

January 2012

Clinical And Demographic Correlates Of Depression In Stable Heart Failure

Beth Heaney
Yale University, blheaney@gmail.com

Follow this and additional works at: <http://elischolar.library.yale.edu/ysndt>

Recommended Citation

Heaney, Beth, "Clinical And Demographic Correlates Of Depression In Stable Heart Failure" (2012). *Yale School of Nursing Digital Theses*. 1006.
<http://elischolar.library.yale.edu/ysndt/1006>

This Open Access Thesis is brought to you for free and open access by the School of Nursing at EliScholar – A Digital Platform for Scholarly Publishing at Yale. It has been accepted for inclusion in Yale School of Nursing Digital Theses by an authorized administrator of EliScholar – A Digital Platform for Scholarly Publishing at Yale. For more information, please contact elischolar@yale.edu.

Clinical and Demographic Correlates of Depression in
Stable Heart Failure

Thesis – Secondary Analysis of Data
Submitted to the Faculty
Yale University School of Nursing

In Partial Fulfillment
of the Requirements for the Degree
Master of Science in Nursing

Beth L. Heaney

May 16, 2012

This Thesis is accepted in partial fulfillment of the requirements for the degree Master of Science in Nursing.

Nancy S. Redeker

Nancy Redeker, PhD, RN, FAHA, FAAN

May 16, 2012

Permission for printing, photocopying or microfilming of Clinical and Demographic Correlates of Depression in Stable Heart Failure for the purpose of individual scholarly consultation or reference is hereby granted by the author. This permission is not to be interpreted as affecting publication of this work or otherwise placing it in the public domain, and the author reserves all rights of ownership guaranteed under common law of unpublished manuscripts.

Beth Heaney, RN, MSN Candidate 2012

May 16, 2012

Acknowledgements

I would like to thank Nancy Redeker for the use of her data, her expertise, and her mentorship. I would also like to acknowledge Michael Kane, Gyeyoon Kim, and Hiywete Solomon for their work on the statistical analysis and assistance throughout the research process.

Disclosure Statement

I have no financial conflicts of interest.

Abstract

CLINICAL AND DEMOGRAPHIC CORRELATES OF DEPRESSION IN STABLE HEART FAILURE

In this secondary analysis of cross sectional data collected from 173 patients with chronic HF the demographic, clinical, and sleep related factors present in patients with stable HF and major depressive disorder (MDD) were explored. Participants were recruited from 5 structured HF disease management programs in the Northeastern US. Measures include the Centers for Epidemiological Studies Depression Scale (CESD), the Charlson Comorbidity Index (CCI), and a sleep diary. Results indicate significant between group differences between patients with MDD and without MDD in age, gender, NYHA, diabetes, chronic fatigue, asthma, past psychiatric history, antidepressant use, anxiolytic use, insomnia, and taking sleeping pills. A logistic regression incorporating age, gender, NYHA class, asthma, diabetes, and insomnia predicted 84.6% of patients with and without MDD, with insomnia remaining significant at a $p = 0.002$. Major Depressive Disorder (MDD) is a common and under-diagnosed co-morbidity in stable heart failure (HF), associated with worse outcomes and lower quality of life. Further identification of the factors associated with MDD in patients with stable HF may help to improve rates of diagnosis and treatment. Self reported insomnia was present in the majority of depressed patients. Other characteristics of depressed patients in the sample include younger age, female gender, NYHA class III/IV, and co-morbid asthma and diabetes.

Table of Contents

<u>Chapter</u>	<u>Page</u>
I. INTRODUCTION.....	1
II. METHODS	4
Sample.....	4
Variables and Instruments.....	5
Procedure.....	6
Data Analysis.....	6
III. RESULTS.....	7
Demographic.....	7
Clinical.....	7
Sleep.....	8
Logistic Regression.....	10
IV. DISCUSSION.....	11
Clinical Implications.....	14
Research Implications.....	15

List of Tables

<u>Table</u>	<u>Page</u>
1. Comparison of participants with and without clinical depression (MDD) based on score of ≥ 28 indicating MDD on demographic and clinical variables.....	9
2. Logistic Regression for Clinical Symptoms and MDD.....	10

Introduction

Depression is common among the 5.8 million people who live with HF in the United States and is associated with increased morbidity, mortality, healthcare costs, and decreased quality of life (Hallas, Wray, Andreou, & Banner, 2011; Smith, 2010). Recent reviews suggest that rates of depression among patients with HF range from 13-77%, although the wide range is likely due to variability in the methods used to measure depression, definitions of depression as depressive symptoms versus clinical depression, and whether or not patients were hospitalized at the time of diagnosis (Delville & McDougall, 2008; Redeker, 2006). This compares with a prevalence of Major Depressive Disorder (MDD) in 10%-25% of women and 5-12% of men in the general population (APA, 2000). Depression is associated with poorer function, decreased quality of life, increase in symptoms, increased mortality, and increased hospitalizations in patients with HF, independent of severity of HF (Friedmann, et al., 2006; Hallas, et al, 2011; Lea, 2009; Sherwood, et al., 2011; Ramasay, et al., 2006; Sullivan, Levy, Russo, & Spertus, 2004). Depression may also be a risk factor for developing HF, particularly in high risk cardiac patients (Joynt, Whellan, & O'Connor, 2004).

Patients with MDD are more likely to be classified as NYHA class III & IV, even when these classifications cannot be explained by CV risk factors or lab work (Skotzko, 2009). The overlap of symptoms and physiology between MDD and HF can lead to exacerbation of symptoms, posing difficulties for both diagnosis and treatment. MDD also complicates management of HF as it is linked to decreased compliance with HF treatment and low levels of social support, both of which are associated with poor outcomes in HF, particularly in older adults and patients with increased daytime sleepiness (Joynt et al, 2004; Luttik, Jaarsma, Moser,

Sanderman, & van Veldhuisen, 2005; Maixner, Struble, Blazek, Kales, 2011; Riegel, et al., 2011).

Although experts recommend screening all HF patients for MDD, especially those with New York Heart Association Class III and IV HF (Skotzko, 2009; Lea, 2009; US Preventative Task Force, 2009), depression remains under-diagnosed and under-treated in these patients. The diagnosis of MDD is missed in approximately 16% of patients with HF in the primary care setting (Delville and McDougall, 2008), and cardiologists inquire about depressive symptoms in fewer than half of their patients (Feinstein, Blumenfield, Orlowski, Frishman, & Ovanssian, 2006). Under-diagnosis of MDD may be due to the shared pathophysiology of HF and MDD, including increased catecholamine release, arrhythmias, elaboration of pro-inflammatory cytokines and platelet activation (Joynt, Whellan, & O'Connor, 2004; Kupper, Widdershoven, & Pedersen, 2011; Lea, 2009) that leads to an overlap in somatic symptoms, such as weight loss, pain, distress, dyspnea, fatigue/energy, disturbed sleep, cachexia, memory problems, and functional decline (Skotzko, 2009). The stigma associated with mental illness may also be a barrier to patient reports and provider questions about depression.

Effective diagnosis of MDD is important because the use of antidepressants as part of pharmacologic treatment for depression may prevent cardiac deaths (Feinstein, et al; 2006). Serotonin reuptake inhibitors (SSRIs) are the most commonly prescribed antidepressants among HF patients and can alleviate symptoms of both MDD and dyspnea, common in HF (Feinstein, et al, 2006; Ramasamy, et al, 2006). Sertraline specifically improved quality of life in patients with HF (Ramasamy et al, 2006). Unfortunately research on treatment options is limited, and some evidence suggests that use of anti-depressants may be associated with adverse effects in HF patients (Skotzko, 2009).

The information on demographic characteristics associated with MDD in stable HF patients is limited because many HF studies lack representation of women, young and middle-aged adults, and minority group members (Bekelman, et al, 2007; Gottlieb, et al, 2004). Depression may be more common in women than men, reflecting the trend in the general population (Gottlieb, et al, 2004; Lea, 2009; Smith, 2010). Younger age (under 60) and living alone are associated with depression in HF patients (Gottlieb, et al, 2004; Smith, 2010). However, additional literature reflects no difference in rates of depression along race, gender, or age in a study with primarily younger, Caucasian, heart transplant patients with HF (Sullivan, Levy, Russo, & Spertus, 2004).

Self report of depression is associated with an increase in the number of co-occurring disorders in HF patients (Hayashino, et al, 2010). There is limited research on which diagnoses are associated with MDD in stable HF patients, with the current literature focusing on psychosocial factors and quality of life. Identifying readily available clinical information, such as co-morbid conditions and symptoms, may assist providers in identifying patients most at risk for having MDD and requiring focused screening and treatment.

Disturbances in sleep are widespread and highly incapacitating in MDD (Sbarra and Allen, 2009). Likewise, sleep disturbance symptoms, such as insomnia, are important to the diagnosis of depression in patients with stable HF (Redeker, 2006). However, the types of sleep symptoms in patients with co-morbid MDD and HF remains poorly understood (Norra, et al, 2011; Wang, et al., 2009).

The purpose of this study is to describe the demographic and clinical characteristics and symptoms of sleep disturbance associated with MDD in patients with stable HF. The following

research questions were addressed: 1) What is the proportion of stable HF patients who have MDD? 2) What is the proportion of patients with MDD who receive antidepressant medication? 3) What clinical (HF status, number or type of co-morbid conditions) and demographic (age, gender, race) characteristics are associated with MDD in stable HF? 4) What characteristics of sleep are associated with MDD in stable HF?

Methods

The study employed a cross-sectional observational design and consists of secondary analysis of data obtained in a project designed to evaluate the contributions of sleep characteristics to daytime symptoms and functional performance in patients recruited from five HF disease management programs in the Northeastern U.S. Details of the overall study have previously been reported, (Redeker, Jeon, et al., 2010a; Redeker, et al., 2010b), and are summarized here as relevant to the current analysis. The study was approved by the institutional review board, and all participants provided written informed consent.

Sample

The sample included 173 participants who had stable chronic heart failure (mean age =60.3±16.8 years; n=60 [35%] female, n=50 [29%] African American; left ventricular ejection fraction mean =32±14.6) (Redeker, et al, 2010a). Participants with stable HF were recruited through referrals from providers at five HF disease management programs in the Northeastern U.S. Eligibility criteria included the following: age > 18 years of age; stable HF (defined as no hospital admissions within the previous month or adjustment of vaso-active medications within the past 2 weeks); cognitively intact (assessed by clinical judgment). Subjects who were pregnant, unstable medically or psychiatrically, or had ongoing alcohol or drug abuse were

excluded. Subjects with a history of Parkinson's disease, obstructive valvular, hypertrophic, or surgically correctable valvular disease, renal failure, previously identified sleep disorders, and hemiplegia affecting the non-dominant arm (confounding factor for actigraph monitoring) were also excluded (Redeker, et al, 2010a).

Variables and Instruments

The Center for Epidemiological Studies Depression Scale (CESD) was used to measure depressive symptoms. The CESD is a 20-item self report questionnaire. Participants respond to each item according to their perceptions over the past week using a four point scale ranging from a score of zero for rare (or none of the time) to three points for most (or all of time) (Mulhauser, 2011). Although a cut-off score of ≥ 16 indicates a likely diagnosis of MDD in the general population (Bardwell, Ancoli-Israel, & Dimsdale, 2006), the presence of somatic symptoms in HF suggests that a higher cut-off score would be more specific in cardiac patients (Contrada, Boulifard, Idler, Krause, Labouvie, 2006). Therefore, we used a score of ≥ 28 as an indicator of MDD (Zich, Attkisson, & Greenfield, 1990). The CESD has a high internal consistency of 0.87 and sufficient test-retest reliability and sensitivity/specificity (Redeker, et al, 2010a).

The Charlson Comorbidity Index (CCI) was used as a measure of comorbid conditions. The CCI was originally developed for use in longitudinal studies to predict mortality based on certain clinical conditions (Charlson, Pompei, Ales, & MacKenzie, 1987). Scores are weighted based on severity of illness, and include conditions such as cardiac disease, diabetes, and cancer.

Demographic data, including age, gender, race, and living alone were obtained through participant self-report and interview. Information on comorbid health problems and medications was obtained through participant self-report and chart review. Information on sleep symptoms

was obtained through self-report. Participants completed a sleep diary for three nights, reporting specifics such as sleep latency, number of awakenings, and time of arousal. Sleep diaries are a valid and reliable measure of insomnia commonly used in research (Epsie, 1991; Epsie, Inglis, Tessier, & Harvey, 2001).

Procedures

A research assistant (RA) recruited participants at participating sites during a routine visit to their HF program. The assistant explained the study, obtained informed consent, and reviewed medical records. Following the initial contact participants completed a packet of questionnaires addressing symptoms, depression and quality of life. Only the data on demographics, the CESD, the CCI, sleep symptoms, and co-occurring diagnoses are reported here. For the larger study, participants also completed one night of polysomnography in their homes and 3 days of wrist actigraphy. Upon completion of data collection each participant received \$50. (Redeker, et al, 2010a; Redeker, et al, 2010b)

Data Analysis

All data were entered into a database. Full details of this approach have previously been described (Redeker, et al, 2010a). SPSS version 18 was used to compute descriptive statistics and to compare the categorical and continuous variables (chi-square, dependent groups t-test) on MDD. Covariance among clinical, demographic, and sleep variables was conducted using a logistic regression. Clinical and demographic variables included in the regression analysis were selected based on their significant bivariate associations with MDD.

Results

Demographic

Of the 324 patients initially approached, 41 were ineligible, 233 consented, and complete data were obtained for 173 participants. The overall sample included 60 females (34.7%) and 61 minority participants (35.7%). Full details of racial breakdown of participants in the minority group were previously reported, and are combined here for ease. The average left ventricular ejection fraction is 32.6, NYHA class is 2.5, body mass index 30.7. (Redeker, et al, 2010a)

The overall group CESD score was ($M = 16.98 \pm 11.01$, range of 0-54). Table 1 lists the demographic and clinical characteristics of participants with and without MDD, based on a cutoff score of ≥ 28 .

Younger and female participants were significantly more likely to have MDD. There were no statistically significant differences in depression based on race or living alone.

Clinical

There were statistically significant differences between participants with and without MDD on NYHA class, with 59.4% of those with MDD having NYHA class III or IV, but there were no statistically significant differences in LVEF. There were no statistically significant differences between those with and without MDD on the Charlson Comorbidity Index, but diabetes (MDD 46.9%, no MDD 24.8%), rheumatoid Arthritis (MDD 21.9%, no MDD 9.3%, $p = 0.051$), chronic fatigue (MDD 18.8%, no MDD 5.7%), asthma (MDD 25%, no MDD 10%), and a past history of psychiatric disorders (MDD 47%, no MDD 3.6%) were significantly more common in patients with MDD. There were no statistically significant differences between groups with and without

MDD on the proportion of patients who had thyroid disease, anemia, osteoarthritis, cancer, COPD, GI disorders, or urinary tract disorders.

Patients with MDD were significantly more likely to be on antidepressants (MDD 33.3%, no MDD 10.7%), anxiolytics (MDD 33.3%, no MDD 4.3%), sedative hypnotics (MDD 13.3%, no MDD 4.3%), and insulin. The most common class of antidepressants was SSRIs (58.7% total). Benzodiazepines were prescribed 81.3% of the time, and Ambien was prescribed 85.7% of the time as a sedative hypnotic.

Sleep Symptoms

There were statistically significant differences between groups with and without MDD on sleep symptoms, including trouble falling asleep (MDD 64.5%, no MDD 44%), difficulty resuming sleep (MDD 58.1%, no MDD 34.8%), waking too early (MDD 58.1%, 29.8%), not feeling rested during the day (MDD 80.6%, no MDD 44.7%), feeling overly sleepy during the day (MDD 67.7%, no MDD 37.6%), and not getting enough sleep (MDD 67.7%, no MDD 42.6%).

Table 1

Comparison of participants with and without clinical depression (MDD) based on score of ≥ 28 indicating MDD on demographic and clinical variables

	No MDD (N=141 /81.5%)	MDD (N=32/18.5%)
	M (SD)/N (%)	M (SD)/N (%)
Demographic Variables		
Age (mean in years)	61.44 (16.38)	55.53(23.84)
Gender*		
Male	98(69.5%)	15(45.9%)
Female	43 (30.5%)	17(53.1%)
Race		
White	91 (65.0%)	19 (61.3%)
Minority	49 (35.0%)	12 (38.7%)
Living Alone	26 (18.4%)	7 (21.9%)
Clinical Variables		
Left ventricular ejection fraction (5)		
NYHA classification*:		
Class I, II	87 (61.7%)	13 (40.6%)
Class III, IV	54 (38.3%)	19 (59.4%)
Body Mass Index (mean)	30.5 (7.91)	31.7 (8.66)
Charlson Comorbidity Index (mean)	2.4 (1.51)	2.65 (1.60)
Diabetes*	35 (24.8%)	15 (46.9%)
Thyroid Disease	22 (15.8%)	5 (15.6%)
Anemia	26 (18.6%)	9 (28.1%)
Rheumatoid Arthritis	13 (9.3%)	7 (21.9%)
Osteoarthritis	21 (15.0%)	7 (21.9%)
Cancer	18 (12.9%)	3 (9.4%)
Chronic Fatigue*	8 (5.7%)	6 (18.8%)
Asthma*	14 (10.0%)	8 (25.0%)
COPD	14 (10.0%)	6 (19.4%)
GI	32 (23.2%)	11 (35.5%)
Renal	23 (16.4%)	4 (12.5%)
Psychiatric***	22(15.9%)	15(46.9%)
Antidepressant Use***	15(10.7%)	10(33.3%)
Sleep Variables		
Difficulty Initiating and Maintaining sleep***	60 (43.2%)	26 (83.9%)
Trouble falling asleep*	62 (44.0%)	20 (64.5%)
Difficulty Resuming Sleep*	49 (34.8%)	18 (58.1%)
Waking too early**	42 (29.8%)	18 (58.1%)
Unrested during day**	63 (44.7%)	25 (80.6%)

Overly sleepy**	53 (37.6%)	21 (67.7%)
Not enough sleep*	60 (42.6%)	21 (67.7%)
Taking sleeping pills**	13 (9.2%)	10 (32.3%)

Comparisons for categorical variables used chi-square; comparisons for continuous variables used dependent group t-tests.***P < 0.001, **P < 0.01, * P < 0.05

Logistic Regression

A logistic regression using age (<61), gender (female), NYHA class (III/IV), asthma, diabetes, and insomnia, was run with 84.6% prediction for patients with and without MDD. Using this model we were able to correctly identify 38.7% of depressed patients, and 95% of non-depressed participants. When all six variables were included, age, gender, diabetes, and insomnia remained significant ($p \leq 0.05$). Insomnia remained the most significant, with a $p = 0.002$. There was no statistically significant finding for NYHA or asthma in the multivariate model. Younger patients and patients with diabetes had almost three times the odds of having MDD, women and patients with NYHA class III/IV 2.5 times the odds, and patients with asthma had 1.7 times the odds. Insomnia increased the odds of MDD 5.5 fold.

Table 2

Logistic Regression of the Associations Among Clinical and Demographic Characteristics, Insomnia Symptoms and MDD

<u>Variables</u>	<u>OR</u>	<u>CI (95)</u>	<u>P-value</u>
Age	2.91	1.14-1.46	0.026
Gender	2.53	1.00-6.38	0.049
NYHA	2.48	.99-6.23	0.053
Diabetes	2.89	1.12-7.46	0.028
Asthma	1.69	.52-5.53	0.379
Insomnia	5.42	1.88-15.61	0.002

Discussion

The rates of MDD in this sample (19%) were lower than reported symptoms of depression, but were consistent with reports of clinically significant depression in this population (Lea, 2009). While symptoms of depression are more common and problematic in patients with stable HF, the distinction of patients with clinical depression is important. Patients meeting DSM-IV criteria for MDD may be at more risk for complications with their HF and would benefit from treatment for their MDD. Our study extends previous work by including a larger proportion of women and minority patients, and includes participants who were selected because they had stable HF rather than hospitalized patients with acute HF who are often the focus of the literature (Norra, et al, 2011). Hospitalized patients are likely to have higher levels of MDD and insomnia due to the acuity of their illness and their environment, and may require different evaluation and management of symptoms than stable outpatients.

Unlike many past studies that included few women and either did not report the proportion of minority patients or included few minorities, the current study was more representative of the general population of HF patients. Therefore the results may be more generalizable to typical practice settings. Given that we found no significant differences in rates of MDD in minority patients, in contrast to previous literature (Sullivan, et al., 2004), further research is needed on the relationship between MDD and race.

The higher rate of MDD in younger and female patients is consistent with the literature (Lea, 2009). This is reflective of higher rates of MDD in females in the general population, though it is unclear whether MDD is more common in females or if men are less likely to report mood symptoms. The higher rates of MDD in younger HF patients may be associated with the

difficulty of living with a disabling illness at a younger age. We found no significant association between living alone and MDD, which had previously been reported as an independent predictor for the development of symptoms of depression (Lea, 2009).

The clinical characteristics significantly related to MDD in this sample were NYHA class III/IV, insomnia, diabetes, rheumatoid arthritis, chronic fatigue, asthma, and past psychiatric history. Interestingly the number of comorbid conditions was not significantly related to MDD. Nearly half (47%) of patients with MDD had a psychiatric history, though only 33% of patients with MDD were prescribed antidepressants. This is significant in that more than half of patients with MDD do not have a previous history of psychiatric illness, and many patients in treatment still have symptoms significant enough to meet criteria for MDD. While we did not specify diagnoses for psychiatric history, our results indicate that a large number of patients with MDD were under treated. Almost half of the patients in this sample with diabetes scored as clinically depressed, indicating that rates of MDD are significantly higher among patients with diabetes and HF. These findings expand on previous research indicating an association between MDD and the number of comorbid conditions (Hayashino, Yamazaki, Takegami, Nakayama, & Sokejima, 2010).

The sample resembled previous research samples as there were high rates of insomnia (51%), with past studies reporting insomnia in 33-64% of HF patients (Redeker, et al, 2010a; Brostrom & Johansson, 2005; Wang, et al, 2010). The significant rate of insomnia in patients with MDD has implications for treatment. While insomnia and hypersomnia are symptoms of MDD (APA, 2000), insomnia may be a risk factor for developing MDD, and treating insomnia or MDD without treating the other will lead to a relapse of both disorders (Sateia, 2009).

The most significant sleep symptom was feeling unrested during the day, with 80.6% of depressed patients reporting daytime fatigue. All three symptoms of insomnia, difficulty initiating and maintaining sleep, and waking too early in the morning, were significantly associated with MDD. Fatigue and sleeping difficulties, along with poor appetite, have previously been described as the depressive symptoms most predictive of cardiovascular events (Hoen, et al., 2010). A thorough evaluation of sleep symptoms and insomnia may help providers identify patients most likely to have MDD.

The six classes of medications most related to MDD were antidepressants, anxiolytics, insulin, sedative hypnotics, and a self report of taking sleeping pills (other than sedative hypnotics). The use of antidepressants and anxiolytics may be related to the high prevalence of MDD among patients with a past psychiatric history. Anxiety and MDD are related disorders and are often found together in clinical practice. First line treatment for both disorders is an SSRI. Though for many patients, use of an antidepressant alone may not alleviate symptoms of depression. The high rates of MDD among patients already on an antidepressant may indicate that these are patients requiring titration of their psychiatric medications, or perhaps patients with refractory depression who would benefit from medication management in a psychiatric setting. The high rate of MDD among patients with diabetes may explain the association between insulin and MDD. The use of sleep aids indicates difficulty sleeping, which is highly correlated with MDD in this population.

Initially in our analysis we looked at the number of diagnoses (CCI) but found no significant between group differences for MDD and no MDD. We then conducted a multivariate analysis to look at the combined effect of the various individual characteristics with significant between group differences. Since many patients with stable HF have multiple diagnoses, the

combined regression allowed us to see how those factors affect each other. The multivariate analysis indicates that patients with insomnia have five-fold odds of having MDD; however, age, diabetes, and gender are also significantly associated with MDD. Surprisingly, unlike previous studies, we did not find that NYHA class was associated with MDD in these multivariate analyses. Whether these factors are causative of MDD or a result of MDD patients remains poorly understood. Additional research is needed to further explore their interaction.

Limitations of the study include not screening for anxiety, as the initial study was investigating sleep, not depression. Additionally, we obtained limited information on psychiatric symptoms, history, and treatment. Diagnosis of MDD was not obtained by interview evaluating DSM-IV criteria; rather we selected a measure we thought would closely approximate clinical diagnosis. We also did not assess for functionality related to MDD. As this is a secondary analysis, information regarding anxiety symptoms, titration status of medications, and past medication trials, was not obtained. The cross sectional design has limitations in predicting and accounting for changes over time.

Clinical Implications

Despite recommendations to screen all HF patients for depression, time and other factors often do not allow for that screening to occur on a regular basis. Identifying readily available clinical factors that increase the odds of having MDD may help address this concern. Clinicians may benefit from knowing younger female patients with insomnia are most at risk for having MDD and can then conduct more focused screenings. The finding that insomnia symptoms were present in a large majority (83.9%) of depressed patients suggests that querying patients about insomnia symptoms may be a non-intrusive way of identifying patients with depression. HF

patients may feel more comfortable reporting sleep symptoms than depressive symptoms, and those reports may be indicative of depression. Patients reporting sleep symptoms should be evaluated for depression. One third of patients with MDD were on antidepressants, indicating that while initiating an antidepressant is a first step, medications must be titrated until clinical efficacy is obtained. Evaluation of depression should occur frequently to determine efficacy of treatment and need for additional dosages increases or switching to another agent.

Research Implications

Further research is needed on treatment options for MDD and insomnia in this population. Additional research is needed to explore the associations between inflammatory medical conditions and MDD in HF patients, particularly implications for management. Future research may also evaluate the difference in effect of MDD and depressive symptoms on HF, and at what point treatment is indicated.

References

- American Psychiatric Association (2000). Diagnostic and statistical manual of mental disorders-
DSM-IV-TR. 4th ed. Washington, DC; American Psychiatric Press Inc. (text revision).
- Bardwell, W. A., Ancoli-Israel, S., & Dimsdale, J. E. (2007). Comparison of the effects of
depressive symptoms and apnea severity on fatigue in patients with obstructive sleep
apnea: A replication study. *Journal of Affective Disorders*, 97(1-3), 181-186.
doi:10.1016/j.jad.2006.06.013
- Bekelman, D. B., Havranek, E. P., Becker, D. M., Kutner, J. S., Peterson, P. N., Wittstein, I. S.,
Gottlieb, M., Yamashita, T., Fairclough, D., Dy, S. (2007). Symptoms, depression, and
quality of life in patients with heart failure. *Journal of Cardiac Failure*, 13(8), 643-648.
- Brostrom, A. and Johansson, P. (2005). Sleep disturbances in patients with chronic heart failure
and their holistic consequences- what different care actions can be implemented?
European Journal of Cardiovascular Nursing, 4, 183-197. DOI:
10.1016/j.ejcnurse.2005.04.005.
- Charlson, M., Pompei, P., Ales, K., MacKenzie, C. R. (1987). A new method of classifying
prognostic comorbidity in longitudinal studies: Development and validation. *Journal of
Chronic Disease*, 40(5), 373-383.
- Contrada, R., Boulifard, D., Idler, E., Krause, T., Labouvie, E. (2006). Course of depressive
symptoms in patients undergoing heart surgery: Confirmatory analysis of the factor
pattern and latent mean structure of the center for epidemiologic studies depression scale.
Psychosomatic Medicine, 68, 922-930. DOI: 10.1097/01.psy.0000244391.56598.10.

Delville, C. L., & McDougall, G. (2008). A systematic review of depression in adults with heart failure: Instruments and incidence. *Issues in Mental Health Nursing*, 29(9), 1002-1017.

Retrieved from

<http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=medl&AN=18770104>

Espie, C.A. (1991). *The Psychological Treatment of Insomnia*. Chichester, UK: J Wiley and Sons.

Espie, C.A., Inglis, S., Tessier, S., Harvey, L. (2001). The clinical effectiveness of cognitive behaviour therapy for chronic insomnia: implementation and evaluation of a sleep clinic in general medical practice. *Behaviour Research and Therapy*, 39(1), 45-60.

Feinstein, R., Blumenfield, M., Orlowski, B., Frishman, W., Ovanessian, S. (2006). A national survey of cardiovascular physicians' beliefs and clinical care practices when diagnosing and treating depression in patients with cardiovascular disease. *Cardiology in Review*, 14(4), 164-169.

Friedmann, E., Thomas, S. A., Liu, F., Morton, P. G., Chapa, D., Gottlieb, S. S., & Sudden Cardiac Death in Heart Failure Trial, Investigators. (2006). Relationship of depression, anxiety, and social isolation to chronic heart failure outpatient mortality. *American Heart Journal*, 152(5), 940.e1-940.e8. Retrieved from

<http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=med4&AN=17070164>

- Gottlieb, S. S., Khatta, M., Friedmann, E., Einbinder, L., Katzen, S., Baker, B., Marshall, J., Minshall, S., Robinson, S., Fisher, M., Potenza, M., Sigler, B., Baldwin, C., Thomas, S. (2004). The influence of age, gender, and race on the prevalence of depression in heart failure patients. *Journal of the American College of Cardiology*, *43*(9), 1452-1549.
- Hallas, C. N., Wray, J., Andreou, P., & Banner, N. R. (2011). Depression and perceptions about heart failure predict quality of life in patients with advanced heart failure. *Heart & Lung: The Journal of Acute and Critical Care*, *40*(2), 111-121.
doi:10.1016/j.hrtlng.2009.12.008
- Hayashino, Y., Yamazaki, S., Takegami, M., Nakayama, T., Sokejima, S., and Fukuhara, S. (2010). Association between number of comorbid conditions, depression, and sleep quality using the Pittsburgh Sleep Quality Index: results from a population-based survey. *Sleep Medicine*, *11*, 366-371. DOI: 10.1016/j.sleep.2009.05.021.
- Hoen, P., Wholley, M., Martens, E., Na, B., van Melle, J., de Jonge, P. (2010) Differential associations between specific depressive symptoms and cardiovascular prognosis in patients with stable coronary heart disease. *Journal of the American College of Cardiology*, *56*(11), 838-844. DOI: 10.1016/j.jacc.2010/03.080.
- Joynt, K. E., Whellan, D. J., & O'connor, C. M. (2004). Why is depression bad for the failing heart? A review of the mechanistic relationship between depression and heart failure. *Journal of Cardiac Failure*, *10*(3), 258-271. Retrieved from
<http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=med4&AN=15190537>

- Kupper, N., Widdershoven, J., Pedersen, S. (2011). Cognitive/affective and somatic/affective symptom dimensions of depression are associated with current and future inflammation in heart failure patients. *Journal of Affective Disorders*, article in press.
- Lea, P. (2009). The effects of depression in heart failure. *Dimensions of Critical Care Nursing*, 28(4), 164-168.
- Luttik, M. L., Jaarsma, T., Moser, D., Sanderman, R., & van Veldhuisen, D. J. (2005). The importance and impact of social support on outcomes in patients with heart failure: An overview of the literature. *Journal of Cardiovascular Nursing*, 20(3), 162-169. Retrieved from <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=med4&AN=15870586>
- Maixner, S., Struble, L., Blazek, M., Kales, H. (2011). Later-life depression and heart failure. *Heart Failure Clinics*, 7(1), 47-58. DOI: 10.1016/j.hfc.2010.08.009.
- Mulhauser, G. (2011). Welcome to the center for epidemiologic studies depression scale (CES-D), a screen test for depression. *Counseling Resource*. Retrieved from <http://counselingresource.com/quizzes/cesd/index.html>.
- Norra, C., Kummer, J., Boecker, M., Skobel, E., Schauerte, P., Wirtz, M., Gauggel, S., and Forkmann, T. (2011). Poor sleep quality is associated with depressive symptoms in patients with heart failure. *International Journal of Behavioral Medicine*, online, DOI: 10.1007/s12529-011-9205-2.

- Ramasamy, R., Hildebrandt, T., O'Hea, E., Patel, M., Clemow, L., Freudenberger, R., & Skotzko, C. (2006). Psychological and social factors that correlate with dyspnea in heart failure. *Psychosomatics*, 47(5), 430-434. Retrieved from <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=med4&AN=16959932>
- Redeker, N. (2006). Somatic symptoms explain differences in psychological distress in heart failure patients vs a comparison group. *Progress in Cardiovascular Nursing*, Fall, 182-189.
- Redeker, N., Jeon, S., Muench, U., Campbell, D., Walseleben, J., Rapoport, D. (2010a) Insomnia symptoms and daytime function in stable heart failure. *Sleep*, 33(9), 1210-1216.
- Redeker, N., Muench, U., Zucker, M., Walseleben, J., Gilbert, M., Freudenberger, R., Chen, M., Campbell, D., Blank, L., Berkowitz, R., Adams, L., Rapoport, D. (2010b). Sleep disordered breathing, daytime symptoms, and functional performance in stable heart failure. *Sleep*, 33(4), 551-560.
- Riegel, B., Moelter, S., Ratcliffe, S., Pressler, S., De Geest, S., Potashnik, S., Fleck, D., Sha, D., Sayers, S., Weintraub, W., Weaver, T., Goldberg, L. (2011). Excessive daytime sleepiness is associated with poor medication adherence in adults with heart failure. *Journal of Cardiac Failure*, 17(4), 340-348. DOI 10.1016/j.cardfail.2010.11.002.
- Sateia, M. J. (2009). Update on sleep and psychiatric disorders. *Chest*, 135, 1370-1379. DOI 10.1378/chest.08-1834.

- Sbarra, D. A., & Allen, J. J. B. (2009). Decomposing depression: On the prospective and reciprocal dynamics of mood and sleep disturbances. *Journal of Abnormal Psychology, 118*(1), 171-182. doi:<http://dx.doi.org/10.1037/a0014375>
- Sherwood, A., Blumenthal, J. A., Hinderliter, A. L., Koch, G. G., Adams, K., J., Dupree, C. S., Bensimhon, Johnson, Trivedi, Bowers, Christenson, O'Connor, C. (2011). Worsening depressive symptoms are associated with adverse clinical outcomes in patients with heart failure. *Journal of the American College of Cardiology (JACC), 57*(4), 418-423.
- Retrieved from
<http://search.ebscohost.com/login.aspx?direct=true&db=c8h&AN=2010919431&site=ehost-live>
- Skotzko, C. E. (2009). Symptom perception in CHF: (why mind matters). *Heart Failure Reviews, 14*(1), 29-34. Retrieved from
<http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=med&AN=18071897>
- Smith, L. (2010). Evaluation and treatment of depression in patients with heart failure. *Journal of the American Academy of Nurse Practitioners, 22*(2010), 440-448.
- Sullivan, M., Levy, W.C., Russo, J.E., Spertus, J.A. (2004). Depression and health status in patients with advanced heart failure: a prospective study in tertiary care. *Journal of Cardiac Failure, 10*(5), 390-396.

The numbers count: mental disorders in America. *National Institute of Mental Health*. Retrieved from <http://www.nimh.nih.gov/health/publications/the-numbers-count-mental-disorders-in-america/index.shtml#MajorDepressive>.

U.S. Preventive Services Task Force. (2009). *Annals of Internal Medicine*, 151(11), 784-792.

Retrieved from

<http://ovidsp.ovid.com/ovidweb.cgi?T=JS&NEWS=N&PAGE=fulltext&AN=19949144&D=medl>

Wang, H., Chen, G., Li, J., Hao, S., Gu, X., Pang, J., Fu, X. (2009). Subjective sleepiness in heart failure patients with sleep-related breathing disorder. *Chinese Medicine Journal*, 122(12), 1375-1379. DOI 10.3760/cma.j.issn.0366-6999.2009.12.004.

Wang, T., Lee, S., Tsay, S., & Tung, H. (2010). Factors influencing heart failure patients' sleep quality. *Journal of Advanced Nursing*, 66(8), 1730-1740. doi:10.1111/j.1365-2648.2010.05342.x

Zich, J. M., Attkisson, C. C., & Greenfield, T. K. (1990). Screening for depression in primary care clinics: The CES-D and the BDI. *International Journal of Psychiatry in Medicine*, 20(3), 259-277.