Original Article

Depression Assessment: Spouses are Poor Proxies for Cardiovascular Disease Patients

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Abstract

Background: Patients are frequently assisted by proxies, usually a spouse, to complete health and medical surveys, including depression assessments. **Objective:** The objective of this study was to examine whether spousal assessments of patient depression concord with those of the patient. **Materials and Methods:** Consecutive adult cardiac patients attending an outpatient cardiovascular disease clinic accompanied by an adult were enrolled. Patient–spousal pairs independently completed the Cardiac Depression Scale (CDS) on behalf of the patient. Proxies provided demographic and medical history information and also completed the Physical Health Questionnaire. **Results:** A total of 72 patients (males 75%; mean age = 67.18 ± 11.35 years) and 72 spouses (mean age = 65.19 ± 11.49 years) met enrollment and analysis criteria. Most spouses were female (75%). Proxies rated patients significantly higher on the CDS (mean = 93.14 ± 29.33) than did patients of themselves (mean = 87.93 ± 26.79), $t(71) = -2.05$, $P < 0.05$. Patient–spousal concordance was low to moderate on the total CDS (concordance correlation coefficient [CCC] = 0.69) and CDS symptoms including mood (CCC = 0.35), anhedonia (CCC = 0.63), anxiety (CCC = 0.71), irritability (CCC = 0.55), hopelessness (CCC = 0.50), cognitive dysfunction (CCC = 0.41), and sleep disturbance (CCC = 0.64). **Conclusions:** These results suggest that spouses have limited insight into patient's psychological status, as self-reported by patients. Proxy assessments should be interpreted with caution and, wherever possible, patients should be encouraged to complete depression assessments on their own.

Keywords: Cardiac Depression Scale, cardiovascular disease, concordance, depression, patient, proxy

INTRODUCTION

Cardiovascular disease (CVD) remains the leading cause of mortality and disease burden worldwide, accounting for 12% of total deaths and 4% of total disease burden.[1] It is estimated that one in every five CVD patients has comorbid depression,[2] with increased rates associated with greater CVD disability.[3] This is 4–5 times the prevalence rate of depression of the general population, recently estimated at approximately 4.4% worldwide.[4]

The relationship between depression and CVD appears to be bi-directional in that (i) depression is a common response to CVD, due to sudden distress, debilitation, and lifestyle change and (ii) depression can promote the onset and/or worsening of CVD.[2,5] In part, this is attributable to lifestyle factors typical of depression and CVD (e.g., poor health behaviors and low adherence to medication regimens),[6,7] but

may also be explained by common biological pathways.[2] Research has identified comorbid depression in CVD settings as an independent risk marker for hospital admissions and mortality.[8] Thus, there is a clear clinical imperative to detect, treat, and manage depression in CVD patients.[9]

Screening for depression as a component of CVD clinical practice is typically via self-report measures, such as the Patient Health Questionnaire-2 (PHQ-2)[10] and the Cardiac Depression Scale (CDS).[11] The CDS was developed specifically for CVD settings and indexes the full spectrum of severity of affective, cognitive, and somatic symptoms associated with

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depression. The CDS is a well-validated tool, achieving 97% sensitivity and 85% specificity for detecting major depressive disorder (MDD),[11] but is not immune to common self-report problems, such as those associated with patient capacity, insight, and/or willingness; in such instances, patient proxies may be asked for assistance.

Proxy assessments are increasingly common across different chronic patient populations,[12] including cancer,[13] stroke,[14] and dementia[15] patients, as part of health monitoring and decision-making processes. Usually, family members, such as spouses, assume the role of patient "proxy." Under certain conditions, such as when there is a high degree of familiarity, proxies may be able to provide a valid assessment of patient symptoms from the patient's perspective.[16] In this instance, proxy assessment may overcome problems associated with self-report assessment, such as limited insight due to a disease condition, response bias, and language barriers.[17] Provided such assessments are valid, proxies may offer valuable additional information that can lead to better informed medical decisions.[17] The advantages associated with proxy assessment, coupled with its ubiquitous use in the health-care settings, highlight its potential as an adjunctive mode of assessment.

Proxy assessments tend to be more accurate when they pertain to observable patient symptoms (e.g., general health and health service usage)[12,16] and less accurate in relation to judgments about nonobservable states (e.g., mood and anhedonia).[17,18] For instance, proxy assessments of patient's quality of life show low-to-moderate concordance with patient's self-assessments.[16,18-21] In general, proxies tend to overestimate the range and severity of negative symptoms experienced by patients.[18,20,21] It has been suggested that concordance may be biased by patient and proxy characteristics, such as socioeconomic factors, the closeness of the relationship shared between patients and proxies,[12,22] caregiver burden, and access to social support.[20,21] For example, female proxies tend to overreport patient symptoms.[22] Moreover, high levels of caregiver burden in proxies are associated with poorer patient–proxy concordance.[14,23] Patient factors, such as their age, disease condition, and associated symptoms, are also influential factors in patient–proxy concordance.[13,22]

The utility of proxy assessment of depressive symptoms in CVD patients has remained largely unexplored. In one example, Quinn *et al*.[24] reported that agreement between caregivers and patients as to whether patients were "depressed" was low, with a 20% false-positive and 10% false-negative rates. Although proxy–patient concordance was higher on other symptoms (such as edema, poor concentration, and dizziness), concordance was not consistently high across all observable symptoms (e.g., shortness of breath and worsening cough).

The aim of this study is to examine the concordance between spousal patient–proxy dyads across the full spectrum of affective, somatic, and cognitive features of depression in CVD populations. In addition, this study examines whether proxy attributes (e.g., sociodemographic, medical, and mental health factors) explain the level of agreement between patients and proxies.

MATERIALS AND METHODS

Ethics
All procedures were in accordance with the ethical standards of the (Blinded Institutional Committee) on human experimentation and conform to the principles outlined in the Declaration of Helsinki of 1975, as revised in 2000.

Participants
Consecutive patients accompanied by an adult spouse (i.e., proxies) and able to complete surveys independently in English were eligible for the study enrollment. The final sample comprised 72 patients (mean age = 67.18 ± 11.35 years) and their accompanying adult spouses (mean age = 65.19 ± 11.49 years), recruited from cardiovascular outpatient clinics (i.e., Heart Function Clinic; Valve Clinic; General Cardiology Clinic; and Cardiac Arrhythmia/Pacemaker Clinic). Patients were predominantly male (75%), while proxies were predominantly female (75%).

Materials
Cardiac Depression Scale
The CDS was developed in cardiac populations to index the full spectrum of depressive symptoms from low-level adjustment disorder with depressed mood to MDD.[11] The scale comprises 26 items to which patients respond using a Likert-type scale ranging from 1 to 7. Seven items are reverse scored and higher scores indicate greater severity of depressive symptoms. A total CDS score and scores of items pertaining to the seven subscales of depression (including Mood, Anhedonia, Anxiety, Irritability, Hopelessness, Cognitive disturbance, and Sleep disturbance) were calculated.[11] A total CDS score ≥95 has excellent sensitivity (97%) and specificity (87%) for detecting MDD in cardiac patients.[25]

Patient Health Questionnaire-2
The PHQ-2[26] is an abbreviated, 2-item version of the PHQ-9 designed to screen for the probable presence of depression and is recommended for routine use in cardiac populations.[27] The questionnaire indexes the presence or absence (yes/no dichotomous response) of depressed mood and anhedonia in the past month. The dichotomous version of the PHQ-2 has strong sensitivity (90%) and good specificity (69%) for the detection of depression in CVD populations.[27]

Procedure
Patients and proxies were recruited from outpatient cardiology clinics in a tertiary hospital located in Victoria, Australia, and provided informed consent prior to participation. Consenting patients who met inclusion criteria were asked to complete the CDS independently. Consenting proxies were asked to complete the CDS on behalf of the patient "as though they were the patient." This procedure mimics the way that accompanying spouses are frequently observed to complete CDS surveys on behalf of patients in outpatient cardiology clinics. Proxies were

also asked to provide demographic/medical history information and to complete the PHQ-2. Patients and proxies were both instructed to complete the questionnaires independently and to avoid sharing or discussing their answers with one another.

Statistical analysis

A total of 87 patient–proxy pairs were consented and enrolled, with 15 pairs later removed due to uncertainty regarding their relationship status which required dyads to be spouses. Missing data ≤2 CDS items were replaced for 17 participants using mean substitution. There were no outliers (±3.29 standard deviation) and data were normally distributed (within ±1 for skewness and kurtosis). The final sample comprised 72 patient–proxy pairs ($n = 144$).

Group means were compared using repeated measures *t*-tests and frequency data were explored using Chi-square tests and logistic regression analysis. Using a threshold score for the presence of depression (CDS ≥95), patient–proxy agreement as to the presence or absence of depression in patients was examined as a binary measure (yes/no agree). A continuous measure of patient–proxy agreement was also employed using intraclass correlation coefficients (ICCs) to measure the strength of agreement for each dyad across all the 26 CDS items. Concordance between summed patient–proxy depression ratings was examined using Lins concordance correlation coefficient (CCC). Statistical analysis was undertaken using IBM SPSS Statistics (Version 22, SPSS Inc., Chicago, IL, USA). Alpha was set at $P < 0.05$ (two tailed) to indicate statistical significance.

RESULTS

Sample characteristics

Most patients ($n = 72$) were male (75%; mean age $= 67.18 ± 11.35$ years) and were of similar age to proxies ($n = 72$; mean age $= 65.19 ± 11.49$ years), $t(142) = 1.04$, $P = 0.299$ (95% confidence interval [CI]–1.78, 5.75). Most patients were diagnosed with systolic heart failure (HFrEF) ($n = 22$; 30.6%) or arrhythmias ($n = 13$; 18.1%). The remainder were diagnosed with ischemic heart disease ($n = 9$; 12.5%), diastolic heart failure (HFpEF) ($n = 9$; 12.5%), valve disease ($n = 7$; 9.7%), hypertension ($n = 5$; 6.9%), or other cardiovascular problems ($n = 7$; 9.7%). Most proxies ($n = 72$) were female (75%) and all patient–proxy pairs lived together (mean number of years living together $= 39.35 ± 14.22$ years). Most patients and proxies had begun or completed secondary-level education [Table 1].

Patient–proxy agreement about patient depression

Proxies rated patients significantly higher on the CDS (mean $= 93.14 ± 29.33$) than did patients of themselves (mean $= 87.93 ± 26.79$), $t(71) = −2.05$, $P = 0.04$, (95% CI–10.27, –0.15). A total of 46% of patients ($n = 33$) self-reported feeling depressed (CDS ≥95). Proxies detected significantly higher rates of depression in patients ($n = 40$; 56%) than did patients of themselves, Chi-square

Table 1: Sample characteristics ($n=144$)

Characteristics	Patient ($n=72$)	Proxy ($n=72$)	P
Age	67±11	65±11	>0.05
Gender, *n* (%)			
Male	54 (75)	18 (25)	<0.001
Female	18 (25)	54 (75)	
Education, *n* (%)			
Primary	6 (9)	4 (6)	>0.05
Secondary	43 (66)	47 (66)	
Tertiary	16 (25)	20 (28)	

(1, $n = 72$) = 21.17, $P = 0.001$. A total of 17 patient–proxy pairs did not agreed as to the presence (CDS ≥95) or absence (CDS <95) of depression in patients (24%). Of these cases, proxies had a 71% false-positive rate and a 29% false-negative rate relative to patients' self-ratings of depression.

Proxy factors and patient–proxy agreement

A series of logistic regression analyses showed that proxies' sociodemographic and medical history factors did not predict agreement between patient–proxy dyads as to the presence or absence of depression in patients [Table 2]. Patient–proxy agreement was also examined as a continuous variable based on the ICC across all the 26 CDS items for each patient–proxy pair; linear regression analysis did not identify any sociodemographic predictors of patient–proxy ICC agreement.

Patient–proxy concordance in the assessments of patient depression

Concordance between patients and proxies was examined ($n = 72$ pairs). Lins CCC revealed low-to-moderate concordance between spousal patient–proxy pairs on CDS total and subscale scores, ranging from 0.35 to 0.71 [Table 3].

DISCUSSION

Patients are often assisted by others, such as spouses, to complete medical assessments. Proxy assessments can offer useful information about patients' who are unable or unwilling to complete such assessments on their own.[17] The aim of this study was to examine whether spousal proxy ratings of depression in patients concord with those of patients.

Our results show that proxies consistently rated patients as being more severely impacted by depression than did patients of themselves. Concordance between patient–proxy pairs was low to moderate across all CDS affective and cognitive domains, with comparatively better concordance for some affective symptoms (such as anxiety and anhedonia) and somatic symptoms, such as sleep disturbance. These findings are consistent with the past literature that has shown low-to-moderate concordance between patient–proxy assessments of patient quality of life,[16,18-21] with a tendency for negative symptoms to be overestimated by proxies.[18,20,21] Research is presently underway to compare patient–proxy

Table 2: Logistic regression to examine proxy characteristics and patient-proxy agreement about patient depression

Proxy characteristics	Patient-proxy agreement (%)	Patient-proxy disagreement (%)	OR	95% CI	*P*
Age (years)					
<60	15 (75)	5 (25)	1.11	0.34-3.69	0.86
≥60	40 (77)	12 (23)			
Gender					
Male	13 (72)	5 (28)	1.35	0.40-4.54	0.63
Female	42 (78)	12 (22)			
Medical history					
History major illness	30 (71)	12 (29)	0.52	0.16-1.68	0.28
No history major illness	24 (83)	5 (17)			
Proxy depression					
Depressed (PHQ-2 ≥1)	22 (76)	7 (24)	1.05	0.35-3.18	0.94
Not depressed (PHQ-2 <1)	30 (75)	10 (25)			

PHQ-2=Patient Health Questionnaire-2, OR=Odds ratio, CI=Confidence interval

Table 3: Lins concordance correlation coefficient of patient-proxy concordance on patients' depression assessments

CDS domain	CCC (*n*=72 pairs)	95% CI
Total CDS	0.69	0.56-0.80
Mood	0.35	0.13-0.53
Anhedonia	0.63	0.48-0.75
Anxiety	0.71	0.57-0.81
Irritability	0.55	0.37-0.69
Hopelessness	0.50	0.31-0.66
Cognition	0.41	0.20-0.58
Sleep disturbance	0.64	0.78-0.76

CCC=Concordance correlation coefficient, CDS=Cardiac Depression Scale, CI=Confidence interval

depression assessments against blinded gold standard psychiatric interview to better interrogate these issues and to explore the validity or otherwise of proxy depression assessments.

Approximately one-quarter of patient–proxy dyads disagreed as to whether patients were depressed or not; in this regard, proxies had a 71% false-positive rate relative to patients' self-assessment. Proxies' sociodemographic, medical, and mental health factors did not predict agreement between patients and proxies as to the presence or absence of patient depression. Moreover, proxy factors were not associated with a more sensitive measure of patient–proxy agreement based on the ICC for each dyad across all CDS items. This was unexpected since past research has shown an association between patient/proxy demographic and medical factors and patient–proxy concordance.[13,22] Our findings suggest that patient–proxy agreement tends to be low to moderate, irrespective of the proxy's sociodemographic factors.

CONCLUSIONS

Depression screening is an important component of best-practice patient care in CVD settings. These findings suggest that spouses, acting as proxies, generally overestimate the extent to which patients are impacted by depressive symptoms; or alternatively, patients underestimate their symptoms. While the quality of life and mortality and morbidity risks associated with depression in CVD require high detection sensitivity, overestimation requires significant additional resources to confirm the diagnosis. In either way, the measurement discrepancy is extraordinarily high. We therefore suggest that patients be encouraged to complete depression screening indices on their own; where circumstances do not permit, health professionals are encouraged to interview patients using a validated depression short form, such as the PHQ-2[26] or Depression Scale-Short Form,[28] rather than relying on proxy assessments.

Conflicts of interest

There are no conflicts of interest.

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