients who undergo a routine depression screening and referral protocol. Secondly this study reports the longer term outcomes of cardiac surgery patients with and without depressive symptoms in the postoperative period.

2. Methods

2.1. Patient sample

Eligible patients were aged ≥ 18 years undergoing cardiac surgery between January 2010 and December 2012 at the Flinders Medical Centre, South Australia. Patients were also required to have a valid postal address or working telephone for the 6 month follow-up. The study received ethics approval from the institutional ethics committee (approval numbers: HREC #566.13). The surgical techniques used at our institution are described more thoroughly elsewhere [32,33].

2.2. Depression screening measure

The Patient Health Questionnaire (PHQ-9) [34,35] was utilized to assess depressive symptoms as per the AHA recommendations [17]. Respondents endorse items based on the previous two-weeks on a scale of 0 “not at all” to 3 “nearly every day.” The PHQ-9 covers the entire spectrum of symptoms reflective of a major depressive episode including the two requisite criterion symptoms for a major depressive episode diagnosis, i.e., (1) little interest or pleasure in doing things, (2) feeling down, depressed, or hopeless. PHQ-9 scores ≥ 10 were regarded as indicative of symptomatic mild depression as recommended by the extant guidelines [17] and based on recent empirical validation [36]. The depression assessment was performed at 30-days. This timeframe coincides with routine follow-up as part of our participation in the Australian and New Zealand Society of Cardiothoracic Surgeons National Database Program. In addition, the majority of patients have been discharged from hospital, and thus a depression assessment can be made without the potential confounds of the immediate postoperative period and the hospital setting.

2.3. Screening protocol frequency

Prior to hospital discharge patients indicated their preference for either in-hospital, telephone or mail-out administration of the PHQ-9. Regardless of initial preference a non-response to the 30-day depression screen led to follow up with telephone call and letters. Letter mail-outs were sent up to a maximum of 3 times, and phone calls were made up to a maximum of 7 times, thus a patient was contacted a minimum 10 times before considered to be a missed patient. A structured interview was not performed in the total population, however patients referred to the clinical psychologist underwent structured clinical interview for case-formulation, therapy planning, goal-setting and treatment response.

2.4. Allocation of groups based on depression screening and anti-depressant use

Given that the efficacy of screening can only be evaluated in so far as the extent to which new or previously unrecognized cases of depression are identified and initiated on treatment [22,30,37], we first allocated patients to a depression cardiac-control group, regardless of PHQ score, when there was pre- or post-operative anti-depressant use ($n = 82$) or depression reported in previous 12-month medical history ($n = 8$). The most common antidepressants were serotonin reuptake inhibitors ($n = 48$) and tetracyclics ($n = 24$). Otherwise, the remaining patients without anti-depressant use or history of depression were then

allocated into a depression screen-positive group (i.e. PHQ-9 score ≥ 10) and a depression screen-negative group (i.e. PHQ-9 score ≤ 9).

2.5. Clinical response to depression symptomatology or suicidal ideation

Patients in the depression screen-positive group and depression-control group were personally informed along with their surgeon, cardiologist and general physician (GP). A structured letter was sent from the Head of Department (3rd author) detailing a description of depression symptoms, a recommendation to consult the local physician regarding depression assessment and possible referral, and describing the importance of depression in CHD supplemented with a beyondblue® pamphlet [38]. Mental health services outlined the consultation details for the cardiac surgery department's clinical psychologist (1st author). Additional information included 2 separate 24-hr emergency crises hotlines, an overview of the Better Access Initiative Medicare funded scheme for subsidized psychologist and psychiatrist care (available to any patient with a GP referral, consisting of minimum 6 Medicare subsidized consultations with the option to extend to 12 sessions in a 12-month period), a website search engine link from the Australian Psychological Society overviewing local psychologist services. Patients deemed to require acute or immediate psychiatric care (PHQ ≥ 20 , or suicidality item-9 ≥ 2) were managed by the clinical psychologist (1st author) in collaboration with the 24-hr South Australian Mental Health Emergency Triage Service for Community and Older Persons.

2.6. Cardiac surgery morbidity outcomes

A combined morbidity endpoint was constructed according to the Society of Thoracic Surgeons Working Group Panel on the Collaborative CABG Database Project [39]. The Society of Thoracic Surgeons morbidity endpoints include; permanent stroke, cerebrovascular accident (CVA) or central neurological deficit persisting for longer than 72 h, new post-operative renal failure (2 or more of: a new requirement for renal dialysis; an increase in serum creatinine >2.0 mg/dL, or a doubling or greater of preoperative serum creatinine level), ventilation >24 h, deep sternal wound infection, reoperation for any reason or postoperative myocardial infarction (MI) (2 or more of: enzyme level elevation; new wall motion abnormalities; serial ECG showing new Q waves). Medical comorbidity (i.e. the covariates and not morbidity endpoints) was defined according to the standardized definitions of the Australian Society of Cardiothoracic Surgeons. Patient access to services was determined with the Australian Bureau of Statistics Accessibility/Remoteness Index of Australia (ARIA) [40]. The ARIA provided classification for access to healthcare services which we dichotomized as; highly accessible and accessible vs. moderately accessible, remote and very remote.

2.7. Six month follow-up

All-cause and cardiac hospital admissions were recorded by a blind auditor utilizing the principal diagnosis at readmission according to International Classification of Disease (ICD-10) criteria. Major adverse cardiovascular events (MACE) were recorded for ICD-10 codes I00-I99. There were 5 deaths in the cohort and an ICD-10 cause of death was not available and thus these patients were censored from analyses. All patients were followed up at 6 months to determine depression symptoms (PHQ-9) and self-reported antidepressant and anxiolytic use, and health service usage. The Short Form-12 (SF-12) measure of subjective and generic quality of life (QOL) was administered preoperatively and at follow-up. The SF-12 is a common measure of QOL in cardiac surgery [41] and cardiovascular patients generally that is standardized to Australian normative values. The SF-12 covers eight domains; physical function, social function, physical role limitations, emotional role limitations, mental health, vitality, bodily pain, and

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