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Enhanced Depression Screening in the Cardiac Rehabilitation Setting An Evidence-Based Project

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Enhanced Depression Screening in the Cardiac Rehabilitation Setting

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Abstract

Depression is common amongst patients with cardiovascular disease. This evidence-based project was designed to evaluate the impact of a practice improvement intervention for screening and referrals in cardiac patients with depression. The American Heart Association Advisory Council recommends depression screening, treatment, and support to provide adequate diagnosis, treatment, and follow-up to patients. Cardiac rehabilitation (CR) is a coordinated effort of structured treatments with physical, mental, and social components, to favorably influence cardiac healing and resume optimal functioning. The problem is current depression screening and referrals are not being documented electronically in the cardiac rehabilitation (CR) setting limiting real-time communication amongst the healthcare team. Descriptive data (number of patients screened, positive screens documented, and number of appropriate referrals completed electronically) will be collected and evaluated. This project successfully implemented a new electronic Patient Health Questionnaire 2-9 (PHQ2-9) depression and referral screening document flowsheet. A 30-day post intervention chart audit revealed a 97% documentation improvement rate for PHQ2-9 surveys. 11% of the patients screened positive for moderate depression. 27% of those patients received a documented referral. Improving the current charting system to an electronic charting system should enhance communication between members of cardiac multidisciplinary team to improve patient care. Further research and staff education need to occur to align patients with moderate to severe depression with a referral. The overall goal of this project was to provide the best evidence for practice improvement in depression care for patients with cardiac disease.

Keywords: Depression, cardiovascular disease, cardiac rehabilitation, Patient Health Questionnaire 2-9.

SECTION 1: INTRODUCTION

Cardiovascular disease is the leading cause of morbidity and mortality in women and men (Hurley, Arthur, & Chessex; Oh, Turk-Adawi, & Grace, 2017). Depression in patients with cardiovascular disease (CVD) is linked to worse outcomes (Schnabel et al., 2013; Sundboll et al., 2016Whooley, 2006; Yu, Park, & Son, 2017). Although depression is found in 5% of the general population, it is found in 20-30% of cardiovascular patients (Bradley & Rumsfeld, 2015). Depression screening guidelines have been recommended, but systematic intervention implementation is lacking in most hospitals leading to unrecognized depression (Larsen, Vestergaard, Sondergaard, & Christensen, 2013). Improving the current charting system to an electronic charting system should enhance communication between members of the cardiac multidisciplinary team and improve screening, referrals, and treatment of patients who screen positively for depression. Understanding the mechanisms in practice guideline gaps for depression in the cardiac rehabilitation setting, may guide opportunities to intervene.

Collaborative care is an evidence-based approach to depression care with the key facilitator being enhancing inter-professional communication through standardized care conduits (Wood, Ohlsen, & Ricketts, 2017). The cardiac team needs to be informed in a timely fashion of depression screening results to better care for patients. The problem is current depression screening and referrals are not documented electronically in the cardiac rehabilitation (CR) unit. The identified areas of improvement include increased nurses' knowledge of the purpose of the PHQ2-9 and the transition to electronic documentation of depression screening and referrals. The two interventions included a PHQ2-9 nursing educational session evaluated by a pre and post educational survey and the implementation of an electronic PHQ2-9 depression screening document flowsheet evaluated by a post-chart audit. After implementation of the two

interventions, there was an increase in nursing knowledge and an increase in electronic documentation of PHQ2-9 surveys and referrals.

Background

By 2020, the World Health Organization (2018) predicts depression will be the second major disability adjusted life years lost. Less than 25% of patients with depressive symptoms are recognized by their providers (Meurs, Zuidersma, Dickens, & DeJong, 2013). Depressive symptoms are linked to a decrease in positive self-care behaviors including medical adherence, exercise, and diet control (Dias & Koike, 2013). Depression can have extreme effects on social functioning and physical effects through associations with cardiovascular disease (Daskalopoulou et al., 2016). Patients with depression are less adherent to medical treatment, have higher rates of premature death, and use health care services at a significantly higher rate (Clark et al., 2016).

Cardiovascular disease (CVD) is a chief cause of mortality and morbidity in men and women globally (Hurley et al., 2017). Currently, CVD accounts for 17.3 million deaths per year and is expected to rise to 23 million by 2030 (Moodie, 2016). Locally, CVD is the leading cause of death for North Carolina residents (House, Stevens, & Whiteman et al., 2016). Not only is CVD a leading cause of death, but also accounts for 10% of the disability adjusted quality of life (DALYs) worldwide (Abraham et al., 2016). In a recent study, 19.3% of myocardial infarction patients were readmitted with heart failure accounting for 15% of adult hospitalizations (House et al., 2016).

In patients with CVD, depression is common, associated with recurrent readmissions and worse related quality of life (Huffman, Celano, Beach, Motiwala, & Januzzi, 2013). Depression remains under-recognized and undertreated in patients at risk for or living with CVD (Meurs et

al., 2013). As a result, a large number of CVD patients may suffer from depressive symptoms, worse quality of life, and potentially worse CV outcomes due to a failure to recognize concurrent depression (Meurs et al., 2013). Together these studies implicate a strong relationship among depression, increased cardiovascular risk, and poor cardiovascular outcomes (Bradley & Rumsfeld, 2015). Despite the accessibility of easy to use screening and treatment instruments, depression is often unrecognized and undertreated in patients with CVD (Huffman et al., 2013).

The American Heart Association (AHA) recommends routine screening of all cardiac patients with the evidence-based PHQ2-9 (Huffman et al., 2013; Kroenke & Spitzer, 2002). The PHQ2-9 is a self-reported screening tool measuring frequency of depressed mood and anhedonia for DSM-IV depression criteria (Kroenke & Spitzer, 2002). The PHQ 2-9 is the depression screening tool used in the CR setting at New Hanover Regional Medical Center (NHRMC). The PHQ2 includes the first two questions that relate to depressed mood in the last two weeks and the PHQ-9 includes an additional seven questions related to the nine diagnostic criteria for major depressive disorder (MDD) (Huffman et al., 2013). Pfizer allows unrestricted use and free public access of the PHQ 2-9 questionnaire to improve mental health diagnosis and patient care (Pfizer.com, 2010).

The clinical scenario that prompted this project was the inability of a multidisciplinary cardiac team (MDCT) to access patient depression screening and referral information electronically. Cardiac rehabilitation (CR) is an evidence-based intervention recommended for patients with CVD to prevent recurrent events (Abraham et al., 2016). CR is a coordinated effort of structured treatments with physical, mental, and social components, to favorably influence cardiac healing and resume optimal functioning (Edmunds, 2012). A

strong body of evidence demonstrates a reduction of cardiac mortality, cardiac readmissions, and repeat cardiac events following cardiac rehabilitation (Edmunds, 2012).

EPIC is the medical electronic software used by the research facility for medical records in the in-patient and out-patient setting. The current CR depression screening protocol is the PHQ2-9 is completed by the patient at home and hand delivered to the CR admission staff. The CR admitting nurse notifies the primary care provider (PCP) for a PHQ2-9 score of 10 or more. The referral is made by a telephone conversation to the PCP and documented in the CR paper charting system. For a PHQ2-9 score of 10 or more, the nurse will make an appointment with the in-house Licensed Clinical Social Worker (LCSW) and document this appointment in the CR paper charting system. The progress notes from the LCSW are not shared electronically with the cardiac team. The referral to the PCP and the LCSW is not documented electronically in the EPIC charting system so the entire multidisciplinary team is unable to access or visualize the depression care process. In the NHRMC's outpatient care settings, the PHQ2-9 EPIC document flowsheets are currently in use. The cardiac rehabilitation unit, which is considered an out-patient facility, does not incorporate the PHQ2-9 electronic flowsheet offered through EPIC.

Problem Statement

Depression is frequently experienced by cardiac patients ranging from 20-30% depending on the assessment method, clinical setting, disease severity, and patient gender (Ski et al., 2012). Considering the high prevalence of depression symptoms in cardiovascular patients and their undesirable effects on prognosis, particular timely attention must be paid to patients and all members of the care team need time access to accurate patient information. Optimal approaches to addressing depression in the CR unit need to be identified and bridge the gap between PCPs

and outpatient CR facility. A structured approach using the electronic medical record (EMR) will improve compliance with clinical practice guidelines for the evaluation and management of cardiac patients with depression.

Purpose

This purpose of this project was to improve electronic documentation of depression screening and treatment in the cardiac rehabilitation setting through an evidence-based intervention.

Clinical Questions

Will implementation of an electronic PHQ2-9 survey flowsheet increase results and referrals documented? Will an educational module improve nursing knowledge of the purpose and American Heart Association's recommendations for the PHQ2-9?

CHAPTER 2: LITERATURE REVIEW

A literature review was conducted through an electronic data base using PUBMED, the Cochrane Library, CINHAL Plus, ProQuest Central, and ProQuest Nursing and Allied Health. Search terms and phrases were *depression, depression and cardiovascular disease, depression screening for cardiovascular disease, PHQ-9,* and *Cardiac Rehabilitation*. The range of research methodologies reviewed included cohort studies, longitudinal studies, systematic reviews, meta-analysis reviews, prospective cohort studies, and descriptive observation studies. The list of articles was narrowed to 34 full text articles written in English. Publication dates were narrowed to in 5 years unless the article contributed significantly to the outcomes of this project. The Melnyk and Fineholt-Overholt Level of Evidence served as the guide for article leveling.

Evidence Supporting the Link between Depression and Cardiac Disease

Evidence supporting the link between depression and cardiac disease is well known (Bradley & Rumsfeld, 2015; Ceccarini, Manzoni, & Castelnuovo, 2014; Lichtman et al., 2014). Depression is highly prevalent in cardiac patients at 31-45%, including myocardial infarction (MI), coronary artery disease (CAD), and unstable angina (Ceccarini et al., 2013; Huffman et al., 2013; Kohlman et al., 2016; Lichtman et al., 2008). A Level 4 case control INTERHEART study for acute MI study reviewed the association of psych-social risk factors with the risk of acute MI. The study included 11,119 cases and 13,648 controls from 52 countries (Rosengren et al., 2004). Survey variables included stress at work and at home, financial stress, and major life events in the past year, locus of control, and presence of depression. The results of the INTERHEART study found positive associations for depression in the last year at 24% compared to a control at 17.6% for patients who experienced an acute MI (Rosengren et al.,

2004). The discussion portion of the INTERHEART study suggested implementing clinical approaches to reduce stressful factors (Rosengren et al., 2004).

Gan et al. (2014) conducted a Level 1 meta-analysis of 40 prospective studies looking at depression's association with increased risk for coronary heart disease (CHD) and MI. The analysis included 40 articles retrieved from Pubmed, Embase, and Web of Science through April 2014. The conclusion of their analysis confirmed the association of depression and the risk for CHD. Another large study researched 1823 participants who were involved in the Rotterdam study who had cardiovascular disease. The researchers conducted a Level4 cohort study and found men with recognized MI had a higher incidence of depression (Jovanova, Luik, & Leening et al., 2016). The Rotterdam Study is an ongoing study since 1990 targeting cardiovascular, endocrine, hepatic, neurological, ophthalmic, psychiatric, dermatological, otolaryngological, locomotor, and respiratory diseases (Hoffman et al., 2015).

Meijer, Conrad, Bos, Anselmino, and Carney (2013), conducted a Level 1 meta-analysis of 16 original articles reviewing 10,175 post-infarction cases evaluating the association of depression. The results revealed depression is associated with prognosis, with an all-cause mortality of 22% and an increased risk of 13% for cardiac events (Meijer et al., 2013). Dias and Koike (2013) conducted a Level 1 systematic review of the pathogenesis of depression after MI including 26 full text articles. The conclusions of this review found a patient's psychological reaction after an acute MI could determine the development of post MI depression (Dias & Koike, 2013). The authors also highlighted the inflammatory response after a MI can result in depression mainly due to injury in the hypothalamus, limbic system, hippocampus, and prefrontal cortex (Dias & Koike, 2013).

Evidence of Depression and Poor Outcomes

There is a wealth of evidence linking depression to increased risk for CVD and poor outcomes for patients with known cardiac disease (Bradley & Rumsfeld, 2015; Haddad, & Phillips, 2013; Hurley et al., 2017; Nakamura et al., 2013; Ski et al., 2012). Depression after a cardiac event has been linked to have an effect on future prognosis and quality of life. Patients who experienced post-myocardial infarction depression have been shown to have an increase in hospital admissions and a reduced adoption of secondary prevention measures (Myers, Gerber, Benyamini, Goldbourt, & Drory, 2015). Patients with a history of depression after a first-time MI were shown to have a 1-year and 19-year increased mortality risk (Sundboll et al., 2016). In the Enhancing Recovery in Coronary Heart Disease (ENRICHD) clinical trial, the findings revealed somatic depressive symptoms are responsible for increased risk of early cardiac morbidity and mortality (Bekke-Hansen, Trockel, & Taylor, 2012).

Benyamini, Roziner, Goldbourt, Drory, and Gerber (2013) conducted a Level 4 longitudinal cohort study of 540 patients and confirmed depression and anxiety were directly related to poorer quality of life. Using a structural-equations model, the authors assessed future behavioral pathways revealing anxiety and depression resulted in reduced quality of life 10 years later (Benyamini et al., 2013). Hagström et al. (2018) used adjusted Cox regression models to conduct a Level 2 prospective randomized clinical trial evaluating the association between individual stressors, baseline cardiovascular risk factors and outcomes (Hagström et al., 2018). After 3.7 years of follow-up depressive symptoms, loss of interest, and financial stress increased the risk of CV death, non-fatal MI, and non-fatal stroke (Hagström et al., 2018).

In a large-scale study, Daskalopoulou et al. (2016) conducted a Level 3 cohort study of 1,937,360 men and women free from cardiovascular disease at baseline. The results found at a median 6.9 years after adjustment for cardiovascular risk factors, a history of depression was associated with higher risk of each of 12 cardiovascular diseases: stable angina (HR = 1.38, 95%CI 1.32–1.45), unstable angina (1.70, 1.60–1.82), myocardial infarction (1.21, 1.16–1.27), unheralded coronary death (1.23, 1.14–1.32), heart failure (1.18, 1.13–1.24), transient ischemic attack (1.31, 1.25–1.38), ischemic stroke (1.26, 1.18–1.34), intracerebral hemorrhage (1.30, 1.17–1.45), and peripheral arterial disease (1.24, 1.18–1.30) (Daskalopoulou et al., 2016).

Chest pain is a common reason people seek emergency care. Chest pain symptoms increase health care costs even in patients without known CAD emphasizing the need for strategies to reduce readmissions (Safdar et al., 2015). A Level 4 prospective cohort study was conducted between August 2013 and May 2015 in a chest pain center that included 365 patients (Kim et al., 2017). In this study, chest pain patients were screened for depression prior to discharge from the emergency department. At the 1-month follow-up, 36% of patients who had an episode of recurrent chest pain also had a higher depression score. The authors recommend identifying and targeting depression interventions to curtail recidivism for chest pain in an emergency department (Kim et al., 2017).

Gan et al. (2014) conducted a Level 1 systematic review of 40 prospective studies associating depression as an independent risk factor for coronary heart disease (CHD) and myocardial infarction (MI). Although past systematic reviews and metanalysis have demonstrated the association between CHD and depression, there was a need of an update of current literature (Gan et al., 2014). The authors concluded that depression is independently associated with an increased risk for CHD and MI (Gan et al., 2014). Benyamini et al. (2013)

conducted a Level 4 longitudinal cohort study of 540 patients who completed behavioral surveys at 5 years and 10 years post MI. The results of the study confirmed depression was directly related to poorer quality of life 10 years later (Benyamini et al., 2013).

Evidence-based Screening Recommendations

In 2008, The American Heart Association (AHA), published a science advisory statement for depression screening, referral, and treatment (Lichtman et al., 2008) (See Appendices B and C). The purpose the 2008 scientific statement was to establish a recommendation for screening, referral, and treatment of depression and cardiac disease (Lichtman et al., 2008). The council reviewed over 60 prospective studies to support the science advisory statements. Level 1 meta-analysis and Level 1 systematic reviews were included for the recommendation. Significant to outcome support of this project was the advisory's recommendation that cardiologists should take depression into account in the management of cardiac disease regardless of whether or not they refer or treat a patient for depression (Lichtman et al., 2008). The AHA statement recommends the PHQ2-9 s an evidence-based tool for screening for depression (Lichtman, et al., 2008).

In 2014, the AHA conducted a critical appraisal of the current literature through a systematic review (Lichtman, Froelicher, & Blumenthal et al., 2014). Fifty-three studies met the criteria for inclusion in the Level 1 systematic review; 32 studies reported on associations with all-cause mortality, 12 on associations with cardiac mortality, and 22 on associations with a composite outcome that included mortality and nonfatal events. In summary, the two AHA Scientific Statements recommend routine screening and careful monitoring of depression for patients with cardiovascular disease (Lichtman et al., 2008). The outcome of this review was a new scientific statement elevating depression as a risk factor for medical outcomes in patients

(Lichtman et al., 2014). In summary, the two AHA Scientific Statements recommended routine screening and careful monitoring of depression for patients with cardiovascular disease.

In 2006, part of the American Health Institute, the National Heart, Lung, and Blood Institute recommended treatment and evaluation of depression in patients with cardiac disease through a collaborative team (Ceccarini et al., 2014). The U.S. Preventive Task Force (USPTF) recommends routine screening for depression in adults if supportive systems are in place to make sure correct diagnosis, effective treatment, and follow-up (Strong, 2013; Siu, 2016). The USPTF has concluded a Level B guideline rating for routine screening for depression with fair evidence that the intervention improves health outcomes (Siu, 2016). The Veterans Administration published a practice guideline statement to routinely screen for major depressive disorder (MDD) to reduce practice variation and assist providers and their patients in the decision-making process (Siu, 2016).

Evidence of Cardiac Rehabilitation Interventions

Research supports a collaborative care approach to improve cardiac and depression outcomes including feedback from healthcare providers, nurses, nutritionists, and licensed clinical social workers (Huffman et al., 2013). A Level 1 systematic review and meta-regression analysis of 74 randomized control trials was conducted to evaluate collaborative care effectiveness for depression care (Conventry, Hudson, & Kontopantelis et al., 2014). The authors described a collaborative care model that included a multi-professional approach to patient care, a structured management, scheduled patient follow-ups, and enhanced inter-professional communication (Coventry et al., 2014). Seventy-four random controlled trials were identified with 21,345 participants. The results of the study revealed collaborative care was associated with improvements in depressive symptoms (Coventry et al., 2014).

Cardiac rehabilitation is considered a collaborative care program (Kachur, Menezes, Schutter, Milani, & Lavie, 2016). Patients who participate in cardiac rehabilitation programs have been shown to reduce depression and mortality (Kachur et al., 2016). A Level 1 meta-analysis of psychological interventions for coronary heart disease revealed strong evidence that psychological interventions reduced risk for revascularization, total deaths, and non-fatal infarction (Whalley, Thompson, & Taylor, 2014). A Level 2 random control study found patients involved in motivational support groups had a higher completion rate in CR compared to patients who did not attend motivational sessions (Mcgrady, Burkes, Badenhop, & Mcginnis, 2014).

Timing of CR depression screening has been shown to have an influence on cardiac patient outcomes. A meta-analysis of identified depression in 30 days of an acute coronary event was associated with increased cardiac morbidity and mortality (Huffman et al., 2013). Nurses have a unique opportunity in the CR setting to improve depression through evidence-based screening protocols, but research suggests they have difficulty identifying symptoms and feel ill-equipped to manage depression (Smith, Johnson, Seydel., & Buckwalter., 2010). Early diagnosis and treatment of depression by health professionals after a cardiac event has been shown to improve outcomes. The Improve Mood-Providing Access to Collaborative Treatment (IMPACT) study revealed positive outcomes are feasible when there is a systematic effort to document depressive symptoms, an application of person-centered approaches, and communication amongst interdisciplinary care partners (Smith et al., 2010).

Evidence for Electronic Documentation

Documentation is a required part of patient standard of care. In 2011, the Centers for Medicare & Medicaid Services established the Medicare and Medicaid Electronic Health Record (EHR) Incentive Programs to encourage health professionals and eligible hospitals to adopt and

demonstrate meaningful use EHR technology (Centers for Medicare & Medicaid Services, 2017). A licensed physician shall maintain patient medical records with sufficient detail to clearly validate why the course of treatment was undertaken (Vanderpool, 2015). Although there are considerable benefits of research on the benefits of the EMR compared to paper charting, a literature review search for EHR use to document depression care in the CR setting was limited.

Clark et al. conducted a Level 4 case control study to evaluate the implementation and documentation of a behavioral health associates (BHA) program in an effort to improve the efficiency of depression care in the primary care setting (Clark et al., 2016). The authors developed an evidence-based collaborative care program that included using an EHR for documentation (Clark et al., 2016). The methodology of this study was tracking screening, referral, treatment, and emergency room use after the implementation of the intervention. After implementation of the BHA program there was a 13% reduction in emergency department use by the patients (Clark et al., 2016).

The EMR stands as a testament of treatment provided by all health professionals and reasoning behind it (Vanderpool, 2015). A Level 4 retrospective chart review was conducted by Flatow et al. (2015) who evaluated all patients admitted 2 years before and 2 years after implementation of the electronic health record (EHR) for quality outcomes in a surgical intensive care unit (SICU). After 2 years mortality decreased by 28% and the rate of central line blood stream infection (CLABSI) per 1,000 catheter days was 85% lower. A Level 4 retrospective chart review was conducted by Lammers, McLaughlin, and Barna (2016) evaluating the adoption of ambulatory EHR documentation hospital readmissions. The authors discovered a 10% decrease between 2010 and 2013 in hospital readmissions and believe documentation will reduce

inefficient care and improve the quality of care for patients with chronic conditions (Lammers et al., 2016).

Critical Appraisal and Synthesis

The high prevalence of depression in the general population and the substantial global burden of cardiac disease has been well documented in literature. Identification and treatment of depression in the cardiovascular population needs to be a priority for healthcare professionals. Early treatment for cardiac patients is crucial to improve outcomes (Bradley & Rumsfeld, 2015). Nurses in the cardiac rehabilitation setting (CRS) need to prepare patients for the possible consequences of depression following a cardiac event. Research suggests a team approach for depression including nurses, primary care providers, cardiologists, and LCSWs promotes better outcomes (Bradley & Rumsfeld, 2015).

Cardiac patients often display depressive symptoms of some sort following an acute heart event or cardiac surgery (Ceccarini et al.2013). The cardiac rehabilitation setting has been shown to be successful in the identification of depression (Whalley, Thompson, & Taylor, 2014). The research supports the AHA recommendations to elevate depression as a risk factor for adverse medical outcomes for patients. Studies have been executed on a collaborative approach to monitoring patients with Acute Coronary Syndrome that demonstrated significant reductions in depressive symptoms and cardiac events (Bradley & Rumsfeld, 2015).

The high prevalence of depression in the general population and the substantial global burden of cardiac disease has been well documented in literature. Identification and treatment of depression in the cardiovascular population needs to be a priority for healthcare professionals. Early treatment for cardiac patients is crucial to improve outcomes (Bradley & Rumsfeld, 2015). Nurses in the cardiac rehabilitation setting (CRS) need to prepare patients for the possible

consequences of depression following a cardiac event. Research suggests a team approach for depression including nurses, primary care providers, cardiologists, and licensed clinical social workers (LCSWs) promotes better outcomes (Bradley & Rumsfeld, 2015). Although there was a limited number of recent studies on the benefit of EHR documentation, the majority of scientific evidence discussed in this review came from data collected from EHRs.

Conceptual Framework

The Iowa model of Evidence-Based Practice will guide the implementation of this project. The trigger that initiated the need for a change in practice was the lack of an electronic depression screening and management tool in the cardiac rehabilitation setting. Triggers initiate the need for a change based on the best evidence (Grove, Burns, & Gray, 2013). There is a sufficient research base that supports the implementation of the new depression care intervention. The project includes monitoring and analyzing the current structure, processes, project outcome data. The final step will include the dissemination and maintenance plan for the project's results.

Summary

The significance of this project was to enhance multidisciplinary electronic communication in the CR setting to better treat depression in patients with CVD. The Agency for Healthcare Research and Quality (AHRQ) published a white paper supporting the importance of effective use of information technology to facilitate quality improvement, care delivery, and patient outcomes (Higgins et al., 2015). There is national and international recognition through research that detection and treatment of depression among patients with CVD is important (Dias & Koike, 2013; Gan, Gong, &Tong, 2014; Junehag, Asplund, & Svedlund, 2014; Lichtman et al., 2014; Myers et al., 2012; Turner et al., 2017; Wu & King, 2016). The AHA

recommendations confirm a new urgency towards the development and dissemination of effective treatments for these high-risk patients (Lichtman, et al., 2014).

In conclusion, the literature supports that cardiac patients are a high-risk population for depression. Depression is a risk factor for cardiac disease and may result in premature death if left untreated (Gan et al.2014). The purpose of a doctor of nurse practice (DNP) project is to find a problem in practice and solve it (Moran, Burson, & Conrad, 2017). This project supports quality improvement through data extraction and analysis through information gathered from the EHR. Strategies to improve patient depression screening, identification, and treatment after a cardiac event have been shown to improve patient outcomes (Bradley & Rumsfeld, 2015). The results of the mentioned studies support the clinical significance of implementing an evidence-based workflow process for depression screening and treatment in the CR setting.

SECTION THREE: METHODOLOGY AND DESIGN

This process improvement project was designed to address depression care documentation according to AHA recommendations. The primary purpose of this project was to improve standard depression care in an outpatient CR unit through the implementation of an EPIC PHQ2-9 document flowsheet (See Appendix G). The two interventions involved in this project included PHQ2-9 nursing education evaluated by an online pre/post survey and implementation of an electronic PHQ2-9 document flowsheet evaluated by post-chart audit. (See Appendix D and Appendix E).

New referral protocol:

1. The PHQ2-9 survey is documented in EPIC for every admission to the CR setting.
2. A primary care provider is referred electronically on EPIC for a PHQ2-9 score of 10 or more.

Measurable Outcomes and Interventions

The first step in the implementation of this DNP project was the electronic dissemination of the pre-intervention education survey to the CR nurses. Second, the CR nurses participated in a PHQ2-9 educational session that included the purpose of the PHQ2-9, the purpose of the practice change, and how-to steps for practice change documentation.

Measurable outcomes for knowledge:

1. Purpose of the PHQ2-9
2. American Heart Association's depression care guidelines
3. Access to EPIC PHQ2-9 document flowsheets
4. Access to EPIC referral documentation
5. Prevalence of depression in patients with cardiac disease

The PHQ2-9 chart audit collected the following data post intervention:

1. Percentage of patients who received electronic documentation of the PHQ2-9
2. Percentage of electronic documentation of PHQ2-9s with a score of 10 or more.
3. Percentage of referrals documented.

Populations:

1. Healthcare professionals responsible for patient identification and treatment for depression.
2. Patients admitted to the cardiac rehabilitation unit.

Interventions:

1. Professional education on the purpose and access of the PHQ2-9 survey flowsheet.
2. Implementation of an electronic PHQ-9 survey flowsheet to be initiated on admission to the CR unit.

Comparisons: The project compared percentage of knowledge improvement after implementation of an PHQ2-9 educational module and the percentage of PHQ2-9 screenings and referrals.

Outcomes and Evaluation

1. After implementation of an educational module, CR nurses improved knowledge of the PHQ2-9 EPIC charting system including referrals, purpose of the PHQ2-9, prevalence of depression in cardiac disease, and the American Heart Association's (AHA) guidelines for depression screening and referrals.

   Evaluation: The intervention was measured by a pre and post education survey. Pre-survey disseminated before the practice change and education and post-survey was conducted two weeks after the project was initiated.

2. After implementation of the electronic PHQ2-9 document flowsheet, surveys and referral percentage increased.

Evaluation: The intervention was measured by a 30-day post-intervention chart audit. Present descriptive data (number of patients screened, positive screens documented, and number of appropriate referrals were collected).

Participants and Setting

The participants in the project were CR nurses and patients admitted to the CR unit. The International Review Board (IRB) for the practice setting as well as the Liberty University's IRB approved the study prior to implementation. The nurses consented to participate in the educational survey prior to distribution. The setting was New Hanover Regional Center Heart Center (NHRMCHC). The NHRMCHC website describes the promotion of care as comprehensive and compassionate from diagnosis and treatment from cardiac conditions to prevention and ongoing follow-up. Patients admitted to cardiac rehabilitation were 18 years of age or older, had either a myocardial infarction in the last 12 months, a coronary artery bypass surgery or stent placement, a valvular repair surgery, or have stable angina. Cardiac rehabilitation patients are cared for by a multidisciplinary team of nurses, providers, exercise physiologists, pulmonary therapists, and a LCSW.

Ethical Considerations

Prior to the onset of this evidence-based project, a permission letter of support to perform the intervention was approved by the cardiac services manager (See Appendix H). The International Review Board (IRB) for the practice setting as well as Liberty University's IRB approved the study prior to implementation (See Appendix J). The consent form outlined the risks and benefits of participation. All participant identifiers were eliminated through a password

protected account on Qualtrics for data collection. The result and chart audit data were kept confidential without participant or patient identifiers using an SPSS coding system. The author complied with all research facility HIPAA requirements for chart audit data collection. The author was previously certified through the CITI program for human subject research. Survey and chart audit results were logged by the author on a password-protected computer. The data results will be discarded after 3 years using an evidence-based informatics health deletion system. All study participants were provided a written consent form and relevant documents upon request.

Data Collection and Tools

An excel spreadsheet was used to collect data from electronic medical records 30 days after the implementation of the PHQ2-9 document flowsheet. The educational survey was developed and formatted by the author using commercially available survey software by Qualtrics. The PHQ-9 Education Survey (Appendix D) will assess nurse's knowledge for depression care and documentation. The purpose of the 5-item pretest/posttest educational survey was to evaluate nurse's knowledge of current practice for depression screening and the AHA's recommended protocols for depression care in patients with CVD. The author authored and implemented the pre-post survey under controlled conditions. Nurses received a password protected email to consent and participate in the survey before and after implementation of the document flowsheet. The dependent variable is the health care team's knowledge level. The dependent variable was measured twice. The independent variables included measuring knowledge level from 0% indicating *not knowledgeable at all* and 100% indicating *very knowledgeable* (see Appendix D). Each response category was assigned a value with a value of 0% given to the most negative response and a value of 100% given to the most positive response.

Project Funding

There was no cost to the quality improvement project. For implementation of the DNP project, a meeting was held with the quality outcomes managers of the medical center. The educational training for the registered nurses was conducted by the student investigator as well as EPIC technology staff. Time provided by the EPIC technology team for staff training was free of charge because they will continue to be educational resource for staff for any informatic updates. The student investigator evaluated existing metrics from the electronic medical record for the post-chart data. The student investigator designed, implemented, and evaluated the pre/post educational survey. This survey has not been validated in previous studies and was used for the first time in this quality improvement project.

Data and Feasibility Analysis

Quantitative data were analyzed and documented descriptively with numbers, percentages, and frequency tables. Descriptive and nonparametric statistics were used for analysis of the pretest/posttest educational survey and the post-audit practice chart audit. Total score and individual item statistics were evaluated. Data analysis was conducted using the IBM SPSS Statistics Version 22. The feasibility of this project to sustain the new depression care interventions is strengthened by the EPIC document flowsheet that accessible at no extra cost to the unit. Although time was needed to get familiar with the new document flowsheet, documentation electronically increases efficiency and is evidence-based (Ceccarini, M., Manzoni, G. M., & Castelnuovo, G., 2014).

Timeline

After IRB and CR leadership approval, the nurses participated intervention education and a pre-educational survey the month before implementation of the project. The launch date was

announced through a password protected email system. The intervention was tracked for compliance of documentation through the quality outcomes team at the hospital. After two weeks of the project initiation date, the nurses participated in the post-educational survey. After 30 days of data collection, the results of the intervention were analyzed and documented. Dissemination of the results took place at a CR practice council meeting approximately one month after the project concluded. Future education on PHQ2-9 referral documentation will be scheduled through the nursing education department (See Appendix M).

SECTION 4: RESULTS

Approval for this EBP project was obtained from Liberty University's Internal Review Board, as well as New Hanover Regional Medical Center's Internal Review Board. A pre/post educational practice survey was collected between April 2018 and May 2018. A recruitment email was sent to 14 registered nurses who work in the CR setting. Nine of 14 nurses qualified to participate in the survey. Five nurses were excluded from being eligible because they do not participate in the depression screening process for new admissions. Three nurses completed the pre-survey and two nurses completed the post online survey. Participation may have been influenced by a leadership position change and this is explained in the limitation section of this document. The pre and post survey contained the same questions. The pre-survey was completed before the educational training and the post-survey was completed 2 weeks after implementation of the new PHQ2-9 document flowsheet. Three education and training sessions occurred for the PHQ2-9 interventions for 13 out of 14 nurses with one nurse not participating due to an extended leave from work.

Education Survey Results

Participants completed a pre/post survey indicating their percent knowledge on five questions relating to the PHQ2-9 survey (see Table 1). Table 1 summarizes the outcome measurement variables for knowledge. Table 1 and Table 2 summarize descriptive statistics of the results of both the pre- and post-education surveys. Post survey participants indicated 100% knowledge on all five questions. The post survey average indicated an increase in knowledge for all five questions including: Question 1 at a 2.7%; Question 2 at 24.7%; Question 3 at 16.7%; Question 4 at 64.8%; and Question 5 at 71.4% (See Table 3).

Table 1.

Pre-Education Survey

Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
Purpose of the PHQ2-9	92.00	100.00	97.33	3.77	14.22	3
AHA depression care guidelines	75.00	90.00	82.33	6.13	37.56	3
Depression prevalence in patients with cardiac disease	75.00	100.00	85.67	10.53	110.89	3
Access to EPIC PHQ2-9 document flowsheets	0.00	92.00	60.67	42.91	1840.89	3
Access to EPIC PHQ2-9 referral documentation	0.00	90.00	58.33	41.30	1705.56	3

Table 2.

Post Education Survey

Field	Minimum	Maximum	Mean	Standard Deviation	Variance	Count
Purpose of the PHQ2-9	100.00	100.00	100.00	0.00	0.00	2
AHA depression care guidelines	100.00	100.00	100.00	0.00	0.00	2
Depression prevalence in patients with cardiac disease	100.00	100.00	100.00	0.00	0.00	2
Access to EPIC PHQ2-9 document flowsheets	100.00	100.00	100.00	0.00	0.00	2
Access to EPIC PHQ2-9 referral documentation	100.00	100.00	100.00	0.00	0.00	2

Table 3.

Pre/Post Education Survey

Question	Pre	Post	Percent Increase
1	97.33	100.00	2.7
2	82.33	100.00	21.4
3	85.67	100.00	16.7
4	60.67	100.00	64.8
5	58.33	100.00	71.4

Chart Audit Results

Implementation of the new PHQ2-9 document flowsheet intervention was initiated May 1, 2018. A retrospective chart review was performed June 15, 2018 for all CR admissions from May 1, 2018 through May 30, 2018. The post chart review examined electronic documentation of the PHQ2-9 and referrals. Of 64 admissions, 62 patients had a PHQ2-9 survey documented at a 97% compliance rate. Of 62 patients, seven patients had a score of 10 or more, at 11.3% of the patients admitted. According to PHQ2-9 guidelines, a score of 10 or more is considered moderate depression requiring a referral and follow-up treatment (Lichtman et al., 2008). Of the seven patients with a 10 or higher score on the PHQ2-9, only two patients had referral documentation at 28.5%.

Table 4: Percentage of Patients Screened

Patients Admitted	Patients Screened	Percentage Screened
N 64	N 62	97%

Table 5: PHQ2-9 Scores over 10

Patients with PHQ2-9 Score 10 or more	Percentage of Patients Screened
N 7	11.3 %

Table 6: Referrals Documented

Referrals documented for a score of 10 or more	Percentage
N 2	28.5%

SECTION 5: DISCUSSION

This project was to implement an EBP document flowsheet to increase the number of CR patients identified as having depression and referring them to care. This was explored by comparing and analyzing pre/post practice survey responses and post intervention chart documentation. The project resulted in an increase in nurse's knowledge and an increase in electronic documentation of depression screening and referral in the CR setting. A health information technology practice gap existed in the CR unit. Patient's PHQ2-9 survey results and referrals were not being documented electronically. Implementation of a nursing educational module improved PHQ2-9 knowledge. Implementation of an EPIC PHQ2-9 document flowsheet resulted in electronic documentation of the survey and referrals. This project compared and analyzed pre/post practice survey responses and post intervention chart documentation. The pre/post practice survey results demonstrated aggregate improvement of knowledge amongst the participants.

The post intervention chart audit revealed promising results for compliance of PHQ2-9 electronic survey documentation increase of 97%. Two cardiac admissions during the time span of May 1- 30, 2018 did not have electronic documentation of the PHQ2-9 survey. The two patients without PHQ2-9 documentation could be at risk for depression and would require additional follow-up by the cardiac nurses. With the new document flowsheet, the cardiac team will be able to visualize a lack of care and respond appropriately in a timely manner. Patients who scored 10 or more on the PHQ2-9 survey was 11.3% of the population admitted to the CR setting falling below the national average of 20-40% (Bradley & Rumsfeld, 2015). According to the AHA recommendations, a PHQ2-9 score of 10 or more requires a referral to the primary care physician or a mental health professional (Lichtman et al., 2008; Lichtman et al., 2014). Out of

seven patients who qualified for a referral, only two patients (28.5%) were documented for a referral. The five patients who were considered moderately depressed according to their PHQ2-9 score are at risk for poorer cardiac outcomes according to research and would benefit from further mental health evaluation (Huffman et al., 2013).

Facilitators and Barriers

This EBP project encountered both barriers and facilitators during the process of this quality improvement change. One unexpected barrier included a managerial position change in the CR setting. The project was approved and supported by both the manager of cardiac services and the manager of the CR program. Unfortunately, right before the scheduled educational phase, the CR manager left, and the new manager was not in support of the document flowsheet change. Additionally, the educational program was shortened to a few minutes per the manager's mandates without time for hands-on practice with the informatics team, nor time for questions about the intervention. Facilitators for this EBP included the support from cardiac services leadership, quality outcome team members, and EPIC technology team members. The quality outcomes officer implemented a compliance tracker to evaluate nurse documentation of each admission to the CR setting which will evaluate trends and gaps for future improvement.

Significance of Project

Prior to the implementation of the electronic PHQ2-9 document flowsheet, the majority of the cardiac team including the cardiologists, the physician assistants, licensed clinical social workers, and primary care providers could not access the patient's PHQ2-9 survey while the patient was participating in cardiac rehabilitation. Without electronic documentation of depression screening results the hospital's cardiac and quality outcome teams were unable to gather important trends to improve patient outcomes. Patients qualified for a depression care

referral were documented in a hard copy file system prior to implementation of the project resulting in potential barriers to timely care. Without electronic documentation, depression follow-up care can lack time-sensitive communication amongst health care professionals potentially negatively effecting patient outcomes (Rimmerman & Corbett, 2014). Implementation of the PHQ2-9 document flowsheet in 1 month of onset, provided crucial depression trends in patients in the research facility's CR setting.

Sustainability

The CR is part of a hospital culture that supports an information technology for quality improvement. As soon as the lack of electronic documentation of depression was brought to the attention of the cardiac manager and the hospital's quality outcomes team, the dissemination plan was in place. The hospital outcomes metric team, EPIC informatics team, and cardiac manager are dedicated to the sustainability of the new PHQ2-9 document flowsheet through a compliance tracker, and ongoing technical and educational support. Compliance will be tracked for sustainability by the quality metrics team. Continued IT support and education will be provided to all staff in the CR setting through nursing education to combat any barriers to maintaining standard of practice in depression care.

Implications for Practice

The electronic documentation of depression has been shown through literature to improve timely care (Huffman et al., 2013). System information technology for depression screening and referral was non-existent in the CR setting. Changing from paper documentation of PHQ2-9 screening and referrals to an EPIC document flowsheet resulted in a timely feedback system for patients with depression and an approach to identifying preventative services and gaps in care. PHQ2-9 screening in the CR setting supports the AHRQ's recommendations to use technology

strategies to improve quality care (Higgins et al., 2015). CR health professionals caring for at risk populations for depression will be better equipped to collaborate on an effective treatment plan through the use of information technology. As a result of this project, the CR now exclusively uses the electronic PHQ2-9 screening and referral document flowsheet.

Dissemination Plan

The dissemination plan includes promoting the results of this project to local stakeholders in the cardiac rehabilitation setting and then to a broad knowledge-based audience. Each unit at the hospital has a practice council. The project facility's nursing practice council is a once-a-month meeting to empower clinical nurses to maintain standards that are consistent with evidence-based practice. The results of this project will be disseminated at the CR practice council meeting. A poster presentation of the project proposal was conducted at a research conference at a local university. A poster presentation of the project is planned for local and national health outcome conferences as well as a web-ex for the faculty chairs at Liberty University. The final manuscript will be submitted for publication to a peer-reviewed journal.

Conclusion

This EBP quality improvement project implemented a new depression screening and referral protocol to advance practice and promote patient outcomes. Depression is a disease of global proportions (Charleson et al.,2013). Depression exists in a noteworthy percentage of patients with cardiac disease (Huffman & Celano, 2015). Given the increased morbidity and mortality associated with depression, it is important that health professionals identify these patients (Bradley & Rumsfeld, 2015). The outcomes team involvement and a 97% compliance documentation rate revealed a heath professional readiness to embrace health information

technology strategies to improve patient care. After implementation of this project, nurses have access to electronic depression screening and referral documentation.

This project promotes healthcare team performance through an initiative designed to improve communication to create a shared understanding of a patient's depression condition. A depression collaborative-care model communicated through the EHR to address physical, psychological, and pharmacological interventions will promote quality care. The lack of consistent referral documentation underscores the continued need to promote strategies that improve a multidisciplinary communication. Further research will need to take place to evaluate how technology can improve the management plan of depression care in the CR setting.

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Appendix A

Levels of Evidence Matrix

Source)	Study Purpose	Sample	Methods	Study Results	Level of Evidence (Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change?
Bradley, S.M. & Rumsfeld, J.S. (2015). Depression and Cardiovascular Disease. *Trends in Cardiovascular Medicine.*25(2015). 614-622. https://.doi.org/10.1016/j.tcm.2015.02.002	Review article analyzing the epidemiologic evidence linking depression to increased CVD risk and worse CVD outcomes, proposed mechanisms by which depression contributes to CVD risk and outcomes, and optimal approaches to the diagnosis and management of depression in CVD patients.	The authors summarize the evidence linking depression to cardiovascular disease and worse outcomes. The authors provide a review of treatment options for depression for CV patients	Review of current literature	The review confirms the need to identify and treat depression in patients with CVD to improve patient outcomes	Level 5: Systematic review design	No limitations were documented	Yes. The article presented an excellent review of side effects of depression and cardiovascular disease as well as evidence-based practice treatment options.
Lichtman, J.H., Bigger, J.T., Blumenthal, J.A., Frasure-Smith, N., Kaufmann, P., Lespérance, F., Mark, D., Sheps, D.S, Taylor, B.C., & Froelicher, E.S. (2008). Depression and coronary heart disease	Recommendations for screening, referral, and treatment	Review of prospective studies since 1990 examining the role of depression and cardiovascular disease	Prospective Literature review.	AHA EBP Recommendations of screening, depression, and treatment	Level 1: Systematic review	No limitations were documented	Yes. AHA scientific advisory council supports the recommendations

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recommendations for screening, referral, and treatment. *Circulation.*118: 1768-1775. https://doi.org/0.1161/CIRCULATIONAHA.108.190769							

Source)	Study Purpose	Sample	Methods	Study Results	Level of Evidence (Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change?
Lichtman J.H., Froelicher, E.S., Blumenthal, J.A., Carney, R.M., Doering, L.V., Frasure-Smith, N… Wulsin, L. (2014) Depression as a risk factor for poor prognosis among patients with acute coronary syndrome. A Systematic review and recommendations. A scientific statement from the American Heart Association. *Circulation.129*(12):1350-69. https://doi.org/10.1161/CIR.0000000000000019.	Systematic review and recommendations to elevate depression as a risk factor for cardiac adverse outcomes	53 studies and 4 meta-analysis were included for review of all-cause mortality, cardiac mortality, and composite outcomes.	Systematic review	Recommendations to elevate depression as a risk factor based on evidence	Level 1: Systematic review	None listed	Yes. AHA scientific advisory council supports the recommendations.
Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9: Validity of a Brief Depression Severity Measure. *Journal of General Internal Medicine*, *16*(9), 606–	PHQ-9 Criterion and construct Validity assessment	6000 patients in 8 primary care clinics and one obstetrical clinic	PHQ-9 administration and the General Health Survey were complete	PHQ-9 surveys demonstrated 88% sensitivity and 88& specificity for major depression. PHQ-9 is a reliable instrument for	Level 4: Cross sectional design study	The major limitation of this study is that it is a cross sectional design	Yes. This study confirms the validity and specificity of the PHQ-9 questionnaire

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613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x				depression screening			
Gan, Y., Gong, Y., Tong, X., Sun, H., Cong, Y., Dong, X., Wang, Y., Xu, X., Yin, X., Deng, J., Li, L., Cao, S., & Lu, Z. (2014). Depression and the risk of coronary heart disease: a meta-analysis of prospective cohort studies. *BMC Psychiatry*, *14*, 371. https://doi.org/10.1186/s12888-014-0371-z	There is a need for an updated meta-analysis of prospective studies to assess the association between depression and the risk of CHD.	40 independent reports met the inclusion criteria	Relevant prospective studies investigating the association between depression and CHD were retrieved from the PubMed, Embase, Web of Science search (up to April 2014) and from reviewing reference lists of obtained articles	Meta-analysis of prospective cohort studies	Level 1: Meta-analysis design	There was the evidence of heterogeneity across the studies used for the analysis of association between depression and the risk of CHD	Yes. The results of our meta-analysis suggest that depression is independently associated with a significantly increased risk of CHD and MI, which may have implications for CHD etiological research and psychological medicine.
Yu, H.Y., Park, Y.S. & Son, Y.J. (2017). Combined effect of left ventricular ejection fraction and post-cardiac depressive symptoms on major adverse cardiac events after successful	The aim of the current study is to examine the combined effect of low left ventricular ejection fraction and post-cardiac depressive symptoms on major adverse cardiac events after successful primary	221 eligible patients were those aged 20 years or older with CAD, who underwent a successful primary PCI, and who	This study is a prospective cohort design study	Of the 221 recruited patients, 34 (15.4%) patients including 31 with re-hospitalization because of cardiac origin problems	Level 4: Prospective longitudinal cohort study design	This study findings will inevitably have a methodological limitation due to the small sample size, with the	Yes. Results suggest that. healthcare professionals should be aware of the necessity of early screening for post-

Source)	Study Purpose	Sample	Methods	Study Results	Level of Evidence (Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change?
primary percutaneous coronary intervention: a 12-month follow-up. *European Journal of Cardiovascular Nursing*. 16(1) 37–45. https://doi.org/ 10.1177/1474515116634530	percutaneous coronary intervention.	understood and agreed to take part in the study. Patients were recruited between June 2012 and July 2013 in the cardiology department of an internal medicine ward and an outpatient clinic at a university hospital in Korea.		such as angina or re-infarction, and three patients with re-vascularization, experienced MACEs during the 12-month follow-up period. The prevalence of post-cardiac depressive symptoms at 1 month after discharge was 15.8%.		occurrence of MACEs being 15.4% in our study.	cardiac depressive symptoms after discharge in percutaneous coronary intervention patients with a low left ventricular ejection fraction.
Kohlmann, S., Gierk, B., Murray, A. M., Scholl, A., Lehmann, M., & Löwe, B. (2016). Base rates of depressive symptoms in patients with coronary heart disease: An individual symptom analysis. *PLoS One, 11*(5) https://doi.org/ https://10.1371/journal.pone.0156167	The present study investigates the frequency of individual depressive symptoms in CHD and their impact on cardiac and subjective health.	The sample included 1337 in- and outpatients with CHD. Patients were included if they were diagnosed as having a CHD by a cardiologist if patients were aged above 18 years and had	Patients were screened for depressive symptoms with the Patient Health Questionnaire-9 (PHQ-9) at three different cardiac treatment sites.	During a 14- day period, more than half of the patients reported a loss of energy (74.9%, 95% Confidence Interval (CI): 70.6–79.2), sleeping problems (69.4%, 95% CI: 64.9–74.0), loss of interest (55.7%, 95% CI: 50.8–60.7). In contrast, psychomotor	Level 2: Random controlled study design	This study did not enroll consecutive patients and had some patients lost at follow-up, possibly leading to under-recognition of chest pain recurrence. In addition, self-selection	Yes. Presented base rates of depressive symptoms offer clinicians a new way to judge the severity of individual depressive symptoms and to communicate individual PHQ-9 profiles

Source)	Study Purpose	Sample	Methods	Study Results	Level of Evidence (Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change?
		sufficient language skills. The patients were screened for depressive symptoms with the Patient Health Questionnaire-9 (PHQ-9) at three different cardiac treatment sites.		change (25.6%, 95%CI: 21.3–30.0), feelings of failure (21.9%, 95%CI: 17.7–26.0), suicidal ideations (14.1%, 95% CI: 10.7–17.6) were less frequently reported.		bias could have led to the high prevalence of patients with anxiety during enrollment. Interpretation of secondary outcomes was limited because of the small number of patients on medications of interest. Lastly, definitive diagnosis of chest pain was not established, which may have provided more insightful results as RCP may be in context of	with patients with respect to gender, age, cardiac symptoms and quality of life. Our study underscores the impact of depression in patients who present with chest pain with and without history of CAD.

Source)	Study Purpose	Sample	Methods	Study Results	Level of Evidence (Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change?
						other underlying causes of chest pain, which is not purely limited to psychiatric disorders.	
Whalley, B., Thompson, D. R., & Taylor, R. S. (2014). Psychological interventions for coronary heart disease: Cochrane systematic review and meta-analysis. *International Journal of Behavioral Medicine, 21*(1), 109-21. https://10.1007/s12529-012-9282-x	This study aims to estimate effects of psychological interventions on mortality and psychological symptoms in this group, updating an existing Cochrane Review.	For 24 of 51 studies, sufficient information was available to perform an exploratory categorization of treatment aims and components.	Systematic review and meta-regression analyses of randomized trials evaluating a psychological treatment delivered by trained staff to patients with a diagnosed cardiac disease, with a follow-up of at least 6 months, were used	Psychological treatments appear effective in treating patients with psychological symptoms of coronary heart disease.	Level 1: Meta-analysis	Heterogeneity in the psychological treatments offered to this patient group reflects a broader uncertainty about the mechanisms by which negative emotions interact with cardiac outcomes. The questions of how psychological treatments	Yes. Psychological treatments appear effective in treating psychological symptoms of CHD patients

Source)	Study Purpose	Sample	Methods	Study Results	Level of Evidence (Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change?
						work in this patient group, which components of treatment are necessary, remain largely unanswered.	
Mcgrady, A., Burkes, R., Badenhop, D., & McGinnis, R. (2014). Effects of a brief intervention on retention of patients in a cardiac rehabilitation program. *Applied Psychophysiology and Biofeedback, 39*(3-4), 163-70. Retrieved from https://10.1007/s10484-014-9252-y	This intervention assessed the effects of a brief intervention on dropout rate in a cardiac rehabilitation program.	One hundred thirty-five patients were recruited from a cardiac rehabilitation program and randomized to either a control or intervention group.	The intervention group participated in four sessions of motivational interviewing and stress management-relaxation in addition to standard cardiac rehabilitation. The control group underwent cardiac rehabilitation alone.	Patients in both the intervention and controls groups who completed cardiac rehabilitation improved the distance walked, quality of life and decreased anxiety.	Level 2: Randomized control trial	Patients were provided with written relaxation instructions and were recommended to practice the relaxation techniques daily, but adherence was not monitored	Yes. There is a need for methods that increase attendance and completion of cardiac rehabilitation programs (particularly through techniques that decrease depression and anxiety).
Kachur, S., M.D., Menezes, A. R., M.D., De Schutter, A., MD, Milani, R. V., M.D., &	The study evaluated the mortality effect of anxiety and hostility on depression after	The authors studied 1150 patients with coronary heart	Non-experimental retrospective	After cardiac rehabilitation, depression, when present, is	Level 4: Retrospective correlational design	Limitations of this study include single-center	Yes. Despite limitations, correlation of the findings

Source)	Study Purpose	Sample	Methods	Study Results	Level of Evidence (Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change?
Lavie, C. J., M.D. (2016). Significance of comorbid psychological stress and depression on outcomes after cardiac rehabilitation. *The American Journal of Medicine, 129*(12), 1316. Retrieved from https:///1852945322?accountid=14606	cardiac rehabilitation and exercise training.	disease following major coronary heart disease events who had completed forma cardiac rehabilitation and exercise training. Using Kellner questionnaires, stress levels were measured in 1 of 3 domains: anxiety, hostility, and depression (with an aggregated overall psychological stress score) and divided into 3 groups: non-depressed (n = 1072), depression alone (n = 18), and depression with anxiety or hostility (n = 60)	correlational design	usually associated with other forms of psychological stress, which confers additional mortality. More measures are needed to address psychological stress after cardiac rehabilitation.		referral. Furthermore, data on socioeconomic status and full medical history are unavailable. Finally, these analyses are retrospective, indicating associations rather than causation.	with previously published information suggests that associations between psychological stress morbidity post cardiac rehabilitation mortality are robust.

Source)	Study Purpose	Sample	Methods	Study Results	Level of Evidence (Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change?
Nakamura, S., Kato, K., Yoshida, A., Fukuma, N., Okumura, Y., Ito, H., & Mizuno, K. (2013). Prognostic value of depression, anxiety, and anger in hospitalized cardiovascular disease patients for predicting adverse cardiac outcomes. *The American Journal of Cardiology, 111*(10), 1432. https://j.amjcard.2013.01.293	The aim of this study was to evaluate the effects of depression, anxiety, and anger on the prognosis of CVD	1400 consecutive patients using the PHQ-9 Questionnaire, the Generalized Anxiety Disorder Questionnaire, and the Spielberger Trait Anger Scale. Cox proportional-hazards regression was used to examine the individual effects depression.	Prospective observational follow-up study	Multivariate analysis showed depression that was a significant risk factor for cardiovascular hospitalization or death after adjusting for cardiac for risk factors and other psychosocial factors (hazard ratio 2.62, p = 0.02), whereas anxiety was not significantly associated with cardiovascular hospitalization or death after adjustment (hazard ratio 2.35, p = 0.10	Level: 4 Prospective correlational study	A limitation of the study was that changes in depression during the follow-up period were not assessed. However, such changes would be difficult to interpret because they would be concomitant with changes in disease severity	Yes. Routine screening for depression should therefore be performed in patients with in CVD, and the potential effects of anger in clinical practice should be reconsidered.

Source)	Study Purpose	Sample	Methods	Study Results	Level of Evidence (Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change?
Schnabel, R. B., Michal, M., Wilde, S., Wiltink, J., Wild, P. S., Sinning, C. R. & Beutel, M. E. (2013). Depression in atrial fibrillation in the general population.*PLoS One, 8*(12) https://10.1371/journal.pone.0079109	Initial evidence suggests that depressive symptoms are more frequent in patients with atrial fibrillation. Data from the general population are limited.	In 10,000 individuals (mean age 56611 years, 49.4% women) of the population-based Gutenberg Health Study we assessed depression by the Patient Health Questionnaire (PHQ-9) and a history of depression in relation to manifest atrial fibrillation (n = 309 cases).	Random cohort sample design	Multivariable regression analyses of the severity of depressive symptoms in relation to atrial fibrillation in cardiovascular risk factor adjusted models revealed a relation of PHQ-9 values and atrial fibrillation (odds ratio (OR) 1.04, 95% confidence interval (CI) 1.01–1.08; P = 0.023).	Level 3: Cohort randomly selected population-based sample design	No limitations were listed in the study.	Yes. Systematic screening may enhance our understanding of prevalence and sequelae of depression in AF.

Source)	Study Purpose	Sample	Methods	Study Results	Level of Evidence (Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change?
Hagström E, Norlund, F., Stebbins, A., Armstrong, P.W., Chiswell, K., Granger, C.B., López-Sendón, J… & Held, C. (2018) Psychosocial stress and major cardiovascular events in patients with stable coronary heart disease. *Journal Internal Medicine.* 283: 83–92. https://doi.org/ 10.1111/joim.1269	Assess the risk of ischemic events associated with psychosocial stress in patients with stable coronary heart disease (CHD).	14 577 patients (median age 65.0, IQR 59, 71; 81.6% males) with stable CHD from patients enrolled from the STABILITY Clinical trial of 15, 828 randomly selected participants	Psychosocial stress was assessed by a questionnaire in 14,577 patients (median age 65.0, IQR 59, 71; 81.6% males) with stable CHD on optimal secondary preventive therapy in the prospective randomized STABILITY clinical trial. Adjusted Cox regression models were used to assess associations between individual stressors, baseline cardiovascular risk factors and outcomes.	Increasing frequency of depressive symptoms and loss of interest were robustly associated with a gradually increased risk of CV death, the primary composite end-point and all-cause death	Level 5: Prospective observational design	Patients from different regions, countries and cultures may not interpret the questions and responses in a uniform way	Yes. This is large scale prospective study. Studying the effect of depression and CV death is significant to patient preventative measures and future hospital readmissions.

Source)	Study Purpose	Sample	Methods	Study Results	Level of Evidence (Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change?
Ceccarini, M., Manzoni, G. M., & Castelnuovo, G. (2014). Assessing depression in cardiac patients: What measures should be considered? *Depression Research and Treatment,* https://10.1155/2014/148256	Despite the prognostic importance of depression in cardiac patients, an estimate suggests that depressive symptoms and disorders are diagnosed and treated in less than 15% of cases. This paper will examine eight well established tools following Italian and international guidelines on mood disorders diagnosis in cardiac patients.	Sample review of eight mood disorder tools.	examine eight well established tools following Italian and international guidelines on mood disorders diagnosis in cardiac patients: the Hospital Anxiety and Depression Scale (HADS), the Cognitive Behavioral Review and assessment of depression screening tools including the Hospital Form (CBA-H), the Beck Depression Inventory (BDI), the two and nine-item Patient Health Questionnaire (PHQ-2, PHQ-9), the Depression Interview and Structured	Though their strengths and weaknesses may appear to be homogeneous, the BDI-II and the PHQ are more efficient towards an early depression assessment in cardiac hospitalized patients.	Level 5: Review article	the selection of the eight tools proposed entirely refers to specific practice guidelines such as the Italian National System of guidelines (SNLG), the Italian Institute of Health (2005), the American health institutes (NHI), the National Heart, Lung and Blood Institute (2006), and the European guidelines for the prevention of cardiovascul	Yes. Among these questionnaires, semi-structured or structured clinical interviews, the Beck Depression Inventory-II (BDI-II) and the Patient Health Questionnaires in the two and nine-item version seem to assess any type of mood impairments rapidly and reliably, minimizing possible underestimates or misjudgments of the depressive symptomatology from both patients and

Source)	Study Purpose	Sample	Methods	Study Results	Level of Evidence (Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change?
			Hamilton (DISH), the Hamilton Rating Scale for Depression (HAM-D/HRSD), and the Composite International Diagnostic Interview (CIDI)			ar disease in the clinical practice published by the European Cardiology Society.	cardiac unit's professionals.

Source)	Study Purpose	Sample	Methods	Study Results	Level of Evidence (Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change?
Dias, R. M., & Koike, M. K. (2013). Pathogenesis of depression after myocardial infarction: Rationale, state of the art and perspectives. *Progress in Health Sciences, 3*(1), 123-127. https://doi.org/https://1425507037?accountuntid=14606	The aim of this study was to review the literature similar to a systematic review to better understand the pathogenesis of post MI depression (PMID).	26 articles were included qualified to be included in this review	Full text articles were obtained in indexed databases of Academic Search Elite, MEDLINE, Library Information Science & Technology Abstracts and EBSCO. The inclusion criteria were the studies that had information about the pathogenesis of PMID	Through this systematic review the authors discovered multiple causes such as psychological, biological dysfunctions or a combination of both.	Level 1 systematic review design	No limitations were listed in this article	Yes. This article highlights the biological reasons for post myocardial infarction depression

Source)	Study Purpose	Sample	Methods	Study Results	Level of Evidence (Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change?
Benyamini, Y., Roziner, I., Goldbourt, U., Drory, Y., & Gerber, Y. (2013). Depression and anxiety following myocardial infarction and their inverse associations with future health behaviors and quality of life. *Annals of Behavioral Medicine, 46*(3), 310-21. https://doi.org/10.1007/s12160-013-9509-3	The purpose of this study was to test a behavioral pathway from post-MI depression/anxiety to future quality of life.	540 patients participated in a questionnaire for anxiety and depression post myocardial infarction	Longitudinal cohort study. A structural equation model was used to test the direct and indirect associations of pre-MI psychosocial resources and emotional reactions to MI to physical and mental quality of life at 10 years,	A structural equations model confirmed that depression and anxiety were directly related to poorer quality of life 10 years later.	Level 4: longitudinal cohort study	The follow-up periods of 5 and 10 years were chosen arbitrarily, similar to most longitudinal studies, and are not necessarily time points that are significant for the individuals involved.	Yes. The opposite effects of anxiety and depression underscore the need to attend to both emotional reactions to MI while encouraging preventive health behaviors.

Source)	Study Purpose	Sample	Methods	Study Results	Level of Evidence (Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change?
Meijer, A., Conradi, H.J., Bos, E.H., M. Anselmino, M., & R. M. Carney, R.M. (2013). Adjusted prognostic association of depression following myocardial infarction with mortality and cardiovascular events: individual patient data meta-analysis. *British Journal of Psychiatry*. 203(2) 90-102. https://doi.org/ 10.1192/bjp.bp.112.111195	To combine original data from studies on the association between post-infarction depression and prognosis into one database, and to investigate to what extent such depression predicts prognosis independently of disease severity.	Sixteen studies participated, creating a database of 10 175 post-infarction cases.	An individual patient data meta-analysis of studies was conducted using multilevel, multivariable Cox regression analyses	Hazard ratios for post-infarction depression were 1.32 (95% CI 1.26-1.38, P<0.001) for all-cause mortality and 1.19 (95% CI 1.14-1.24, P<0.001) for cardiovascular events. Hazard ratios adjusted for disease severity were attenuated by 28% and 25% respectively.	Level 1: Meta-analysis study design	An inherent problem of IPD meta-analysis is that individual studies use different methods to assess relevant variables.	Yes. This study represents an important step forward in understanding the association between post-infarction depression and prognosis.

Source)	Study Purpose	Sample	Methods	Study Results	Level of Evidence (Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change?
Rosengren, A., Hawken, S., Ounpuu, S., Silwa, K., Zubaid, M., Almahmeed, W.A., Blackett, K.N., Sitthiamorn, C., Sato, H., & Yusuf, S., (2004). Association of psychosocial risk factors with risk of acute myocardial infarction in 11119 cases and 13648 controls from 52 countries (the INTERHEART study): case-control study. *Lancet.* 364(9438). 953-62 https://doi.org/ https://doi.org/10.1016/S0140-6736(04)17019-0	The aim of the present analysis was to investigate the relation of psychosocial factors to risk of myocardial infarction in 24767 people from 52 countries	11,119 cases and 13, 648 controls from 52 countries	Data for demographic factors, education, income, and cardiovascular risk factors were obtained by standardized approaches. Psychosocial stress was assessed by four simple questions about stress at work and at home, financial stress, and major life events in the past year. Additional questions assessed locus of control and presence of depression.	People with myocardial infarction (cases) reported higher prevalence of all four stress factors ($p<0.0001$)	Level 4: Case control design study	Unable to view limitations of the article	Yes. This study is important to look at the global burden of cardiac disease and depression

Source)	Study Purpose	Sample	Methods	Study Results	Level of Evidence (Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change?
Clarke, R. M. A., Jeffrey, J., Grossman, M., Strouse, T., Gitlin, M., & Skootsky, S. A. (2016). Delivering on accountable care: Lessons from A behavioral health program to improve access and outcomes. *Health Affairs, 35*(8), 1487-1493A. https://doi.org/https://dx.doi.org/10.1377/hlthaff.2015.1263	To build a collaborative care program called Behavioral Health Associates to improve patient outcomes	44,000 patients with a behavioral health condition in our population	The developed an evidence-based, all-payer collaborative care program called Behavioral Health Associates (BHA), operated as part of UCLA Health, an integrated academic medical center and evaluated post intervention ED visits and % of patients treated. The authors Methods We tracked the total number of BHA patients seen and the monthly rate of new intakes since the program's inception in November 2012	BHA providers have treated nearly 13 percent of the approximately 44,000 patients with a behavioral health condition in our population (approximately 5,720), more than tripling the number of patients receiving our system's services. BHA's 13 percent reduction in ED visits compared to the IMPACT trial's 10 percent reduction in costs.	Level 3: Prospective control trial design	This evaluation was subject to two limitations. The IMPACT model is an evidence-based practice, so we did not design the ED utilization tracking (which does not control for regression to the mean or secular changes) as a summative evaluation. In addition, this program was delivered within a single delivery	Yes. Collaborative care is an evidence-based holistic approach to depression care.

Source)	Study Purpose	Sample	Methods	Study Results	Level of Evidence (Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change?
			through January 2016.			system, which is also an academic medical center, so the findings might not be generalizable to other systems.	

Source)	Study Purpose	Sample	Methods	Study Results	Level of Evidence (Melnyk Framework)	Study Limitations	Would Use as Evidence to Support a Change?
Daskalopoulou, M., George, J., Walters, K., Osborn, D. P., Batty, G. D., Stogiannis, D., . . . Hemingway, H. (2016). Depression as a risk factor for the initial presentation of twelve cardiac, cerebrovascular, and peripheral arterial diseases: Data linkage study of 1.9 million women and men. *PLoS One, 11*(4). https://doi.org/10.1371/journal.pone.0153838	To examine the risk of 12 cardiovascular diseases according to depression status	1,937,360 adult men and women, free from cardiovascular disease at baseline, using linked UK electronic health records between 1997 and 2010. Patients registered from 225 general practices were studied using an open cohort design	The primary endpoint was initial presentation of 12 cardiovascular diseases after baseline. We used disease-specific Cox proportional hazards models with multiple imputation adjusting for cardiovascular risk factors (age, sex, socioeconomic status, smoking, blood pressure, diabetes, cholesterol	New onset depression was associated with each of the 12 diseases, with no evidence of stronger associations compared to history of depression.	Level 4: Cohort study design	There is a lack of validation work on depression recording in primary care databases, and evidence suggests that a provider's diagnosis of depression has a specificity of 81.3% and a sensitivity of around 50%	Yes. In this study the authors contribute more cardiovascular events (greater than 90,000) than any previous meta-analysis.

Haddad, M., Walters, P. Phillips, R., Tsakok, J., Paul Williams, P., Mann, A., & Tyler, A. (2013). Detecting depression in patients with coronary heart disease: a diagnostic evaluation of the PHQ-9 and HADSD in primary care, findings from the UPBEAT-UK study. *PlosOne*.8(10): e78493 https://doi.org/ 10.1371/journal.pone .0078493 8(10): e78493 https://doi.org/ 10.1371/journal.pone .0078493	People with coronary heart disease (CHD) are at heightened risk of depression, and this co-occurrence of conditions is associated with poorer outcomes including raised mortality. This study compares the diagnostic accuracy of two depression case finding instruments in CHD patients relative to a diagnostic standard, the revised Clinical Interview Schedule (CIS-R).	803 patients identified from the CHD registers of GP practices in Greater London.	Random controlled experimental design	Of 730 recruited patients without previously identified depression, 32 (4.4%) met ICD-10 depressive episode criteria according to the CIS-R. For the PHQ-9 and HADS-D lower cut-points than those routinely recommended were associated with improved case identifying properties. The PHQ-9 appeared the superior instrument using a cut-point of ≥8 (sensitivity=94%; specificity=84%). Using categorical scoring the PHQ-9 was 59% sensitive and 95% specific. For the HADS-D using cut-point ≥5, sensitivity was 81% and specificity was 77%	Level 2: random controlled study design	A possible limitation of this study is that recruitment of the sample was limited to general practices based in South London, and only 28% of eligible patients participated in this study.	This is the first large-scale investigation of the accuracy of these commonly used measures within a primary care CHD population. Our results suggest that although both scales have acceptable abilities and can be used as case identificatio n instruments for depression in patients with CHD, the PHQ-9 appeared diagnosticall y superior

Kim, Y., Soffler, M., Paradise, S., Qurat-ul-ain Jelani, Dziura, J., Sinha, R., & Safdar, B. (2017). Depression is associated with recurrent chest pain with or without coronary artery disease: A prospective cohort study in the emergency department. *The American Heart Journal,* 191, 47-54. https://doi.org/https:///10.1016/j.ahj.2017.06.003	The purpose of this study to assess (1) the prevalence of depression, anxiety, and high perceived stress in low- to moderate-risk chest pain patients in the ED and (2) whether these factors were associated with recurrent chest pain in this population with and without evidence of coronary artery disease.	The objective of the study was to determine whether psychological states predict recurrent chest pain.	A prospective cohort study of low– to moderate–cardiac risk ED patients admitted to the Yale Chest Pain Center with acute chest pain. Study was conducted on low- to moderate-risk ED patients who were ruled out for acute infarction and admitted to Yale Chest Pain Center (CPC), an observation unit. Inclusion criteria included age of 30 years or greater and admitted with acute chest pain.	There was a direct relationship between psychometric evaluation of depression (via PHQ8) and the frequency of chest pain. Upon assessing the role of the psychological states in relation to each other, depression was clearly a driving factor in the association between psychological conditions and recurrence of chest pain	Level 4 prospective cohort study design	This study did not enroll consecutive patients and had some patients lost at follow-up, possibly leading to under recognition of chest pain recurrence. In addition, self-selection bias could have led to the high prevalence of patients with anxiety during enrollment	Depression is independentl y associated with recurrent chest pain regardless of significant cardiac ischemia on stress testing. Identificatio n and targeted interventions may curtail recidivism with recurrent chest pain.

DiSante, J., Bires, A. M., Cline, T., & Waterstram-Rich, K. (2017). An Analysis of the prevalence of depression post–myocardial infarction. *Critical Care Nursing Quarterly.* 40(2). 124-136. https://doi.org/ 10.1097/CNQ.0000000000000149	The primary aim of the study was to collect data using the Patient Health Questionnaire-9 (PHQ-9), a public domain screening tool. This research was intended to provide evidence that would sup- port using the PHQ-9 as a standard depression screening tool for patients post–myocardial infarction	Twenty-four post-MI patients were evaluated via the PHQ-9 Patient Depression Questionnaire. The ages of the patients ranged from 44 to 83 years, with a mean age of 64.7 years	The study was a quantitative study with a sample of convenience.	The PHQ-9 did find that 87.5% of the patients who received the PHQ-9 had depression symptoms based on the questionnaire. The 87.5% fell into the category of minimal depression. Major depression was not detected with the use of the PHQ-9 in any of the 24 patients based on the criteria.	Level 3 non-random convenienc e design method	The small sample size hindered the statistical significance for the study. Reasons for the small size included patients eliminated be-cause of the exclusion criteria.	The lack of major depression recognized in this study with the PHQ-9 shows that the PHQ-9 will not recognize major depression at a higher rate with the use of the screening tool

Jovanova, O., Luik, A. I., Leening, M. J. G., Noordam, R., Aarts, N., Hofman, A., Dehghan, A., & Tiemeier, H. (2016). The long-term risk of recognized and unrecognized myocardial infarction for depression in older men. *Psychological Medicine, 46*(9), 1951-1960. https://doi.org/https://dx.doi.org/10.1017/S0033291716000544.	The purpose of the study was to evaluate the long-term effect of recognized and unrecognized myocardial infarction (UMI)(MI) for depression on older men.	Men over 55 years old who consented to be part of the Rotterdam Study in 1990	1823 men were followed for the occurrence of depression	Men with RMI had on average [unstandardized regression coefficient (B) 1.14, 95% CI 0.07–2.21] higher scores for depressive symptoms.	Level 4: Descriptive Cohort design	A limitation of our study is the possible misclassification of UMI.	Yes. Long term effects of cardiovascular disease on depression may influence cardiac rehabilitation interventions.

Appendix B

PHQ2-9

Over the last 2 weeks, how often have you been bothered by any of the following:

Question	Not at all (0)	Several days (1)	More than half the days (2)	Nearly everyday (3)
1. Little interest or pleasure in doing things?				
2. Feeling down, depressed, or hopeless?				
3.Trouble falling or staying asleep, or sleeping too much?				
4.Feeling tired or having little energy?				
5.Poor appetite or overeating?				
6.Feeling bad about yourself—or that you are a failure or have let yourself or your family down?				
7.Trouble concentrating on things, such as reading the newspaper or watching television?				
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?				
9. Thoughts that you would be better off dead or of hurting yourself in some way?				

Developed by Drs. Robert L. Spitzer, Janet B.W. Williams, Kurt Kroenke and colleagues, with an educational grant from Pfizer Inc. No permission required to reproduce, translate, display or distribute.

Appendix C

PHQ-9 Treatment Algorithm

PHQ-9 Scores and Proposed Treatment Actions * PHQ-9 Score	Depression Severity	Proposed Treatment Actions
0 – 4	None-minimal	None
5 – 9	Mild	Watchful waiting; repeat PHQ-9 at follow-up
10 – 14	Moderate	Treatment plan, considering counseling, follow-up and/or pharmacotherapy
15 – 19	Moderately Severe	Active treatment with pharmacotherapy and/or psychotherapy
20 – 27	Severe	Immediate initiation of pharmacotherapy and, if severe impairment or poor response to therapy, expedited referral to a mental health specialist for psychotherapy and/or collaborative management

Developed by Drs. Robert L. Spitzer, Janet B.W. Williams, Kurt Kroenke and colleagues, with an educational grant from Pfizer Inc. No permission required to reproduce, translate, display or distribute.

Appendix D

Education Survey

Please give your knowledge level (on a scale from 0% to 100%) for the following line items:

Question	0	10	20	30	40	50	60	70	80	90	100
The purpose of the PHQ2-9											
The American Heart Association's depression care guidelines											
Depression prevalence in patients with cardiac disease											
Access to EPIC PHQ2-9 document flowsheets											
Access to EPIC PHQ2-9 referral documentation											

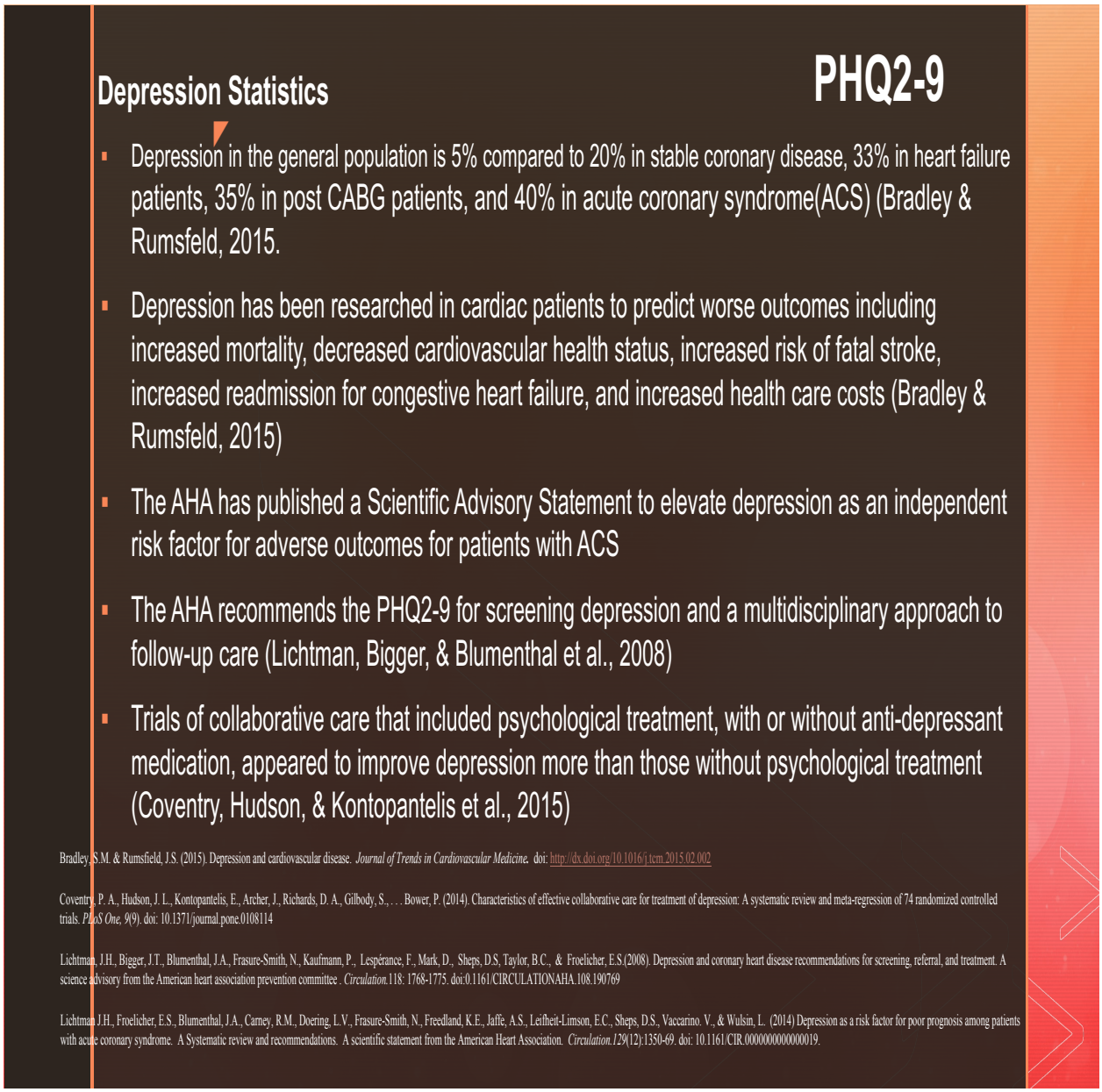
Appendix E

PHQ2-9 Chart Audit Tool

Chart	Yes, PHQ2-9 Documented	No, PHQ2-9 not documented	Yes, Referral Documented	No Referral documented

Appendix F

PHQ2-9 Educational Module



Appendix G

PHQ2-9 EPIC Tip Sheets

Epic TIP SHEET

Quality: Depression Screening and Follow-Up

PREV 12 (NQF 0418): Screening for Clinical Depression and Follow-Up Plan

DESCRIPTION:
Percentage of patients aged 12 years and older screened for depression on the date of the encounter using an age appropriate standardized depression screening tool AND if positive, a follow-up plan is documented on the date of the positive screen

DENOMINATOR:
All patients aged 12 years and older before the beginning of the measurement period with at least one eligible encounter during the measurement period
DENOMINATOR EXCLUSIONS:
Patients with an active diagnosis for Depression or a diagnosis of Bipolar Disorder
DENOMINATOR EXCEPTIONS:
Patient Reason(s): Patient refuses to participate
OR
Medical Reason(s): Patient is in an urgent or emergent situation where time is of the essence and to delay treatment would jeopardize the patient's health status
OR
Situations where the patient's functional capacity or motivation to improve may impact the accuracy of results of standardized depression assessment tools. For example: certain court appointed cases or cases of delirium

NUMERATOR:
Patients screened for depression on the date of the encounter using an age appropriate standardized tool AND if positive, a follow-up plan is documented on the date of the positive screen
NUMERATOR EXCLUSIONS:
Not Applicable

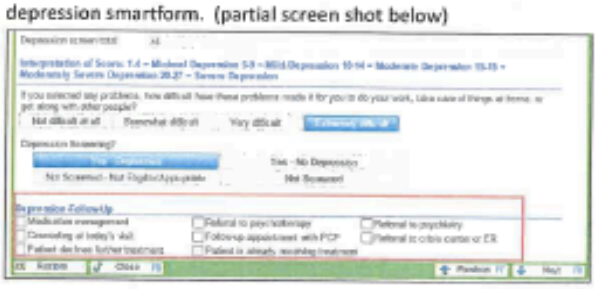
EPIC DOCUMENTATION TOOLS:

1. Quality form: Depression (PHQ-2 →9)
2. Depression Screening Best Practice Advisory
3. Depression Screen Positive Best Practice Advisory

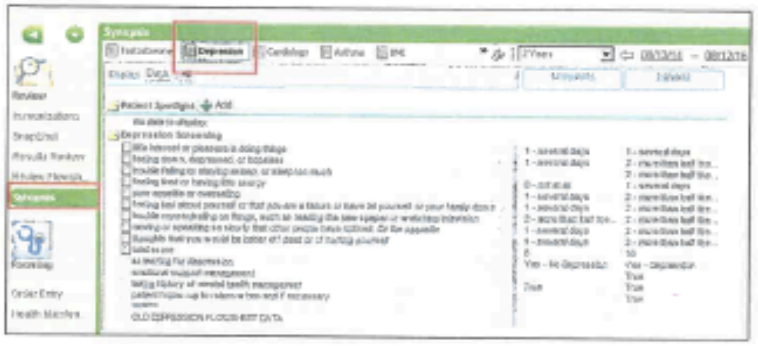
EPIC WORKFLOW:

1. **Rooming Staff:**
   a. Complete activities of rooming tab in sequential order
   b. Select Quality forms section within the rooming tab at all 6month follow-up and annual exam visits.
   c. Depression Screening BPA will appear if your patient has not been screened for depression within the last year (along with all other rooming assessment alerts)
   d. Select the link from within the BPA to open the Depression smart form

b. Discuss the results with your patient, formulate an action plan and select the appropriate boxes on the depression smartform. (partial screen shot below)

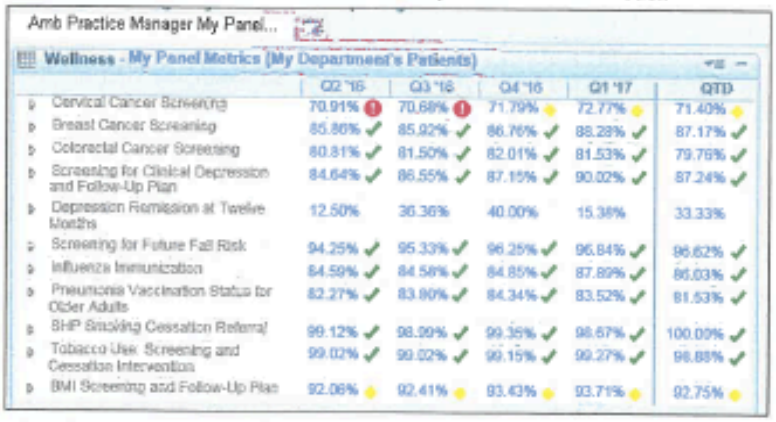


EPIC CHART REVIEW: Synopsis → Depression



EPIC PERFORMANCE MEASUREMENT AND QUALITY IMPROVEMENT TOOLS:

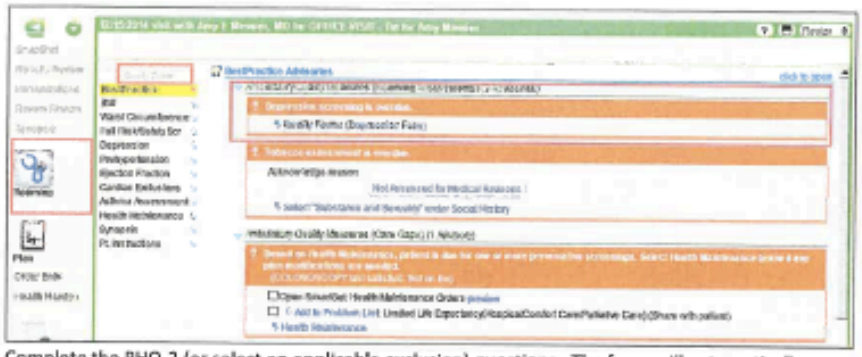
1. MyDashboard MyPanel Metrics Reports (Epic→Reports→My Dashboard)
   a. Select the Chevron to see drilldown reports, graphs and measure descriptions
   b. Run care gap reports for measure deficiency lists
   c. Hover over performance values to see numerator/denominator information



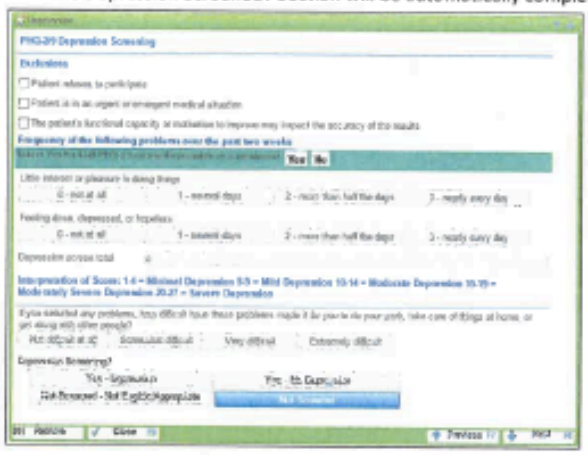
Amb Practice Manager My Panel...

Wellness - My Panel Metrics (My Department's Patients)

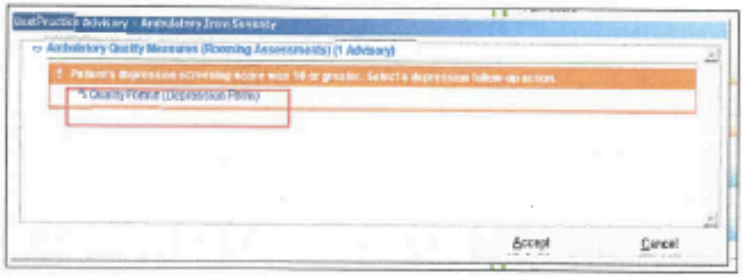
	Q2 '16	Q3 '16	Q4 '16	Q1 '17	QTD
Cervical Cancer Screening	70.91%	70.68%	71.79%	72.77%	71.40%
Breast Cancer Screening	85.86%	85.92%	86.76%	88.28%	87.17%
Colorectal Cancer Screening	80.81%	81.50%	82.01%	81.53%	79.76%
Screening for Clinical Depression and Follow-Up Plan	84.64%	86.55%	87.15%	90.02%	87.24%
Depression Remission at Twelve Months	12.50%	36.36%	40.00%	15.38%	33.33%
Screening for Future Fall Risk	94.25%	95.33%	96.25%	96.84%	96.62%
Influenza Immunization	84.59%	84.58%	84.85%	87.89%	86.03%
Pneumonia Vaccination Status for Older Adults	82.27%	83.80%	84.34%	83.52%	81.53%
BHP Smoking Cessation Referral	99.12%	98.99%	99.36%	98.67%	100.00%
Tobacco Use: Screening and Cessation Intervention	99.02%	99.02%	99.15%	99.27%	98.88%
BMI Screening and Follow-Up Plan	92.06%	92.41%	93.43%	93.71%	92.75%



e. Complete the PHQ-2 (or select an applicable exclusion) questions. The form will automatically expand to the complete PHQ-9 form to complete if the PHQ-2 score is 3 or greater. **DO NOT** complete the follow-up section. The Depression Screened? Section will be automatically completed based on your selections.



2. **Providers:**
   a. An alert will appear opening the chart or placing any orders notifying you if your patients depression screen was abnormal. Select the link to open the Quality Form.



Appendix H

CONSENT FORM

TITLE OF QUALITY IMPROVEMENT PROJECT

Implementation of a PHQ2-9 Document Flowsheet in the Cardiac Rehabilitation Setting

PRINCIPAL INVESTIGATOR

Heidi Winslow RN, MSN

Liberty University School of Nursing

910-538-9313

winslowh@uncw.edu

My name is Heidi Winslow RN, MSN. I am a staff nurse at New Hanover Regional Medical Center, and a DNP student at Liberty University. As a graduate student in the School of Nursing at Liberty University, I am conducting an evidence-based research study for depression screening documentation in the cardiac rehabilitation unit. I am conducting this project as part of my requirements for my Doctor of Nursing Practice degree.

Research studies only include people who choose to take part. **Your participation in this research study is completely voluntary.** No matter what decision you make, there will be no penalty to you and you will not lose any benefits to which you are entitled. You may stop participating at any time during the study. **Please let me know if you do not want your data included as part of this research study.**

The purpose of this research study is to determine if implementation of a PHQ2-9 electronic document flowsheet improves patient depression screening, treatment, and documentation in the cardiac rehabilitation unit.

This research study involves the following:

- You will be asked to participate in a 5-question pre/post knowledge survey. Both surveys consist of the same questions. The survey questions are intended to assess current knowledge of the purpose of the PHQ2-9, evidence-based guidelines, and EPIC PHQ2-9 electronic resources. It should take approximately 5 minutes to complete the surveys.

The anticipated risks and benefits to you from participating in this study may include:

- There are no physical risks in participating in this study. Participation will be completely anonymous, and no personal, identifying information will be collected.
- The societal benefits to participating in this study include a national and international recognition through research that detection and treatment of depression among patients with cardiovascular disease is critical. The AHA's recommendations confirm a new urgency towards the development and dissemination of effective treatments for these high-risk patients. Depression is a risk factor for cardiac disease and may result in premature death if left untreated. To ensure that patients with depression are not overlooked and possibly reduce worse outcomes, depression screening and treatment should begin soon after a cardiac event. The literature supports the clinical significance of implementing an evidence-based workflow process for depression screening and treatment in the cardiac rehabilitation (CR) setting.

This study has been reviewed by the New Hanover Regional Medical Center (NHRMC) Institutional Review Board (IRB). This Board has been established under the authority of the Food and Drug Administration (FDA) for the purpose of protecting the rights and well-being of people recruited to participate in research activities. This Board looks at the risks and benefits of each study and receives updated information throughout the study to ensure your safety as a research participant. You should decide for yourself, in consultation with study personnel and other advisors, whether joining this study is a good decision for you.
If you wish to speak with someone about your rights while participating in this study, you may contact the NHRMC IRB office at (910) 667-4621.

If you have any questions regarding this survey, please contact me.

Sincerely,
Heidi Winslow RN, MSN
Liberty University DNP Student
910-538-9313
Email: winslowh@uncw.edu

Your completion of the survey implies your consent to participate in the research study. Please keep this information sheet or record the researcher's contact information in case you have future questions.

Survey Link:
https://uncw.az1.qualtrics.com/jfe/form/SV_0UOjnE1q5W41z3D

Appendix I

Manager Approval Letter

February 2, 2018

Attention: IRB
Liberty University
Lynchburg, Virginia

IRB Members:

Ms. Heidi Winslow, MSN, RN, Liberty University Doctor of Nursing Practice Student (Principal Investigator) and Dr. Dorothy Murphy, DNP, FNP-BC, Associate Professor of Nursing, and DNP Scholarly Project Chair have proposed to conduct Ms. Winslow's Doctor of Nursing Practice Scholarly Project: Depression Screening in the Cardiac Rehabilitation Setting at New Hanover Regional Medical Center Cardiac Rehabilitation Unit.

New Hanover Regional Medical Center Cardiac Rehabilitation Unit is committed to providing excellent, comprehensive care for our patients, facilitated by the pursuit of quality improvement. Ms. Winslow's Doctor of Nursing Practice Scholarly Project reflects our commitment that every patient receives optimal quality health care.

New Hanover Regional Medical Center Cardiac Rehabilitation Unit is pleased to support Ms. Winslow's Scholarly Project: Depression Screening in the Cardiac Rehabilitation Setting.

Feel free to contact me if I can be of further assistance.

Respectfully,

XXXXXXXXXXXXXXXX

XXXXXXXXX
Administrator Cardiac Services

New Hanover Regional Medical Center
P.O. Box 9000 / 2131 S. 17th Street / Wilmington, NC 28402-9000
910-343-7000

Appendix J

Facility IRB Approval Letters

March 29, 2018

Heidi Winslow, RN, BSN
UNCW
301 S. College Rd.
Wilmington, NC 28403

Dear Mrs. Winslow:

Study Title: Depression Screening in the Cardiac Rehabilitation Setting.
IRB Study #: 1803-3

Thank you for submitting your study for review by the New Hanover Regional Medical Center Institutional Review Board. We have reviewed your study on 03/29/2018. Listed below are the actions that were taken regarding this study. If changes are required for approval, once the IRB has received the requested revisions a final approval letter will be sent to you. *Prior to the start of your study, you must have completed the administrative review and have approval from the Director of Research. Administrative approval is not required for retrospective chart review studies.*
This IRB operates in accordance with all applicable laws, regulations, and guidelines for research. Compliance is maintained with the FDA Code of Federal Regulations, Office for Human Research Protections (OHRP), Good Clinical Practice (GCP) guidelines, and International Conference of Harmonization (ICH).

IRB Action: Expedited **Action Item: Initial Approval**
IRB Action Date: 03/29/2018 **Expiration Date:** 3/28/2019
Required Changes: No modifications required.
Reason for Review: Expedited
Approved Subject Enrollment Number: 10 *You may not exceed this number without submitting an update/amendment request to the IRB.*
The IRB must be notified in the event of any amendments, updates, consent form changes, adverse events, safety issues, or problems encountered during this approval period. You are encouraged to preview the website located at www.nhrmc.org/irb to familiarize yourself with your responsibilities, the submission requirements, and forms that will need to be completed during the course of the approval period.
If you have any questions, please feel free to contact the IRB office at 343-4621.

Sincerely,

XXXXXXXXXXXXXXXXXX
George Wilkes, RPh
XXXXXXXXXX
Chairperson, Institutional Review Board

New Hanover Regional Medical Center
P.O. Box 9000 / 2131 S. 17th Street / Wilmington, NC 28402-9000
910-343-7000

May 4, 2018

Heidi Winslow, RN, BSN
6 West Atlanta Street
Wrightsville Beach, NC 28480

Dear Mrs. Winslow:

Study Title: Depression Screening in the Cardiac Rehabilitation Setting.
IRB Study #: 1803-3

Thank you for submitting your study for review by the New Hanover Regional Medical Center Institutional Review Board. We have reviewed your study on 5/04/2018. Listed below are the actions that were taken regarding this study. If changes are required for approval, once the IRB has received the requested revisions a final approval letter will be sent to you.

This IRB operates in accordance with all applicable laws, regulations, and guidelines for research. Compliance is maintained with the FDA Code of Federal Regulations, Office for Human Research Protections (OHRP), Good Clinical Practice (GCP) guidelines, and International Conference of Harmonization (ICH).

IRB Action: Expedited **Action Item:** Expedited Review Update
IRB Action Date: 5/04/2018 **Expiration Date:** 3/28/2019
Required Changes: No modifications required.
Reason for Review: Procedure
Description: Expedited review request to add a data collection variable to collect referral documentation for those who scored positively for depression.

If you have any questions, please feel free to contact the IRB office at 343-4621.

Sincerely,

XXXXXXXXXXXXXXXXXXXX

George Wiley, PhD
Chairperson, Institutional Review Board

Appendix K

Liberty University IRB Approval Letter

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

April 12, 2018

Heidi Winslow
IRB Approval 3233.041218: Implementation of a Patient Health Questionnaire 2-9 Electronic Document Flowsheet

Dear Heidi Winslow,

We are pleased to inform you that your study has been approved by the Liberty University IRB. This approval is extended to you for one year from the date provided above with your protocol number. If data collection proceeds past one year, or if you make changes in the methodology as it pertains to human subjects, you must submit an appropriate update form to the IRB. The forms for these cases were attached to your approval email.

Thank you for your cooperation with the IRB, and we wish you well with your research project.

Sincerely,

XXXXXXXXXXXX

XXXXXXXXXXXX
Administrative Chair of Institutional Research
The Graduate School

LIBERTY
UNIVERSITY.
Liberty University | Training Champions for Christ since 1971

Appendix L

CITI CERTIFICATES

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Heidi Winslow (ID: 5584200)
- **Email:** hwinslow@liberty.edu
- **Institution Affiliation:** Liberty University (ID: 2446)
- **Institution Unit:** Nursing
- **Phone:** 910-538-9313

- **Curriculum Group:** Biomedical Research - Basic/Refresher
- **Course Learner Group:** Biomedical & Health Science Researchers
- **Stage:** Stage 1 - Basic Course
- **Description:** Choose this group to satisfy CITI training requirements for investigators and staff involved primarily in biomedical research with human subjects.

- **Report ID:** 21165097
- **Completion Date:** 14-Oct-2016
- **Expiration Date:** 14-Oct-2019
- **Minimum Passing:** 80
- **Reported Score*:** 84

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Belmont Report and CITI Course Introduction (ID: 1127)	11-Oct-2016	3/3 (100%)
History and Ethics of Human Subjects Research (ID: 498)	14-Oct-2016	6/7 (86%)
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	14-Oct-2016	4/5 (80%)
Informed Consent (ID: 3)	14-Oct-2016	5/5 (100%)
Social and Behavioral Research (SBR) for Biomedical Researchers (ID: 4)	14-Oct-2016	4/4 (100%)
Records-Based Research (ID: 5)	14-Oct-2016	3/3 (100%)
Genetic Research in Human Populations (ID: 6)	14-Oct-2016	4/5 (80%)
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	11-Oct-2016	4/5 (80%)
FDA-Regulated Research (ID: 12)	14-Oct-2016	4/5 (80%)
Research and HIPAA Privacy Protections (ID: 14)	14-Oct-2016	4/5 (80%)
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	14-Oct-2016	4/4 (100%)
Recognizing and Reporting Unanticipated Problems Involving Risks to Subjects or Others in Biomedical Research (ID: 14777)	14-Oct-2016	1/5 (20%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	11-Oct-2016	5/5 (100%)
Liberty University (ID: 15111)	11-Oct-2016	No Quiz

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: https://www.citiprogram.org/verify/?df9cf927-0a2d-4f06-9e74-90b7026f1672

CITI Program
Email: support@citiprogram.org
Phone: 888-529-5929
Web: https://www.citiprogram.org

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Heidi Winslow (ID: 5584200)
- **Email:** hwinslow@liberty.edu
- **Institution Affiliation:** Liberty University (ID: 2446)
- **Institution Unit:** Nursing
- **Phone:** 910-538-9313

- **Curriculum Group:** Biomedical Research - Basic/Refresher
- **Course Learner Group:** Biomedical & Health Science Researchers
- **Stage:** Stage 1 - Basic Course
- **Description:** Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in biomedical research with human subjects.

- **Report ID:** 21165097
- **Report Date:** 14-Oct-2016
- **Current Score**:** 85

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
History and Ethics of Human Subjects Research (ID: 498)	14-Oct-2016	6/7 (86%)
Liberty University (ID: 15111)	11-Oct-2016	No Quiz
Informed Consent (ID: 3)	14-Oct-2016	5/5 (100%)
Social and Behavioral Research (SBR) for Biomedical Researchers (ID: 4)	14-Oct-2016	4/4 (100%)
Belmont Report and CITI Course Introduction (ID: 1127)	11-Oct-2016	3/3 (100%)
Records-Based Research (ID: 5)	14-Oct-2016	3/3 (100%)
Genetic Research in Human Populations (ID: 6)	14-Oct-2016	4/5 (80%)
FDA-Regulated Research (ID: 12)	14-Oct-2016	4/5 (80%)
Research and HIPAA Privacy Protections (ID: 14)	14-Oct-2016	4/5 (80%)
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	14-Oct-2016	4/4 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	11-Oct-2016	5/5 (100%)
Cultural Competence in Research (ID: 15166)	11-Oct-2016	5/5 (100%)
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	14-Oct-2016	4/5 (80%)
Recognizing and Reporting Unanticipated Problems Involving Risks to Subjects or Others in Biomedical Research (ID: 14777)	14-Oct-2016	1/5 (20%)
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	11-Oct-2016	4/5 (80%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: https://www.citiprogram.org/verify/?d8cf927-0a2d-4f06-9e74-90b7f028f1672

Collaborative Institutional Training Initiative (CITI Program)
Email: support@citiprogram.org
Phone: 888-529-5929
Web: https://www.citiprogram.org

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Heidi Wrislow (ID: 5584200)
- **Email:** hwrislow@liberty.edu
- **Institution Affiliation:** Liberty University (ID: 2446)
- **Institution Unit:** Nursing
- **Phone:** 910-538-9313

- **Curriculum Group:** Social & Behavioral Research - Basic/Refresher
- **Course Learner Group:** Social & Behavioral Researchers
- **Stage:** Stage 1 - Basic Course
- **Description:** Choose this group to satisfy CITI training requirements for investigators and staff involved primarily in Social/Behavioral Research with human subjects.

- **Report ID:** 21132052
- **Completion Date:** 11-Oct-2016
- **Expiration Date:** 11-Oct-2019
- **Minimum Passing:** 80
- **Reported Score*:** 88

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Belmont Report and CITI Course Introduction (ID: 1127)	11-Oct-2016	3/3 (100%)
History and Ethical Principles - SBE (ID: 490)	11-Oct-2016	4/5 (80%)
Defining Research with Human Subjects - SBE (ID: 491)	11-Oct-2016	5/5 (100%)
The Federal Regulations - SBE (ID: 502)	11-Oct-2016	4/5 (80%)
Assessing Risk - SBE (ID: 503)	11-Oct-2016	5/5 (100%)
Informed Consent - SBE (ID: 504)	11-Oct-2016	4/5 (80%)
Privacy and Confidentiality - SBE (ID: 505)	11-Oct-2016	5/5 (100%)
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	11-Oct-2016	4/5 (80%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	11-Oct-2016	5/5 (100%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	11-Oct-2016	5/5 (100%)
Cultural Competence in Research (ID: 15166)	11-Oct-2016	5/5 (100%)
Liberty University (ID: 15111)	11-Oct-2016	No Quiz
Internet-Based Research - SBE (ID: 510)	11-Oct-2016	2/5 (40%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

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COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Heidi Winslow (ID: 5584200)
- **Email:** hwinslow@liberty.edu
- **Institution Affiliation:** Liberty University (ID: 2446)
- **Institution Unit:** Nursing
- **Phone:** 910-538-9313

- **Curriculum Group:** Social & Behavioral Research - Basic/Refresher
- **Course Learner Group:** Social & Behavioral Researchers
- **Stage:** Stage 1 - Basic Course
- **Description:** Choose this group to satisfy CITI training requirements for investigators and staff involved primarily in Social/Behavioral Research with human subjects.

- **Report ID:** 21132052
- **Report Date:** 14-Oct-2016
- **Current Score**:** 88

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
Liberty University (ID: 15111)	11-Oct-2016	No Quiz
History and Ethical Principles - SBE (ID: 490)	11-Oct-2016	4/5 (80%)
Defining Research with Human Subjects - SBE (ID: 491)	11-Oct-2016	5/5 (100%)
Belmont Report and CITI Course Introduction (ID: 1127)	11-Oct-2016	3/3 (100%)
The Federal Regulations - SBE (ID: 502)	11-Oct-2016	4/5 (80%)
Assessing Risk - SBE (ID: 503)	11-Oct-2016	5/5 (100%)
Informed Consent - SBE (ID: 504)	11-Oct-2016	4/5 (80%)
Privacy and Confidentiality - SBE (ID: 505)	11-Oct-2016	5/5 (100%)
Research with Prisoners - SBE (ID: 506)	11-Oct-2016	Quiz Not Taken
Internet-Based Research - SBE (ID: 510)	11-Oct-2016	2/5 (40%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928)	11-Oct-2016	5/5 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	11-Oct-2016	5/5 (100%)
Cultural Competence in Research (ID: 15166)	11-Oct-2016	5/5 (100%)
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	11-Oct-2016	4/5 (80%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

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Appendix M

Timeline

Date	Milestone	Significance
2/13/ 18	Meeting with quality outcome manager	Dr. XX, who is a quality improvement champion at the hospital encouraged me to set up a meeting with Diana XXX who is a quality metrics supervisor. I met with Ms. X and explained the PHQ2-9 hard copy problem in the CR setting. The significance of this meeting was she provided several alternative options to streamline PHQ2-9 documentation in the CR setting. Her suggestion was to meet with Janet XXX next for approval of an electronic option.
2/22/18	Meeting with unit managers and outcome manager	The manager approved moving to an electronic system for CR. This was significant because without her approval my plan B for my project would be in the trash. Very excited!
3/5/18	Met with EPIC team and Diane XXX for EPIC documentation options	The significance of this meeting can't be underestimated. The EPIC team validated that I found a major 'jewel' of a project. They were devastated that patients may have been missed for depression through hard-copy charting. They all agreed that electronic charting needed to happen for best practice. They commended me for my research and effort to help patients.
3/12/18	Met with EPIC/IT Team for NHRMC to discuss documents	Again, the significance of this meeting can't be underestimated. The EPIC team confirmed the significance of this project and the need for a change. The EPIC also quickly came up with electronic options that would improve patient care readily available on EPIC.
3/23/18	Meeting with EPIC Team and CR staff to discuss current and potential PHQ2-9 practice.	This meeting confirmed through communication with the registered nurses that according to current practice, a practice guideline gap exists for best practice.
3/26/18	Email from the IT/EPIC team that the hospital wants to start the practice change as soon as possible.	This email was significant in that I do not have NHRMC or Liberty IRB approval. Keep in mind
3/26/18 - 3/30/18	Emails back and forth to two IRBs	Revisions of IRB applications to NHRMC and Liberty University

4/1/18 - 4/15/18	IRB Approval by Liberty University and New Hanover Regional Medical center	IRB Approval is vital to start working on my DNP EBP
4/20/18	Pre-educational survey emailed to CR nurses	The pre-survey is important to evaluate current knowledge on the PHQ2-9 and where it can be documented on EPIC
4/20/18 -4 /27/18	Educational training of the CR nurses	Prior to implementing a new intervention, education will need to be conducted
5/1/18 - 5/30/18	Implementation of new EPIC document flowsheet	The new EPIC document flowsheet for PHQ2-9 is evidence-based and should be standard practice for cardiac patients
5/10/18	Post-educational survey emailed to CR nurses	After the nurses have had some time to implement the new document flowsheet, post assessment of knowledge is important
6/1/18 - 6/15/18	Data collection of the educational survey and post-chart audit	Data collection will provide valuable information on protocol understanding as well as provide patient trends for depression.
6/16/18	Beginning the process of Part 4 & 5 in Phase 3 of the DNP Project	Phase 4 & 5 are significant to prepare the DNP project for publication
7/25/18 -8 /15/18	Dissemination of project results at the CR Practice Council	The unit practice council serves as a forum for discussion for new protocols and policies.
7/25/18 - 8/15/18	Manuscript preparation for publication	Journal writing is important for our profession and those we serve
8/15/18 - 9/15/18	Digital Commons submission, Defense Presentation, completion of practicum hours	The digital commons submission, the defense presentation and practicum are required for graduation.