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Accuracy of anxiety and depression screening tools in heart transplant recipients☆

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ABSTRACT

Purpose: The aim of this study was to assess the validity and reliability of psychological screening tools in outpatient heart transplant recipients.
Methods: Forty-eight heart transplant recipients completed the Patient Health Questionnaire 9-item scale (PHQ-9), Generalized Anxiety Disorder 7-item Scale (GAD-7), Kessler Psychological Distress 10-item Scale (K-10) and Medical Outcomes Short Form 36-item Health Survey. A structured psychological interview (Mini International Neuropsychiatric Interview Version 6) was conducted after completion of the questionnaires. Internal consistency, criterion validity and construct validity of the PHQ-9, GAD-7 and K-10 were evaluated.
Results: Internal consistency supported the reliability of the screening tools. The optimal cut-off on the PHQ-9 for depression was 10 (sensitivity = 0.86; specificity = 0.93). A score of 6 on the GAD-7 maximized sensitivity (0.75) and specificity (0.89) for anxiety. A score of 17 on the K-10 was the optimal cut-off for diagnosis of either anxiety or depression (sensitivity = 0.83; specificity = 0.84). Increasing scores on the screening tools were associated with lower health-related quality of life.
Conclusion: Psychometric analyses support the reliability and validity of the PHQ-9, GAD-7 and K-10 as screening tools for detection of anxiety and depression in heart transplant recipients.

Psychological disorders, such as anxiety and depression, are common after heart transplantation (Dew & DiMartini, 2006; McCrystal, Pepe, Esmore, & Rosenfeldt, 2004; Politi et al., 2004; Taylor, Stehlik, & Edwards, 2009). A recent study reported that the risk for post heart transplant major depression was 41% and post-traumatic stress disorder (PTSD) 13% (Favaro et al., 2011). Post-transplant anxiety and depression require treatment because of the negative impact of these disorders on quality of life and association with increased morbidity and mortality (Dew et al., 1999; 2015). Although strong evidence regarding the effectiveness of interventions for post-transplant depression and anxiety is lacking (Conway et al., 2014), specialized treatment from a multidisciplinary team is recommended by the International Society for Heart and Lung Transplantation (ISHLT) (Costanzo et al., 2010).

To deliver specialized treatment for psychological disorders, heart transplant recipients affected by anxiety or depression must first be identified. In most circumstances, routine psychological evaluation for all recipients by a specialist is not feasible in clinical practice. Moreover, self-reporting of psychological distress is not common (Bijl & Ravelli, 2000). Identification of psychological disorders can be aided with screening tools that identify patients who have a likelihood of a psychological disorder. In this regard, the ISHLT (Costanzo et al., 2010) recommends that depressive symptoms should be regularly evaluated during follow-up with user-friendly, validated screening instruments. Although the ISHLT guidelines focus on recognition and referral for treatment of depression specifically, we propose that screening for anxiety disorders would also be worthwhile in clinical practice due to the considerable prevalence and negative consequences of these disorders in heart transplant recipients (Dew & DiMartini, 2006).

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Despite the potential benefits of routine evaluation of the presence of psychological distress for heart transplant recipients, the psychometric properties of screening tools for the detection of depression and anxiety have not been evaluated in this population. To assist implementation of screening and referral for specialist treatment of post-transplant psychological disorders, the aim of this analysis was to assess the validity and reliability of self-administered questionnaires to screen for post heart transplant anxiety and depression in heart transplant recipients.

1. Patients and methods

A single-site, cross-sectional study was conducted to assess the psychometric properties of screening tools for the detection of anxiety and depression in heart transplant recipients. Human research ethics committee and institutional approval was granted for the study and it was registered prospectively with the Australian New Zealand Clinical Trials Registry (ACTRN12613000740796). Internal consistency was used to test the reliability of the screening tools. Criterion validity was assessed by comparing results from the screening tools with a standard diagnostic tool for detection of psychological disorders. Construct validity was evaluated by testing hypotheses derived from previous research regarding the associations between psychopathology and quality of life. It was hypothesized that the heart transplant recipients who reported greater severity of psychological symptoms on the screening tools would also report lower health-related quality of life.

1.1. Patients

Heart transplant recipients over 18 years of age who attended the outpatient clinic at a major metropolitan hospital in Australia were eligible to participate in the study. Patients who were less than three months post-transplant as well as those who were cognitively impaired (as confirmed by a treating clinician), were unable to understand and speak English, had a diagnosed major psychiatric comorbidity (schizophrenia, bipolar disorder, dementia) or had terminal illness were excluded.

1.2. Data collection

Data concerning demographics and clinical characteristics were collected from medical records. Psychological symptom experience and quality of life data were collected from participants using self-report questionnaires. Questionnaires were completed by participants while waiting for their appointment at the outpatient clinic. A research assistant was available to provide clarification about any of the items contained within the questionnaire. A structured psychological interview was conducted over the phone by a provisional psychologist undertaking a Doctor of Clinical Psychology degree after the initial screening. The psychologist was blinded to the results of the screening questionnaires.

1.3. Measures

1.3.1. Mini International Neuropsychiatric Interview version 6.0 (MINI 6.0)

The MINI 6.0 is a short structured diagnostic interview for psychiatric disorders as included in the 4th version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) and the 10th version of the International Classification of Diseases (ICD-10) (Sheehan et al., 1998). It consists of 120 questions and screens 17 axis I disorders for 24 current and lifetime diagnoses. Current is defined as experiencing symptoms associated with the disorder within the past month for all disorders except generalized anxiety disorder and substance abuse disorders. In a validation study, which enrolled 370 participants, sensitivity of the MINI was 0.7 and specificity was 0.85 with the Structured Clinical Interview for DSM-III (SCID-P) (Sheehan et al., 1997) Inter-rater reliability between interviewers was excellent in this study, with the kappa score for the majority (16/23) of modules being over 0.9 (Sheehan et al., 1997).

1.3.2. Patient Health Questionnaire 9-item scale

The Patient Health Questionnaire 9-item scale (PHQ-9) is a brief self-report measure of depression (Spitzer, Kroenke, & Williams, 1999). Participants were asked to consider the preceding two weeks and rate symptom frequency as not at all (0), several days (1), more than half of all days (2) or nearly all days (3).

1.3.3. Generalized Anxiety Disorder 7-item scale

The Generalized Anxiety Disorder 7-item scale (GAD-7) is a self-reported measure of anxiety. Higher scores indicate higher levels of anxiety. Participants were asked to consider the preceding two weeks and rate symptom frequency as not at all (0), several days (1), more than half of all days (2) or nearly all days (3). The GAD-7 has high internal consistency ($\alpha = 0.92$) and is strongly correlated with the Beck Anxiety Inventory (Spearman's correlation coefficient = 0.72) (Spitzer, Kroenke, Williams, & Lowe, 2006).

1.3.4. Kessler Psychological Distress Scale (K-10)

The Kessler Psychological Distress Scale (K-10) is a brief self-report measure of psychological distress, which is used frequently in research and clinical practice to screen for psychological disorders. This 10-item scale measures severity of anxiety and depression symptoms using a 5-point Likert type scale. It has been shown to strongly discriminate between community cases and non-cases of DSM-IV psychological disorders (Kessler et al., 2002).

1.3.5. Medical Outcomes Short Form-36 Health Survey

The Medical Outcomes Short Form-36 Health Survey (SF-36) yields an 8-scale profile of self-reported functional health and well-being. Higher scores indicate a better health status (Garratt, Schmidt, Mackintosh, & Fitzpatrick, 2002). The domains of quality of life measured by the SF-36 are physical functioning, role limitations due to physical health, role limitations due to emotional problems, energy/fatigue, emotional well-being, social functioning, pain and general health.

1.4. Statistical analysis

Formal sample size calculation was not conducted. Descriptive statistics were generated using STATA version 13 (Statacorp, College Station, TX). Frequencies, means and standard deviations (SD) were used to describe demographic, clinical and symptom characteristics. Reliability was measured as internal consistency using Cronbach's alpha. Receiver operating characteristics with the MINI as the criterion were calculated to assess criterion validity of GAD-7, PHQ-9 and K-10 results. MINI diagnoses of 'major depression (current or recurrent)', 'major depression with melancholic features' and 'dysthymia' were used as the criterion standard for evaluation of the validity of the PHQ-9. For the GAD-7, MINI diagnoses of 'panic disorder', 'agoraphobia', 'panic disorder with agoraphobia', 'agoraphobia without a history of a panic disorder', 'social disorder (generalized or non-generalized)', 'post-traumatic stress disorder' and 'generalized anxiety disorder' were used. As the K-10 is a non-specific measure of psychological distress, the presence of either anxiety or depression MINI diagnoses was used as the criterion. The Liu method was used to identify the optimal cut-point that maximized the sensitivity and specificity of the screening tools in the detection of psychopathology. Hierarchical regression (controlling for demographic and clinical characteristics) was used to assess whether the severity of psychological symptoms, as measured by the screening tools, was associated with quality of life. A Bonferroni correction was applied to account for multiple comparisons made from the same dataset. A p-value of <0.002 (0.05/24) was considered statistically significant.

2. Results

From January to September 2014, 48 participants completed the screening questionnaires (PHQ-9, GAD-7 and K-10) as well as the