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Implementation of a Depression Screening Tool for Cardiovascular Patients in the Primary Care Setting

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by

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Dedication

I dedicate this quality improvement project especially, to my late Mother Margaret Ballentine and to my Father Charley Ballentine. I would also like to dedicate this quality improvement project to my late Grandfather Calvitt Ballentine and my Grandmother Mildred Ballentine. They are and have been the most influential leaders throughout my life. They have been exceptional leaders and mentors that facilitate my attributions in our healthcare system and their accomplishments and encouragement have motivated me to provide optimal healthcare to the community. Next, I would be honored to send my dedication, love, and sincere gratitude for the continuous support from all my family members, friends, mentors, and colleagues for all their support and motivation. I also dedicate my passion for this project to the patients and families who inspired this project. Lastly, I would like to thank the Lord above for without Him nothing is possible.

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Abstract

Background: Patients with cardiovascular disease (CVD) have a two-fold increased risk of depression as compared to patients without CVD. According to the American Heart Association (AHA, 2016), there is no gold-standard procedure for screening for depression in cardiovascular patients. Screening for depression varies greatly across specialties and practices, often leaving a gap for detection and treatment of depression in cardiac patients. There are many depression screening tools available; however, the AHA recommends use of the patient health questionnaire (PHQ) screening tool. The PHQ-2 and PHQ-9 questionnaires are the most brief, sensitive, and specific depression screening tool for patients with cardiovascular disease.

Method: A quality improvement study was designed and implemented to determine the usability of the PHQ screening tool in primary care and to compare the results of the screening tools between practices. A descriptive pre-test and post-test survey design was conducted to compare findings from two primary care settings, which utilized the PHQ depression screening tool to screen for depression in cardiovascular patients. A total of 60 charts were audited, 30 charts from each practice. A retrospective chart review was conducted at completion of the study in order to compare the results of depression screenings and implemented treatments between the two practices.

Results: Of the 60 audited charts, 51 patients were screened for depression by their primary care provider. After frequency distributions were calculated, it was noted that

29% of the sample population had depressive symptoms. This data is consistent with the evidence-based literature that demonstrates that patients with cardiovascular disease are at high risk for depression and should be routinely screened for depression in their primary care homes as recommended by the American Heart Association (2016). Each of these patients (n=15) who screened positive for depression was started on treatment for depression at the time of the initial depression screening visit.

Implications: Findings from the quality improvement project underscored the need for primary care providers to utilize the PHQ screening tool as the standard for screening in patients with CVD due to the incidence of depression in cardiovascular patients and the tool's efficacy and ease of use. Depression screening in primary care should be included in continuing medical education requirements for providers working in the primary care setting. It is important to support all levels of government to adopt mental health policies and to integrate mental health policy into public health policy and general social policy. Additional research is needed to properly characterize evidence-based care of patients with comorbid depression and cardiovascular disease.

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Chapter 1 Introduction

1.1 Description of the Clinical Problem

In patients with cardiovascular disease (CVD) seen in primary care, data suggests a high prevalence rate for depression with several studies indicating that approximately 15-20% of patients who have had a myocardial infarction (MI) meet criteria for major depressive disorder (Lichtman, Bigger, Blumenthal, and Frasure-Smith, 2008). An even higher percentage of patients with CVD display an elevated level of depressive symptoms that would meet criteria for other depressive disorders (Lichtman, et al., 2008). According to Lichtman, et al., (2008), depression is frequently found in patients with coronary heart disease (CHD) and is also independently associated with an increase in cardiovascular morbidity and mortality (p. 1768). Among these patients, however, depression is often underdiagnosed or misdiagnosed due to the patients' other comorbidities and the lack of standardized depression screening tools (McGuire, Ahearn, and Doering, 2015).

Numerous studies have identified a significant correlation between depression, increased risk of cardiovascular disease, and poor quality of life (Peters, Pinto, Beckett, Swift, Potter, McCormack,…& Bulpitt, 2010; McGuire, et al., 2015; Mavrides & Nemeroff, 2013). As Lichtman et al., (2008) discusses, "depression reduces the chances of successful modifications of other cardiac risk factors and participation in cardiac rehabilitation and is associated with higher healthcare utilization and costs and, not

surprisingly, greatly reduced quality of life" (p. 1769). Depression is also associated with a poorer prognosis for patients with cardiovascular disease (Peters, et al., 2010).

McGuire, et al., (2015) suggests that there is a need for more research in depression and cardiac patients due to costs, co-morbidities, and outcomes. Recently, the American Heart Association assembled recommendations for primary care providers to screen CVD patients for depression (Mavrides & Nemeroff, 2013). The purpose of this study is to determine the best screening depression tool and implement the tool for early detection of depression in primary care settings for patients with cardiovascular disease

1.2 Scope of the Clinical Problem

Patients with cardiovascular disease have a two-fold increased risk of depression as compared to patients without heart disease (Kronish, Krupka, & Davidson, 2012, p. 126). Similarly, Lichtman et al., (2008) also discusses that depression is approximately three times more common in patients after they have had an acute myocardial infarction (AMI) as compared to the general population (p. 1768).

In terms of cost, it is estimated that the economic impact of depression in the United States ranges from a devastating $20 billion to $45 billion annually, rivaling the costs of chronic diseases such as hypertension (Rutledge, Vaccarino, Johnson, Bittner, Olson, Linke,…Shaw, 2009). Even minor depression has been shown to increase economic burden (Rutledge et al., 2009). According to Rutledge, et al., (2009), depression is associated with a 15% to 53% increase in 5-year cardiovascular costs. These costs have been described as direct and indirect. Direct costs include hospitalizations, office visits, procedures, and medications; whereas, indirect costs

include out-of-pocket expenses, lost productivity and wages, and travel (Rutledge, et al., 2009, p. 176).

In terms of health comorbidities, CVD and Depression are both highly prevalent, coexisting diseases (Paz-Filho, Licinio, & Wong, 2010). They share common pathophysiological etiologies or co-morbidities, such as cardiac rhythm disturbances alterations in the hypothalamic-pituitary axis, and hemorheologic, inflammatory and serotoninergic changes (Paz-Filho, 2010). There is compelling evidence that depression is an independent risk factor for both the development of CVD and for worsening prognosis once CVD is established (Paz-Filho, 2010). Evidence has also shown that patients with CVD may become depressed as a response to the burden of a co-morbid condition (Paz-Filho, 2010).

In addition to the co-morbidity correlation between CVD and Depression, there is strong evidence to suggest that depression is associated with an increased risk of cardiovascular disease and cardiac death (Glassman, 2007). Patients with depression and comorbid CVD have a higher mortality rate than the general population (Hare, Toukhsati, Johansson, & Jaarsma, 2014). Evidence has shown a severity relationship between depression and CVD: the more severe the depression, the higher the subsequent risk of mortality and other cardiovascular events (Hare et al., 2014). Furthermore, short-term prognosis is found between these co-morbidities (Jiang, Alexander, Christopher, Kuchibhatla, Gaulden, Cuffe,…O'Connor, 2001).

For psychosocial effects of CVD and depression, evidence suggests that dysfunctional personal relationships or family responsibilities are correlated for elevated CVD risk (Low, Thurston, & Matthews, 2010). Supportive social relationships and

positive psychological factors are associated with reduced risk of depression in patients with CVD, as well as reduced risk of morbidity and mortality associated with CVD (Low, et al., 2010). Consideration of psychosocial factors may improve the identification of patients at elevated risk for CVD and depression, and may also lead to the development of effective psychological interventions for patients with or at risk for CVD (Low, et al., 2010). Moreover, evidence suggests that social and family support play important roles in CVD and mental health (Healthy People 2020). In other words, stress related to interpersonal relationships and family responsibilities has been shown to be an important risk factor in the development of CVD (Low, et al., 2010).

Decreased sexual activity and sexual dysfunction are common in patients with CVD and can increase depression (Armstrong, 2012). Changes in sexual activity after a cardiac event may impair a patient's quality of life and may negatively affect psychological health (Armstrong, 2012). The resulting anxiety and depression may be an important contributing cause of sexual dysfunction, including decreased libido, difficulty with arousal and orgasm, and dyspareunia (Armstrong, 2012).

Finally, hospital readmission rates and depression are common. Data show that patients with major depression and cardiovascular disease have increased readmissions and lengthier hospital stays (Jiang, et al., 2001). In one study, patients with CHF who had major depression were more than twice as likely as non-depressed patients to die or be readmitted within 3 months to 1 year after hospitalization (Jiang, et al., 2001).

1.3 Analysis of Current Practice

According to McGuire et al., (2015), there continues to be a significant practice gap in relation to screening, referral, and treatment of depression in CVD patients (p. 427). Although the American Heart Association recommends routine screening for depression in patients with cardiovascular disease, there are conflicting opinions among healthcare providers with regard to timing of screening and location of screening, especially in cardiology and primary care settings (Kronish, et al., 2012). Much of the research on depression in patients with CVD disease has occurred in the acute care setting (Lichtman, et al., 2008). With the emphasis in primary care management, improving outcomes, and decreasing hospital readmissions, primary care screening for depression in patients with CVD is essential and the ideal opportunity for long-term management (Kronish, et al., 2012).

Currently, there is no standardized depression screening template for patients with cardiovascular disease in the primary care setting (Kronish, et al., 2012). There are many depression screening tools available for the primary care setting; however, the American Heart Association recommends the use of tools such as the Patient Health Questionnaire 2-item screening tool (PHQ-2) and/or Patient Health Questionnaire nine-item screening tool (PHQ-9) due to the ease of use, reliability, and validity of the PHQ questionnaires (McGuire, et al., 2015, p. 429). The PHQ has also been easily implemented into electronic medical record (EMR) systems for general use. Ideally, implementation of these screening tools into the EMR would routinely alert the provider to perform the screening.

The PHQ-2 comprises the first two questions in the PHQ-9 questionnaire. As McGuire, et al., (2015) discusses, the PHQ-2 screening scale is the best brief screening instrument for use during a routine visit intake or annual physical examination survey. According to the American Psychological Association (2016), the PHQ-2 inquires about the degree to which an individual has experienced a depressed mood and anhedonia over the past two weeks. Its purpose is not to establish a final diagnosis or to monitor depression severity, but rather to screen for depression (APA, 2016). Patients who screen positive should be further evaluated with the PHQ-9 to determine whether they meet criteria for a depressive disorder (APA, 2016). If the PHQ-2 is negative, the provider may continue with the remainder of the assessment and does not need to complete the PHQ-9 unless desired (McGuire, et al., 2015).

The PHQ-9 is a nine-item self-report measure developed to diagnose the presence and severity of depression in primary care (Stafford, Hons, Berk, & Jackson, 2007). It is based directly on DSM-IV diagnostic criteria for major depression (Stafford, et al., 2007). It has the potential of being a dual-purpose instrument that, with the same nine items, can establish depressive disorder diagnoses using a categorical algorithm and grade the depressive symptom severity (Stafford, et al., 2007). As a severity measure, the score on the PHQ-9 can range from 0 to 27. Scores of 5, 10, 15 and 20 represent thresholds demarcating the lower limits of mild, moderate, moderately severe and severe depression, respectively (Stafford, et al., 2007). In multiple studies, PHQ-9 scores > 10 have been found to have a sensitivity of 88% and a specificity of 88% for Major Depressive Disorder (APA, 2016).

The PHQ questionnaires have been shown to be valid and reliable and have been widely utilized in studies with cardiac patients (Stafford, et al., 2007). The opportunity to screen for depression in cardiac patients should not be missed, as effective treatment of depression in these patients will lead to improved health outcomes (McGuire et al., 2015).

1.4 Discussion of Practice Innovation/Best Practices to Address Problem

Early detection of depression in patients with cardiovascular disease has been shown to improve outcomes in these patients (Lichtman, et al., 2008). During primary care visits, the provider should administer the simple and quick PHQ-2 question survey in order to screen for depression, thereby, following AHA guidelines and recommendations. Studies have shown that these patients are not routinely screened for depression in other settings (Kronish, et al., 2012).

1.5 Statement of the Purpose/Problem

The purpose of this evidence-based project is to implement a standardized approach for depression screening for cardiovascular patients in the primary care setting in order to more accurately and efficiently assess the severity of depression in these patients and treat them in a timelier manner. Currently, there is not a routine screening process for depression in the primary care setting for cardiovascular patients.

1.6 Project Questions

What is the best depression screening tool for implementing into a primary care setting for screening among patients with CVD for early detection? What evidence identifies timely and efficient screening of depression in patients with cardiovascular

disease? What research is available on the importance of detection of depression in cardiac patients? What research is available on depression screening in the primary care setting?

1.7 PICOT Question and Definitions

For providers in primary care settings who manage CVD patients, is the use of PHQ questionnaires utilized as a depression screening tool more efficient and effective as compared to no routine screening and sporadic screening with multiple tools? The population (P) in this study is providers in primary care who manage primary care patients with cardiovascular disease, and the intervention (I) is providers utilizing the best screening tool for depression in patients with CVD. The following will be measures to assess the intervention: screening for depression, medication therapy, and referral for counseling. The comparison (C) for this study is the current practice of providers' utilization of multiple tools for screening for depression in CVD patients; however, there is no routine, standardized process in place in primary care settings. The outcome (O) will be to identify and implement the best screening tool for depression in patients with CVD.

1.8 Definitions

1. Depression. The Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV, 2000) describes depression as a depressed mood and/or loss of interest or pleasure in life activities for a duration of at least two weeks and at least five of the following symptoms that cause clinically significant impairment in social, work, or other important areas of daily functioning

Table 1.1 PICOT Definitions

Population	Current Practice	Intervention	Outcome	Time
60 patients age 18 years and older with documented cardiovascular disease (chart audits). Providers in Primary Care who manage Primary Care patients with CV disease	Currently, providers use multiple tools for Screening for Depression in Primary Care patients with CV disease, but no standardized screening process	Providers use the best Screening Tool for Depression in Patients with CV disease.	Identify and Implement the best screening tool for depression in Primary Care patients with CVD as measured by: 50% provider documentation of using the screening tool and subsequent management (counseling, medication)	6-month review of implementation of depression screening for 30 patients at routine Primary Care visits

Depressed mood most of the day, diminished interest or pleasure in all or most activities; significant unintentional fluctuations in weight; insomnia or hypersomnia; agitation or psychomotor dysfunction; fatigue or loss of energy, feelings of worthlessness or guilt; diminished ability to think or concentrate; and suicidality (USDHHS, 2008).

1. **Cardiovascular Disease.** The American Heart Association (2016) describes cardiovascular disease as a multitude of individual diseases of the heart and vasculature, including structural heart disorders and blood clots.
2. **Screening Tools**. A screening tool is a simple test which is performed on a large number of people to identify those who have or are likely to develop a specific disease. Often these screening tests have a high sensitivity and moderate specificity (Medical Dictionary, 2016).
3. **Primary Care**. Primary care is the level of a health system that provides entry into the system for all new needs and problems, and it provides a home for patients to manage new problems as well as chronic conditions.
4. **Health Care Provider.** A health care provider is defined as one who renders medical care or health services to patients, including physicians, nurse practitioners, physician assistants, and others (Medical Dictionary, 2016).
5. **Adult Patients.** An adult patient will be defined as a patient who is 18 years of age or older with cardiovascular disease.

1.9 Assumptions

Patients diagnosed with cardiovascular disease deserve routine, standardized screening of depression in primary care settings since depression may severely affect

morbidity and mortality. Evaluation of evidenced-based practice can identify best practice measures to identify and treat depression in this population. Implementation of depression screening tools can reduce suffering of patients and yield better outcomes for their overall health status. PHQ-2 and PHQ-9 questionnaires are effective and efficient screening tools for depression, and the American Heart Association has strongly recommended these tools as the gold standard for cardiovascular patients. Provider education is imperative to understanding the importance of detection and treatment of depression in these patients. Identifying and appraising quality evidence from current research is important to change current clinical practice guidelines that lead to improved patient outcomes.

1.10 Chapter Summary

Depression and CVD are highly prevalent in the United States. Persons with CVD have more depression than the general population. Persons with depression are more likely to eventually develop CVD and also have a higher mortality rate than the general population. In order to minimize morbidity and mortality, it is crucial to understand that depression and CVD are frequently co-morbid and that both conditions should be treated concomitantly. To screen for depression in these patients, an appropriate, standardized screening approach should be utilized by providers and staff. The PHQ screening tools are a cost-effective, reliable, valid, and time-efficient approach to improving patients' quality of life.

Chapter 2 Literature Review

Evidence-based research has been utilized to facilitate process improvement in our continuously evolving healthcare system. It has been essential for healthcare clinicians to possess the skills of critically appraising evidence and distinguish best evidence from unreliable evidence (Melnyk & Fineout-Overholt, 2015). A systematic literature review was performed with the purpose of identifying evidence that supports screening for depression in primary care patients with cardiovascular disease. The purpose of this study is to determine the best screening depression tool and implement the tool for early detection of depression in primary care settings for patients with cardiovascular disease.

2.1 Search Methodology

The identification of depression screening tools utilized in cardiac patients was generated based on a comprehensive search of databases accessed through the University of South Carolina's online library. The literature has been extensively reviewed through use of CINAHL Complete and Cochrane Library electronic databases. The most frequent key words and phrases that were used in the searches included "depression," "cardiovascular," and "screening." These specific search terms focus on the PICOT question and definitions. For the majority of the search iterations, the search terms "depression" and "cardiovascular" were used together or with an additional modifier.

The initial search was undertaken in CINAHL Complete (2006-2016) through the Thomas Cooper Library. The limiters "Full Text" and "English" were utilized for all searches within this database. For the initial search, the terms "depression" and "cardiovascular" were used, and this search returned 1,004 results, which was further narrowed by the third search term "screening." This search yielded a total of 53 results of which four articles were chosen due to relevance to PICOT question and due to the high quality of evidence. Another similar search in CINAHL included the search terms "depression," "cardiovascular," and the additional modifier "randomized trial." This search resulted in 48 articles, and four of these articles were found to be applicable to the PICOT question.

The next search was conducted in Cochrane Library with limiters of "Trials" and "2006-2016." The search terms utilized for this search were "depression, coronary heart disease, and randomized." This search yielded 51 results of which four articles were chosen for relevance to the PICOT question. Another search was undertaken in CINAHL Complete with the keywords "depression" and "coronary heart disease," and this search returned 19 results of which three were found to be applicable to the PICOT question.

Inclusion and exclusion criteria were established for the purpose of selecting appropriate studies to address the PICOT question. For inclusion criteria, the searches were limited to English language articles only. Also, higher levels of evidence were the only types of articles included in the selection process, specifically Levels I-IV (Melnyk & Fineout-Overholt, 2015). Evidence ratings (Level I-IV) and quality ratings for the literature are based on Dearholt & Dang's (2012) book *John Hopkins Nursing Evidence-Based Practice: Model and Guidelines.*

Exclusion criteria included non-English language studies, as well as studies published before 2006. There were many descriptive and qualitative studies in several of the searches, but these were excluded from the evidence table at this time due to evidence ratings. However, several of the descriptive and qualitative studies were set aside due to quality ratings.

After evaluation of the articles using inclusion and exclusion criteria, the choices were narrowed to fifteen articles which were most appropriate for the topic and were good to high quality evidence. In the evidence table (see Appendix A), there are fifteen articles, which are Level I through Level IV evidence according to John Hopkins' model (Dearholt & Dang, 2012). There are a variety of types of studies contained within the table, including systematic reviews, meta-analyses, randomized controlled trials, a quasi-experimental study, cohort studies, and clinical practice guidelines from the American Heart Association. Of the fifteen included articles, there are 5 randomized controlled trials, and several of these are double-blind studies. According to Melnyk and Fineout-Overholt (2015), "randomized control trials are the most appropriate research design to answer questions of efficacy and effectiveness of interventions because their methodology provides confidence in establishing cause and effect" (p. 116).

According to Melnyk and Fineout-Overholt (2015), critical appraisal hinges on validity, reliability, and applicability (p.87). The database search generated the fifteen selected articles that were placed in a literature review table (see Appendix A) then utilized for their analysis and synthesis. In this table, there is discussion of the limitations of each study, including threats to internal validity, external validity, and reliability.

2.2 Analysis of Evidence

Current research has been analyzed to identify common symptoms, pathophysiology, treatment, and implementation of screening tools for depression in patients with cardiovascular disease. Analysis of literature has been a significant process utilized to support changes in current practice, policies, and guidelines.

Depression Symptoms and Comorbidities. Dysphoria, insomnia or hypersomnia, anhedonia, fatigue or loss of energy, increased guilt or worthlessness, decreased concentration, appetite changes, psychomotor dysfunction, and suicidal ideation are the symptoms of depression and exist on a vast continuum of severity and complexity (McGuire et al., 2015, pp. 422-423). In one double-blind randomized control trial, higher depression scores were associated with an increased risk of a subsequent cardiovascular event, mortality, and possibly dementia (Peters, Pinto, Beckett, Swift, Potter, McCormack,… Bulpitt, 2010). This was a double-blind RCT of 2,656 participants. The HYVET was a randomized double-blind, placebo-controlled trial and employed an antihypertensive treatment regimen of indapamide sustained release 1.5 mg with the optional addition of perindopril 2–4 mg. Ethical and regulatory approvals were obtained prior to data collection. Depression scores were collected using the 15-item GDS (geriatric depression scale) administered as part of a Quality of Life (QoL) questionnaire at baseline and annually thereafter (Peters, et al., 2010). The researchers found that a GDS score of ≥6 was associated with an increased risk of all-cause and cardiovascular mortality and cardiovascular morbidity. Mood was found to be worse in those who previously had a cardiac event. GDS score ≥6 was associated with increased risks of all-cause (HR 1.8, 95% CI: 1.4–2.3; $p < 0.001$) and cardiovascular mortality (HR

2.10, 95% CI: 1.5–3.0; p <0.001), all stroke (HR 1.8, 95% CI: 1.2–2.8; p 0.002) and all cardiovascular events (HR 1.6, 95% CI: 1.2–2.1; p 0.001). Risk of incident dementia also tended to be increased (HR 1.28, 95% CI: 0.95–1.73; p 0.110). This study also found that there is an increased risk of all-cause and cardiovascular mortality and cardiovascular morbidity in patients who suffer from the above listed depressive symptoms (Peters, et al., 2010).

The study concluded that a depressed mood is common in older people with hypertension (Peters, et al., 2010). Higher depression scores were associated with an increased risk of a subsequent cardiovascular event, mortality and possibly dementia (Peters, et al., 2010). The researchers suggest that further studies would require replication and exclusion of some alternative possibilities before testing in an intervention trial (Peters, et al., 2010).

This double-blind RCT helps to significantly minimize threats to internal validity by reducing selection bias (Dearholt & Dang, 2012). The size of the study was large which minimizes threats to validity. The subjects in each of the groups were similar with regard to demographic and baseline clinical variables, which makes the results more generalizable. Baseline demographics were clearly displayed in a table to complement the discussion in the article. Although participants were unable to enter the study if they required nursing care, the researchers did not collect rigorous information about activities of daily living, disability levels or maintenance of social networks, socioeconomic status or activity level. Therefore, there is the potential for uncontrolled confounding from unmeasured factors. According to Dearholt and Dang (2012), the study is Level I Evidence with a high quality rating (A).

Mavrides and Nemeroff (2013) found that the prevalence of major depressive disorder (MDD) in patients with CAD, including stable and unstable angina or MI, is estimated to be between 15 and 20%. They also found that another estimated 30–45% have clinically significant depressive symptoms without meeting DSM-IV or DSM-V (Diagnostic and Statistical Manual of Mental Disorders fourth and fifth editions) criteria for MDD (Mavrides & Nemeroff, 2013, p. 329). This study was a systematic review of 61 randomized controlled clinical trials. PubMed and PsycINFO databases were searched through July 2012. No trials were excluded, and the studies included were primarily from North America and Europe. The search was completed with key words of antidepressants, CVD, coronary artery syndrome, SSRIs, depression, treatment of depression, post-MI, major depression, and cardiac disease (Mavrides & Nemeroff, 2013). These researchers found that depressive symptoms are especially prevalent in patients recently hospitalized with acute cardiac events, with a depression prevalence rate of 20-36% in patients recently hospitalized with congestive heart failure (Mavrides & Nemeroff, 2013). In addition, depressive symptoms often persist indefinitely in patients with CVD, partly due to under diagnosis and partly due to a lack of treatment or inadequate treatment. In the progression of post-MI depression, symptoms generally remain fairly consistent in terms of severity for up to 12 months (Mavrides & Nemeroff, 2013). Several mechanisms, behavioral and physiologic, have been implicated in the connection between depression and cardiac disease, including alterations in platelet function, inflammation, variability in heart rate, and adrenocortical hyperactivity (Mavrides & Nemeroff, 2013, p. 330). The studies contained in this review are randomized control clinical trials, and this helps to minimize threats to internal validity.

The authors stated that they limited search results to the English language. By limiting to English only, the researchers risk biasing the amount of research they may find with regard to their research topic. The number of studies reviewed is 61, which helps to limit threats to external validity. The results were consistent across all studies increasing the generalizability of the results to the general population. The authors displayed their results of all utilized clinical trials in an evidence table, and discussed odds ratios (OR), effect sizes, and confidence intervals (CI) for the trials. The researchers compared the results of each study, which limits threats to reliability in this review. Based on criteria by Dearholt and Dang (2012), this study is Level I Evidence and has a high-quality rating (A).

In one prospective cohort study with 960 participants, the researchers found that higher baseline depressive symptoms over five years predicted greater risk of functional decline in patients with CVD (Sin, Yaffe, & Whooley, 2014). Cardiovascular severity assessments were obtained at baseline and again at 5 years. The severity of depressive symptoms was assessed at baseline and at the 5-year follow-up using the 9-itme Patient Health Questionnaire (PHQ). In models that tested each cardiovascular predictor separately, baseline depressive symptoms and angina pectoris frequency were associated with greater risk of functional decline during the 5-year period, whereas higher baseline exercise capacity predicted lower risk of ADL and IADL decline ($p < .001$) (Sin, Yaffe, & Whooley, 2014). These results suggest that efforts to treat and decrease depressive symptoms may be as important as treating actual symptoms of cardiovascular disease to enhance functional status (Sin, Yaffe, & Whooley, 2014). This study had a large sample size, which strengthens the validity; however, the sample was largely male which limits

the generalizability of the results (Sin et al., 2014). This study is Level III Evidence with a quality rating of A (Dearholt & Dang, 2012).

In one systematic review, the literature revealed that CVD and Depression are both highly prevalent diseases, which have been shown to frequently coexist (Paz-Filho, Licinio, & Wong, 2010). This study is a literature review of a combination of RCTs, quasi-experimental studies, and non-experimental studies in which the reviewers utilized the PubMed database in order to describe the pathophysiological link between cardiovascular disease and depression (Paz-Filho, 2010). In this study, researchers found that depression and CVD share common pathophysiological etiologies or co-morbidities, such as alterations in the hypothalamic-pituitary axis and serotoninergic changes (Paz-Filho, 2010). There is compelling evidence that depression is an independent risk factor for both the development of CVD and for worsening prognosis (Paz-Filho, 2010).

Evidence has also shown that patients with CVD may become depressed as a response to the burden of a co-morbid condition (Paz-Filho, 2010). Several non-experimental studies were included in this review which increases the threat to internal validity (Paz-Filho, 2010). The results were consistent across all studies increasing the generalizability of the results to the general population (Paz-Filho, 2010). This study is Level III Evidence with a good quality rating (B) (Dearholt & Dang, 2012).

In addition to the co-morbidity correlation between CVD and Depression, one clinical review showed that there is strong evidence to suggest that depression is associated with an increased risk of cardiovascular disease and cardiac death (Hare, Toukhsati, Johansson, & Jaarsma, 2014). This is a clinical review of five major randomized controlled trials with the purpose of evaluating the effects of anti-depressant

pharmacotherapy on depression in cardiovascular disease settings (Hare, et al., 2014). Researchers found that patients with depression and comorbid CVD have a higher mortality rate than the general population (Hare, et al., 2014). Evidence has shown a severity relationship between depression and CVD: the more severe the depression, the higher the subsequent risk of mortality and other cardiovascular events (Hare, et al., 2014). In this review, a total of five randomized control trials were reviewed, and the researchers felt that these were all high quality evidence. The five trials included significant numbers of patients ranging from 101 to 2,481 (Hare, et al., 2014). However, the low number of studies included limits the validity of the review (Hare, et al., 2014). This study is Level III Evidence with a good quality rating (B) (Dearholt & Dang, 2012).

Depression Screening. It is highly recommended to promptly assess depression in patients with cardiovascular disease as it represents a crucial risk factor which may result in worsening cardiac symptoms and premature death following cardiac events (Mavrides & Nemeroff, 2013). Many screening tools are available for evaluation of patients with depressive symptoms (Mavrides & Nemeroff, 2013).

The Hospital Anxiety and Depression Scale (HADS) is one of the simplest and most widely utilized screening instruments for depression (Ceccarini, Manzoni, & Castelnuovo, 2014). This screening tool utilizes a simple 14-item Likert-scale type of scoring, and has been found to reliably detect depressive symptoms in post-MI patients in the inpatient setting. The questionnaire was designed to provide a reliable tool within the clinical practice and it is composed of 7 questions which identify the level of anxiety and 7 questions which relate to depression. The authors created this outcome measure specifically to avoid excessive reliance on other aspects which are intertwined with

anxiety and depression (Ceccarini, et al., 2014). Items of the Hospital Anxiety and Depression Scale (HADS) are scored from 0 to 3 on a Likert scale with a final score ranging from 0 to 21 for either anxiety or depression (Ceccarini, et al., 2014). The total score is used as a measure of global mood disorder according to the classifications of mild (8-10), moderate (11-15), and severe anxiety or depression (16-21). Zigmond and Snaith (1983) performed the validation study for this screening tool. They found that internal and test-retest reliabilities of both total and subscale scores were generally good as the questionnaire allowed to determine subscale factors assessing dimensions of anhedonia, anxiety, and psychomotor agitation (Ceccarini, et al., 2014). The Hospital Anxiety and Depression Scale (HADS) is hence a reliable instrument useful to screen and evaluate post-MI patients for symptoms of psychological distress. This tool has several disadvantages or limitations, including its weakness in detecting actual severity of depression (Ceccarini, et al., 2014).

Another tool, the Cognitive Behavioral Assessment Hospital Form (CBA-H), is also a common type of inpatient screening instrument, which has been used internationally to discriminate between emotional states and behavioral changes related to the current hospitalization or health diagnosis (Ceccarini, et al., 2014). Bertolotti, Sanavio, and Zotti (2002) conducted a validation study for this screening tool in Italian hospital, and this has since been considered a valid and reliable tool for general psychological distress screening within the hospital context (Ceccarini, et al., 2014). The CBA-H is composed by four cards: A, B, C, and D. Card A contains 21 items focusing on the present time and investigates the emotional state at the time of test completion (i.e., hospitalization). Card B contains 23 items asking about the previous three months

investigating on dysphoria and on other psychophysiological disorders and stress (Ceccarini, et al., 2014). Card C contains 61 items focusing on the period of time prior to the disease and it asks a self-reported patient description of his/her stable character and behavior such as introversion/extroversion, neuroticism, social anxiety, speed and impatience, job involvement, hostility, hard driving, and irritability (Ceccarini, et al., 2014). Card D contains 47 items on biographical information about general lifestyle (work, affective and sexual life, smoking, eating and drinking, sleep quality, and physical exercise) and health risk factors (Ceccarini, et al., 2014). A limitation to this tool is its excessive number of questions (Ceccarini, et al., 2014). The questionnaire contains 147 items with a true and false answering system. Also, this tool does not specifically target the population of cardiac patients, although these patients may be included for screening (Ceccarini et al., 2014).

A third commonly utilized and studied screening instrument is the Beck Depression Inventory (BDI-II), which consists of 21 items (Ceccarini et al., 2014). Beck, Steer, and Brown (1996) developed the screening tool and conducted a validation study, which showed a strong test-retest reliability for this tool (Ceccarini et al., 2014). The Beck depression tool assesses the severity of 21 depression symptoms rated on a 4-point scale (0-3). The tool consists of 13 items which address cognitive or affective symptoms, and the remaining 8 items assess somatic symptoms such as insomnia and fatigue. BDI total scores of 10-18 are consistent with mild depression, 19-29 with moderate depression, and 30 or higher with severe depression (Ceccarini, et al., 2014). The tool has been supported by a consistent number of studies, and it is known to correspond with over 90% of clinical diagnoses for patients who suffer from depression (Ceccarini, et al.,

2014). However, it must be noted that this tool can only be used to measure the severity of depression and is not necessarily utilized as a diagnostic tool (Ceccarini, et al., 2014). This limits its use to a measurement of depressive symptoms, and it leaves the provider to make the initial diagnosis through other means.

Lastly, there is a screening instrument for depression in cardiac patients which is considered the gold-standard of screening tools in this population of patients (Ceccarini, et al., 2014). This tool is known as the Patient Health Questionnaire (PHQ-2 and PHQ-9). The American Heart Association (AHA) recommends using the Patient Health Questionnaire (PHQ-2) at minimum (Lichtman, et al., 2008). This tool provides two questions that are recommended for identifying currently depressed patients, and if positive on either or both questions, it is recommended that all nine PHQ items (PHQ-9) be asked (Lichtman, et al., 2008). The PHQ-9 is based directly on DSM-IV diagnostic criteria for major depression, and this tool has shown to be valid and reliable after having been widely utilized in studies with cardiac patients (Stafford, Hons, Berk, & Jackson, 2007). One study by Stafford, et al., (2007) investigated the validity of the PHQ instruments relative to a referent diagnostic standard in recently hospitalized patients with CAD. Three months post-discharge for a cardiac admission, 193 CAD patients completed the PHQ-9 (Stafford, et al., 2007). The Mini International Neuropsychiatric Interview (MINI) was the criterion standard (Stafford, et al., 2007). In this study, scale reliability was calculated using Cronbach's α. Convergent validity was computed using Pearson's intercorrelations (Stafford, et al., 2007). The internal consistencies for the self-report questionnaire were excellent with Cronbach's α coefficient of 0.90 for the PHQ-9 (Stafford, et al., 2007). The questionnaire was found to have a sensitivity of 81.5% and a

specificity of 80.6% (Stafford, et al., 2007). This brief, sensitive, and specific screening tool may be completed in less than five minutes by a provider or self-administered by the patient in the same short time period (Lichtman, et al., 2008). This tool has been shown to be efficient in the detection of depression, and it may also be used in follow up assessments after the initial diagnosis has been made which adds to its usefulness in practice (Lichtman, et al., 2008).

Depression Treatment. Despite the high prevalence rate of major depression and minor depressive symptoms in cardiac patients and their poor prognosis for survival and quality of life, comparatively few receive treatment for their depressive disorder (Mavrides & Nemeroff, 2013, p. 332). There are many reasons for this occurrence, including under-diagnosis and provider reluctance to initiate treatment due to concerns about the safety of antidepressant medications, including the potential for medication interactions or unwanted cardiac adverse effects. According to Sin et al., (2014), researchers have found that efforts to treat and decrease depressive symptoms may be as important as treating actual symptoms of cardiovascular disease to enhance functional status. The treatment of depression in patients with cardiovascular disease has shown to increase overall survival, and this should be considered by providers caring for patients with CVD.

The most commonly utilized Pharmacotherapy treatment choices for depression in patients with cardiovascular disease include sertraline, escitalopram oxalate, venlafaxine hydrochloride, bupropion hydrochloride (Davidson, Rieckmann, Clemow, Schwartz, Shimbo, Medina, … Burg, 2010). Short-term treatment of depression with tricyclic antidepressants (TCAs) is relatively safe in patients with cardiovascular disease;

however, long-term treatment has not been well studied, and orthostatic hypotension is a serious complication observed with some TCAs (Davidson, et al., 2010). Therefore, TCAs should be used cautiously in patients with cardiovascular disease, especially those with baseline postural systolic blood pressure reductions (Davidson, et al., 2010). Bupropion has been found to be safe in patients with cardiovascular disease although more studies are needed for this treatment (Davidson, et al., 2010).

One systematic review of randomized control trials found that there is considerable evidence that antidepressants, especially SSRIs, are safe in the treatment of major depression in patients with CVD (Mavrides & Nemeroff, 2013). This was a systematic review of 61 randomized controlled clinical trials retrieved from the databases PubMed and PsycINFO (Mavrides & Nemeroff, 2013). No trials were excluded, and the studies included were primarily from North America and Europe (Mavrides & Nemeroff, 2013). The studies contained in this review are randomized control clinical trials, and this helps to minimize threats to internal validity (Mavrides & Nemeroff, 2013). In this review, 7 clinical trials of tricyclic antidepressants (TCAs), one of TCAs and bupropion together, were included, and 10 clinical trials of selective serotonin reuptake inhibitors (SSRIs) were included as well (Mavrides & Nemeroff, 2013). This review's results were consistent across all studies, thereby increasing the generalizability of the results to the general population of patients with cardiovascular disease.

Raskind et al. (1982) studied 12 men with ischemic heart disease, post-MI and CABG, who met criteria for secondary major depression, defined as depression that follows a major illness (Mavrides & Nemeroff, 2013). The goals were to evaluate changes in cardiac conduction, frequency of orthostatic hypotension, and the efficacy of

the antidepressant imipramine (Mavrides & Nemeroff, 2013). The authors of this study concluded that imipramine was safe in a patient with stable ischemic heart disease and minimal conduction defects; however, if a person had pretreatment orthostatic hypotension, the frequency of orthostatic hypotension with imipramine should be considered and prescribed cautiously (Mavrides & Nemeroff, 2013). Imipramine and doxepin were evaluated by Veith et al. in a randomized, double-blind, placebo-controlled trial of 24 patients, of whom 23 had experienced an MI, 8 had coronary artery bypass graft (CABG) surgery, one had a pacemaker, and one had a prosthetic heart valve (Mavrides & Nemeroff, 2013). The purpose of the study was to evaluate the effects of imipramine and doxepin on cardiac conduction and determine the antidepressant efficacy in depressed patients with cardiac disease (Mavrides & Nemeroff, 2013). Veith et al. concluded that post-MI patients could safely be treated with either imipramine or doxepin, though if they are at risk for developing orthostatic hypotension, they should receive alternative treatments (Mavrides & Nemeroff, 2013).

Glassman et al. (1983; 2011) evaluated the use of imipramine in depressed patients with left ventricular impairment in a prospective trial with 15 depressed patients undergoing radionuclide angiography (Mavrides & Nemeroff, 2013). Patients received imipramine and the dose gradually increased to 3.5 mg/kg/day over the course of 3 weeks; the radionuclide angiography was then repeated (Mavrides & Nemeroff, 2013). Only 11 of the 15 patients completed the entire 3-week treatment period because of adverse effects (Mavrides & Nemeroff, 2013). Of those who completed the treatment period, imipramine was reported to be effective in treating the depressive symptoms, though no information was provided regarding how this was assessed and measured

(Mavrides & Nemeroff, 2013). Glassman et al. concluded that although imipramine does not affect ventricular function, orthostatic hypotension was clinically significant and clearly needs to be monitored (Mavrides & Nemeroff, 2013).

In a similarly designed study, Roose et al. (1986) evaluated the effects of nortriptyline in 21 depressed patients with decreased left ventricular ejection fraction (Mavrides & Nemeroff, 2013). The authors suggested that nortriptyline might be a safe medication for the treatment of depression in patients with heart failure (Mavrides & Nemeroff, 2013). Roose et al. conducted another trial comparing imipramine (3.5 mg/kg/day) and nortriptyline (1.4 mg/kg/day) in 196 depressed patients with cardiac conduction disease (Mavrides & Nemeroff, 2013). The patients were enrolled for over 10 years (Mavrides & Nemeroff, 2013). Both nortriptyline and imipramine were found to be effective antidepressants, with nortriptyline causing less cardiac side effects (Mavrides & Nemeroff, 2013). The authors concluded that in patients with cardiac conduction deficits, with or without heart failure, nortriptyline is preferable to imipramine (Mavrides & Nemeroff, 2013). Dietch et al. (1987) studied 10 elderly, depressed patients with cardiac conduction disease treated with nortriptyline with the primary goal to evaluate EKG changes associated with the medication (Mavrides & Nemeroff, 2013). Each patient had abnormal EKGs at baseline, with first-degree AV block, hemi-blocks, bundle branch blocks, and bradycardia (Mavrides & Nemeroff, 2013). Nortriptyline was effective in treating depressive symptoms of elderly patients and was associated with minimal risk in patients with conduction disease (Mavrides & Nemeroff, 2013).

Cohen et al. (1993; 2010) evaluated trimipramine in an open study of 22 patients with mild heart disease and mild to moderate depression in a 28-day trial (Mavrides &

Nemeroff, 2013). Depression severity was assessed using the CGI Scale and Hamilton Depression Scale (HAM-D). The goal of the trial was to evaluate the efficacy of trimipramine and monitor cardiac changes and adverse effects (Mavrides & Nemeroff, 2013). Trimipramine seemed to be safe and effective for depression in patients with mild heart disease (Mavrides & Nemeroff, 2013). Roose et al. compared the effects of imipramine and bupropion in depressed patients with heart failure in a double-blind crossover study, which was comprised of 10 patients (Mavrides & Nemeroff, 2013). Bupropion and imipramine were equally efficacious in the treatment of depression (Mavrides & Nemeroff, 2013). The authors concluded that bupropion was safer than imipramine for use in depression accompanied by heart failure secondary to the low frequency of orthostatic hypotension and negligible effects on left ventricular function (Mavrides & Nemeroff, 2013).

A small double-blind, randomized, controlled 6-week trial comparing paroxetine to nortriptyline in 81 patients with both depression and ischemic heart disease assessed the efficacy and cardiovascular safety of the two medications (Mavrides & Nemeroff, 2013). Although paroxetine and nortriptyline were both effective antidepressants, nortriptyline was associated with significantly more frequent and serious cardiac events than paroxetine (Mavrides & Nemeroff, 2013). Roose and colleagues used a historical control group to compare the potential cardiovascular effects of fluoxetine and nortriptyline, 27 patients received the SSRI and 60 patients received the TCA (Mavrides & Nemeroff, 2013). Although this was a historical controlled non-prospective trial, fluoxetine did not exhibit the cardiovascular side effects that were observed with nortriptyline (Mavrides & Nemeroff, 2013).

Additional evidence from a clinical trial that SSRIs might be beneficial and safe in cardiac patients came in 1999, when Shapiro et al. performed an open-label study evaluating the safety, tolerability, and efficacy of sertraline in post-MI patients in the Sertraline Antidepressant Heart Attack Trial (SADHAT). Sertraline led to improvement in depressive symptoms without any increased risk of adverse cardiac events. Further evidence of the potential efficacy of SSRIs in CVD patients came from a double-blind, placebo-controlled trial of fluoxetine (Mavrides & Nemeroff, 2013). In this 25-week study, 54 patients with depression and recent MI were enrolled (Mavrides & Nemeroff, 2013). The authors concluded that fluoxetine is a safe and effective antidepressant in patients who are post-MI (Mavrides & Nemeroff, 2013). Further evidence for the efficacy of SSRIs in depressed patients with cardiac disease is derived from the Canadian Cardiac Randomized Evaluation of Antidepressant and Psychotherapy Efficacy (CREATE) study. This 2 × 2 factorial designed trial evaluated the efficacy of IPT and citalopram in 284 patients with CAD over a 12-week period (Mavrides & Nemeroff, 2013). Surprisingly, some of the subgroup analyses suggested that clinical management may be more effective than IPT in patients with low baseline social support or poor day-to-day functioning (Mavrides & Nemeroff, 2013).

Two large multicenter trials, ENRICHD and MINDIT assessed the treatment of depression in patients with MDD and CAD. In the ENRICHD trial (Enhancing Recovery in Coronary Heart Disease), 2,481 patients with acute MI and major depressive disorder, minor depressive disorder, or dysthymia were randomized to CBT or treatment as usual (Mavrides & Nemeroff, 2013). The group receiving CBT showed a small but statistically significant decrease in their depressive symptoms, but exhibited no change in the

incidence of cardiac events during the initial 6-month treatment period. In MIND-IT (Myocardial Infarction Depression Intervention Trial), 91 post-MI depressed patients were randomized to receive either mirtazapine or citalopram. Patients were followed for an average of 27 months (Mavrides & Nemeroff, 2013). The antidepressant efficacy of mirtazapine and citalopram was not superior to placebo (Mavrides & Nemeroff, 2013). Interestingly, patients who did not respond to antidepressant treatment exhibited a higher rate of cardiac events when compared to those who responded to the antidepressant (Mavrides & Nemeroff, 2013).

In the SADHART-CHF trial, O'Connor et al. studied the antidepressant efficacy and cardiovascular safety of sertraline versus placebo in depressed patients with CHF. This was a 12-week randomized, double-blind, placebo-controlled trial (Mavrides & Nemeroff, 2013). Depression symptom severity was rated using the HAM-D, and patients were treated with sertraline (50–200 mg/day) or placebo in addition to nurse-facilitated support (Mavrides & Nemeroff, 2013). Of the 469 patients enrolled, 234 patients received sertraline and 235 patients received placebo. Sertraline was not superior to placebo ($P = 0.89$, 95% CI −1.7 to 0.9), though both groups exhibited a statistically significant reduction in HAM-D scores ($P < 0.001$). A significantly larger number of subjects in the sertraline group withdrew from the study due to medication side effects (27/234; 11.5%) compared to the placebo group (14/235; 6%; $P = 0.03$). There was no statistically significant difference in all-cause mortality between the groups (Mavrides & Nemeroff, 2013). The authors concluded that sertraline neither improved depression nor cardiac outcomes compared to placebo (Mavrides & Nemeroff, 2013). One of the possible limitations of the study was the relatively moderate severity of depression of the

patients that comprised the study (HAM-D scores were 19.9 in the sertraline group and 18.4 in placebo).

As concluded by Mavrides and Nemeroff (2013) in their systematic review, selective serotonin reuptake inhibitors (SSRIs) are considered to be the safest of the antidepressants for these patients with cardiovascular disease, and this class of antidepressants is associated neither with orthostatic hypotension nor conduction abnormalities (Mavrides & Nemeroff, 2013, p. 339). Furthermore, multiple randomized clinical trials have demonstrated that two SSRI antidepressants, sertraline and citalopram, are the safest for patients with cardiovascular disease and are effective for moderate, severe, or recurrent depression in this population of patients (Mavrides & Nemeroff, 2013; Lichtman et al., 2008). This study is Level I Evidence with an excellent quality rating (A) (Dearholt & Dang, 2012).

Depression Education for Patients, Families, and Interdisciplinary Team. One pilot study with a randomized controlled design evaluated psychosocial support and the effect of interdisciplinary team education for post-cardiac surgery heart failure patients (Agren, Berg, Svedjeholm, & Stromberg, 2014). The study included a total of 42 patient-partner completed baseline assessments for evaluating psychosocial support and education from an interdisciplinary team approach. Patients with postoperative health failure and their partners were chosen to participate in 3 month and 12 month follow up phone interviews (Agren et. al., 2014). Randomization was performed using a random-number table with block of 12 (Agren et. al., 2014). Several questionnaires were used, including a demographic questionnaire, Charlson Comorbidity Index, SF-36, Beck Depression Inventory, and Perceived Control (Agren et. al., 2014). Partners in the

intervention group increased health in the role emotional and mental health dimensions, and patients increased health in vitality, social function, and mental health dimensions as compared with the control group (Agren et. al., 2014). Patients' perceived control improved significantly in the intervention group over time (Agren et. al., 2014). The results of this study suggest that psychoeducational support from a multidisciplinary team to post-cardiac surgery heart failure dyads (patient and partner) improves health and perceived control in patients after 3 and 12 months (Agren et. al., 2014). These results also suggest that interventions focusing on psychoeducational support can improve the life situation for the patient-partner and especially for the patients (Agren et. al., 2014). Psychoeducational support appears to be a promising intervention, but the results need to be confirmed in larger studies (Agren et. al., 2014). One limitation to this study is the relatively small sample of couples in the study, which poses a threat to external validity. There were also some inter-group differences and outcomes, which would limit generalizability. This study is Level I Evidence with a good quality rating (B) (Dearholt & Dang, 2012).

2.3 Synthesis of Literature

According to Melnyk and Fineout-Overholt (2015) synthesis is not a summarization of the articles identified as significant, but it is rather a process of critical thinking built on several principles of the synthesis. After a comprehensive analysis of the literature was performed, inferences were made to synthesize best practices for screening for depression in patients with cardiovascular disease. Major depressive disorder and depressive symptoms are prevalent in the population of patients with

cardiovascular disease, especially those who have recently been hospitalized for a cardiac event (Peters, et al., 2010).

Timely screening, detection, and treatment of depression in patients with cardiovascular disease may help to improve quality of life and increase overall survival for these patients (Sin, et al., 2014). Although screening tools have been condensed and are readily available to providers in primary care practices for their patients, synthesis of the literature has shown that screening for depression in CVD patients is not routinely undertaken in any setting, inpatient or outpatient (Lichtman, et al., 2008; Peters, et al., 2010; Ceccarini, et al., 2014). Through comparison of the available depression screening tools, synthesis of the literature revealed that the PHQ-2 and PHQ-9 tools are the most brief, sensitive, and specific depression screening tool for patients with cardiovascular disease (Ceccarini, et al., 2014; Mavrides & Nemeroff, 2013). Since the PHQ questionnaire can be easily self-administered by patients or by the healthcare provider in 5 minutes or less, this tool is also considered the most time efficient of the depression screening tools (Ceccarini, et al., 2014). The PHQ questionnaire is also recommended by AHA as the most appropriate screening for this population of patients (Lichtman, et al., 2008). Providers should be prepared to treat and refer these patients based on results of the individual screenings. Multiple safe treatment options exist for patients who test positive for depressive symptoms, and the provider should weight benefits and risks when deciding upon appropriate treatment regimens in patients with depression who have cardiovascular disease (Davidson, et al., 2010; Mavrides & Nemeroff, 2013). Overall, there is good evidence to implement the use of PHQ depression screening for cardiovascular patients in primary care.

2.4 Recommendations

Based on the evidence illustrated from the selected studies in this review, recommendations have been identified to assist primary care providers in improving the quality and timeliness of care delivered to cardiovascular patients who are suffering from depression. These recommendations have been graded according to Dearholt & Dang's (2012) book *John Hopkins Nursing Evidence-Based Practice: Model and Guidelines*. The recommendations have been based on the quality and amount of evidence available to support the implications for guidelines, practice parameter, or clinical policy.

1. **Screening for Depression in Patients with CVD – Grade A (High Quality) Evidence.** Psychological distress has a significant negative impact on patients with CVD and is often under-recognized by health care providers (Lichtman et al., 2008). Primary care providers and cardiovascular specialty providers are called upon to improve their recognition of psychological distress in their patients and assure referrals are made to collaborative care teams for proper diagnosis and treatment (Lichtman et al., 2008). At a minimum, the Patient Health Questionnaire (PHQ-2) provides two questions that are recommended for identifying currently depressed patients. If the answer is "yes" to either or both questions, it is recommended that all nine of the PHQ items (PHQ-9) be asked (Lichtman et al., 2008). For patients with mild symptoms, follow-up during a subsequent visit is advised at which time the PHQ-9 questionnaire may again be utilized for screening. In patients with positive depression scores, a provider or nurse should review the answers with the patient, and treatment options should be discussed with the patient (Lichtman et al., 2008).

2. **Treatment of Depression in Patients with CVD – Grade A (High Quality) Evidence**. There is considerable evidence from randomized controlled clinical trials that antidepressants, especially SSRIs, are safe in the treatment of major depression in patients with CVD (Mavrides & Nemeroff, 2013). Researchers have concluded that frequent and timely treatment adjustment by primary care physicians, along with increased patient self-monitoring, improved control of diabetes, depression, and heart disease (Mavrides & Nemeroff, 2013). Evidence also suggests that depressed patients who are not responsive to treatment for depression may be at greater risk for adverse cardiac events, but aggressive cardiologic care may help mitigate this increased risk. Depressed patients may also require additional clinical management to ensure compliance with cardiac treatment regimens and to promote lifestyle behavior change (Lichtman et al., 2008).

3. **Provide education to the providers, staff, patients, and family members – Grade B (Good Quality) Evidence.**

   Formal and clear procedures, mechanisms, regular case reviews, and peer staff development need to be in place in order to sustain a successful screening program and offer an environment which aids in bringing about the best outcome for the patient dealing with depression. Psychoeducational intervention has been found to reduce anxiety and depression in patients with cardiovascular disease, and educational interventions increase family satisfaction (Agren et. al., 2014). When the families and the patients are well-informed, there is a basis for fruitful and effective communication between them and the healthcare professionals

leading to increased compliance to treatment regimens and overall better outcomes (Agren et al., 2014).

2.5 Chapter Summary

Despite the devastating consequences, comorbid cardiovascular disease and depression remain poorly recognized and treated (Paz-Filho, 2010; Lichtman et al., 2008). Primary care providers and cardiovascular specialty providers are called upon to improve their recognition of depression in their patients and assure referrals are made to collaborative care teams for proper diagnosis and treatment (Lichtman et al., 2008). There is a vast literature on depression in cardiovascular patients, and this review has analyzed some of that literature and synthesized recommendations for providers in primary care practices with the purpose of standardizing routine screening for depression in cardiovascular patients in primary care. Based on the evidence, recommendations include screening for and treatment of depression in these patients, as well as recommendations for provider, staff, patient, and family education throughout the screening and treatment processes (Lichtman et al., 2008; Mavrides & Nemeroff, 2013; Agren et. al., 2014).

With regard to screening tools, the PHQ-2 and PHQ-9 questionnaires are the most brief, sensitive, and specific depression screening tool for patients with cardiovascular disease (Ceccarini, et al., 2014; Mavrides & Nemeroff, 2013). The PHQ-9 is based directly on DSM-IV diagnostic criteria for major depression, and this tool has shown to be valid and reliable after having been widely utilized in studies with cardiac patients (Stafford et al., 2007). Multiple safe treatment options exist for patients who test positive for depressive symptoms with SSRIs being shown as especially safe and effective in

patients with cardiovascular disease (Davidson, et al., 2010; Mavrides & Nemeroff, 2013). Also, recommendations have been made for further research into this area of study in order to support standardized screening protocols that might facilitate improved processes for patients with depression with cardiovascular disease in all primary care settings (Huffman et. al., 2014).

Chapter 3 Methodology

3.1 Introduction

According to the American Heart Association (2016), there is no gold-standardized procedure for screening for depression in cardiovascular patients. Screening for depression varies greatly across specialties and practices, often leaving a gap for detection and treatment of depression in cardiac patients (McGuire et al., 2015). The purpose of this project is to determine the best screening depression tool and implement the tool for early detection of depression in primary care settings for patients with cardiovascular disease. The purpose of this chapter is to describe the design, sample, setting, depression screening tool, and procedures utilized in this project.

3.2 Design

A descriptive pre-test and post-test survey design will be conducted to compare findings from two primary care settings, which use the Patient Health Questionnaire (PHQ) depression screening tool to screen for depression in cardiovascular patients. The PHQ is a multiple-choice self-report inventory used for screening and diagnosing depression. It is copyrighted by Pfizer Inc.

3.3 Unit of Analysis

The first unit of analysis will include the findings from an audit on 60 patient charts and the results of their depression screenings. Demographic data that will be collected includes age, gender, and race of all the patients.

The second unit of analyses will include data from the Patient Health Questionnaire (PHQ). The tool is available in two forms, PHQ-2 and PHQ-9. The PHQ-2 comprises the first two questions in the PHQ-9 questionnaire. As McGuire, et al., (2015) discusses, the PHQ-2 screening scale is the best brief screening instrument for use during a routine visit intake or annual physical examination survey. According to the American Psychological Association (2016), the PHQ-2 inquires about the degree to which an individual has experienced a depressed mood and anhedonia over the past two weeks. Its purpose is not to establish a final diagnosis or to monitor depression severity, but rather to screen for depression (APA, 2016). Patients who screen positive should be further evaluated with the PHQ-9 to determine whether they meet criteria for a depressive disorder (APA, 2016).

The third unit of analysis will include the providers' demographic data who care for cardiovascular patients in primary care settings. The providers are employed in family practice settings located in the Pee Dee area of rural South Carolina. Demographic data includes one MD and one Family Nurse Practitioner in the first family practice and two MDs and one FNP in the second family practice. Provider gender, provider specialty, and provider length of time (years) in practice will be collected for each provider. Providers will also be asked if they have utilized the PHQ screening tool in practice previously.

3.4 Sample

The sample includes 60 adult cardiovascular patients who present for primary care in two primary care settings in rural Pee Dee South Carolina. For the purpose of this project, a patient with "cardiovascular" disease will be defined as any patient who is 18 years of age or older and has any or a combination of the following diagnoses: coronary artery disease, stroke, hypertension, congestive heart failure, arrhythmias, valvular heart disease, cardiomyopathy, myocardial infarction, and rheumatic heart disease. The primary care providers are adult primary care providers, including three physicians and two family nurse practitioners. All providers are licensed by the state of South Carolina.

3.5 Setting

The settings include two family practices in rural South Carolina in the Pee Dee area. The family practices are comprehensive family practices open five days per week, with on-call after hour services. These practices serve as the patient's first point of entry into the health care system and as the continuing focal point for all needed health care services. The first practice sees an average of 38 patients per day, and the second practice sees an average of 51 patients per day.

3.6 Outcomes to be measured

The PHQ-9 is a nine-item self-report measure developed to diagnose the presence and severity of depression in primary care (Stafford, Hons, Berk, & Jackson, 2007). It is based directly on DSM-IV diagnostic criteria for major depression (Stafford, et al., 2007). It has the potential of being a dual-purpose instrument that, with the same nine items, can establish depressive disorder diagnoses using a categorical algorithm and grade the

depressive symptom severity (Stafford, et al., 2007). As a severity measure, the score on the PHQ-9 will range from 0 to 27 for each patient. The scale is scored as follows: 1-4 (minimal depression), 5-9 (mild depression), 10-14 (moderate depression), 15-19 (moderately severe depression), and 20-27 (severe depression) (Stafford, et al., 2007).

In multiple studies, PHQ-9 scores greater than 10 have been found to have a sensitivity of 88% and a specificity of 88% for Major Depressive Disorder (APA, 2016). The PHQ questionnaires have been shown to be valid and reliable and have been widely utilized in studies with cardiac patients (Stafford, et al., 2007). The Mini International Neuropsychiatric Interview (MINI) was the criterion standard (Stafford, et al., 2007). In this study, scale reliability was calculated using Cronbach's α. Convergent validity was computed using Pearson's intercorrelations (Stafford, et al., 2007). The internal consistencies for the self-report questionnaire were excellent with Cronbach's α coefficient of 0.90 for the PHQ-9 (Stafford, et al., 2007).

3.7 Framework/model of research: Stetler's Model

The Stetler model of Evidence-Based Practice (Appendix D) was chosen because it has long been known as a practitioner-oriented model which utilizes research findings in order to facilitate safe and effective evidence-based nursing practice (Melnyk & Fineout-Overholt, 2015). There are five phases in the Stetler model. First, Stetler's model will be utilized by ensuring the providers and practices are ready for the change and systematically conducting a search for relevant evidence (Melnyk & Fineout-Overholt, 2015). Stetler's second phase has been utilized to assess a body of evidence, summarize the evidence for quality and validity, and identify a need through the systematic collection of evidence (Melnyk & Fineout-Overholt, 2015). Phase three will

be used to compare the responses from the survey and evaluate if the intervention combined with the guidelines proposed a change to current practice. The fourth phase of Stetler's model will be used to demonstrate translation or application of the intervention, with the implementation of the PHQ-2 and PHQ-9 screening tools for patients with cardiovascular disease (Melnyk & Fineout-Overholt, 2015). In phase five, evaluation of the plan to improve outcomes for patients with CVD who suffer from depression through the implementation of screening tools and follow-up screenings with appropriate treatment will be implemented and evaluated (Melnyk & Fineout-Overholt, 2015).

3.8 Description of intervention

Depression screening is an essential part of the detection, treatment, and referral of patients with depressive disorders. The PHQ-2, comprising the first 2 items of the PHQ-9, inquires about the degree to which an individual has experienced depressed mood and anhedonia over the past two weeks. Its purpose is not to establish final diagnosis or to monitor depression severity, but rather to screen for depression. Patients who screen positive on the PHQ-2 should be further evaluated with the PHQ-9 to determine whether they meet criteria for a depressive disorder.

According to McGuire et al., (2015), there continues to be a significant practice gap in relation to screening, referral, and treatment of depression in CVD patients (p. 427). Although the American Heart Association recommends routine screening for depression in patients with cardiovascular disease, there are conflicting opinions among healthcare providers with regard to timing of screening and location of screening, especially in cardiology and primary care settings (Kronish, et al., 2012).

Prior to administering the PHQ screening tool to patients, the providers at both primary care practices will be given educational handouts that contain information regarding the PHQ-2 and PHQ-9 depression screening tools. These educational handouts will include the following: risk factors of depression in patients with cardiovascular disease, signs and symptoms of depression, directions for utilizing the PHQ tool, importance of educating patients and families regarding depression, and an algorithm for initiation of depression treatment and referral for those patients who test positive during screening.

The providers will also have the opportunity to view a YouTube video describing the use and administration of PHQ screening for depression. The YouTube video is presented by Dr. Charles Porter and a Cardiology group in Kansas City on behalf of patients who have comorbid cardiovascular disease and depression. The video is 4 minutes and 14 seconds in length, and the providers may easily view the video from home. The video may be accessed via the following URL: https://www.youtube.com/watch?v=DtQCp5350as. A sign in sheet will be provided at the offices for providers to sign once they complete the video. These additional resources will allow each provider equal opportunity to access significant information regarding depression screening in cardiovascular patients.

3.9 Strategies to reduce barriers and increase supports

The influential change participants in primary care will include practice administrators, board of directors, and primary care providers. In order for the implementation of these screenings to be successful, support of these influential participants must be obtained. A strategy that will increase support is to demonstrate the

ease of use and effectiveness of the short screening PHQ tools. This cost-effective and easy-to-use tool may be easily administered and has been shown to decrease morbidity and mortality in patients with cardiovascular disease, thereby reducing healthcare costs. The PHQ screening tools are a cost-effective, reliable, valid, and time-efficient approach to improving patients' quality of life. The strategic process for implementing this intervention can be addressed with the most significant emphasis on improving quality of life for patients with cardiovascular disease.

A potential barrier to successful implementation of routine depression screening is the issue of fidelity**.** Burns, Grove, and Gray (2013) describe fidelity as the consistent implementation of an intervention. Since part of the plan will involve other providers, it will be of utmost importance to ensure that an organized plan or protocol is in place so that each provider interacts with the patients in the same manner in relation to the project. The protocol for implementation of this screening tool will require that each patient has cardiovascular disease and is 18 years of age or older. The protocol will require that the first two questions of the tool (PHQ-2) be administered to the patient by the provider while the provider is in the room to examine the patient. If these two questions are positive, the provider will proceed by administering the remaining seven questions of the questionnaire. The protocol will then require that the provider score the patient's depression according to the scale that is provided with the PHQ tool. If the patient is tested positive for depression, the provider will be asked to document in chart the implemented treatment plan, follow up, education, and any referrals that are made. This protocol will be discussed with each provider and will be given as a handout prior to implementation of the screening tool.

If the screening tool is to be implemented into the EMR for future implementation of this tool into project, this may limit the feasibility utilization of the screening tool since EMRs have been traditionally difficult to change or manipulate. There has also been consideration concerning administration of the PHQ-2 and PHQ-9 screenings on paper and having them scanned into the EMR since the providers are still using some paper forms in conjunction with EMR documentation. As Melnyk and Fineout-Overholt (2015) discuss, many times it takes more time to carry out a study than is projected in the beginning of the project. Time is also a possible limit to administration of screenings and collection of data, but it is hopeful that the project may be undertaken as a 3-month review of the initial screenings and initial follow up visits without difficulty.

3.10 Instruments

Provider demographic information will be collected during a scheduled office visit and entered into Microsoft Excel for analysis comparison using the Data Analysis Tool. Similarly, during the chart audits, each patient's demographic data will be collected and entered into the Data Analysis Tool in Microsoft Excel. Demographic data for patients will include age, gender, and race. The PHQ screening tool will be administered to the patients by the provider. The PHQ screening tool will be administered on paper and scanned into the electronic medical record for review at the end of the 3-month period.

3.11 Procedure

Step one will consist of training the providers on the use of the tool and administration of the tool. The PHQ depression screening tool will be administered by the providers to the patients in the privacy of the examining room if the patient meets

appropriate criteria and agrees to the screening. Patients must be 18 years or older and must have a documented history of cardiovascular disease without a documented history of depression. The PHQ-2 will be answered, which consists of the first two questions of the scale. If positive, the remaining seven questions (PHQ-9) will be administered. Copies of the PHQ tool will be given to both practices. Completed tools will be scanned into the EMR in each respective patient's chart. If the patient self-identifies that they are moderately or severely depressed based on a score of 10 or higher on the PHQ scale, then the patient is referred for further assessment and intervention.

After the University of South Carolina Institutional Review Board (IRB) approves the study, the quality improvement project will commence. Educational handouts regarding the importance of depression screening in cardiovascular patients and regarding the use of PHQ screening tools will be given to the providers at enrollment into this project. The handouts will contain information on signs and symptoms of depression that have been commonly encountered by cardiac patients. The handouts will identify the importance of educating patients and family members regarding the seriousness of depression and the availability of treatment. Providers will be provided with email and phone number in order to ask any questions regarding implementation of the screening tool for this project.

Three months after implementation of the PHQ screening tool, 60 charts will be reviewed, which will include a total of 30 charts from each practice. Data obtained from the PHQ tools will be migrated into Microsoft Excel's for statistical and descriptive analysis of the Likert scale. Each question (Appendix C) will be calculated by the mode.

The mode of the data is the value which appears most frequently as mentioned previously. This will be placed in a table and illustrated in a bar graph format.

3.12 Protection of Human Subjects

The Collaborative Institutional Training Initiative (CITI) course on protection of human subjects will be completed by the investigator for the University of South Carolina prior to data collection. Two members of the committee will provide scientific review of the proposal. Since this project includes research of medical records, review and approval by the University of South Carolina's IRB will be required. IRB approval for this project will be sought prior to any involvement of patient information. The investigator is an employee of the healthcare system in which the practices are included and has access to the electronic medical records.

Once the committee and IRB have reviewed and approved the project, the investigator will begin data collection. Only essential patient data for the project will be retrieved. Data that will be retrieved from each chart are as follows: age of the patient, race, gender, cardiovascular diagnoses, existence of previous psychiatric diagnoses, PHQ-2 and PHQ-9 screening results, subsequent initiation of depression treatment and counseling by the providers, and initiation of psychiatric referrals if needed.

All data which is collected will be saved in the investigator's computer in a password protected spreadsheet. The computer to be utilized is password protected, and there will be no record included to identify any of the subjects. The patients will be assigned a number as a patient identifier, and their names will not be used. In order to protect patient information, all patient information will be collected, encrypted, and

stored on a flashdrive. No tracers will be linked to patient health records in order to protect patient anonymity.

3.13 Data Analysis Methods

PHQ screening tool results of 60 patients with cardiovascular disease will be collected during chart review and entered into Microsoft Excel. The Data Analysis tool in Excel will be utilized to graphically display the results of the PHQ screenings. Microsoft Excel spreadsheets and graphs will also be utilized for collection of the providers' demographic data. Excel Data Analysis Correlation function will be utilized to compare provider usage of the tool between the two practices, which will allow for inferences to be made regarding provider demographic data and use of PHQ screening tools between the two practices.

Once the survey data is entered into the Excel spreadsheet and the identifiers removed, the data will be reviewed and organized in collaboration with a University of South Carolina statistician. Data analyses will include both descriptive and inferential statistics using the Data Analysis tool in Excel.

3.14 Chapter Summary

Despite poor outcomes, comorbid cardiovascular disease and depression remain poorly recognized and treated. Primary care providers are called upon to improve their recognition of depressive symptoms in their patients and assure appropriate treatment is initiated per current guidelines. At new patient and routine follow up visits, the PHQ-2 and PHQ-9 screening tools should be implemented for each patient who has cardiovascular disease. This active approach to delivering quality care and screening for

prevention of complications from depression can potentially improve quality measures and outcomes in management of patients with cardiovascular disease.

Chapter 4 Results

4.1 Introduction

According to Lichtman, et al., (2008), there is a high prevalence of depression in patients with cardiovascular disease. Thus, the American Heart Association (2016) has recommended routine screening for depression. In this DNP quality improvement project, a descriptive pre-test and post-test survey design was conducted to compare findings from two primary care settings that implemented the use of the brief and efficient Patient Health Questionnaire (PHQ) depression screening tool to screen for depression in cardiovascular patients. The purpose of this chapter is to present the findings with a discussion.

4.2 Description of Sample

Out of the sixty patient charts which were audited, fifty-one (response rate was 85%) patient health questionnaire (PHQ) depression screening tool surveys were completed. These questions were administered to the patients by five primary care providers in two primary care practices in the Pee Dee area over a two-month period. The primary care providers are adult primary care providers, including three physicians and two family nurse practitioners. All providers are licensed by the state of South Carolina.

The patients were screened for depression through use of the PHQ-2 and PHQ-9 depression screening tools. Thirty charts were initially audited from each practice. Five patients canceled their appointments prior to screening, three patients did not show for their appointments, and one patient declined to answer the screening survey questions.

There were twenty-three patients who answered the screening tool survey questions from the first practice, and twenty-eight patients responded to the survey in the second primary care practice. The final sample (n = 51) was comprised of adult patients, ages ranging from 35-78, who had a pre-existing cardiovascular diagnosis but no history of diagnosed depression. Cardiovascular diagnoses for these patients included hypertension, coronary artery disease, history of myocardial infarction, congestive heart failure, and stroke.

4.3 Analysis of Research Questions

Table 4.1 depicts the frequency distribution of the patients' responses to the depression screening tool survey from both practices combined. Microsoft Excel's FREQUENCY function for data analysis was utilized to calculate frequency distributions. According to the screening tool results, 29% (n=15) of the sample population had little interest or pleasure in doing things over the past 2 weeks. Results also indicated that the patients felt down or depressed over the 2 weeks prior to screening. Following the initial two questions of the surveys, trouble sleeping (27%) was the next most common symptom identified. (Table 4.1).

Table 4.2 depicts the comparison of patients' responses between the two primary care practices. Responses were similar from both practices. None of the sample had a formalized diagnosis of depression or treatment of depression prior to implementation of this screening tool. Of note, Practice 1 had a higher rate of positive responses to trouble concentrating, moving or speaking slowly, and restlessness. However, these patients from Practice 1 also had prior diagnoses of attention deficit disorders. The patients were not currently receiving treatment for attention deficit disorders (Table 4.2).

Table 4.1 PHQ Screening Tool Survey Frequency Distributions (Both Practices)

Over the past 2 weeks, have you been bothered by any of the following?	**Yes** **%**	**No** **%**
Little interest or pleasure in doing things	29	71
Feeling down, depressed, or hopeless	29	71
Trouble falling asleep, staying asleep, or sleeping too much	27	-
Feeling tired or having little energy	23	-
Poor appetite or overeating	18	-
Feeling bad about yourself, that you are a failure, or that you have let yourself or your family down	20	-
Trouble concentrating on activities such as reading the newspaper or watching television	22	-
Moving or speaking so slowly that other people could have noticed, or being so fidgety or restless that you have been moving around a lot more than usual	12	-
Thinking that you would be better off dead or that you want to hurt yourself in some way	4	-

Table 4.3 depicts the t-Test calculations which were performed utilizing the Data Analysis TookPak with t-Test function in Microsoft Excel. Results showed that there were no statistically significant differences between the practices for patients reporting depression symptoms using the PHQ. Patients with cardiovascular disease reported depression symptoms across the board in both practices (Table 4.3.)

Table 4.4 depicts the prevalence of each category of depression severity from both practices as diagnosed from utilization of the PHQ screening tool. Providers were able to make diagnosis with severity of depression using the results of the PHQ screenings. The majority of patients in each practice scored 10-19 on the PHQ scale which indicated that these patients were in the severity categories of “moderate” depression or “moderately severe” depression per the PHQ scoring card. (Table 4.4).

Table 4.2 Comparison of PHQ Results Between Two Primary Care Practices

Over the past 2 weeks, have you been bothered by any of the following?	**Practice 1 "Yes" Responses %**	**Practice 2 "Yes" Responses %**
Little interest or pleasure in doing things	26	32
Feeling down, depressed, or hopeless	26	32
Trouble falling asleep, staying asleep, or sleeping too much	26	29
Feeling tired or having little energy	21	25
Poor appetite or overeating	17	18
Feeling bad about yourself, that you are a failure, or that you have let yourself or your family down	22	18
Trouble concentrating on activities such as reading the newspaper or watching television	26	18
Moving or speaking so slowly that other people could have noticed, or being so fidgety or restless that you have been moving around a lot more than usual	17	7
Thinking that you would be better off dead or that you want to hurt yourself in some way	4	4

Table 4.3 t-Test Values of Comparison of PHQ Results Between Practices

t-Test: Two-Sample Assuming Equal Variances		
	Practice 1	**Practice 2**
Mean	20.55555556	20.33333333
Variance	52.52777778	103.75
Observations	9	9
Pooled Variance	78.13888889	
Hypothesized Mean Difference	0	
df	16	
t Stat	0.053328593	
P(T<=t) one-tail	0.479065139	
t Critical one-tail	1.745883676	
P(T<=t) two-tail	0.958130278	
t Critical two-tail	2.119905299	

Table 4.4 Depression Severity in Patients with CVD as Compared Between Two Primary Care Practices

Depression Severity	**Practice 1 %**	**Practice 2 %**
Mild Depression	**33**	**22**
Moderate Depression	**50**	**33**
Moderately Severe Depression	**0**	**33**
Severe Depression	**17**	**11**

Table 4.5 compares the implementation results of the two practices for the cardiovascular patients who tested positive for depression. Consistent with current literature, the most commonly chosen antidepressants for the patients were the SSRIs sertraline and escitalopram (Davidson, et al., 2010). SSRIs were chosen most frequently (50% of patients with positive diagnosis) above all other antidepressants in Practice 1 and

in Practice 2 (67%). Bupropion was the second choice after SSRIs in both practices. There was one patient in each practice who answered "yes" to the question regarding thoughts of self-harm, and these two patients were referred immediately for psychiatric evaluation and counseling.

Table 4.5 Comparison of Depression Treatment Interventions Between Two Practices

Interventions utilized by the primary care providers for treatment of depression	**Practice 1** **%**	**Practice 2** **%**
Initiation of SSRI (sertraline, escitalopram, citalopram)	**50**	**67**
Initiation of SNRI (venlafaxine)	**17**	**11**
Initiation of Bupropion	**33**	**22**
Initiation of Tricyclic Antidepressants	**0**	**0**
Depression Counseling	**100**	**100**
Referral to Psychiatry	**17**	**11**

Table 4.6 depicts the t-Test calculations which were performed utilizing the Data Analysis TookPak with the t-Test function in Microsoft Excel. The p-value (0.964134897) for these results was not statistically significant. The providers in both practices utilized similar treatment approaches for these patients based on current evidence-based depression treatment recommendations and guidelines. (Table 4.6.)

4.4 Conclusion

Frequency distributions were calculated for PHQ depression screening survey results for each question in order to note the frequency of depressive symptoms in this sample of patients with cardiovascular disease. Patients who answered "yes" to the initial two screening questions were asked the remaining seven questions per the screening tool guidelines. Results were then compared between the two practices to note differences in

patients' responses from each practice.

Table 4.6 t-Test Values of Comparison of Treatment Choices Between Practices

t-Test: Two-Sample Assuming Equal Variances		
	Practice 1	**Practice 2**
Mean	36.16666667	35.16666667
Variance	1263.766667	1558.966667
Observations	6	6
Pooled Variance	1411.366667	
Hypothesized Mean Difference	0	
df	10	
t Stat	0.046104222	
P(T<=t) one-tail	0.482067449	
t Critical one-tail	1.812461123	
P(T<=t) two-tail	0.964134897	
t Critical two-tail	2.228138852	

After frequency distributions were calculated, it was noted that 29% of the sample population had depressive symptoms. This data is consistent with the evidence-based literature that demonstrates that patients with cardiovascular disease are at high risk for depression and should be routinely screened for depression in their primary care homes as recommended by the American Heart Association (2016). Each of these patients (n=15) who screened positive for depression was started on treatment for depression at the time of the initial depression screening visit.

During the post-test portion of the study, the fifty-one charts were reviewed after screening and implementation of treatment measures by the providers in order to compare the chosen treatment options in both practices. All of the providers documented the utilization of depression counseling during the initial visits, including the use of educational handouts regarding depression printed from the electronic medical record. SSRIs were the most frequently utilized Pharmacotherapy treatment choice in each

practice, followed by the use of Bupropion. Follow up appointments ranged from 1-2 weeks dependent upon other comorbid conditions and severity of depressive symptoms.

Chapter 5 Discussion

5.1 Introduction

Throughout the literature review and at completion of the DNP quality improvement project, recommendations have been identified to assist primary care providers in improving the quality and timeliness of care delivered to cardiovascular patients who are suffering from depression. Timely screening, detection, and treatment of depression in patients with cardiovascular disease may help to improve quality of life and increase overall survival for these patients (Sin, et al., 2014). The purpose of this chapter is to discuss recommendations for practice, education, research, and health policy based on the findings of this project and evidence-based literature.

5.2 Recommendations for Practice

According to the quality improvement project and consistent with the literature, patients with cardiovascular disease are at high risk for depression and should be routinely screened to improve quality of life and patient outcomes (McGuire, et al., 2015; Mavrides & Nemeroff, 2013). Nearly one third of the sample screened positive for depression (DNP Project, Ballentine, 2017). Through an evaluation of the available depression screening tools, synthesis of the literature revealed that the PHQ-2 and PHQ-9 tools are the most brief, sensitive, and specific depression screening tool for patients with cardiovascular disease (Ceccarini, et al., 2014; Mavrides & Nemeroff, 2013). In this quality improvement project, the PHQ-9 screening tool was found to have a sensitivity of 90% and specificity of 90% (DNP Project, Ballentine, 2017). These results are similar to

findings in multiple studies where PHQ-9 scores greater than 10 have been found to have a sensitivity of 88% and a specificity of 88% for Major Depressive Disorder (APA, 2016; Stafford, et al., 2007).

Findings from the quality improvement project underscored the need for primary care providers to utilize the patient health questionnaire (PHQ) screening tool as the standard for screening in patients with cardiovascular disease due to the incidence of depression in cardiovascular patients and the tool's efficacy and ease of use. The PHQ screening tools are a cost-effective, reliable, valid, and time-efficient approach to improving patients' quality of life (McGuire, et al., 2015; Ceccarini, et al., 2014). In patients with positive depression scores, the provider should review the answers with the patient, and treatment options should be discussed with the patient.

Also, consistent with the literature, providers in the quality improvement project chose SSRIs most frequently in the treatment of their patients who screened positive for depression. There is considerable evidence from randomized controlled clinical trials that antidepressants, especially SSRIs, are safe in the treatment of major depression in patients with CVD (Mavrides & Nemeroff, 2013). Researchers have concluded that frequent and timely treatment initiation by primary care providers, along with increased patient self-monitoring, leads to improved control of depression and cardiovascular disease (Mavrides & Nemeroff, 2013; Kronish, et al., 2012; McGuire, et al., 2015). Evidence also suggests that depressed patients who are not responsive to treatment for depression may be at greater risk for adverse cardiac events, but aggressive cardiologic care may help mitigate this increased risk (Lichtman et al., 2008). Depressed patients

may also require additional clinical management to ensure compliance with cardiac treatment regimens and to promote lifestyle behavior change.

Providers must be prepared to refer depressed patients when necessary. During the quality improvement project, one patient from each practice stated that they recently had thoughts of self-harm, and these patients were promptly referred for further psychiatric evaluation and treatment. Appropriate follow up appointments should be scheduled for all patients with depressive symptoms in order to monitor progress and responses to treatment.

5.3 Recommendations for Education

Prior to implementation of the quality improvement screening tool, providers and nursing staff were educated on the use of the PHQ tool. Formal and clear procedures, mechanisms, regular case reviews, and peer staff development need to be in place in order to sustain a successful screening program and offer an environment which aids in bringing about the best outcome for the patient dealing with depression. Depression screening in primary care should be included in continuing medical education requirements for providers working in the primary care setting (Agren et. al., 2014; Lichtman et al., 2008; Mavrides & Nemeroff, 2013).

Providers and staff should educate patients and families on the potential impacts of depression on their health and quality of life. Patients and families should also be educated on the importance of compliance with treatment regimens in the successful treatment of depression. During this quality improvement project, providers documented counseling the patients with depression 100% of the time.

Psychoeducational counseling and intervention have been found to reduce anxiety and depression in patients with cardiovascular disease, and educational interventions increase patient and family satisfaction (Agren et. al., 2014). When the families and the patients are well-informed, there is a basis for fruitful and effective communication between them and the healthcare professionals leading to increased compliance to treatment regimens and overall better outcomes (Agren et al., 2014).

5.4 Recommendations for Research

Adequately powered and randomized clinical trials remain necessary to develop refinements in screening tools and collaborative care models which can lead to even greater improvements in mental health and function in patients with CVD (Huffman, et al., 2014). Researchers suggest that further research efforts to address increased mortality in depressed patients with cardiovascular illnesses should focus on processes that impact cardiac functional status (Huffman, et al., 2014). Additional research is needed to properly characterize evidence-based care of patients with comorbid depression and cardiovascular disease. Also, more trials are needed before the recognition and treatment of depression becomes part of the routine clinical care of patients with cardiovascular disease due to several factors including time constraints in primary care practice and lack of standardized depression screening across specialties.

Randomized controlled trials are warranted to examine existing and newer depression treatment strategies in patients with cardiovascular disease. In one clinical trial, sertraline led to improvement in depressive symptoms without any increased risk of adverse cardiac events (Shapiro, et al., 1999). However, data on potential harms such as adverse effects of antidepressants in patients with cardiovascular disease are quite

limited. The new RCTs should be designed with extended periods of follow-up that enable more complete ascertainment of side effects and potential harm of antidepressant use. More trials such as these are needed to examine the effect of SSRIs and other available treatments on mortality and cardiac events.

5.5 Recommendations for Health Policy

According to *Healthy People 2020*, the burden of mental illness in the United States is among the highest of all diseases, and mental disorders are among the most common causes of disability (USDHHS, 2014). The *Healthy People 2020* goal is to "improve mental health through prevention and by ensuring access to appropriate, quality mental health services" (2014). The U.S. Preventive Services Task Force (2010) recommends screening adults for depression when staff-assisted depression care supports are in place to assure accurate diagnosis, effective treatment, and follow-up. Persons at increased risk of depression are considered at risk throughout their lifetime, and groups at increased risk include persons with chronic medical diseases such as cardiovascular disease (USPSTF, 2010). Chronically ill Medicare beneficiaries with accompanying depression have significantly higher health care costs than those with chronic diseases alone (Unützer, 2009).

Several recent changes in healthcare policy have promoted access to mental health for the population; however, there continues to be a significant gap in care for people with mental health disorders in the United States (CDC, 2011). These changes include detection and treatment of depression in patients with comorbid chronic illnesses and older adults. The 2005 White House Conference on Aging adopted a resolution to improve recognition, assessment, and treatment of mental illness and depression among

older Americans (CDC, 2011; WHCOA, 2005). Medicare Part B covers one depression screening per year, and these screenings must be administered in a primary care setting that can provide follow-up treatment (CMS, 2017).

Limited access to care continues to be a problem for people with mental health disorders in the United States. Barriers to care include mental healthcare provider shortages. Although healthcare reform has reduced the rates of uninsured adults, many adults in the United States remain uninsured which presents another barrier to care. It is important to support all levels of government to adopt mental health policies and to integrate mental health policy into public health policy and general social policy.

As the Federal Government continues to implement the health reform legislation, it will bring attention to providing services for individuals with mental health disorders, including new opportunities for access to and coverage for treatment and prevention services (USDHHS, 2014). It would be beneficial to ensure mental health is included in generic health reforms that are occurring, such as development of health information systems, quality improvement initiatives, basic training and continuing education standards, and accreditation procedures. Health policy should promote population-level depression screening programs based on the literature and current screening guidelines. Mental health reform policies should also seek to improve the current grant program related to integration of mental health and primary care with a new approach to drive significant reforms that improve care and health outcomes for patients with mental health disorders. Primacy care providers should have incentives to screen routinely per current guidelines such as those of the USPSTF (2010).

5.6 Limitations

With regard to limitations of the quality improvement project, the sample size was relatively small (n=51), and this may increase threats to external validity of the project. The patients were chosen by appointment date, which increased randomization, thereby minimizing threats to the internal validity of the project. The results of the screening surveys and implemented interventions were similar between both practices, which increases the generalizability of the results and recommendations from the project. The length of time for the project was a significant limitation to this study, allotting the providers only 2 months to implement the depression screening tool and treatment plan for the patients.

5.7 Conclusion

Despite the devastating consequences, comorbid cardiovascular disease and depression remain poorly recognized and treated (Paz-Filho, 2010; Lichtman et al., 2008). Primary care providers are called upon to improve their recognition of depression in their patients and assure prompt treatment is initiated in these patients (Lichtman et al., 2008). There is a vast literature on depression in cardiovascular patients, and recommendations have been made for providers in primary care practices with the purpose of standardizing routine screening for depression in cardiovascular patients in primary care. Based on the evidence and findings of this project, recommendations include screening for and treatment of depression in these patients, as well as recommendations for provider, staff, patient, and family education throughout the screening and treatment processes (Lichtman et al., 2008; Mavrides & Nemeroff, 2013; Agren et. al., 2014).

With regard to screening tools, the PHQ-2 and PHQ-9 questionnaires are the most brief, sensitive, and specific depression screening tool for patients with cardiovascular disease (Ceccarini, et al., 2014; Mavrides & Nemeroff, 2013). The PHQ-9 is based directly on DSM-IV diagnostic criteria for major depression, and this tool has shown to be valid and reliable after having been widely utilized in studies with cardiac patients (Stafford et al., 2007).

Multiple safe treatment options exist for patients who test positive for depressive symptoms with SSRIs being shown as especially safe and effective in patients with cardiovascular disease (Davidson, et al., 2010; Mavrides & Nemeroff, 2013). Also, recommendations have been made for further research into this area of study in order to support standardized screening protocols that might facilitate improved processes for patients with depression with cardiovascular disease in all primary care settings (Huffman et. al., 2014).

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Wang, W., Lopez, V., Chow, A., Chan, S., Cheng, K. K. & He, H. (2014). A randomized controlled trial of the effectiveness of a self-help psychoeducation programme on outcomes of outpatients with coronary heart disease: study protocol. *Journal of Advanced Nursing*, *70*(12): 2932–2941. doi: 10.1111/jan.12397.

Appendix A: Evidence Table

Brief Reference, Type of study, Quality rating	Methods	Threats to validity/ reliability	Findings	Conclusions
Mavrides, N. & Nemeroff, C. (2013). Treatment of depression in cardiovascular disease. *Depression and Anxiety*, 30: 328-341. doi: 10.1002/da.22051. Systematic Review of RCTs Level I Evidence Quality Rating: A – High Quality	Systematic Review of 61 randomized controlled clinical trials. PubMed and PsycINFO databases were searched through July 2012. No trials were excluded, and the studies included were primarily from North America and Europe. The search was completed with key words of antidepressants, CVD, coronary artery syndrome, SSRIs, depression, treatment of depression, post-MI, major depression, and cardiac disease.	Internal Validity: The studies contained in this review are randomized control clinical trials, and this helps to minimize threats to internal validity. The authors stated that they limited search results to the English language. By limiting to English only, the researchers risk biasing the amount of research they may find with regard to their research topic. External Validity: The number of studies reviewed is 61, which should help to limit threats to external validity. The results were consistent across all studies increasing the generalizability of the results to the general population. Reliability: The authors displayed their results of all utilized clinical trials in an evidence table, and discussed odds ratios (OR), effect	A total of 61 articles and book chapters were included. There is strong evidence for a bidirectional association between depression and CVD. Short-term treatment of depression with TCAs is relatively safe in patients with ischemic heart disease, heart failure, or previous MI. In general, the SSRIs are safe and probably effective in treating depression in patients with ischemic heart disease.	There is considerable evidence from these randomized controlled clinical trials that antidepressants, especially SSRIs, are safe in the treatment of major depression in patients with CVD. Although efficacy has been demonstrated in some, but not all, trials for both antidepressants and certain psychotherapies, large, well-powered trials are urgently needed.

		sizes, and confidence intervals (CI) for the trials. The researchers compared the results of each study, which limits threats to reliability in this review.		
Peters, R., Pinto, E., Beckett, N., Swift, C., Potter, J., McCormack, T., … Bulpitt, C. (2010). Association of depression with subsequent mortality, cardiovascular morbidity and incident dementia in people aged 80 and over and suffering from hypertension. Data from the Hypertension in the Very Elderly Trial (HYVET). *Age and Ageing*, 39: 439-445. doi: 10.1093/ageing/afq042. Randomized Control Trial	Double-blind RCT of 2,656 participants. The HYVET was a randomized double-blind, placebo-controlled trial and employed an antihypertensive treatment regimen of indapamide sustained release 1.5 mg with the optional addition of perindopril 2–4 mg. Ethical and regulatory approvals were obtained prior to data collection. Depression scores were collected using the 15-item GDS administered as part of a Quality of Life (QoL) questionnaire at baseline and annually thereafter.	Internal Validity: This was a double-blind RCT; therefore, the subjects were randomly assigned to experimental and control groups, and the subjects and providers were kept blind to the study group. Double-blinding helps to significantly minimize threats to internal validity by reducing selection bias (Dearholt & Dang, 2012). External Validity: This was a large study of 2,656 participants, and this minimizes threats to validity. The subjects in each of the groups were similar with regard to demographic and baseline clinical variables, which makes the results more generalizable. Baseline demographics were clearly displayed in a table to complement the discussion in the article. Although participants were unable to enter the study if they required nursing care, the researchers did not collect rigorous information about activities of daily living, disability levels or maintenance of social networks, socioeconomic status or activity level.	The researchers found that a GDS score of ≥6 was associated with an increased risk of all-cause and cardiovascular mortality and cardiovascular morbidity. Mood was found to be worse in those who previously had a cardiac event. GDS score ≥6 was associated with increased risks of all-cause (HR 1.8, 95% CI 1.4–2.3) and cardiovascular mortality (HR 2.10, 95% CI 1.5–3.0), all stroke (HR 1.8, 95% CI 1.2–2.8) and all cardiovascular events (HR 1.6, 95% CI 1.2–2.1). Risk of incident dementia also tended to be increased (HR 1.28, 95% CI 0.95–1.73).	Depressed mood is common in older people with hypertension. Higher depression scores were associated with an increased risk of a subsequent cardiovascular event, mortality and possibly dementia. The researchers suggest that further studies would require replication and exclusion of some alternative possibilities (such as following up a population known to be free of vascular disease or disability at

Level I Evidence Quality Rating: A – High Quality		Therefore, there is the potential for uncontrolled confounding from unmeasured factors. This limits generalizability and presents possible threats to validity. Reliability: Hazard ratios (HR) and confidence intervals (CI) were discussed in-depth, along with p-values. The treatment effect was large (level of significance), and the treatment is precise (CI). The large sample also minimizes threats to reliability. All results were clearly displayed in tabular form.		baseline, or carefully controlling for the confounding effect of disability) before testing in an intervention trial.
Huffman, J.C., Mastromauro, C. A., Beach, S. R., Celano, C. M., DuBois, C. M., Healy, B. C., … Januzzi, J. L. (2014). Collaborative care for depression and anxiety disorders in patients with recent cardiac events: The management of sadness and anxiety in cardiology (MOSAIC) randomized clinical trial.	This is a single-blind randomized clinical trial, with study assessors blind to group assignment, from September 2010 through July 2013 of 183 patients admitted to inpatient cardiac units in an urban academic general hospital for acute coronary syndrome, arrhythmia, or heart failure and found to have clinical	Internal Validity: This is a single-blind study with randomized assignment to the experimental and control groups. Study assessors were kept blind to the study group. Baseline sociodemographic and medical data were collected from the electronic medical record by blinded study staff and from patients prior to randomization. External Validity: Unfortunately, this study was not powered by an appropriate sample size, which increases the threat to external validity. The internal and external validity of the findings are strengthened by concurrent identification and management of multiple psychiatric conditions, inclusion of patients with multiple cardiac diagnoses to include a substantial proportion of patients admitted to	Patients in the intervention group were found to have improvements in depressive symptoms and general functioning as compared to the control group at the end of the 24-week period. Patients randomized to CC had significantly greater estimated mean improvements in SF-12 MCS at 24 weeks (11.21 points [from 34.21 to 45.42] in the CC group vs 5.53 points [from 36.30 to 41.83] in the control group;	Collaborative care (CC) models for mental health conditions use nonphysician care managers (CMs) to systematically identify disorders, perform longitudinal assessments, and coordinate stepped treatment recommendations between mental health specialists

JAMA Internal Medicine, *174*(6): 927-935. Randomized Control Trial Level I Evidence Quality Rating: B – Good Quality	depression, generalized anxiety disorder, or panic disorder on structured assessment. In this study, 92 patients were randomized to the intervention group and 91 to the control group (usual care group).	a typical cardiac unit, use of patient preference in treatment, inclusion of patients (10%) who declined treatment as part of the intent-to-treat design, and centralized post-discharge care management by telephone. Reliability: Results were displayed in tabular form. Confidence intervals and effect sizes were discussed by the researchers. The effect sizes of the intervention on mental quality of life, depression, and function were moderate (0.34 to 0.61), and the effect size on depression (0.45) is at the upper end of the range seen in typical collaborative care depression interventions. These results add to the reliability of the study and minimize threats.	estimated mean difference, 5.68 points [95% CI, 2.14-9.22]; *P* = .002; effect size, 0.61). Patients receiving CC also had significant improvements in depressive symptoms and general functioning, and higher rates of treatment of a mental health disorder; anxiety scores, rates of disorder response, and adherence did not differ between groups.	and primary medical providers. Collaborative care and related care management interventions for depression have improved treatment and outcomes in a variety of populations, including patients with CVD. Adequately powered and randomized trials remain necessary to determine whether refinements to this model can lead to even greater improvements in mental health and function.
Davidson, K. W., Rieckmann, N., Clemow, L., Schwartz, J. E., Shimbo, D.,	A 3-month observation period to identify patients with ACS and persistent	Internal Validity: This was a randomized study, which minimizes threats to internal validity. It was a single-blind trial in which patients were not blinded to their treatment	At the end of the trial, the proportion of patients who were satisfied with their depression care was higher	Enhanced depression care for patients with ACS was associated

Medina, V., … Burg, M. M., (2010). Enhanced depression care for patients with acute coronary syndrome and persistent depressive symptoms: coronary psychosocial evaluation studies randomized controlled trial. *Archives of Internal Medicine, 170*(7):600–608. doi:10.1001/archinternmed.2010.29. Randomized Controlled Trial Level I Evidence Quality Rating: B – Good Quality	depressive symptoms was followed by a 6-month single-blind randomized controlled trial. From January 1, 2005, through February 29, 2008, 237 patients with ACS from 5 hospitals were enrolled, including 157 persistently depressed patients randomized to intervention (initial patient preference for problem-solving therapy and/or pharmacotherapy, then a stepped-care approach; 80 patients) or usual care (77 patients) and 80 non-depressed patients who underwent observational evaluation.	status for ethical reasons; however, outcome assessors were blinded. External Validity: The patients selected for this trial did not include all patients with ACS. Researchers excluded those with cognitive impairments, other life-threatening conditions, and, most importantly, other psychiatric conditions such as alcohol or other drug dependence and bipolar disorder. Because these comorbid conditions are highly prevalent in depressed patients, the findings may not be applicable to all patients with ACS and depressive symptoms. This limits generalizability. Reliability: The researchers discussed odds ratios (OR), confidence intervals (CI), and levels of significance for their findings. They discussed the treatment effect and preciseness of the intervention. This minimizes threats to reliability.	in the intervention group (54% of 80) than in the usual care group (19% of 77) (OR, 5.4; 95% confidence interval [CI], 2.2–12.9 [*P*<.001]). The Beck Depression Inventory score decreased significantly more (*t*155=2.85 [*P*=.005]) for intervention patients (change, −5.7; 95% CI, −7.6 to −3.8; *df*=155) than for usual care patients (change, −1.9; 95% CI, −3.8 to −0.1; *df*=155); the depression effect size was 0.59 of the standard deviation. At the end of the trial, 3 intervention patients and 10 usual care patients had experienced major adverse cardiac events ([*P*=.047]), as well as 5 non-depressed patients (6%) (for the intervention vs non-depressed cohort, [*P*=.49]).	with greater satisfaction, a greater reduction in depressive symptoms, and a promising improvement in prognosis. The researchers suggest that further trials of enhanced depression care are required to determine whether this type of treatment can improve post-ACS prognosis.

Wang, W., Lopez, V., Chow, A., Chan, S., Cheng, K. K. & He, H. (2014). A randomized controlled trial of the effectiveness of a self-help psychoeducation programme on outcomes of outpatients with coronary heart disease: study protocol. *Journal of Advanced Nursing*, *70*(12): 2932–2941. doi: 10.1111/jan.12397. Randomized Controlled Trial with Repeated Measures Level I Evidence Quality Rating: B – Good Quality	In this proposed randomized controlled trial, a convenience sample of 128 coronary heart disease outpatients will be recruited from a tertiary hospital in Singapore. Participants are randomly assigned to the 4-week experimental group and will participate in the program or the control group who will not participate in the program. The outcome measures include the: 12-item Short Form Health Survey, Perceived Stress Scale, Hospital Anxiety and Depression Scale and General Self-Efficacy Scale. Data will be collected at baseline, then 4 and 16 weeks from baseline. At the end, a process	Internal Validity: As the researchers discuss, the best way to minimize confounding bias is through the use of randomization. The RCT proposed for this study will overcome this limitation and minimize threats to internal validity. External Validity: There are many factors that could influence the results of this study and its generalizability, such as duration of illness, age and educational level. Reliability: In the statistical point of view, confounding variables can be dealt with using multivariate repeated measure ANCOVA. The authors discuss that confounding variables will be controlled as covariates in the model for analysis. These measures will help to minimize threats to reliability as well as validity of the study.	This RCT was proposed and received grant funding in July 2013. According to the researchers, nature of this program will benefit both healthcare providers and patients. For patients, this program affords them the flexibility to carry out their recovery at their own time. The program also may help patients save money (e.g. transportation, program charges) and time when compared with attending hospital-based rehabilitation programs. For the healthcare providers, the independent nature of this program will greatly reduce the amount of contact time with patients, which allows them to spend more time with patients who require their attention, for example patients with acute myocardial infarction. This will result in a more efficient use of health resources in the long run. Eventually, this program	The proposed study is in line with the global trend in promoting self-management for chronic health conditions. To the best of research team's knowledge, this is the first RCT in the region that incorporates a home-based self-help psychoeducation approach for CHD patients and evaluates its effectiveness on patients' outcomes, including HRQoL, psychological status, cardiac risk factors and health service use. The proposed RCT will make a significant contribution to the current knowledge of the effectiveness

	evaluation will be conducted to assess the acceptability, strengths and weaknesses of our program based on the participants' perspectives.		aims to be available for all CHD patients living in the community.	of home-based self-help programs. The process evaluation included in this study will help the research team understand the strengths and weaknesses of this program. If this home-based self-help psychoeducation program is effective, it can be an option for CHD patients in addition to existing cardiac rehabilitative services.
Agren, S., Berg, S., Svedjeholm, R., & Stromberg, A. (2014). Psychoeducational support to post cardiac surgery heart failure patients and their	Pilot study with a randomized controlled design which included a total of 42 patient-partner completed baseline assessments for evaluating psychosocial support	Internal Validity: The 42 patient-partner dyads that chose to participate were randomized to either the experimental or control groups. Randomization minimizes threats to internal validity. External Validity: There was relatively a small sample of couples in this study, and	Partners in the intervention group increased health in the role emotional and mental health dimensions, and patients increased health in vitality, social function, and mental health dimensions as compared with the control group.	The results of this study suggest that psychoeducational support from a multidisciplinary team to post cardiac surgery heart failure dyads improves health

partners—A randomized pilot study. *Intensive and Critical Care Nursing, 31*: 10-18. doi:10.1016/j.iccn.2014.04.005. Pilot study with a randomized controlled design. Level I Evidence Quality Rating: B – Good Quality	and education from an interdisciplinary team approach. Patients with postoperative health failure and their partners were chosen to participate in 3 month and 12 month follow up phone interviews. Randomization was performed using a random-number table with block of 12. Several questionnaires were used, including a demographic questionnaire, Charlson Comorbidity Index, SF-36, Beck Depression Inventory, and Perceived Control.	this is a threat to external validity. There were some inter-group differences and outcomes, which would limit generalizability. Reliability: The researchers discussed the levels of significance for their results and placed these results in a table. The small sample size may have influenced that the difference between the groups did not reach statistical significance. This is a threat to reliability. As the researchers discuss, this was only a pilot study, and larger studies need to be undertaken.	Patients' perceived control improved significantly in the intervention group over time.	and perceived control in patients after 3 and 12 months. These results also suggest that interventions focusing on psychoeducational support can improve the life situation for the patient-partner and especially for the patients. Psychoeducational support appears to be a promising intervention but the results need to be confirmed in larger studies.
Grace, S. L., Grewal, K., Arthur, H. M., Abramson, B. L., & Stewart, D. E. (2008).	A prospective, controlled quasi-experimental 157 female cardiac	Internal Validity: Given the nonrandom study design, causal conclusions about the changes realized for female heart patients	Researchers found that 51 (45.1%) of the women self-reported participating in CR at 1 of 18 sites, and site-	Following a cardiac event, female patients improved their

A Prospective, Controlled Multisite Study of Psychosocial and Behavioral Change Following Women's Cardiac Rehabilitation Participation. *Journal of Women's Health*, *17*(2): 241-248. doi: 10.1089/jwh.2007.0519. Prospective, Controlled Quasi-Experimental Design Level II Evidence Quality Rating: A – High Quality	inpatients from three hospitals consented to participate in a prospective study, and 110 (79%) were retained 18 months post-discharge. A mailed survey discerned CR participation 9 months post-discharge. Quality of life (Short-Form Health Survey Physical and Mental Component Summary [SF-12 PCS and MCS]), exercise behavior (Health-Promoting Lifestyle Profile II [HPLPII]), Exercise Benefits and Barriers Scale (EBBS), and anxiety and depressive symptoms (Hospital Anxiety and Depression Scale [HADS]) were assessed in hospital	cannot be drawn. Non-randomization increases the threat to internal validity. External Validity: Generalizability is limited by the selection biases and differences between CR participants and nonparticipants. In particular, and as shown in other studies, 49, 51, 52 CR participants were more likely to have had ACS or an ACB than a PCI and were better educated than nonparticipants. Also, because of the small number of women in the sample, lack of power may be masking changes. Reliability: The use of self-report measures is open to social desirability bias and other errors in reporting. Specifically, self-report of exercise behavior may be biased. The method through which the results were obtained poses a threat to reliability.	verified participation was 82.43% _ 29.97% of prescribed sessions. For CR participants, paired *t* tests assessing change from hospitalization to 18 months post-discharge revealed significant improvements in physical quality of life (p _ 0.001), anxiety (p _ 0.05), and exercise behavior (p _ 0.01). Women who did not participate in CR experienced significant improvements in physical quality of life (p _ 0.02), and depressive symptoms (p _ 0.03) but not exercise behavior.	physical quality of life and affect, but only patients who participated in CR increased their exercise behavior. Given the cardiac benefits of exercise and that women are often sedentary and given that this exercise behavior was sustained post-CR, these findings are significant. A sufficiently powered randomized controlled trial of women's outcomes after CR participation is greatly needed.

	and 18 months post-discharge.			
McGuire, A. W., Ahearn, E. & Doering, L. V. (2015). Psychological distress and cardiovascular disease. *Journal of Clinical Outcomes Management, 22*(9), 421-432. Systematic Review Level II Evidence Quality Rating: B – Good Quality	Systematic Review of relevant and current (2005–2015) clinical trials was performed by a series of searches conducted in the PubMed and PsychINFO databases using Boolean terms/phrases along with manual extraction from the reference lists of pertinent studies. The researchers narrowed their results and utilized 18 relevant articles for this study.	Internal Validity: All studies included were experimental clinical trials; however, not all studies utilized randomization. Non-randomization increases the threat to internal validity through bias. External Validity: The researchers presented results from 18 studies, which is a small number of studies and potentially presents a threat to external validity. The results were consistent across all studies increasing the generalizability of the results to the general population. Reliability: The authors displayed their results of all utilized clinical trials in an evidence table, and discussed odds ratios (OR), confidence intervals (CI), and p-values for the trials. The significance (ORs, effect sizes, level of significance) of the treatment effects and the preciseness (CI) of the studies utilized limit threats to reliability.	Screening for psychological distress in CVD is recommended. Referral and treatment issues need further exploration. Pharmacologic treatment of psychological distress in CVD remains equivocal; however, promising data exists for other therapies such as cognitive behavioral therapy and social support strategies.	Psychological distress has a significant negative impact on patients with CVD and is under-recognized by health care providers. Primary care providers and cardiovascular specialty providers are called upon to improve their recognition of psychological distress in their patients and assure referrals are made to collaborative care teams for proper diagnosis and treatment.
Stafford, L., Hons, M. A., Berk, M., & Jackson, H. J. (2007).	Participants were recruited between May 2005 and March	Validity: The internal consistencies of the results were excellent. In terms of the generalizability of these findings, this study	One hundred and ninety-three of the recruited patients	Criterion validity for the PHQ-9 and HADS was good,

Validity of the hospital anxiety and depression scale and patient health questionnaire-9 to screen for depression in patients with coronary artery disease. *General Hospital Psychiatry*, *29*(5): 417-424. doi:10.1016/j.genhosppsych.2007.06.005 Quasi-experimental study with post-test only design Level II Evidence Quality Rating: A – High Quality	2006 from the Geelong Hospital in Victoria, Australia. All were English-speaking patients who resided permanently in Australia and were hospitalized for percutaneous transluminal coronary angioplasty (PTCA), AMI or coronary artery bypass graft surgery (CABG) during this time were eligible for participation. There were no other exclusion criteria. Two hundred and twenty-nine patients agreed to participate in the study. The HADS and PHQ-9 measures were mailed to participants 3 months post-discharge.	included patients recently hospitalized for cardiac disease. It is unknown whether the results from this analysis would generalize to PHQ-9 and HADS scores among other populations or to patients with other comorbidities. Reliability: A possible limitation of this study is that participants were required to complete two measures of depression in one questionnaire pack. Although other measures were placed between these two instruments, and the structure and content of these two instruments differ, effects of repetition or order cannot be excluded. The use of self-report measures is open to social desirability bias and other errors in reporting. Specifically, self-report of exercise behavior may be biased. The method through which the results were obtained poses a threat to reliability.	(84.3%) completed both the structured clinical interview and the self-report questionnaires. Twenty-eight participants did not return their questionnaires for an unknown reason, 3 withdrew due to physical illness and 4 withdrew due to depression. Thirty-five participants met diagnostic criteria for major depression (male=24; female=11), 13 for minor depression (male=10; female=3) and 6 for dysthymia (male=6; female=0), corresponding to a 3-month post-discharge depression rate of 28%. Nine (4.7%) of the 193 participants met criteria for both major depressive disorder and dysthymia, so-called "double depression". The internal consistencies for the self-report questionnaires were excellent with Cronbach's α	and both instruments can be recommended to identify any depressive disorder and major depressive disorder in recently hospitalized patients with CAD. Diagnostic superiority of the PHQ-9 over the HADS for major depressive disorder was reported. Both instruments have acceptable properties for detecting depression in recently hospitalized cardiac patients.

			coefficients of 0.90 and 0.81 for the PHQ-9 and HADS, respectively. The intercorrelation between the HADS and PHQ-9 was 0.72.	
Paz-Filho, G., Licinio, J., & Wong, M. (2010). Pathophysiological basis of cardiovascular disease and depression: a chicken-and-egg dilemma. *Revista Brasileira de Psiquiatria*, *32*(2): 181-191. Retrieved from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4259495/pdf/nihms645332.pdf Systematic Review Level III Evidence Quality Rating: B – Good Quality	A systematic literature review of a combination of RCTs, quasi-experimental studies, and non-experimental studies. The reviewers utilized the PubMed database in order to describe the pathophysiological link between cardiovascular disease and depression. The manuscripts included in the article were selected based on their methodological aspects and the strength of their findings.	Validity: Several non-experimental studies were included in the review. This increases the threat to internal validity. The results were consistent across all studies increasing the generalizability of the results to the general population. Reliability: The researchers did not include a specific analysis of the levels of evidence of the studies which they included in their review. This is an increased threat to reliability of the review.	Depression and cardiovascular disease are both highly prevalent. Several studies have shown that the two are closely related. They share common pathophysiological etiologies or co-morbidities, such as alterations in the hypothalamic-pituitary axis, cardiac rhythm disturbances, and hemorheologic, inflammatory and serotoninergic changes. Furthermore, antidepressant treatment is associated with worse cardiac outcomes (in case of tricyclics), which are not observed with selective serotonin reuptake inhibitors.	There is irrefutable evidence that depression and CVD share common pathways. Both of these conditions are stress-reactive disorders of unknown etiology. To minimize morbidity and mortality, it is crucial to understand that MDD and CVD are frequently co-morbid and that both conditions should be treated concomitantly, as the treatment of depression improves the patient's quality of life and their

				adherence to a regimen of medication for CVD.
Sin, N. L., Yaffe, K., & Whooley, M. A. (2014). Depressive symptoms, cardiovascular disease severity, and functional status in older adults with coronary heart disease: The Heart and Soul Study. *Journal of the American Geriatrics Society*, 63: 8-15. doi:10.1111/jgs.13188. Prospective Cohort Study Level III Evidence Quality Rating: A – High Quality	A prospective cohort study designed to examine how psychosocial factors influence clinical outcomes in individuals with coronary heart disease. The sample comprised 960 participants. The severity of depressive symptoms was assessed at baseline and at the 5-year follow-up using the 9-itme Patient Health Questionnaire (PHQ). Cardiovascular severity assessments were obtained at baseline and again at 5 years.	Internal Validity: There was a well-defined and representative sample of patients at similar points of cardiovascular severity. Follow-up was sufficiently long and complete at the end of the 5-year period. These factors minimize threats to internal validity. External Validity: It is unknown whether the findings may be generalized to older populations, such as those aged 75 and older, since the average of patients was 67. The sample was also largely male, and many were veterans, although other characteristics of the sample were representative of individuals with CHD, including ethnic diversity (40% were nonwhite) and a wide range of diagnoses. These factors pose threats to external validity. Also, a number of confounding variables may have been responsible for the association between depressive symptoms and functional decline, although demographic characteristics, BMI, comorbid conditions, and health behaviors were adjusted for, suggesting that these variables did not explain the relationship	Over 5 years, the researchers found higher baseline depressive symptoms predicted greater risk of functional decline, whereas higher baseline exercise capacity was associated with lower risk of functional decline. In 658 of the participants, 5-year changes in depressive symptoms and exercise capacity were associated with 5-year changes in functional status as well.	In older adults with coronary heart disease, depressive symptoms and lower exercise capacity predicted functional decline over 5 years. In contrast, other traditional measures of cardiovascular severity such as angina pectoris were not independently predictive of subsequent functional status. These results suggest that efforts to treat and decrease depressive symptoms may be as important as

		between depressive symptoms and functional status. The researchers attempted to adjust for important confounding variables, but list this as a threat to external validity and a limitation of the study. Reliability: The researchers discuss the magnitude of the relationship between predictors (RR) and the preciseness of the study estimates (CI), which minimize threats to reliability. As the researchers discuss, it is unknown whether the results would differ if more-frequently assessed, short-term relationships, such as associations between changes in angina pectoris and functional status every 6 months, were examined. This poses a threat to the reliability of the results.		treating actual symptoms of cardiovascular disease to enhance functional status.
Eurelings, L. S. M., Ligthart, S. A., van Dalen, J. W., van Charante, E. P., van Gool, w. A., & Richard, E. (2013). Apathy is an independent risk factor for incident cardiovascular disease in	A prospective cohort study of 1810 community-dwelling older individuals (70–78 years of age) without a history of CVD or stroke. Symptoms of apathy and depression were assessed with the 15-item Geriatric Depression Scale.	Internal Validity: There was a well-defined and representative sample of patients at similar points of cardiovascular severity. Follow-up was sufficiently long and complete at the 2-year follow-up. These factors minimize threats to internal validity. External Validity: The large sample size of 1,810 older individuals minimizes threats to external validity, and the results are easily generalizable to patients within the included	Symptoms of apathy and depression were present in 281 (15.5%) and 266 (14.7%) participants, respectively. Incident CVD occurred in 62 (3.5%) participants and stroke in 55 (3.1%) participants. Apathy was associated with incident CVD after adjustment for demographics and	Symptoms of apathy in older persons without a history of cardiovascular disease or stroke are highly prevalent and are strongly associated with incident cardiovascular disease. This

the older individual: a population-based cohort study. *International Journal of Geriatric Psychiatry*, *29*: 454-463. Prospective Cohort Study Level III Evidence Quality Rating: A – High Quality	Incident CVD and stroke were assessed after 2 years follow-up. The associations of symptoms of apathy and depression with incident CVD and stroke were analyzed separately using logistic regression analysis.	age group. The researchers also adjusted for confounding variables, which limits threats to external validity. Reliability: The researchers discussed odds ratios (OR), confidence intervals (CI), and levels of significance for their findings. They discussed the treatment effect and preciseness of the intervention. This minimizes threats to reliability.	cardiovascular risk factors (odds ratio (OR) = 2.60, 95% CI = 1.46–4.65). Exclusion of subjects with depressive symptoms yielded a similar OR (2.94, 95% CI = 1.45–5.96, n = 1544).	association is independent from well-established cardiovascular risk factors and from the presence of depressive symptoms. Therefore, apathy can be considered as an important risk factor for incipient cardiovascular disease. Since the nature of these symptoms may lead to a tendency to withdraw from clinical care, this emphasizes the need for recognition of apathy symptoms in older persons without previous cardiovascular disease or stroke.
Van der Kooy, K., van Hout, H., Marwijk, H.,	Meta-analyses and meta-regression	Internal Validity: The methodological quality of every study utilized for this review	After inclusion and exclusion criteria, 28	The results of this elaborate

Marten, H., Stehouwer, C., & Beekman, A. (2007). Depression and the risk for cardiovascular diseases: systematic review and meta analysis. *International* Journal of Geriatric Psychiatry, *22*: 613-626. doi: 10.1002/gps.1723 Systematic Review and Meta-Analysis of Non-Experimental Studies Level III Evidence Quality Rating: A – High Quality	analyses of longitudinal cohort and case-control studies reporting depression at baseline and CVD outcomes at follow-up. The following databases were utilized in this project: Medline (1966–2005) and PSYCHINFO (1966–2005). The following search terms were used: depression, depressive disorder, depressi* (truncated), cardiovascular diseases, myocardial ischemia, coronary, infarct* (truncated), ischemic, heart diseases.	was independently assessed by two of four reviewers, who were blinded for author and journal. Researchers used a standardized checklist of predefined quality criteria for prognostic cohort and case-control studies, based on the checklist. The checklist comprised 18 items concerning internal validity, generalizability, and precision, which could be scored as positive, negative and unclear. These methods should minimize threats to validity and reliability. The researchers only included published studies and left out unpublished studies. This presents an issue of publication bias which is a threat to validity. External Validity: There were 28 studies contained in this study. Of these the researchers felt that 11 studies were high quality evidence. Reliability: The authors displayed their results of all utilized studies in an evidence table, and discussed odds ratios (OR), confidence intervals (CI), and p-values for the trials. The significance (ORs, effect sizes, level of significance) of the treatment effects	articles were chosen. The risk of depression for CVD onset was higher in populations that were free of CVD at baseline.	systematic meta-analysis and meta-regression analysis confirm that depression is associated with the development of various CVDs in community-dwelling and general practice populations. Depressed mood moderately increased the risk for MI, CHD, cerebrovascular diseases and other CVDs to the same level (1.43–1.63). Only the combined risk of the MI-studies, the group with the strictest IC-10 definition, did not suffer from heterogeneity. There was a great methodological variation among

		and the preciseness (CI) of the studies utilized limit threats to reliability.		the selected studies.
Hare, D. L., Toukhsati, S. R., Johansson, P. & Jaarsma, T. (2014). Depression and cardiovascular disease: A clinical review. *European Heart Journal*, *35*: 1365-1372. Retrieved from: http://eurheartj.oxfordjournals.org/content/ehj/35/21/1365.full.pdf Systematic Clinical Review of experimental studies Level III Evidence Quality Rating: B – Good Quality	Clinical review of five major randomized controlled trials to evaluate the effects of anti-depressant pharmacotherapy on depression in cardiovascular disease settings.	Validity: A total of five randomized control trials were reviewed. The researchers felt that these were all high quality evidence. The five trials included significant numbers of patients ranging from 101 to 2,481. However, the low number of studies included limits the validity of the review. Reliability: The authors clearly displayed the results of all utilized studies in an evidence table, and this limits threats to reliability.	Cardiovascular disease is the leading cause of death, disability, and disease burden in the developed world. Depression is common in CVD patients and is linked to higher mortality and morbidity rates. An American Heart Association Science Advisory suggested that the PHQ screening tools appear to be the most useful in this population of patients.	There is sufficient evidence to support the introduction of exercise, talking therapies, and anti-depressant medications to reduce depression in CVD patients. Although research has yet to clearly and consistently identify cardiovascular benefits in this regard, depression is a fundamental determinant of quality of life in these patients. Many questions remain, and further research is clearly required to unravel potential pathophysiological mechanisms and

				to determine both the best management strategies and the effects on clinical outcomes.
Lichtman, J. H., Bigger, J. T., Blumenthal, J. A., Frasure-Smith, N., Kaufmann, P. G., Lespérance, F., …Froelicher, E. S. (2008). Depression and coronary heart disease recommendations for screening, referral, and treatment: A science advisory from the American Heart Association Prevention Committee of the Council on Cardiovascular Nursing, Council on Clinical Cardiology, Council on	This is a multispecialty consensus document which provides experts' opinions and reviews of the evidence linking depression with CHD and provides recommendations for healthcare providers for the assessment, referral, and treatment of depression. A group of experts reviewed 60 prospective studies and 100 narrative reviews on which they based their conclusions and recommendations for healthcare providers.	Internal Validity: The researchers discuss several non-experimental studies, and this increases threats to internal validity. External Validity: Despite differences in sample sizes, duration of follow-up, and assessment of depression and depressive symptoms, these studies included in the experts' review have demonstrated relatively consistent results. This minimizes threats to validity and increases generalizability. Reliability: The researchers reviewed a large number of articles, and this adds to the reliability of their conclusions and recommendations.	The following recommendations were made by the American Heart Association: At a minimum, the Patient Health Questionnaire (PHQ-2) provides 2 questions that are recommended for identifying currently depressed patients. If the answer is "yes" to either or both questions, it is recommended that all 9 PHQ items (PHQ-9) be asked. For patients with mild symptoms, follow-up during a subsequent visit is advised. In patients with high depression scores, a physician or nurse should review the answers with the patient. There is no evidence that treatments for	The high prevalence of depression in patients with CHD supports a strategy of increased awareness and screening for depression in patients with CHD. Specifically, routine screening for depression in patients with CHD in a variety of healthcare settings and coordination of care among healthcare providers.

Epidemiology and Prevention, and Interdisciplinary Council on Quality of Care and Outcomes Research. *Circulation*, *118*: 1768-1775. doi: 10.1161/circulationAHA.108.190769 Clinical Practice Guidelines Level IV Evidence Quality Rating: A – High Quality			depression are differentially effective in cardiac versus other patients. Evidence also suggests that depressed patients who are not responsive to treatment for depression may be at greater risk for adverse cardiac events. Aggressive cardiologic care may help mitigate this increased risk. Depressed patients may also require additional clinical management to ensure compliance with cardiac treatment regimens and to promote lifestyle behavior change.	

Note: Evidence ratings (Level I-IV) and Quality ratings for the literature are based on Dearholt & Dang's (2012) book *John Hopkins Nursing Evidence-Based Practice: Model and Guidelines.*

Appendix B: Evidence Level and Quality Guide

Evidence Levels	Quality Guides
Level I – Experimental studies, Randomized Control Trials (RCT), Systematic Reviews of RCTs with or without meta-analysis **Level II** – Quasi-experimental studies, Systematic Reviews of a combination of RCTs and quasi-experimental studies, or quasi- experimental studies only, with or without meta-analysis **Level III** – Non-experimental studies, Systematic Reviews of a combination of RCTs, quasi-experimental studies, and non-experimental studies, or non-experimental studies only, with or without meta-analysis Qualitative studies or Systematic Reviews with or without meta-synthesis	**A High Quality**: Consistent, generalizable results; sufficient sample for the study design; adequate control; definitive conclusions; consistent recommendations based on comprehensive literature review that includes thorough reference to scientific evidence. **B Good Quality**: Reasonably consistent results; sufficient sample for the study design; some control, fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence. **C Low Quality or Major Flaws**: Little evidence with inconsistent results; insufficient sample size for study design; conclusions cannot be drawn.
Level IV – Opinions of expected authorities and/or nationally recognized expert committees/consensus panels based on scientific evidence Includes: Clinical Practice Guidelines and Consensus Panels (Adapted from Deaholt & Dang, 2012).	**A High Quality**: Material officially sponsored by professional, public, private, organization, or government agency; documentation of a systematic literature search strategy; consistent results with sufficient numbers of well-designed studies; criteria-based evaluation of overall scientific strength and quality of included studies and definitive conclusions; national expertise is clearly evident; developed or revised within the last 5 years. **B Good Quality**: Material officially sponsored by professional, public, private, organization, or government agency; reasonably thorough and appropriate systematic literature search strategy; reasonably consistent results; sufficient numbers of well-designed studies; evaluation of strengths and limitations of included studies with fairly definitive conclusions; national expertise is clearly evident; developed or revised within the last 5 years. **C Low Quality or Major Flaws**: Material not sponsored by official organization or agency; undefined, poorly defined, or limited literature search strategy; no evaluation of strengths or limitations of included studies, insufficient evidence with inconsistent results, conclusions cannot be drawn; not revised within the last 5 years.

Appendix C: Patient Health Questionnaire Depression Screening Tool

TABLE 1. PATIENT HEALTH QUESTIONNAIRE (PHQ-9)*

Over the last 2 weeks, how often have you been bothered by any of the following problems? (use "✔" to indicate your answer)

	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead, or of hurting yourself in some way	0	1	2	3
add columns:		+	+	
(Health care professional: For interpretation of TOTAL please refer to scoring card below)	**TOTAL:**			

10. If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all _____ Somewhat difficult _____

Very difficult _____ Extremely difficult _____

***PHQ-9 QUICK DEPRESSION ASSESSMENT**

For initial diagnosis:

1. Patient completes PHQ-9 Quick Depression Assessment.
2. If there are at least 4 ✓s in the shaded section (including Questions #1 or #2), consider a depressive disorder. Add score to determine severity.
3. **Consider Major Depressive Disorder** if there are at least 5 ✓s in the shaded section (1 of which corresponds to Question #1 or #2).

   Consider Other Depressive Disorder if there are 2–4 ✓s in the shaded section (1 of which corresponds to Question #1 or #2).

Note: Since the questionnaire relies on patient self-report, all responses should be verified by the clinician. A definitive diagnosis is made on clinical grounds taking into account how well the patient understood the questionnaire, as well as other relevant information from the patient. Diagnoses of major depressive disorder or other depressive disorder also require impairment of social, occupational, or other important areas of functioning (Question #10) and ruling out normal bereavement, a history of a manic episode (bipolar disorder), and a physical disorder, medication, or other drug as the biological cause of the depressive symptoms.

To monitor severity over time for newly diagnosed patients or patients in current treatment for depression:

1. Patients may complete questionnaires at baseline and at regular intervals (e.g., every 2 weeks) at home and bring them in at their next appointment for scoring, or they may complete the questionnaire during each scheduled appointment.
2. Add up ✓s by column. For every ✓: "Several days" = 1; "More than half the days" = 2; "Nearly every day" = 3.
3. Add together column scores to get a TOTAL score.
4. Refer to the PHQ-9 Scoring Card (at right) to interpret the TOTAL score.
5. Results may be included in patients' files to assist you in setting up a treatment goal, determining degree of response, as well as guiding treatment intervention.

PHQ-9 SCORING CARD FOR SEVERITY DETERMINATION

for health professional use only

Scoring — add up all checked boxes on PHQ-9

For every ✓: Not at all = 0; Several days = 1; More than half the days = 2; Nearly every day = 3.

Interpretation of Total Score

Total Score	Depression Severity
1–4	Minimal depression
5–9	Mild depression
10–14	Moderate depression
15–19	Moderately severe depression
20–27	Severe depression

This PHQ-9 questionnaire is also available at www.depression-primarycare.org/clinicians/toolkits/materials/forms/phq9/

Appendix D

Stetler's Model of Evidence-Based Practice