

## **Review Article**

### **Screening for depression in cardiac rehabilitation: A Review**

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## **Abstract**

**Purpose:** Practice guidelines promote depression screening in cardiac rehabilitation (CR). The objective herein was to review: (1) CR program compliance with depression screening recommendations, and (2) the evidence evaluating whether screening for depression is related to improved outcomes in patients eligible for CR.

**Methods:** A limited literature search was conducted on key resource databases (MEDLINE, EMBASE, CINAHL, Cochrane Library, Evidence-Based Medicine Reviews, SCOPUS, and the University of York Centre for Reviews and Dissemination). A focused Internet search was also conducted with a concentrated grey literature search for evidence reports. Inclusion criteria included English language documents published between January 1, 2002 and August 1<sup>st</sup>, 2013.

**Results:** Five studies were included in this review. Three studies were found in regards to the first objective and reported varying program compliance rate with depression screening recommendations, ranging from 29.0% to 68.4%. Two studies examined whether depression screening led to improved outcomes in CR-eligible patients. Both studies found that among patients who recalled being screened, there was no significant difference in depressive symptom scores at follow-up as compared to patients who were not screened ( $p>0.05$ ).

**Conclusions:** Approximately one-third to two-thirds of CR programs routinely screen for depression. There are no randomized controlled trials testing the effects of screening on any outcomes. While some observational studies suggest that screening alone may not improve patient outcomes, more randomized controlled research is needed to address this issue.

## **Condensed Abstract**

Practice guidelines promote depression screening in cardiac rehabilitation (CR). One-third to two-thirds of CR programs routinely screen. The evidence evaluating whether screening is related to improved outcomes was reviewed. The few published studies, of observational design

only, suggest that screening alone may not improve outcomes. Randomized controlled research is needed.

Globally, cardiovascular disease (CVD) is the leading cause of mortality. In 2008, an estimated 17.3 million people died as a result of CVD, representing 30% of all global mortality.<sup>1</sup>

Depression is one of the most frequent co-morbidities of CVD<sup>2</sup> and is the leading cause of disability worldwide.<sup>3</sup> Depression is a mood disorder, characterized by low mood and anhedonia.<sup>4</sup> It has been estimated that approximately 30% of patients who have been hospitalized for a myocardial infarction display depressive symptoms, in which 15-20% suffer from major depression.<sup>5</sup>

Research suggests that co-morbid depressive symptoms are associated with greater mortality,<sup>6,7</sup> increased hospital admissions following a myocardial infarction, and a lower likelihood of adopting secondary prevention measures, such as smoking cessation and participation in cardiac rehabilitation (CR).<sup>5</sup> It has been established that there are safe and effective approaches for treatment of depression in this population, including particularly cognitive behavioral therapy<sup>8</sup> and selective serotonin reuptake inhibitors.<sup>9</sup> Research suggests that such treatments are helpful in improving mood,<sup>10</sup> reducing rehospitalisation rates,<sup>11</sup> improving engagement in secondary prevention behaviors,<sup>12</sup> and perhaps reducing mortality rates,<sup>13</sup> although the evidence for the latter remains mixed.<sup>14</sup>

Accordingly, the American Heart Association<sup>15</sup> and recently the National Heart Foundation of Australia<sup>16</sup> have published recommendations to routinely screen cardiac patients for depression. While centers have adopted these recommendations,<sup>17,18</sup> observational studies suggest that the practice may lead to substantial increases in workload with low detection rates.<sup>18,19</sup> Randomized controlled trials (RCTs) undertaken in primary care settings have failed to find benefit in screening for depressive symptoms.<sup>20</sup> Reviews involving cardiac populations have identified no RCTs testing the effects of screening on depression outcomes,<sup>10</sup> leading to the

suggestion that the American Heart Association should reconsider its recommendation to screen at this time.<sup>21</sup>

## **Depression and CR**

CR programs, where a comprehensive approach to secondary prevention is delivered by an inter-professional team, may serve as a more appropriate setting for the assessment and treatment of depression.<sup>22</sup> A recent meta-analysis of coronary heart disease patients (who were not necessarily depressed) demonstrated moderate reductions of depression with CR participation.<sup>11</sup> This could be due to screening and detection, social support, psychosocial education (eg, stress management), the mood-enhancing effects of exercise,<sup>23</sup> or more likely a combination of these factors. It has also been shown that participation in CR is associated with reduced depression-related mortality,<sup>24</sup> including patients with heart failure.<sup>25,26</sup>

Indeed, depression screening is considered a core component of CR by the British Association for Cardiovascular Prevention and Rehabilitation,<sup>27</sup> the CR section of the European Association for Cardiovascular Prevention and Rehabilitation,<sup>28</sup> and the Canadian Association of Cardiovascular Prevention and Rehabilitation.<sup>29</sup> The American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR) Core Components document emphasizes identifying clinically significant depression as important to evaluation for psychosocial management.<sup>30</sup> Moreover, they have published a position statement advocating depression screening in CR,<sup>22</sup> and assessment of depression is included as a performance measure<sup>31</sup> Furthermore, screening and assessment of psychological distress, especially depression, is considered a core competency for CR professionals.<sup>32</sup> Finally, the Canadian Cardiovascular Society, with representation from the Canadian Association of Cardiovascular Prevention and Rehabilitation, has recently developed quality indicators<sup>33</sup> in the area of CR.<sup>34</sup> Process indicators regarding depression assessment and treatment were included. The objectives of this paper were to review: (1) CR program

compliance with depression screening recommendations and the tools administered to assess depression, and (2) the evidence related to whether screening for depression is related to improved outcomes.

## **METHODS**

### **Search Strategy**

For this narrative review, a limited literature search was conducted on key resource databases, for articles published between January 1, 2002 and August 1<sup>st</sup>, 2013. A date limit of 2007 was used for RCTs as it was assumed any older trials would be summarized in review papers.

Databases searched were MEDLINE, EMBASE, CINAHL, the Cochrane Library, Evidence-Based Medicine Reviews, SCOPUS, and the University of York Centre for Reviews and Dissemination databases. A focused Internet search was also conducted with a concentrated gray literature search for evidence reports available on websites for the Canadian Agency for Drugs and Technologies in Health and the Agency for Healthcare Research and Quality. Reference lists of identified reviews were also scanned, and the authors consulted with key researchers in the field to identify any further articles.

### **Inclusion Criteria**

Methodological filters were applied to limit retrieval by study type; RCTs, systematic reviews, and studies which were non-randomized in design were considered. Only case studies were excluded. The search was also limited to English language documents.

Studies which enrolled adult cardiac patients who were eligible to participate in a CR program, based on CR guidelines,<sup>29</sup> were considered for this review. The indicated diagnoses and procedures for eligibility were coronary artery disease, post- myocardial infarction, post-coronary artery bypass graft, post-percutaneous coronary intervention patients, acute coronary syndrome, valvular disease, heart failure, and heart transplant.

For the first objective, the outcome was the proportion of CR programs which screened for depressive symptoms. Screening tools used were described. For the second objective, outcomes included depressive symptoms, depression remission, health-related quality of life, secondary prevention behaviors, physical health and function, morbidity or mortality.

### **Data Collection and Analysis**

Four reviewers (SK, SG, MC, and AB) screened references which were identified by the search strategy by reviewing the titles and abstracts. If the abstract identified the appropriate patient group, and addressed depression screening, the full article was obtained for inclusion consideration. Two authors (MC and AB) extracted the data from the included articles and data was summarized in either text or table form.

### **RESULTS**

Five studies were included in this narrative review. The literature search identified 3 studies pertaining to CR program screening compliance<sup>35–37</sup> and 2 studies testing the effects of depression screening on outcomes in CR-eligible patients.<sup>38,39</sup> Study designs are listed in Tables 1 and 2, respectively.

#### **Objective 1: CR Program Depression Screening Compliance**

Characteristics of included studies and screening rates are shown in Table 1. Screening varied from 29-68% of surveyed programs.

Two studies reported the tools used to screen for depression. The tools reported by Polyzotis et al<sup>36</sup> included the Hospital Anxiety and Depression Scale,<sup>40</sup> the Beck Depression Inventory,<sup>41</sup> and the Screening Tool for Psychological Distress.<sup>42</sup> The Hospital Anxiety and Depression Scale was the most commonly used tool, with 60% of programs that screened reporting its use. Zullo et al<sup>35</sup> reported the use of the Center for Epidemiologic Studies Depression Scale<sup>43</sup> primarily, and “other depression scales”.



## **Objective 2: Effect of Depression Screening on Patient Outcomes**

Table 2 summarizes the characteristics and findings of the 2 studies that addressed the effect of screening on patient outcomes.<sup>38,39</sup> No RCTs were identified. Both studies examined the effect of screening on self-reported depressive symptoms. The incidence of depression screening was patient-reported, and therefore caution is warranted when interpreting these findings. One study found null effects of depression screening on patient outcomes,<sup>39</sup> and the other reported mixed effects.<sup>38</sup> The latter study by Cahill et al<sup>38</sup> reported that those who recalled screening had greater depressive symptoms at follow-up. Moreover, it is highly possible that the patients who received treatment were significantly more likely to recall being screened and more depressed than those who were not treated. The latter would suggest that the appropriate patients are being treated, but the treatment itself was insufficient. Indeed the degree and nature of treatment follow-up was not assessed in the study. Finally, no studies were identified that examined the effect of screening on any other outcomes under study. Clearly, more research, of rigorous design, is needed in this area.

## **DISCUSSION**

Despite numerous recommendations to screen for depression in CR settings by professional societies, this review identified broad variability in program implementation of these recommendations, but overall relatively low adoption. This review also failed to identify an RCT evaluating the effects of depression screening in cardiac patients, and the 2 observational studies identified null effects or increases in depressive symptoms suggesting inadequate treatment in the “real-world” CR setting.

### **Depression Screening Recommendations for CR**

The lack of reduced depressive symptoms found in the 2 studies would initially appear to support the recent calls to reconsider screening recommendations. However, upon closer consideration of

the 10 World Health Organization screening principles,<sup>44</sup> there is no principle purporting that screening must be related to outcomes, only that there is an effective treatment for the condition. As outlined in the introduction, this latter condition is well-met.<sup>12,45</sup>

Arguably, the only screening principle for which we currently have insufficient evidence is that the total cost of finding a case should be economically-balanced in relation to medical expenditure as a whole. Given that 9 of the 10 screening principles are met for depression and CR, rather than re-considering our screening recommendations, the CR community should undertake research to establish the economic impact of screening and which, if any, interventions to treat depression after it is identified by a CR program are most effective. Further research in this area should be contemplated and the Canadian and American CR registries may facilitate such research. In the meantime, the overall state of the science would suggest CR programs should screen for depression.

### **Depression Screening Tools in CR**

With respect to depression tools administered by CR programs, the Hospital Anxiety and Depression Scale and the Beck Depression Inventory both have high internal consistency and good sensitivity.<sup>46</sup> Moreover, the Screening Tool for Psychological Distress has been found to compare well with other longer and validated measures, including the Beck Depression Inventory,<sup>42</sup> and has the advantage of consideration of other psychosocial hazards known to affect outcome<sup>6</sup>. Contrary to the above scales, the Center for Epidemiologic Studies Depression Scale<sup>43</sup> has not, to our knowledge, been validated in a cardiac population. Finally, this scale and the Beck Depression Inventory are not screening tools, but measure severity of depressive symptomatology and were developed for research purposes.

A validated screening tool applicable in cardiac samples should be applied in the CR setting. Programs should consider the American Heart Association's recommendations<sup>15</sup> to

initially screen with the Patient Health Questionnaire-2,<sup>47</sup> followed by the Patient Health Questionnaire-9<sup>48</sup> if depressive symptomatology is reported by the patient. Both have good sensitivity and specificity for major depression.

### **Depression Treatment Recommendations for CR**

The lack of reduced depressive symptoms reported in the 2 studies reviewed related to depression treatment highlights the importance of exploring what processes of care patients with identified depression receive in the context of CR. These results underline the need to develop and test more effective referral and treatment systems for patients who may be depressed within the CR setting. It has been demonstrated that when screening is combined with collaborative care, significant improvements in depressive symptoms and overall quality of life are achieved.<sup>12</sup> Collaborative care involves several healthcare providers working together to deliver care,<sup>49</sup> including frequent check-ins, medication adjustments, promotion of treatment adherence, and disease-related education.<sup>12</sup> This is highly achievable in the context of CR. Finally, the CR community should move beyond process, and focus on attainment of improved depression outcomes in the patients we serve.

### **Limitations**

Caution is warranted when interpreting the results of this review. First, this was not a systematic review. Second, the quality of the articles included was not assessed systematically. However, given that no RCTs were identified, it can be concluded that quality was not high. Lastly, only English-language articles were included, thus limiting generalizability of the results.

### **CONCLUSIONS**

Depression recommendations in CR have not been consistently adopted, underlining the need to develop and test effective depression screening and referral processes in the CR context. It is

clear from this review that more randomized controlled studies on depression screening and patient outcomes in cardiac rehabilitation are needed. The AACVPR Performance Measures and Canadian CR quality indicators should be expanded to include outcome metrics for treatment of depression and attainment of remission.

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Table 1. Summary of studies examining depression screening in CR programs (n= 3 studies).

| Author, Country                              | Sample and Design  | Proportion Screening |
|--|--|----------------------|
| Zullo et al. <sup>31</sup> ,<br>USA          | CR programs in Ohio (n=94)<br>66% of 142 CR programs in Ohio participated in the survey.<br>Cross-sectional  | 37.2%                |
| Polyzotis et al. <sup>32</sup> ,<br>Canada   | CR Programs in Ontario (n=38)<br>84.4% of all 45 CR programs in Ontario responded to the survey.<br>Cross-sectional  | 68.4%                |
| Cortes-Bergoderi et al. <sup>33</sup> , USA; | CR programs in South America (n=116)<br>72.5% of all 160 CR programs in South America responded to the survey.<br>South American Countries participating in survey: Argentina, Brazil, Colombia, Chile, Ecuador, Paraguay, Peru, Uruguay, Venezuela<br>Cross-sectional | 29.0%                |

CR, Cardiac Rehabilitation, USA, United States of America.

Table 2. Summary of studies examining effects of depression screening on cardiac patient outcomes (n= 2 studies).

| Author, Country                               | Study Design  | Participants/ Sample               | Comparison                 | Outcomes   | Measures       | Results   |
|---|---|------------------------------------|----------------------------|--|----------------|---|
| Cahill et al. <sup>36</sup> , Canada          | Prospective, observational<br><br>6-month follow-up | n=128<br>Women cardiac outpatients | Screening vs. no screening | Number of women screened since CR referral, and the effect of screening on depressive symptoms at post-test            | HADS-D & PHQ-2 | 40.3% of all the participants recalled being formally screened for psychosocial distress since CR referral.<br><br>There was no significant difference in depressive symptoms on the HADS-D at post-test between participants who recalled being screened and those who did not, but there was on the PHQ-2.<br><br>HADS-D: 3.83±4.00 vs. 3.13±3.09; p>.05<br>PHQ-2: 1.21±1.80 vs. 0.57±1.00; p<.05 |
| Shanmugasagaram et al. <sup>37</sup> , Canada | Prospective, observational<br><br>1-year follow-up  | n=1809<br>Cardiac inpatients       | Screening vs. no screening | Number of patients who were screened, effect of screening on treatment, and effect of screening on depressive symptoms | BDI-II         | 28.7% of all participants recalled having been screened since cardiac hospitalization. Among those enrolled in CR, 32.5% recalled being screened.<br><br>No significant difference in depressive symptoms was found between participants who recalled being screened and those who did not. (BDI-II: 10.12±8.78 vs. 9.80±8.17; p>.05)   |

CR, Cardiac rehabilitation; HADS-D, Hospital anxiety and depression scale-depression subscale; Patient Health Questionnaire- 2, PHQ-2; BDI-II, Beck depression inventory