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Research Article

Evaluation of the Relationship between Psychosocial Issues in Patients with Congestive Heart Failure and Low Ejection Fraction

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Abstract

Purpose: The symptoms of depression and other psychosocial conditions can overlap with congestive heart failure (CHF), and subsequently remain underdiagnosed and untreated despite evidence that they can increase morbidity, mortality, and readmissions in these patients. The objective of this study is to establish the presence or absence of a relationship between ejection fraction (EF) and the management of psychiatric disorders in patients with CHF. Additionally, the relationship between proper management of CHF and psychiatric disorders will be examined.

Methods: Data was collected for 758 patients seen at heart failure clinics at a university-affiliated Medical Center between October 2014 and November 2016 via retrospective chart analysis for patient-specific items including EF, New York Heart Association (NYHA) classification, Emotion Thermometer reports, comorbidities, and psychiatric and cardiac medication use.

Results: For patients that did not report distress, anxiety, depression, anger, or "needing help" on their Emotion Thermometer scores, there was no correlation between any NYHA class of heart failure and EF. For those that did report distress, anxiety, depression, anger, or "needing help" on their Emotion Thermometer scores, there was a statistically significant negative and positive correlation between EF and reported anger and "needing help" scores respectively ($p = 0.002$ and $p = 0.028$ respectively, $n = 281$). However, there was no statistically significant correlation between EF and distress, anxiety, or depression ($p > 0.05$).

Conclusion: Certain psychosocial conditions including anger and "needing help" have shown correlation with ejection fraction. Further research with clinical trials is needed to clarify the relationship between psychosocial conditions and heart failure.

Keywords: *Heart Failure; Ejection Fraction; Depression*

Introduction

In the United States alone, more than 5.8 million people suffer from congestive heart failure (CHF), with more than 500,000 new cases being diagnosed each year, leading to significant morbidity, mortality, and healthcare expenditures [1]. Psychosocial conditions and their effect on these patients is a growing field of research. Because the symptoms of heart failure, which can overlap with those of conditions such as depression, psychosocial conditions in these patients are often overlooked and remain untreated, even though studies have shown depression rates in CHF patients to approach 50% [2]. Another study has indicated that severe depression symptoms may be present in up to 85% of heart failure patients [3]. Recently, evidence is growing that psychosocial conditions such as depression, anxiety, and cognitive impairment can contribute to increased mortality and readmission rates in patients with CHF [4,5]. In fact, Rumsfeld., *et al.*

found depressive symptoms to be the strongest predictor of short-term declines in health status for heart failure patients [6]. It has also been suggested that there is a correlation between patients with CHF and the development of new onset depression. A study done by Havranek., *et al.* examined the development of depression in patients with CHF who did not have depressive symptoms at baseline. The results indicated that 21.2% of patients in the study were found to have depressive symptoms one year later [7]. It has also been shown that improvement in depression in cardiac patients can improve adherence to medications [8]. This relationship may in turn affect disease progression of heart failure. However, studies clarifying the clinical relationship between these psychological issues and mortality and readmission rates remain largely unexplored.

Aim of the Study

This study aims to establish the presence or absence of a relationship between ejection fraction and the management of psychiatric disorders in patients with CHF. Additionally, the relationship between the proper management of CHF and psychiatric disorders will be examined.

Methods

The research was conducted according to the principles of the Declaration of Helsinki, seventh revision (*JAMA*. 2013; 310:2191-4). Data was collected for patients seen between October 2014 and November 2016 in heart failure clinics at Loma Linda University Medical Center through retrospective examination of electronic medical records to assess patient-specific items. These items included age, gender, New York Heart Association (NYHA) classification of heart failure, ejection fraction, and patient-reported Emotion Thermometer measurements (2013 version), which assessed patient reported levels of the following categories: (i) distress, (ii) anxiety, (iii) depression, (iv) anger, and (v) "needing help" (whether or not the patients require help dealing with the aforementioned conditions). The Emotion Thermometer can be found in the supplementary materials. This tool requires participants to rate each category on a scale from zero to ten, with higher numbers indicating increasing severity. Participants were required to meet the following criteria to be included in the study: an age of 18 years or older, a documented diagnosis of CHF, documented ejection fraction and NYHA classification and successful completion of an Emotion Thermometer report. Patients who did not meet one or more of the criteria were excluded from the study. Out of a total of 972 patients screened, 214 did not meet the criteria and were excluded from the study, leaving a total study population of 758 patients.

Statistical analyses

Descriptive statistics for the continuous variables were reported as means with standard deviation. The paired t-test was used when comparing continuous data. Categorical data was expressed as counts and percentages. We used bivariate Pearson correlation between ejection fraction, New York Heart Association categories and reported distress scores, reported anxiety scores, reported depression scores, reported anger scores, and reported scores for need help scores. All tests were 2-tailed and a p-value of less than 0.05 was determined to represent statistical significance. Data analysis was conducted with Microsoft Excel and the IBM SPSS® version 24.0 software platform.

Results

Patient background characteristics (Table 1) showed an average age of 62.5 years, with most patients classified as NYHA Class III (55%), or Class II (29%). A majority of patients (64%) were found to have appropriate treatment for CHF. (According to current recommendations, a therapeutic regimen of an ACE inhibitor or ARB, or ARNI along with a beta blocker and an aldosterone antagonist is the new recommended therapy for CHF with reduced ejection fraction) [9]. A total of 38.7% of the study population was found to be treated with psychiatric medications, with the largest proportion being on benzodiazepines (12.1%), or selective serotonin reuptake inhibitors (11.7%). All other classes of psychiatric medications had a total usage of less than 3% of the total study population. The most common comorbidities were abnormal rhythms/atrial fibrillation, hypertension, and acute coronary syndrome.

Characteristic	n = 758
Age - yr.	62.5
Gender - no. (%)	
Male	447 (59)
Female	311 (41)
NYHA - no. (%)	
Class I	84 (11)
Class II	221 (29)
Class III	417 (55)
Class IV	32 (4)
Appropriate Treatment for CHF - no. (%)	513 (64)
Average Ejection Fraction - %	38.5
Psychiatric Medications - no. (%)	293 (38.7)
SSRI	89 (11.7)
SNRI	19 (2.5)
TCA	18 (2.4)
BZD	92 (12.1)
Antipsychotics	4 (0.5)
Atypical Antipsychotics	15 (1.9)
Other	56 (7.4)
Heart Failure Medications - no. (%)	
ACE Inhibitor/ARB	566
Beta Blocker	647
Aldosterone Antagonist	211
Diuretic	489
Digoxin	12
Statin	443
Isosorbide dinitrate/hydralazine	7
Valsartan/sacubitril	37
Medical History - no. (%)	
Pulmonary Hypertension	75
Atrial Fibrillation	232
Abnormal Rhythms	324
Valve Disease	147
Acute Coronary Syndrome	355
Heart Failure	696
Diabetes	275
Hypertension	492
Cancer	69
Obesity	218
Chronic Kidney Disease	177

Table 1: *Patient demographics.*

For patients that did not report any distress, anxiety, depression, anger, or need for help on their Emotion Thermometer scores, there was no correlation between New York Heart Association Class and ejection fraction. For those that did report distress, anxiety, depression, anger, or need for help on their Emotion Thermometer scores, there was a statistically significant negative and positive correlation between ejection fraction and reported anger and need help scores respectively ($p = 0.002$ and $p = 0.028$ respectively, $n = 281$). However, there was no statistically significant correlation between ejection fraction and reported distress, anxiety, and depression scores ($p > 0.05$). Due to the lack of patients diagnosed or treated with psychiatric medications, no conclusion could be made.

Discussion

The results of this study suggest there may be a potential relationship between certain psychosocial conditions and the ejection fraction of patients with diagnosed heart failure. Given that the body of research investigating the relationship between cardiac and psychosocial conditions has revolved around depression, and to a lesser extent, anxiety, it was rather unexpected that the two categories which showed a significant correlation were those of anger and needing help. The results suggest that patients who report that their anger is a problem and is uncontrolled represent a negative inverse correction to ejection fraction with higher anger scores representing lower ejection fractions. On the other hand, the patient's ability to self-identify that they needed help represented a positive correlation with higher numbers on the scale representing higher ejection fraction scores. Although prior studies have indicated an increase in morbidity, mortality, and readmission rates between heart failure and psychosocial conditions, these results suggest that there is a direct clinical relationship and are indicative that the association between them is complicated and requires further investigation (Figure 1).

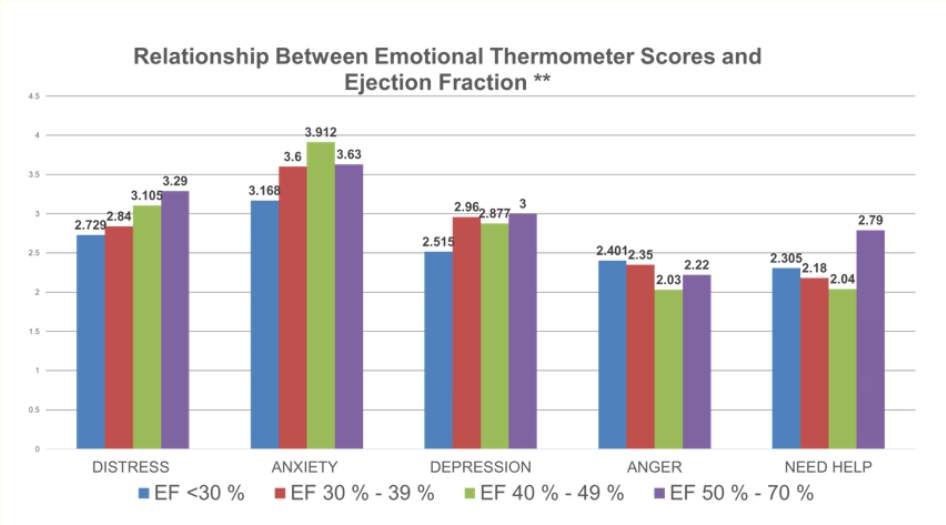

Figure 1: *Relationship between emotion thermometer scores and ejection fraction.*

Given the prevalence of depression in patients with heart failure as cited above, the lack of patients being treated with psychiatric medications confirmed that patients with psychiatric comorbidities often remain untreated. Larger studies that are sufficiently powered are needed to compare the proper management of psychiatric conditions in CHF with those who remain untreated.

Some limitations of this study include retrospective study design and small sample size (n = 758). The mental health thermometer reports were also subject to patient interpretation. Additionally, there was a lack of necessary follow-up mental health thermometer reports which would help to properly assess the correlation between CHF and psychiatric state.

Future prospective clinical trials are needed to clarify the relationship between these psychosocial conditions and ejection fraction.

Conclusion

Certain psychosocial conditions including anger and "needing help" have shown correlation with ejection fraction. Further research with clinical trials is needed to clarify the relationship between psychosocial conditions and heart failure.

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