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EVALUATION OF PSYCHOLOGICAL SERVICES FOR ANXIETY AND DEPRESSION PROVIDED IN A UNIVERSITY-BASED PRIMARY CARE CLINIC

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EVALUATION OF PSYCHOLOGICAL SERVICES FOR ANXIETY AND
DEPRESSION PROVIDED IN A UNIVERSITY-BASED PRIMARY CARE CLINIC

A dissertation submitted in partial fulfillment of the requirements for the degree of doctor
of philosophy at Virginia Commonwealth University

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Abstract

EVALUATION OF PSYCHOLOGICAL SERVICES FOR ANXIETY AND DEPRESSION PROVIDED IN A UNIVERSITY-BASED PRIMARY CARE CLINIC

By Elizabeth Sadock, MS

A dissertation submitted in partial fulfillment of the requirements for the degree of doctor of philosophy at Virginia Commonwealth University

Virginia Commonwealth University, 2014.

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Primary care clinics are increasingly integrating psychological services into their service programs, however few studies have used a comparison group to demonstrate the effectiveness of these services. This study evaluated the psychological services provided at the Ambulatory Care Clinic (ACC) at the Virginia Commonwealth University Health System (VCUHS) by comparing changes in 147 patients' PHQ-9 depression scores and GAD-7 anxiety scores over time to the scores of 139 patients at the Hayes E. Willis Health Center, a comparison clinic with demographically similar patients but no integrated psychological services. Assessment data were collected from participants in the ACC at VCUHS during their first or second primary care psychology appointment and during their 3rd-5th appointment. To maximize similarity in baseline levels, participants in the Hayes clinic were matched to participants from the ACC at VCUHS according to their initial levels of depression and anxiety. Participants from the Hayes clinic were then evaluated with follow-up measures of depression and anxiety at approximately the

same time interval as their matched counterparts from the ACC at VCUHS. Results indicated that participants from the ACC at VCUHS experienced significantly greater decreases in their depression and anxiety scores compared to participants in the Hayes Clinic. These results remained significant after accounting for participants' medication for depression and anxiety and participants' medical diagnoses. The influence of additional mental health services, treatment resistance factors, marital status, employment status, and general demographic variables were also evaluated. This study provided modest preliminary evidence that indicate integration of psychological services is effective. Strengths, limitations, and implications and future directions are discussed.

Evaluation of Psychological Services for Anxiety and Depression Provided in a University-Based Primary Care Clinic

There is a growing need for psychologists to expand beyond their typical care settings and take an active role as care providers in medical settings. Primary care medicine, in particular, is changing from a strictly biomedical field to one that is adopting an increasingly biopsychosocial perspective, paving the way for the integration of psychology (Bluestein & Cubic, 2009). Approximately 75% of patients seen in primary care settings also have mental health concerns and physicians are often not fully equipped to treat both physical and psychological problems (Grenier, Chomienne, Gaboury, Ritchie, & Hogg, 2008; Levant, 2005). According to primary care physicians, they are not as confident addressing problems that are more psychologically based due to their lack of specialty training in this area (Grenier, et al., 2008). It is becoming clear that an integrated approach to medical care can best serve patients' varied and complex needs.

Over the past decade, psychologists have played an increasingly larger role in primary care settings and have filled a variety of roles. Grant funded projects aimed at integrating psychological services into the medical model began to emerge around the 1960s (Robinson & Strosahl, 2009). Early attempts at integration faced barriers similar to those being confronted today, such as lack of communication between physicians and psychologists and lack of funding. Early exploratory research investigating the mental health status of patients seeking medical treatment revealed high prevalence rates of depression, inspiring many treatment studies focusing on depression treatments in primary care settings (Bruce et al., 2004; Cuijpers, van Straten, van Schaik, & Andersson, 2009; Lucock, Kirby, & Wainwright, 2011; McFeature & Pierce, 2012; Unützer, 2002). The acceptance of psychologists in primary care gained

momentum in the 1990s when the Group Health Cooperative integration model was first featured at many national conferences (Robinson & Strosahl, 2009). Today, the role of psychologists within the primary care setting is more established but the research literature supporting an integrated model of care remains insufficient. Only a few studies have provided quantitative evidence to support program efficacy (Bruce et al., 2004; Cape, Whittington, Buszewicz, Wallace, & Underwood 2010; Cuijpers et al., 2009; Lucock et al., 2010; McFeature & Pierce, 2012; Sadock, Auerbach, Rybarczyk, & Aggarwal, 2014; Unützer, 2002). However, many of these studies have notable limitations such as lack of a comparison group and small sample sizes. Without more evaluative studies, psychologists will be unable to establish a substantiating presence within primary care.

The present study evaluated the effects of treatment provided by primary care psychologists at the Ambulatory Care Clinic (ACC) at the Virginia Commonwealth University Health System (VCUHS), a training clinic primarily serving minority and indigent patients. Specifically, this study compared changes in depression and anxiety levels in patients provided integrated psychological treatment to those of patients from a comparison clinic, the Hayes E. Willis Health Center, a primary care clinic that provides medical services to a similar population of patients. Patients at the Hayes Clinic were not offered integrated psychological services but their levels of anxiety and depression were tracked over the same time interval as patients at the ACC at VCUHS. Patient depression and anxiety are treated at the Hayes Clinic by physicians and the social worker, and patients are occasionally referred to specialty mental health services. The ACC at VCUHS offers the same medical services as the Hayes Clinic but also provides integrated psychological services. Therefore, patients at the Hayes Clinic were able to serve as an

appropriate source of comparison for patients at the ACC at VCUHS who received integrated psychological services.

In the following sections, the model describing the roles of psychologists and justification for their presence in the primary care setting is presented, followed by a detailed description of the varying levels of integration between mental health professionals and physicians. Description of the typical problems afflicting patients referred to psychologists and some typical interventions employed will then be presented. Next, the barriers to integrating psychologists into a medical setting are discussed as well as some proposed solutions. This section is followed by a review of the literature on incidence and treatment of anxiety and depression in primary care outpatient setting.

The Primary Mental Health Care (PMHC) Model

The treatment model for psychologists in primary care settings is different than the traditional therapy model. The most prominent difference is that sessions are designed to be brief, approximately 15-30 minutes in contrast to the standard one-hour counseling session (Rowan & Runyan, 2005). This brevity is consistent with the medical model of care. The primary care psychologist must therefore establish rapport and quickly ascertain the nature of the problem, potential diagnoses, and develop a plan of action. Patients typically return once a month for care, concurrent with their medical appointment. Considering the infrequency of therapy (once a month as opposed to the traditional standard of once a week) it is important that psychologists provide patients with information so they can independently address psychological concerns. Patients are typically given written pamphlets and information packets to supplement the brief intervention administered during the session (Rowan & Runyan, 2005).

Psychological services are integrated into primary care centers to varying degrees. Services can be coordinated, co-located, or integrated (Blount, 2003). When patient care is coordinated, physicians and psychologists are housed in different settings and exchange information about their shared patients. It is effortful to maintain communication and often requires a personal commitment from medical and psychology staff (Blount, 2003). Co-located care implies that the psychologists are housed within the medical center thereby facilitating easier communication and likelihood of referrals. In co-located care, physicians and psychologists can often discuss patients in passing and therefore more seamlessly work together to improve patient care. In a study of 100 patients in a Family Medicine residency, physicians referred patients to the psychologist by either first introducing the patient to the psychologist during the patient's scheduled primary care visit, or by simply referring the patient to see a psychologist. When the physician introduced the patient to the psychologist, 74% of patients kept their referral appointments, as opposed to 44% when the introduction was not made (Coleman, Patrick, Eagle & Hermalin, 1979 as cited in Blount, 2003). Therefore, co-located services have been found to have higher follow-up rates than coordinated care settings. Finally, integrated healthcare is distinct from coordinated care or co-located care in that physicians and psychologists work on a team, sharing files, space and information about the patient (Blount, 2003). Some programs have gone a step further and developed interdisciplinary treatment teams with a variety of specialists, such as physicians, social workers, psychologists, dieticians, and other relevant support staff (Knowles, 2009).

The level of integration of psychological services in a medical setting can be influenced by the physical environment of the clinic, degree of information sharing, and the collaborative culture of a center (Collins, Levis, Mung, & Wade, 2006). Benefits of a shared environment

include more communication between physicians and psychologists resulting in greater likelihood of physicians referring their patients to a psychologist (Blount, 2003). Physicians and psychologists easily share patient information in centers that have electronic patient files that can be accessed by both parties (Knowles, 2009). In addition, the culture of a medical setting can dictate the level of integrated care. Even if physical space and records are shared, if the role of psychologists is not established and their services not utilized, patients will not benefit.

Educating physicians on the type of services that psychologists provide can foster integration.

Based on the definitions of levels of integrated care, the integration of psychologists at the ACC at VCUHS, where the intervention portion of this study was conducted, is best described as following an integrated care model. Psychologists work within the same physical space as physicians, they share electronic notes, and psychologists copy the patients' primary care physicians on all patient notes. However, because the VCUHS is a training hospital the medical staff is often rotating, so in-person communication between physicians and psychologists is not always feasible.

Psychologists in Primary Care Settings

For a variety of reasons psychological concerns are not adequately addressed in primary care settings and therefore there is a need for integrated psychological care (Butler et al., 2008; Kessler, Stafford, & Messier, 2009). These reasons include primary care physicians' lack of training and resultant low confidence in dealing with psychological problems (Grenier et al., 2008) and lack of reimbursement for mental health services (Flocke, Crabtree, & Stange, 2007; Tai-Seale et al., 2005). However, psychologists can play an important role in addressing patients' mood and behaviors and addressing how psychological and physical health are interconnected. Psychologists can also assess patients' need for psychotropic medication and provide alternative

treatments to medication. Considering that primary care physicians prescribe 60-70% of all psychotropic medications, it is necessary to have psychologically minded staff (Lewis, Marcus, Olfson, Druss, & Pincus, 2004 as cited in Gunn & Blount, 2009). These prescriptions are often written in the absence of an official diagnosis or proper assessment. A study conducted in 46 primary care clinics in the United States explored patient perception and preferences for receiving treatment for depression (Dwight-Johnson, Sherbourne, Liao, & Wells, 2000). Results revealed that 83% desired treatment for their depressive symptoms and 67% percent of those desiring treatment preferred counseling, especially African American patients. The population in the present study is predominantly African American. Thus, solely prescribing medication is insufficient and inconsistent with the preferences of most patients, who often desire counseling (Dwight-Johnson et al., 2000).

The primary care setting is a prime location for detecting mental health disorders and providing patients with on-site psychological services. The American Academy of Family Physicians (AAFP) noted that physicians are the first to identify many mental health disorders; 47% of people with Generalized Anxiety Disorder and 42% of people with depression were identified and diagnosed by primary care physicians (American Academy of Family Physicians, 2004 as cited in Westheimer, Steinley-Bumgarner, & Brownson, 2008). The presence of psychologists is therefore valuable. Furthermore, primary care is an optimal setting for identifying people who do not seek psychological services due to fear of stigmatization. Patients referred to see a psychologist within the course of a standard medical appointment are reportedly less resistant to mental health services (Ayalon, Arean, Linkins, Lynch, & Estes, 2007). This linkage is especially salient for minority populations who are often underserved and do not independently seek out mental health services. One study found that the integrated care model

afforded greater accessibility to care, resulted in fewer missed appointments, and increased patient participation in mental health services when compared to co-located primary care clinics (Ayalon et al., 2007). The authors interpreted these findings to be a result of the proximity of care and also the establishment of a trusting relationship between the patient and physician leading the patient to more readily accept mental health care within the primary care setting (Ayalon et al., 2007). Therefore primary care clinics are an ideal setting to address mental health concerns with patients who might not have otherwise sought out mental health services.

Patients also may avoid mental health services because of logistical barriers such as transportation problems. In this respect, the integrated model provides “one-stop shopping” for patients (Rowan & Runyan, 2005). This convenience is especially important for patients of lower socioeconomic status who may struggle to find transportation to their appointments. Considering that many patients in the present study are of low socioeconomic status, they may be more likely to accept and benefit from the services provided by an integrated care model.

Primary care psychologists are often engaged in preventative care, which if effective, can offset medical costs. Medical conditions with the highest reported mortality rates have behaviorally modifiable risk factors (Mokdad, Marks, Stroup, & Gerberding, 2004). Tobacco use, lack of exercise, poor diet, and obesity are four commonly encountered risk factors in primary care patients that can be altered via behavior modification. The prevalence of patients with at least one of these risk factors is 97% and 80% for two or more of these factors (Flocke et al., 2007). Treating prodromal symptoms is much more feasible and affordable than managing fully developed diseases or chronic conditions. Psychologists can educate patients about the connection between their physical and mental health and encourage and facilitate change by providing patients with the necessary tools and support.

Finally, there are unforeseen positive benefits for patients who receive psychological services. They show greater adherence to their medical treatment regimens and consequently experience improved general health outcomes; they are also more proactive, decreasing the likelihood of future visits (Robinson & Strosahl, 2009).

The Role of the Psychologist: Typical Referrals and Interventions

Primary care psychologists address a diverse array of patient symptoms, thus, there is no typical patient profile or treatment protocol within the primary care setting. Some patients may have a diagnosable mental health disorder that can be addressed using brief, evidenced-based treatments. However, a referral to specialty mental health is indicated for patients presenting with more chronic and severe mental health concerns who may benefit from receiving long-term, consistent care (Knowles, 2009). Primary care psychologists must consider how patients' psychological status may exacerbate patients' health conditions and affect their ability to manage their medical regimens as well as how their medical conditions can exacerbate their mental health. Thus, primary care psychologists target patients' depression and anxiety. Other common problems addressed by psychologists include chronic pain management, smoking cessation, weight management, insomnia, medication adherence, managing and adjusting to chronic illness such as diabetes, and cognitive difficulties. Please see Table 1 for a complete listing of common interventions (presented in Sadock et al., 2014). Finally, psychologists can also act as a liaison between physicians and their patients by helping patients learn how to be assertive and voice their concerns to their providers and by relaying important information to their physicians. Primary care psychologists encounter a range of presenting problems and patients rarely experience one problem in isolation and therefore they must have a broad base of knowledge and

be able to address the psychological, behavioral, and interpersonal components of any presenting concern (McDaniel & Fogarty, 2009).

Table 1.

Typical interventions by visit focus

Problem Areas	Interventions
All Problem Areas	Introduction of Services Psychoeducation Supportive Counseling Self-Monitoring Goal-Setting Problem Solving
Depression	Play Your Cards Right (Lang, Norman, & Casmar, 2006) Behavioral Activation (Hopko, Lejuez, Ruggiero, & Eifert, 2003) Cognitive Behavioral Therapy (CBT) (Cully & Teten, 2008) Interpersonal Intervention (Cully & Teten, 2008) Assertiveness Training (Cully & Teten, 2008)
Anxiety	Relaxation Training (i.e. deep breathing, progressive muscle relaxation, guided imagery) (Cully & Teten, 2008) Graded Exposure (Barlow, Farra, & Cohen, 2002)
Pain	Introduction to the Gate Control Theory Activity (Keefe & Somers, 2010) Pacing and Behavioral Activation (Keefe & Somers, 2010; Kerns, Sellinger, & Goodin, 2011) Relaxation Training (Keefe & Somers, 2010; Kerns et al., 2011)
Smoking/Substance	Stimulus Control (Penberthy, Wartella, & Vaughan, 2011) Urge Surfing (Penberthy et al., 2011) Motivational Interviewing (Britt, Hudson, & Blampied, 2004)
Insomnia	Sleep Restriction (Rybarczyk, Lund, Garroway, & Mack, 2013) Stimulus Control (Rybarczyk et al., 2013) Sleep Hygiene (Rybarczyk, et al., 2013)
Weight Loss	CBT (Cully & Teten, 2008) Motivational Interviewing (Britt et al., 2004) Stimulus Control (Cully & Teten, 2008)
Medication Adherence	CBT (Cully & Teten, 2008) Motivational Interviewing (Britt et al., 2004)

Overcoming Barriers for Effective Integration

Unfortunately there are barriers to integration which most likely account for the slow process of assimilating psychologists into medical settings, despite all the aforementioned

benefits (Kessler et al., 2009). Primary among these is differences in professional languages and cultures (Knowles, 2009). However, psychologists are encouraged to adopt medical terminology and avoid psychological jargon while working within the medical setting (Knowles, 2009). They also should welcome interruptions by physicians to discuss a patient's needs, have the flexibility to assimilate into a new environment, and learn and adapt to hospital culture (Gunn & Blount, 2009). Available resources and offices for psychological staff is often a practical concern that prevents expansion of the medical family to include mental health professions (Collins et al., 2006).

Furthermore, the role of psychologists within the medical center is not always clearly defined, so it is recommended that psychologists educate medical providers about the scope of their services so medical providers can make appropriate referrals and provide patients with collaborative health care (Gunn & Blount, 2009). To foster full integration, relationship building between disciplines is essential. However, as integrated care programs become more normative, younger physicians will have greater exposure to this model of care, increasing overall integration. They will be more likely to identify situations in which referring to psychology would be valuable (Robinson & Strosahl, 2009).

Another problem that needs to be addressed is the lack of specialty training; a traditionally trained psychologist cannot easily function in a medical setting without proper instruction (Bluestein & Cubic, 2009). Fortunately, as more psychologists are desired in medical settings, federal grant programs have been established to support the education of psychology graduate students in primary care settings. For example, in 2002 the Eastern Virginia Medical School (EVMS) Clinical Psychology Internship Program was awarded a Graduate Psychology Education grant for a project called "Integrating Psychology Internship Training in a Primary

Care Setting” (Bluestein & Cubic, 2009). This program involved training graduate psychology students to work in a medical setting and shadow family medicine residents. Physician and psychology interns worked together to provide enhanced patient care. The program was deemed successful and so in 2007 another grant was awarded for a project called “Enhanced Patient Care by Collaboratively Training Psychologists and Primary Care Providers,” exposing a larger number of psychologists to the primary care setting (Bluestein & Cubic, 2009). The role of psychologists and their integration into the EVMS primary care environment was evaluated using the Physician Belief Scale (Ashworth, Williamson, & Montanco, 1984). The qualitative data on the family medicine residents and faculty were unanimously positive and complimentary of the psychology interns. The success of such programs will continue to generate the awarding of future grants allowing more psychologists to gain exposure to the primary care setting. Furthermore, psychology-training programs are increasingly incorporating health psychology and behavioral medicine into their curriculum at the graduate level (see Council for Clinical Health Psychology Training Programs website, <http://www.cchptp.org/>).

Effects of Depression and Anxiety on Primary Care Patients

Depression is an important psychological variable to measure in primary care settings due to the impact of depressed mood on health outcomes. In a meta-analysis of twelve studies exploring the effects of anxiety and depression on patient adherence to medical recommendations, patients with depression were reportedly three times more likely to be noncompliant than patients who were not depressed (DiMatteo, Lepper, & Croghan, 2000). Improvement in depression scores for primary care patients is associated with improved self-care. For example, improvements in depression scores (PHQ-9) for cardiac patients resulted in increased adherence to medication and more secondary preventative behaviors (Bauer et al.,

2012). Therefore depression is considered a risk factor for poor compliance, which leads to poor health outcomes, but successful treatment of depression can offset these risk factors.

Anxiety is also detrimental to patients' health and well-being. People with generalized anxiety disorder have reported symptoms of depression and anxiety that are significantly correlated with impairments in many aspects of functioning such as physical functioning, disease-specific quality of life, psychological well-being, and disability in everyday life (Revicki, Brandenburg, Matza, Hornbrook, & Feeny, 2008). As anxiety symptoms increase, so does impairment (Revicki et al., 2008). Compared to the general population, patients with any form of anxiety disorder have self-reported poorer physical and mental functioning (Beard, Weisberg, & Keller, 2010). The more anxiety disorders diagnosed in a patient, the greater the impairment. However, 41% of patients with a diagnosable anxiety disorder reported that they were not receiving treatment for their anxiety (Kroenke, Spitzer, Williams, Monahan, & Löwe, 2007). Generalized Anxiety Disorder (GAD) causes great human burden and patients with GAD or patients characterized as worriers also present a great economic burden to health care systems due to their use of prescription medications (Kertz & Woodruff-Borden, 2011). Therefore anxiety is an important symptom to monitor within a primary care setting because of its bi-directional impact on physical and psychological health.

The combination of comorbid anxiety and depressive disorders results in a unique patient profile that differs from patients with a diagnosis of pure anxiety or pure depression and it is associated with greater impairment, poorer compliance to treatment regimens and poorer treatment response (Lecrubier, 2001; Tylee, Gastpar, Lépine, & Mendlewicz, 1999; Walters, Buszewicz, Weich, & King, 2011). A pan-European survey of patients with depression who had consulted with a healthcare provider regarding their depression in the previous six months was

used to identify four clusters of depressed patients: moderately impaired depression, severe depression associated with anxiety, depression associated with chronic physical problems, and depression associated with sleep difficulties (Tylee et al., 1999). Patients with depression associated with anxiety were the most severely impacted with regard to disability and symptom severity (Tylee et al., 1999). Another study evaluated the impact of mixed anxiety and depressive disorder (MADD) on primary care patients' symptoms of distress and quality of life (Walters et al., 2011). Over the course of the year, the mixed anxiety and depressive disorder patients had higher distress three months after baseline evaluation (but not higher after a year) compared to people without MADD. MADD patients also reported lower quality of life than other patients (Walters et al., 2011). Additional support for the negative impact of MADD was found in a study of general practitioners attempting to treat primary care patients for depression and anxiety. Poor patient outcomes were found in patients who had risk factors including comorbid anxiety and depression, along with high symptom severity, unemployment, and poor social support (Prins et al., 2011). Last, data from the Netherlands Study of Depression and Anxiety indicated that MADD was associated with higher symptom severity, earlier age of onset, longer duration of symptoms, higher neuroticism, and higher incidence of trauma than patients with pure depression or pure anxiety (Lamers et al., 2010). MADD patients have been identified as higher utilizers of primary care services, resulting in economic burden for health care systems (Lecrubier, 2001). Therefore, a comorbid diagnosis of depression and anxiety appears to have an additive negative impact on patient outcomes. In general, depression, anxiety, and especially comorbid anxiety and depression, result in poorer psychological and physical health and so these mental health conditions should be addressed in primary care settings.

Prevalence Rates of Depression and Anxiety

There is a high prevalence rate of depression in primary care settings. In a sample of 1,752 patients screened for depression using the Prime-MD, 27.3% met criteria for depression (Tamburrino, Lynch, Nagel & Smith, 2009). Anxiety is often overlooked because it is less prevalent than depression in primary care settings; however, it leads to impairment when undetected and untreated. Kroenke and colleagues (2007) explored the prevalence, impairment, comorbidity, and detection of anxiety disorders in primary care. Nine hundred and sixty-five randomly assigned patients from fifteen primary care clinics in the United States completed the Generalized Anxiety Disorder (GAD-7) questionnaire followed by a structured interview administered over the phone by a mental health professional. The prevalence of at least one anxiety disorder was 19.5% out of the 965 patients. Specifically, 8.6% of patients had posttraumatic stress disorder, 7.6% had generalized anxiety disorder, 6.8% had a panic disorder, and finally 6.2% had a social anxiety disorder.

Mixed anxiety and depressive disorder (MADD) is a common diagnosis and should be assessed in primary care (Roy-Byrne et al., 1994). In a sample of 1,783 primary care patients from the Netherlands, sixty-seven percent of patients diagnosed with depression also had a current anxiety diagnosis and 75% had a lifetime anxiety diagnosis (Lamers et al., 2010). Patients with anxiety were more likely to have depression, while patients with depression were not as likely to have anxiety (Lecrubier, 2001; Lamers et al., 2010); anxiety preceded depression in over half of MADD patients, but depression preceded anxiety in only 18% of MADD patients (Lamers et al., 2010).

The Impact of Demographic Factors on Depression and Anxiety

There are differences in levels of depression and anxiety as a function of demographic variables, such as gender. A study of 1,000 primary care patients (559 women), found that

women were more likely to have mental disorders, mood disorders, anxiety disorders, and somatoform disorders, and were more likely to score lower on a measure of health related quality of life than men (Linzer et al., 1996). Furthermore, most findings indicate that the discrepancy between rates of depression in women and men is a ratio of 2:1 and is often reported as 3:1 or 4:1 for diagnoses of major depressive disorder (Culbertson, 1997). The lifetime male to female prevalence rate for all anxiety disorders is 1 to 1.7 and the one-year male to female prevalence rate is 1 to 1.79 (McLean, Asnaani, Litz, & Hofmann, 2011). One hypothesis for these differing rates is that women may be more likely to endorse symptoms of depression and anxiety and also more likely to seek treatment and thus their prevalence rates are inflated (Banks & Kohn-wood, 2002).

There are also studies that support differences in depression rates between African Americans and Caucasians due to a complex interaction of variables. When controlling for confounds, African Americans have been found to be less likely to have had Major Depressive Disorder during their lifetime (10.4%) than Caribbean blacks (12.9%), or non-Hispanic whites (17.9%) (Williams et al., 2007). However, chronic depression is much higher for African Americans (56.5%) and Caribbean blacks (56%) than non-Hispanic whites (38.62%) (Williams et al., 2007). While African Americans are less likely to have depression, when they do, they report more debilitating and severe symptoms, are much less likely to seek services, and therefore their depression is more chronic (Williams et al., 2007). Research on differences in anxiety between African Americans and Caucasians is inconclusive, with some studies suggesting African Americans suffer more from anxiety than the general population (Neal & Turner, 1991), while other studies of primary care psychology clinics find no racial differences in anxiety rates (Brown, Shear, Schulberg, & Madonia, 1999), and still other studies support a

greater prevalence of Generalized Anxiety Disorder in European American primary care patients than African American patients (Kertz & Woodruff-Borden, 2011). Lifetime prevalence of GAD is lower in African Americans but this may be due to under-recognition (Breslau et al., 2006).

Studies suggest that depression and anxiety are frequently under-detected for African Americans in primary care clinics. Data on 96,075 patients from the National Ambulatory Medical Care Study from 1995-2005 (Stockdale, Lagomasino, Siddique, McGuire, & Miranda, 2008) indicated that disparities in diagnoses, counseling/referrals for counseling, and antidepressant medication exist for African Americans and Latinos in primary care clinics. Also, African Americans may use services that require doctor's orders less frequently than Caucasians due to patient preferences and poor patient-physician communication (i.e. African Americans prefer fewer services but this may be due to a lack of information about available options; Ashton et al., 2003). A survey of 43 depressed, low-income African Americans who were engaged in psychotherapy were asked why African Americans were less likely to seek mental health services than Caucasians with similar levels of distress. Stigma, shame, and denial were identified as barriers to care (Cruz, Pincus, Harman, Reynolds, & Post, 2008). However, similar concerns about stigma are recognized as a barrier for mental health services for Caucasians as well (Givens, Katz, Bellamy, & Holmes, 2007). African Americans are more likely than Caucasians to go to their primary care provider for mental health care than to seek services at specialty clinics or from psychiatrists (Snowden, 2001; Snowden & Pingitore, 2002), so it is important that these patients be identified and encouraged to use primary care psychology services.

There are also racial differences in the treatment of depression in primary care clinics. One study showed that when African Americans and Caucasians were treated for depression in a

research setting in which treatment protocols was standardized, there was no racial differences on initial depression or outcome measures, although African Americans had poorer functional outcomes (Brown, Schulberg, Sacco, Perel, & Houck, 1999). However, another study showed that when physicians were not following a mandated, standardized, research protocol, African Americans received similar mental health treatment but were less likely to be prescribed psychotropic medication for their depression (Snowden & Pingitore, 2002), which may account for the lack of treatment progress. Research has supported that African Americans are less likely to find the use of antidepressants as acceptable (Cooper et al., 2003), which may partially explain the lower rates of prescriptions. However, research shows that the combination of therapy and medication is the most effective for treating depression and so if African Americans are not being prescribed antidepressants as frequently, they may be at a disadvantage. (Pampallona, Bollini, Tibaldi, Kupelnick, & Munizza, 2004). Finally, African American primary care patients have more comorbid psychiatric disorders, higher life stress, poorer physical functioning and other complications than Caucasians, which may act as barriers to treatment progress (Brown, Schulberg, & Madonia, 1996).

Age-related factors also impact the detection and treatment of depression. Depression is often unrecognized and undertreated in older adults (Riedel-Heller, Weyerer, König, & Lippa, 2012; Sadock et al., 2014). There is some debate over the prevalence of depression in older adults. A meta-analysis of age as a risk factor for depression revealed that older adults (65+) were at significantly higher risk for depression, with the exception of the oldest old (85+) who were not significantly more at risk (Zhao et al., 2012). However, an earlier review (Jorm, 2000) found no consistent relationship between age and rates of depression and anxiety. Although older adults may have an increase in depression and anxiety over time, if risk factors are controlled for

(i.e. marital status, education, income, etc.), then there actually is a downward trend in levels of depression and anxiety in older adults. However, it is important to note that the distributions of these risk factors are uneven across age groups (i.e. older adults may generally be at higher risk for having risk factors for depression and anxiety). In regard to anxiety disorders, the literature suggests that prevalence rates decline with age (Jorm, 2000; Sable & Jeste, 2001; Sadock et al., 2014). Generalized Anxiety in primary care was found to be more prevalent in younger versus older adults (Kertz & Woodruff-Borden, 2011). Jorm (2000) hypothesized that older adults have lower levels of anxiety and depression than younger adults because older adults have decreased emotional reactivity, increased emotional coping, and a desensitization to stressful life events. Older adults possess resiliency factors to cope with life changes and so they are able to thrive under adversity by using coping skills and accepting their health decline (Aldwin & Yancura, 2010; Hardy Concato, & Gill, 2002). There are many challenges with research on age effects such as age biases in assessment measures that can under or overestimate levels of depression and anxiety due to cohort effects (Jorm, 2000). Regardless of the exact prevalence rates, older adults can benefit from psychological services, especially when integrated in primary care because many older adults visit their primary care physicians during the critical months preceding suicide attempts (Unützer, 2002).

Marital status is another factor that may impact levels of depression and anxiety in primary care patients. The literature suggests that marital status affects ability to cope with stressors (Kessler & Essex, 1982). Marriage has been found to have positive health and psychological benefits; however studies support that women get less rewards from being married than men (Coombs, 1991). Those who are not married have varying levels of depression based upon their status; people who are separated or divorced have more severe depression than people

who have been widowed or never married (Cotton, 1999). A study examined marital transitions by assessing mental health status before and after separations, divorces, and becoming widowers (Wade & Pevalin, 2004). Those who were separated and divorced had poorer levels of mental health after the transition; however, they also had poor mental health prior to the split, suggesting that perhaps they were more likely to have relational discord (Wade & Pevalin, 2004). In contrast, people who were widowed had an isolated increase in mental health problems surrounding the death of their spouse; however these problems were not as extreme as those of people who were separated or divorced (Wade & Pevalin, 2004). Another study of depression rates and marital status found that the following groups were more depressed than their relative counterparts: women, people who are separated or divorced, younger people, people with lower SES, and non-Caucasians (Cotton, 1999). In a study comparing stress levels of married and recently separated women, it was found that that women who were recently separated and had low income had the highest level of financial and relationship strain and this strain was correlated with low emotional well-being (Nelson, 1989). Alternatively, marriage to a partner who provides companionship and psychological support can act as a buffer against physical and psychological disorders (Coombs, 1991). Thus, marital status is an important variable to consider when evaluating depression and anxiety within primary care settings.

Levels of depression and anxiety may also be influenced by employment status. Studies indicate that unemployment is a risk factor for the development of depression (Montgomery, Cook, Bartley, & Wadsworth, 1999). Unemployed patients are more likely to have many physical and psychological concerns such as insomnia, depression, anxiety, and increased cardiovascular risk factors (Harris, Harris, & Shortus, 2010). These patients are in need of increased resources such as referrals to psychology, social work, and social services.

Psychological treatments can include cognitive behavioral therapy (CBT), goal-setting, and motivational interviewing. The unemployed are a particularly vulnerable population that requires significant medical and mental health care (Harris et al., 2010).

Another variable that impacts the prognosis of depression and anxiety treatment over time is baseline levels of anxiety and depression (Prins et al., 2011). This trend remains even when treatment is administered to patients. Research suggests that patients with chronic symptoms may benefit from attending a specialty clinic that could provide more consistent and intensive treatment options (Knowles, 2009). These patients should be referred; however, many patients cannot afford other services and have no other available free care options. So while brief treatment is far from ideal, it may be the only viable option in the current healthcare climate and may provide a buffer against further deterioration over time and may serve as a placeholder until longer-term care options become available.

Treatment of Depression and Anxiety in Primary Care

High prevalence rates of depression have inspired research studies exploring the efficacy of treating depression in primary care settings. The Prevention of Suicide in Primary Care Elderly: Collaborative Trial (PROSPECT; Bruce et al., 2004) and Improving Mood–Promoting Access to Collaborative Treatment (IMPACT; Unützer, 2002) intervention studies examined depression in elderly primary care patients. Many older adults are at-risk for depression and visit their primary care physician in the months preceding suicide attempts (Unützer, 2002). Therefore proper identification and treatment of depression is imperative. Both programs found significant reductions in depression symptoms for elderly adults receiving treatment compared to older adults receiving care as usual. Other studies have compared the treatment of depression by psychologists integrated in primary care settings to treatment administered in separate, specialty

mental health clinics. The Primary Care Research in Substance Abuse and Mental Health for the Elderly (PRIMS-E) study examined depression rates in two groups of older adults ($N = 1531$, $M = 73.9$ years) randomly assigned to either integrated care or enhanced specialty referral (Krahn et al., 2006). Integrated care was defined as mental health services and medical services co-located in the same facility. The results revealed that for participants with major depression, the enhanced specialty referral group was more effective at symptom reduction than integrated care. This is not surprising because it is typical for patients with more severe psychopathology to be referred out of a primary care clinic in order to receive more concentrated, specialty care (Knowles, 2009). Thus the enhanced specialty care is a more appropriate setting for patients with severe psychopathology because the concentrated treatment approach results in greater symptom reduction for people with more severe symptoms. However, the two groups yielded similar decreases in depression rates at three and six month follow-ups. Other studies have also concluded that primary care settings yield the same outcomes as referral specialty care (Cuijpers et al., 2008; Lopez, Coleman-Beatie, Jahnke, & Sanchez, 2008). Integrated care programs have many additional benefits beyond effective treatment of depression, such as convenience of care and the ability to identify and treat patients who may not otherwise seek psychological services either due to stigmatization or lack of insight.

A meta-analysis examining psychological treatment for depressed adult primary care patients provides additional evidence for the effectiveness of treating depression within primary care (Cuijpers et al., 2009). The authors selected 15 randomized controlled studies that compared primary care patients with depressive symptoms or depressive disorder who received psychological treatment to a control group defined as either care as usual, placebo, or waitlist (Cuijpers et al., 2009). The analysis indicated that depression can be effectively treated in

primary care settings and the decrease in depressive symptoms is particularly greater in instances in which the physicians specifically referred the patient to mental health services. When referred by a general practitioner the effect size for treatment of depression did not differ between primary care settings and control settings. In contrast, when random screenings of depression identified patients who may benefit from services (as opposed to referral by physician), treatment outcomes were not as positive. Although the reason for this effect is unclear, it is possible that the physicians encouraged their patients to seek mental health services or that the physicians may have been able to accurately identify patients likely to benefit from psychological services (Cuijpers et al., 2009). For example, the physician may be aware of a patient's past experience with psychological services and other unknown factors that cannot be readily identified from a self-report questionnaire. This is yet another illustration of the benefits of integrated patient care as well as the effectiveness of depression treatment in primary care.

Studies have also explored different intensities of treatment for depression in primary care and results have indicated that reduction in psychological symptoms can occur without extensive, costly treatments (Bryan, Morrow, & Appolonio, 2009; Lucock et al., 2011). In a study that used a low intensity, stepped care intervention model, primary care graduate mental health workers provided a two-session, guided, self-help intervention to patients with significant depression and anxiety (Lucock et al., 2011). Immediate treatment was compared to delayed treatments for primary care patients and results supported the effectiveness of the brief intervention. Thus, a stepped care approach for treating patients with depression and anxiety may be clinically effective and cost effective. Another study supports that changes in patients' well-being and functioning can occur when patients attend as few as two to three appointments with integrated psychological services (Bryan et al., 2009) and that these gains are maintained at two

year follow-up (Ray-Sannerud et al., 2012), although this study lacked a control group. In addition, the study showed that patients who received subsequent mental health treatment (after attending integrated psychological services) did not report additional gains compared to those who did not receive additional mental health treatment, which suggests that the greatest gains occur earlier on in treatment. These findings support the Primary Care Mental Health Care model, which is a brief intervention model of care that is meant to serve a wide range of patients in need of services (Rowan & Runyan, 2005; Strosahl, 1996).

Finally, a study similar to the present study found that primary care patients experienced significant reductions in depression after receiving behavioral health services (McFeature & Pierce, 2012). Services included at least four thirty-minute sessions over the course of four weeks and involved problem solving, goal-setting, and implementation of various strategies to help patients accomplish their goals. Two hundred and fifty-one patients with depression participated. Average pre-scores on the PHQ-9 were 17.82 ($SD = 5.92$), indicating moderately severe depression and average post-scores were 8.79 ($SD = 4.57$), indicating mild depression. A little less than half (49.8%) of the participants improved their PHQ-9 scores by at least 50% (McFeature & Pierce, 2012). However, more modest reductions of depression have been found in other similar studies (Young et al., 2012). This study had one notable limitation, lack of a control group. The present study addressed this limitation with the addition of a matched comparison group.

Studies have also supported the successful treatment of anxiety in primary care clinics. A treatment evaluation for anxiety disorders was conducted in a large sample of primary care patients in seven different clinics across four US cities (Roy-Byrne et al., 2010). Treatment included a choice of cognitive behavioral therapy, medication, or both. Results showed

significantly greater decreases in symptoms of anxiety, depression and somatic symptoms for the intervention group compared to care as usual (Roy-Byrne et al., 2010). Consistent with the literature, most patients preferred CBT to medication, although results did not reveal significant differences in treatment effects (Roy-Byrne et al., 2010).

Further evidence of the successful treatment of primary care patients with anxiety can be found in a meta-analysis of the impact of brief psychological interventions for depression and anxiety (Cape et al., 2010). The study compared 34 studies with a total of 3,962 patients. Interventions in most of the studies were CBT (13 studies), followed by problem solving (12 studies) and finally counseling (8 studies). CBT for anxiety was found to be more effective than CBT for depression and CBT for people with comorbid anxiety and depression was least effective (Cape et al., 2010). According to the study using CBT to treat anxiety in primary care was comparable to treating anxiety in a specialty referral clinic (Cape et al., 2010).

However, the positive impact of using multidisciplinary treatment for depression and anxiety has not always been substantiated in the literature. Chan, Whitford, Conroy, Gibney, & Hollywood, (2011) evaluated a multidisciplinary treatment approach in a study of low socioeconomic status female primary care patients. Treatment included an additional hour of care provided by medical staff, psychologists, and social workers. The addition of the multidisciplinary treatment was not more effective in decreasing anxiety and depression and increasing quality of life than care as usual. In fact depression scores increased. It was hypothesized that patients became more depressed because they were focusing on the gravity of their problems. Also the intervention might not have been intensive enough to match their level of depression and anxiety. Finally, treatment diffusion may have occurred because physicians were assigned patients in the treatment and control conditions (Chan et al., 2011). In summary,

treatment for depression and anxiety may not be as effective for patients who have difficulty fulfilling basic needs due to their low socioeconomic status.

Medication and Psychotherapy Treatment

The combination of therapy and medication is the most effective treatment approach for depression (Pampallona et al., 2004) and anxiety (Demertzis & Craske, 2006). When Cognitive Behavioral Therapy (CBT) is used in combination with medication, relapse is less likely and this combination treatment has been found to be more effective than psychotherapy alone or medication alone. In addition, research has shown that CBT has similar treatment effects as medication, but may have more long-term benefits, be more cost-effective, better tolerated, and have lower relapse rates (Demertzis & Craske, 2006). CBT teaches patients to systematically confront their anxieties and develop self-efficacy and coping skills for tolerating anxiety (Schneider & Levenson, 2008). Medication is effective in managing anxieties but if discontinued patients may have difficulty confronting their anxieties because they have not developed adaptive coping strategies (Demertzis & Craske, 2006). Beyond CBT, counseling and problem-solving therapies are equally effective for treating patients with depression and comorbid anxiety and depression (Demertzis & Craske, 2006). The typical medication used for patients with depression, anxiety, and comorbid anxiety and depression is SSRIs, although patients with anxiety disorders such as panic disorders may benefit from short-term use of benzodiazepines (Schneider & Levenson, 2008). The primary care setting is conducive for treating anxiety and depression with a combination of medication and counseling.

Medical Conditions and Anxiety and Depression

There is a strong bi-directional relationship between the physical and mental health of a patient as evidenced by the high prevalence of psychological symptoms and disorders in medical

settings (Levant, 2005). Patients with physical problems often experience many associated stressors leading to anxiety and depression (Bluestein & Cubic, 2009) and 20-50% of the time depressive disorders are comorbid with chronic medical conditions (Ani et al., 2009). Consistent with this, the extent of patients' prescribed medical treatment is positively correlated with their symptoms of depression (Gunn & Blount, 2009). Patients with depression and anxiety are also more likely to report greater medical symptoms, after controlling for medical condition severity (Katon, Lin, & Kroenke, 2007) and patients with depression and anxiety and a medical condition have much poorer outcomes and greater disability than patients with a medical condition but no depression and anxiety (Sareen et al., 2006).

Statement of Problem

Psychologists are an important and effective addition to the primary care team and physicians have responded positively to their presence in primary care (Bluestein & Cubic, 2009; Westheimer, et al., 2008). Despite the integration of clinical psychologists into medical settings, the effectiveness of their services has yet to be definitively evaluated. Although some descriptive studies exist, few studies to date have compared their findings to an appropriate source of comparison, thereby limiting the scope of their conclusions.

The main aim of the present study is to evaluate the effect of existing services provided by primary care psychologists at the Ambulatory Care Clinic (ACC) at the Virginia Commonwealth University Health System (VCUHS) on patients' anxiety and depression. These patients were compared to a similar sample of primary care patients receiving services at another outpatient clinic (Hayes E. Willis Health Center) who did not have access to integrated psychological services but had similar baseline levels of depression and anxiety. In order to maximize similarity in baseline levels, participants in the Hayes clinic were matched to

participants from the ACC at VCUHS according to their initial levels of depression and anxiety. Participants from the Hayes clinic were then evaluated with follow-up measures of depression and anxiety at approximately the same time interval as their matched counterparts from the ACC at VCUHS. Thus, only the participants at the ACC at VCUHS received integrated psychological services between the pre and post-assessment.

The following specific hypotheses were evaluated:

1. Relatively fewer African Americans and relatively fewer older adults would be referred by their physicians at the ACC at VCUHS to primary care psychology compared to the overall composition of the ACC primary care clinic (Riedel-Heller et al., 2012; Sadock et al., 2014; Stockdale et al., 2008).
2. It was expected that patients treated at the ACC at VCUHS would have significantly greater decreases in anxiety and depression scores from baseline to follow-up than comparison group patients at the Hayes Clinic.
3. It was expected that use of psychotropic medications, medical diagnoses (as represented by the Charlson Co-morbidity Index), and receipt of outside services for depression and anxiety would influence patients' anxiety and depression levels but that membership in the comparison clinic or experimental clinic would account for the greatest variance in changes in depression and anxiety scores over time.
4. Patients' levels of depression and anxiety would vary as a function of demographic variables.
 - a. It was expected that Caucasians would have higher initial levels of anxiety and depression than African Americans (Kertz & Woodruff-Borden, 2011; Sadock et al., 2014) but Caucasian patients would have greater decreases in depression scores over

time than African Americans (Brown et al., 1999; Sadock et al., 2014). Further, African American patients would be prescribed medication for anxiety and depression less frequently than Caucasian patients (Snowden & Pingitore, 2002; Stockdale et al., 2008).

b. Based on findings by Linzer et al. (1996), Culbertson (1997), and Banks and Kohn-wood (2002) women would report higher initial levels of depression and anxiety than men.

c. Older adults would have lower levels of anxiety than younger adults (Jorm, 2000; Sable & Jetse, 2001).

d. Patients who were divorced or separated would have higher levels of depression and anxiety than patients who were widowed and patients who were married would have the lowest levels of depression and anxiety. We expected this relationship to be especially pronounced for divorced or separated women with lower socioeconomic status (Cotton, 1999; Nelson, 1989).

e. Unemployment was expected to be associated with higher levels of depression and anxiety (Harris et al., 2010; Montgomery et al., 1999).

5. Patients with higher initial depression and anxiety scores would be less reactive to treatment effects than patients with lower initial scores (Prins et al., 2011; Sadock et al., 2014). Patients with comorbid anxiety and depression at the ACC at VCUHS would be more resistant to treatment effects than patients with anxiety alone or patients with depression alone (Lecrubier, 2001).

Method

Participants

Participants were primary care patients at the ACC of the VCUHS and at the Hayes Clinic. These medical centers primarily serve indigent, urban and rural populations. Overall, the two clinics were demographically similar. In the ACC at VCUHS sample, there were a total of 147 participants, the majority female ($N = 103$, 70.1%) compared to a sample of 139 Hayes participants with 102 female participants (73.4%). For both samples, the racial majority was African American followed by Caucasian. In the ACC at VCUHS sample, there were 90 African Americans (61.2%) and 56 Caucasians (38.1%) compared to 91 African Americans in the Hayes sample (65.5%) and 42 Caucasians (30.2%). Finally, there was a significant difference between the average ages of the two clinics. The average age for the ACC at VCUHS sample was 52.13 years ($SD = 11.39$) compared to a younger sample of Hayes patients ($M = 49.39$ years, $SD = 9.88$). Please refer to Table 2 (page 41) for a more detailed description of the demographics for the two clinics.

Experimental Clinic: ACC at VCUHS. Approximately 55 resident primary care physicians referred their patients for psychological services to an on-site psychology training clinic. Resident primary care physicians who are supervised by attending physicians serve patients in this setting. The VCU Medical Center is an academic training clinic and so residents rotate through the clinic as part of their training and therefore patients do not always receive continuous medical care from the same physician.

Service providers in the psychology training clinic were 16 doctoral graduate students in clinical (13 students) and counseling psychology (3 students). Graduate student trainees were stratified across program year (i.e. four 2nd year students, five 3rd year students, five 4th year students, two 6th year student; 50% with Master's degree). All students had concurrent clinical placements in other settings and clinical practicum begins during students' second year. Licensed

clinical psychologists specializing in health psychology provided one-hour weekly group supervision and on-site supervision. The present study evaluated data from patients referred to the ACC at VCUHS psychology clinic between July 2010 and February 2014 for treatment of depression or anxiety.

Comparison Clinic: Department of Family Medicine at the Hayes E. Willis Health Center. The Department of Family Medicine at the Hayes E. Willis Health Center is a primary care clinic in Richmond, Virginia that served as a comparison clinic. Patients received services from their primary care physician and there was also an on-site social worker who provided counseling to patients as well as referrals for community resources. Patients being seen at the Hayes Clinic for primary care services were recruited for the study in the clinic waiting room from July 12, 2013 – November 22, 2013. All patients received ongoing care from attending physicians. A total of 315 patients agreed to participate in the study and 163 (51.75%) were eligible (please refer to Figure 1 for a flow chart of Hayes Clinic recruitment), meaning their scores on measures of depression and anxiety could be matched to those of patients in the ACC at VCUHS sample or their scores were in the moderate range or higher for depression or anxiety. There were 139 participants who completed the study and 24 eligible participants were lost to follow-up.

The present study compared data from patients referred to the ACC at VCUHS psychology clinic with data from patients from the Hayes Clinic because the patients in both clinics were demographically similar (see table 2, page 41 for a description of patient demographics). Although patients at the Hayes clinic do not have access to integrated psychological services, their physician and the on-site social worker address their depression and anxiety and in some instances patients are referred to specialty mental health clinics. The ACC at

VCUHS offers the same services as the Hayes Clinic with the addition of integrated psychological services.

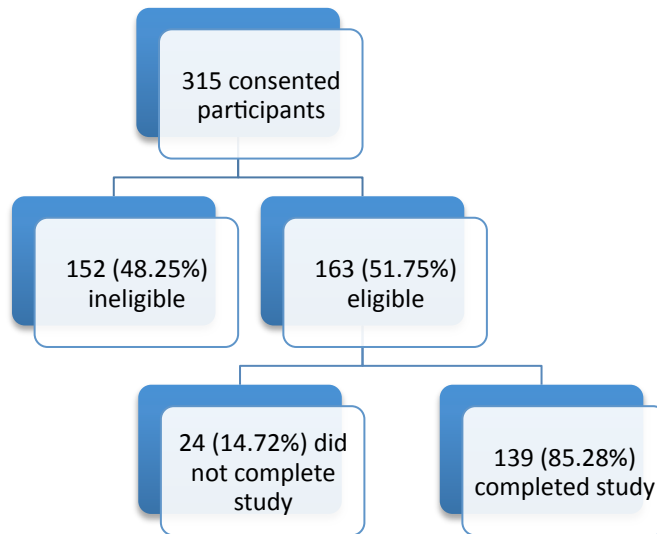


Figure 1. Recruitment flow chart for Hayes Clinic participants

Procedure

ACC at VCUHS. Physicians at the ACC at VCUHS identified and referred patients to the psychology clinic who they judged to be good candidates for behavioral and psychological interventions. Graduate student clinicians and resident primary care physicians share an office. This facilitates communication between the two parties about mutual patients, and particularly facilitates “warm hand-off” referrals by physicians wherein primary care psychologists meet with patients immediately after their medical visit. Residents return from a patient encounter and report to the precepting medical attending with primary care psychologists present in the room. If the physician judged that the patient could benefit from psychological services, then one of the psychology graduate trainees was consulted or asked to meet with the patient. The psychology graduate trainees also saw patients who were on their official clinic schedule. The services were scheduled using the same front desk scheduling system and sessions took place in the same

clinical exam rooms as the physicians.

At the beginning of each patient visit, graduate trainees administer a few brief questionnaires. For all patients, regardless of presenting problem, anxiety and depression were routinely assessed using the Generalized Anxiety Disorder (GAD-7; Spitzer, Kroenke, & Williams, 2006) and the Patient Health Questionnaire-9 (PHQ-9; Spitzer, Kroenke, & Williams, 1999) respectively due to the high prevalence of these conditions within primary care clinics. However, for the purposes of this study, we focused solely on the assessment data from patients who were initially referred for either depression or anxiety. After the initial assessment, the student clinician administered a brief intervention focusing on one or two identified problem areas (i.e. depression and/or anxiety, and other presenting problem). This intervention was not standardized because the complexity of each patient's symptoms required a more idiographic approach, which is consistent with standard psychological treatments utilized by primary care psychologists (Blount, 2003). However, interventions are consistent with empirically derived brief interventions for anxiety and depression (Cuijpers et al., 2009; Roy-Byrne et al., 2009). For example, patients with depression often received treatment that included problem solving, positive event planning, behavior activation, and medication consultations. Patients with anxiety often received treatment that included diaphragmatic breathing, problem-solving, exposure therapy, and medication consultations. See Table 1 on page 9 for a comprehensive summary of the utilized treatment approaches. Patients then scheduled follow-up appointments at variable intervals depending on the referral question, patient availability and access to transportation, and other factors that may affect scheduling. Patients who returned were re-administered the PHQ-9 and GAD-7, along with other measures if they identified an additional problem area (e.g. smoking cessation, weight management, insomnia, chronic pain, etc.).

Graduate trainees recorded progress notes for each patient encounter in patients' electronic medical records and included the purpose of the patient referral, focus of the session, brief summary of services, assessment results, and specific recommendations to physicians, such as considering increasing the patient's antidepressant dosage. For the purposes of the study, trained clinical psychology graduate students reviewed the patients' psychology visit notes and determined the focuses of the visit and extracted assessment data and entered all patient information into a secure database. Basic demographic data such as gender, race, age, marital status, employment status, as well as medication lists, and medical problem lists were also collected through access to patient medical records or obtained with the assistance of the Virginia Commonwealth University Enterprise Analytics team.

In order to capture changes in patient-reported anxiety and depression scores over time, we chose to measure changes in assessment data from patients' first and third psychology visit because primary care psychology treatment is brief (an average of 2 visits; Rowan & Runyan, 2005; Strosahl, 1996), changes in patient well-being and functioning can occur in as few as two to three visits with integrated psychological services (Bryan et al., 2012), and because the greatest treatment gains occur earlier in treatment (Ray-Sannerud et al., 2012). However assessments were not always administered at every patient visit and so we measured levels of depression and anxiety using two clustered time intervals: (1) Pre scores: visits 1 and 2, (2) Post scores: visits 3 through 5. In addition, if patients had an interval of greater than 200 days between pre and post scores or an interval of greater than 120 days between any two visits, then these patients were not included in the study database. Our reasoning was that we would be unable to capture treatment effects if the time interval between treatment sessions was too widely dispersed.

Hayes Clinic. A clinical psychology doctoral student (Elizabeth Sadock, M.S.) recruited participants from the waiting room of the Hayes Clinic (see Appendix A, 3. Script for approaching patients in the waiting room). All participants had to be patients and so they were asked to confirm that they receive their primary care at the Hayes Clinic. This excluded friends or family of patients, people who were at the Hayes clinic to pick up prescriptions from the pharmacy but were not patients, and people who were seen at the Hayes Clinic for non-primary care services (i.e. HIV treatment). Patients interested in the study were consented in-person by a clinical psychology doctoral student (see Appendix B) in a partitioned area of the waiting room and those who agreed to participate were given the Patient Health Questionnaire-9 (PHQ-9; Spitzer et al., 1999) and the Generalized Anxiety Disorder (GAD-7; Spitzer et al., 2006) to complete. Finally, participants were asked if they were currently receiving treatment for depression or anxiety from the on-site social worker, their physician, or from an off-site psychiatrist, psychologist, social worker, counselor, or spiritual leader (see Appendix A, 4. Demographic and Mental Health Exposure Form). Patients at the ACC at VCUHS were matched with patients from the Hayes clinic according to their initial levels of anxiety and depression. Hayes Clinic participants received a follow-up assessment at the same time interval as that of their matched counterpart at the ACC at VCUHS. Once all Hayes participants were matched, we continued collecting follow-up data on 26 participants whose scores were in the moderate to severe range and reassessed these participants approximately 54 days after their initial assessment. This follow-up time interval was determined by calculating the average time interval between the pre and post scores for participants in the ACC at VCUHS sample (i.e. $M = 53.80$ days, $SD = 41.10$ days).

All eligible participants received a phone call from a clinical psychology doctoral student who verbally administered the PHQ-9 and GAD-7. Participants were also asked if they had received services for depression or anxiety from a physician, psychiatrist, psychologist, social worker, counselor, or spiritual leader since they completed the initial phase of the study. If the clinical psychology doctoral student was unable to make contact with participants over the phone after two attempts, she tried other avenues (i.e. text, mail letter, VCU health portal; See Appendix A, 6, 7). Letters were sent to 17 participants who could not be reached via telephone asking them to call the study coordinator in order to complete the study; four of the participants responded to the letter. Once participants completed the follow-up phone call assessment, they were mailed a \$10.00 gift card from Wal-Mart (see Appendix A, 9. Gift Card Letter). Finally, all assessment data were recorded into a database and the Virginia Commonwealth University Enterprise Analytics team helped retrieve basic demographics, medication lists, and medical problem lists from participants' medical records. Of note, some data obtained from the Virginia Commonwealth University Enterprise Analytics team for participants from the Hayes Clinic and the ACC at VCUHS were inconsistent, specifically, data for participant employment and medical problem lists. Participants listed as both employed and unemployed were coded as employed in order to be conservative when testing our hypothesis that participants who were unemployed would have lower depression and anxiety scores. In order to account for participants who had multiple Charlson Comorbidity scores listed (scores derived from patients' medical problem list), we used the highest score because Charlson scores are determined according to patient history of medical conditions and thus the scores will only increase over time. Accordingly, the highest score is the most accurate score.

Measures

The Generalized Anxiety Disorder (GAD-7; Spitzer, Kroenke, & Williams, 2006).

The GAD-7 is a seven item self-report questionnaire that assesses symptoms of anxiety experienced over the past two weeks using the following Likert scale: 0 = Not at all, 1 = several days, 2 = more than half the days, and 3 = nearly everyday (see Appendix A1). The ratings are tallied to obtain a summary score with the following norms: less than 4 indicates no anxiety despite mild endorsement of symptoms, between 5 and 9 is considered mild anxiety, between 10 and 14 is considered moderate anxiety, and greater than 15 is considered severe anxiety. Finally there is a summary question that asks patients to rate how difficult these symptoms have made it for them to do work, take care of things at home, or get along with other people. Item responses range from “not difficult at all” to “extremely difficult.”

The GAD-7 was normed on 2,739 patients in 15 primary care clinics in the United States (Spitzer et al., 2006). Self-report scores derived from the GAD-7 were compared to diagnoses made by qualified mental health professionals as well as patient functional status measures, disability days, and health care records with results indicating good agreement. The GAD-7 has good reliability and validity. The seven items had high internal consistency (Cronbach’s alpha = .92) and good test retest reliability (intraclass correlation = .83). Additionally, scores derived from self-report versus mental health professional administered reports of the GAD-7 also had good reliability (intraclass correlation = .83), indicating that regardless of administration procedure, results on the GAD-7 were similar. In order to determine clinically significant cut-off scores for the GAD-7, mental health professionals first used the Diagnostic and Statistical Manual of Mental Disorders (4th Edition) as criteria for assessing patients. These scores were compared to patients’ GAD-7 scores and results showed that a summary score of 10 or greater

was determined as the cut off point to yield optimal sensitivity of 89% and a specificity of 82% for generalized anxiety disorder (Spitzer et al., 2006). The GAD-7 was moderately good at detecting panic disorder (sensitivity of 74% and specificity of 81%), social anxiety disorder (sensitivity of 72% and specificity of 80%), and posttraumatic stress disorder (sensitivity of 66% and specificity of 81%) (Spitzer, et al., 2006). Despite the interrelatedness of depression and anxiety, a factor analysis determined their distinct dimensionality. Further analysis showed differences in the presentation and effects of depression and anxiety as they relate to impairment and disability (Spitzer et al., 2006).

The Patient Health Questionnaire-9 (PHQ-9; Spitzer, Kroenke, & Williams, 1999).

The PHQ-9 has been used extensively as a brief, useful tool for assessing depression in primary care settings (Tamburrino et al., 2009; Klinkman, 2009). It consists of nine items and is designed to measure depressive symptoms experienced over the last two weeks (see Appendix A2). Severity of depression is determined by the following cut-offs: less than 4 indicates no symptoms of depression despite mild endorsement of some symptoms, between 5 and 9 indicates mild depression, between 10 and 14 indicated moderate depression, 15 to 19 indicated moderate severe depression, and greater than 20 indicates severe symptoms of depression.

According to the validation study for the PHQ-9 (Kroenke, Spitzer, & Williams, 2001), internal consistency for the PHQ-9 was excellent (Cronbach's alpha = .89) and test-retest reliability was also good ($r = .89$) for a sample of 3,000 primary care patients. Mental health professionals gave patients the Structured Clinical Interview for DSM-III-R and asked diagnostic questions from the PRIME-MD (the longer questionnaire from which the PHQ-9 was derived), and the results were compared to patients' scores on the PHQ-9. Results were used to create cut-off scores for the measure (Kroenke et al., 2001). Each severity range score (i.e. 0-4, 5-9, 10-14,

15-19, and 20-27) corresponds to a positive likelihood ratio for major depression disorder (i.e. 0.04, 0.5, 2.6, 8.4, and 36.8, respectively). For example a score 0-4 is 0.04 times as likely in a patient with or without major depression (Kroenke et al., 2001). In a systematic review investigating the best assessments for evaluating the most prevalent mental disorders found in primary care (depression, anxiety, and somatization), the PHQ-9, GAD-7, and PHQ-15 were examined. The PHQ-9 was found to be a good measure for detecting depressive disorders and the abbreviated version, the PHQ-2, was also found to have good sensitivity and to be a well-validated measure of depression (Kroenke, Spitzer, Williams, & Löwe, 2010). The PHQ-9 has been administered on a variety of patients within the primary care setting to test its reliability and validity across different populations. In an ethnically diverse sample of 5,053 primary care patients, with 2,520 non-Hispanic whites, 598 African Americans, 941 Chinese Americans, and 974 Latinos, exploratory factor analysis revealed one factor loading for each racial/ethnic group with coefficients ranging from .79 to .89 (Huang, Chung, Kroenke, Delucchi, & Spitzer, 2006). This indicates that the PHQ-9 can effectively detect and monitor depression for racially and ethnically diverse primary care patients (Huang et al., 2006).

Charlson Co-morbidity Index (Charlson, Pompei, Ales, & Mackenzie, 1987). The Charlson co-morbidity index was created to predict ten year mortality rates for patients with a concurrent medical conditions. There are 22 conditions in the index, each assigned a score of 1, 2, 3, or 6 according to the risk of mortality for each condition. The scores are totaled to provide an overall mortality rating. The following conditions are rated a 1: Myocardial infarct, congestive heart failure, peripheral vascular disease, dementia, cerebrovascular disease, chronic lung disease, connective tissue disease, ulcer, and chronic liver disease. The following receive a score of 2: Hemiplegia, moderate or severe kidney disease, diabetes, diabetes with complication,

tumor, leukemia, and lymphoma. A score of 3 is given to patients with Moderate or severe liver disease. Lastly, a score of 6 is given to patients with the following: Malignant tumor, metastasis, AIDS. The Age-adjusted Charlson co-morbidity score is derived by taking the patients' co-morbidity scores and adding 1 point for patients in their 50's, 2 points for patients in their 60's, 3 for 70's, 4 for 80's, and 5 for 90's, thereby accounting for the relationship between age and mortality. Originally the Charlson Co-morbidity scale was used to help physicians know the severity of conditions and thus how to aggressively they should be treated (Charlson et al., 1987).

Results

Characteristics of the Sample

Descriptive data for study participants are presented in Table 2. Included are primary care patients referred to the psychology clinic at the ACC at VCUHS ($N = 147$) for depression or anxiety, the Hayes patients who consented to participate in the study ($N = 315$) and those Hayes patients who were eligible to participate in the study ($N = 139$). Also included in the table is a comparison of the demographics between participants from the ACC and eligible participants from the Hayes Clinic. Of note, the Hayes sample had significantly younger participants than the ACC sample ($p = .028$) and also had relatively fewer unemployed participants compared to the ACC sample ($p = .002$).

We also compared the 139 Hayes participants who completed the study to the 24 eligible participants who were lost to follow-up in order to determine if the participants who dropped out of the study were demographically distinct from those who completed the study. Analyses revealed that there were no differences in gender ($\chi^2(1) = .75, p = .10$), race ($\chi^2(1) = .56, p = .46$), or age ($F(1, 161) = 3.30, p = .07$). There were also no differences in participants' initial

scores on the PHQ-9 ($F(1, 161) = 1.03, p = .31$) or the GAD-7 ($F(1, 161) = .35, p = .55$). In addition no differences were found when comparing the percentage of patients prescribed medications for depression and/or anxiety ($\chi^2(1) = .02, p = .90$) and this relationship remained non-significant when including opioids in the list of medications, ($\chi^2(1) = .02, p = .90$). However, the difference between patients' Charlson scores trended towards significance ($F(1, 161) = 3.73, p = .055$), such that participants who completed the study ($N = 139$) had higher Charlson scores ($M = 1.17, SD = 1.64$) than participants lost to follow-up ($N = 24; M = .50, SD = .98$). When taking into account age adjustment for the Charlson score, the differences between study completers and those lost to follow-up was significant ($F(1, 161) = 4.15, p = .043$), such that participants had higher scores ($N = 139, M = 1.88, SD = 1.84$) than those who did not complete the study ($N = 24, M = 1.08, SD = 1.18$). Thus, with the exception of some differences in the Charlson Co-morbidity Index, participants who dropped out of the study were not demographically distinct from those who completed the study.

Table 2.

Demographics for patients at the Hayes Clinic and the ACC at VCUHS

	ACC* N = 147	Hayes N = 315	Hayes eligible with F/U* N = 139	*Differences: ACC & Hayes Eligible
Gender				
Male	N = 44 (29.9%)	N = 102 (32.4%)	N = 37 (26.6)	$\chi^2(1) = .39, p = .60$
Female	N = 103 (70.1%)	N = 213 (67.6%)	N = 102 (73.4)	
Age	M = 52.13 SD = 11.39	M = 48.54 SD = 11.64	M = 49.35 SD = 9.88	$t(284) = 2.20, p = .028^*$
Race				
Caucasian	N = 56 (38.1%)	N = 75 (23.8%)	N = 42 (30.2%)	$\chi^2(1) = 1.40, p = .24$ (Difference between Caucasian and African American)
African American	N = 90 (61.2%)	N = 230 (73%)	N = 91 (65.5%)	
Asian/Pac. Island	N = 1 (.7%)	N = 0	N = 0	
American Indian	N = 0	N = 2 (.6%)	N = 1 (.7%)	
Other	N = 0	N = 8 (2.5%)	N = 5 (3.6%)	
Marital Status				
Single	N = 55 (37.4%)	N = 145 (46%)	N = 58 (41.7%)	$\chi^2(4) = 4.02, p = .40$
Divorced	N = 36 (24.5%)	N = 73 (23.2%)	N = 36 (25.9%)	
Married	N = 29 (19.7%)	N = 48 (15.2%)	N = 26 (18.7%)	
Separated	N = 15 (10.2%)	N = 31 (9.8%)	N = 15 (10.8%)	
Widowed	N = 12 (8.2%)	N = 18 (5.7%)	N = 4 (2.9%)	
Employment Status				
Employed	N = 70 (47.6%)	N = 186 (59%)	N = 80 (57.6%)	$\chi^2(1) = 9.24, p = .002^*$ (Differences between Employed (i.e. employed and self- employed) and Unemployed (i.e. Unemployed, Disabled, Retired))
Self-employed	N = 4 (2.7%)	N = 7 (2.2%)	N = 3 (2.2%)	
Unemployed	N = 31 (21.1%)	N = 49 (15.6%)	N = 23 (16.5%)	
Disabled	N = 16 (10.9%)	N = 6 (1.9%)	N = 3 (2.2%)	
Retired	N = 11 (7.5%)	N = 7 (2.2%)	N = 0	
Unknown	N = 15 (10.2%)	N = 60 (19%)	N = 28 (20.1%)	

Finally, to address our hypothesis that relatively fewer African Americans and relatively fewer older patients would be referred to the primary care psychology clinic at the ACC at VCUHS for depression and anxiety relative to the overall composition of the ACC at VCUHS, we used a chi square analysis. Consistent with our hypothesis, relatively fewer older adults were referred to the primary care psychology clinic, $\chi^2(1) = 11.45, p < .001$. The overall primary care clinic at the ACC at VCUHS had 769 (22.58%) older adult patients and 2,492 (76.42%) younger adult patients over the course of a year. This is compared to only 17 (11.56%) older adult

patients out of a total of 147 patients referred to the primary care psychology clinic for depression or anxiety. Although fewer African American patients were referred to the primary care psychology clinic (61.2%) for depression and/or anxiety compared to the overall composition of the primary care clinic (68.71%), this difference only trended towards significance, $\chi^2(1) = 3.22, p = .07$.

Effects of Psychological Intervention on Anxiety and Depression

The main analyses compared differences between change in anxiety and depression scores for participants from the ACC at VCUHS with those of participants at the Hayes Clinic. Mean baseline and follow-up anxiety and depression scores for the two samples as well as average pre-post time intervals are presented in Table 3. The difference in the average time intervals over which pre and post scores were obtained for the two clinics was non-significant, $t(284) = -.77, p = .47$. Initial depression and anxiety scores did not differ as a function of gender or race and there was no interaction between changes in depression and anxiety over time as a function of age, gender, or race.

Table 3.

PHQ-9 and GAD-7 pre and post scores for study participants

Clinic	PHQ-9 pre-scores	PHQ-9 post-scores	GAD-7 pre-scores	GAD-7 post-scores	Time Interval
ACC <i>N</i> = 147	<i>M</i> = 15.20 <i>SD</i> = 6.66	<i>M</i> = 13.33 <i>SD</i> = 7.27	<i>M</i> = 14.02, <i>SD</i> = 5.28	<i>M</i> = 11.65, <i>SD</i> = 6.25	<i>M</i> = 52.64 <i>SD</i> = 40.41
Hayes <i>N</i> = 139	<i>M</i> = 14.42 <i>SD</i> = 5.75	<i>M</i> = 14.35 <i>SD</i> = 6.77	<i>M</i> = 13.56 <i>SD</i> = 5.04	<i>M</i> = 12.70 <i>SD</i> = 5.76	<i>M</i> = 56.20, <i>SD</i> = 37.37

An independent sample t-test comparing eligible participants from the Hayes Clinic and the ACC at VCUHS on initial levels of depression and anxiety showed non-significant differences ($t(281.68) = 1.07, p = .29$; $t(284) = .75, p = .45$). Thus, a repeated measures ANOVA

was used to compare change in anxiety and depression scores between the two clinics. There was a significant main effect for depression scores over time ($F(1, 284) = 8.86, p = .003$), indicating an overall decrease in depression scores across groups over time, and a significant groups x time interaction, $F(1, 284) = 7.71, p = .006$ (see Table 4). The latter effect indicates that the decrease in depression scores was primarily accounted for by patients at the ACC at VCUHS who declined markedly in contrast to Hayes patients who showed only a slight decline (see Figure 2). We calculated effect size by comparing the mean change scores and standard deviations of the PHQ-9 for the participants at the Hayes Clinic and at the ACC at VCUHS, Cohen's $d = .33$ (small to medium effect), effect-size $r = .16$.

Table 4.

Repeated measures ANOVA for PHQ-9 depression scores

	<i>df</i>	Mean Square	<i>F</i>	Significance
TIME	1	133.82	8.86	.003
CLINIC	1	1.93	.03	.87
CLINIC * TIME	1	116.51	7.71	.006
ERROR	284	15.10		

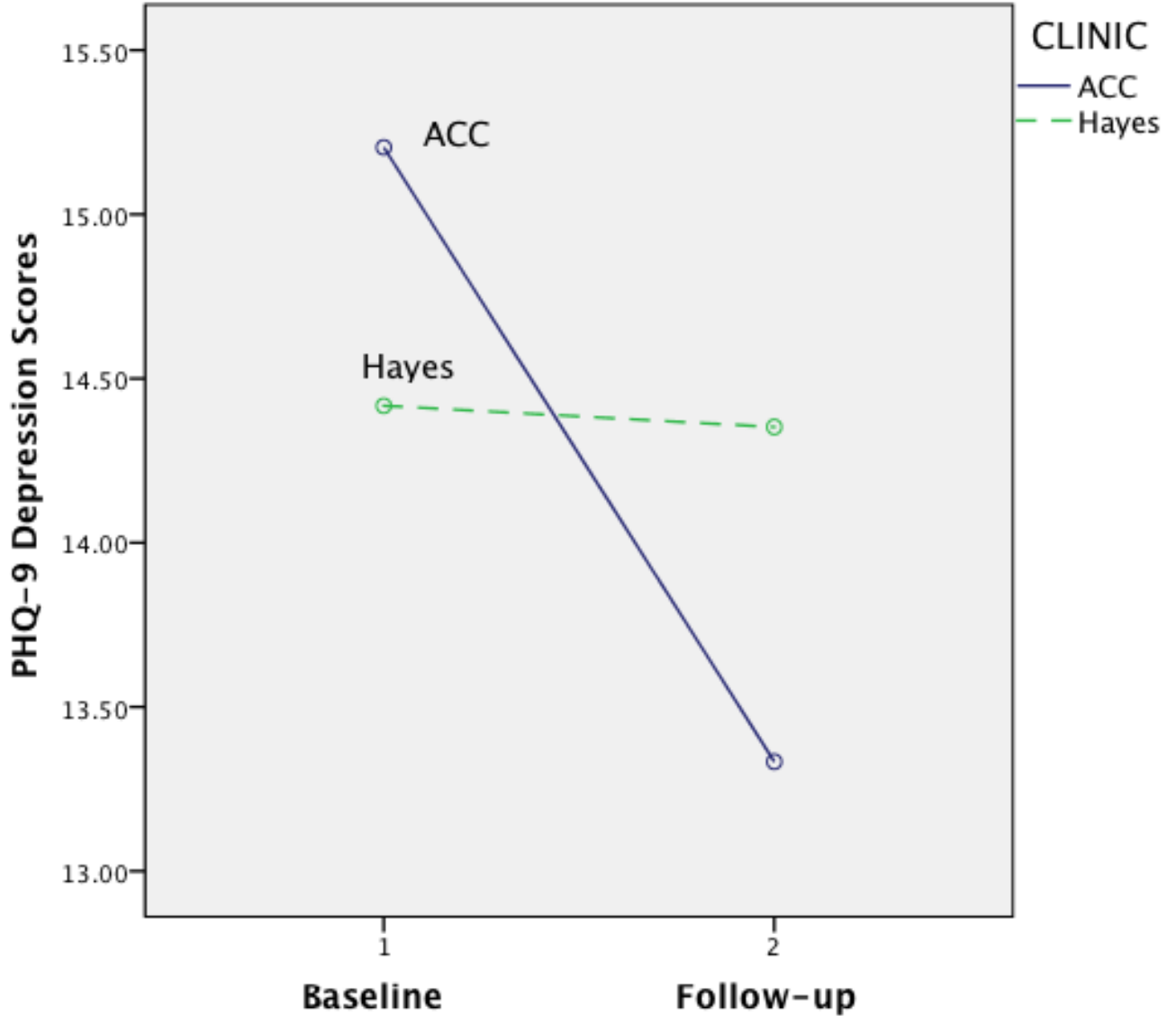


Figure 2. Pre and post PHQ-9 depression scores for participants from the Hayes Clinic and the ACC at VCUHS

We also used a repeated measures ANOVA to assess patients' changes in anxiety scores according to clinic type. There was a significant main effect for the change in anxiety scores over time across clinics ($F(1, 284) = 26.31, p < .001$) and a significant interaction effect between time periods and clinic type ($F(1, 284) = 5.70, p = .018$, see Table 5). As with depression, the latter

effect indicates that the overall decline in anxiety scores was primarily accounted for by patients at the ACC at VCUHS in contrast to Hayes Clinic patients who showed a more moderate decline (see Figure 3). We calculated effect size by comparing the mean change scores and standard deviations of the GAD-7 for the participants at the Hayes Clinic and at the ACC at VCUHS, Cohen's $d = .28$ (small to medium effect), effect-size $r = .14$.

Table 5.

Repeated measures ANOVA for GAD-7 anxiety scores

	<i>df</i>	Mean Square	<i>F</i>	Significance
TIME	1	372.84	26.31	.000
CLINIC	1	12.25	.25	.62
CLINIC * TIME	1	80.81	5.70	.018
ERROR	284	14.17		

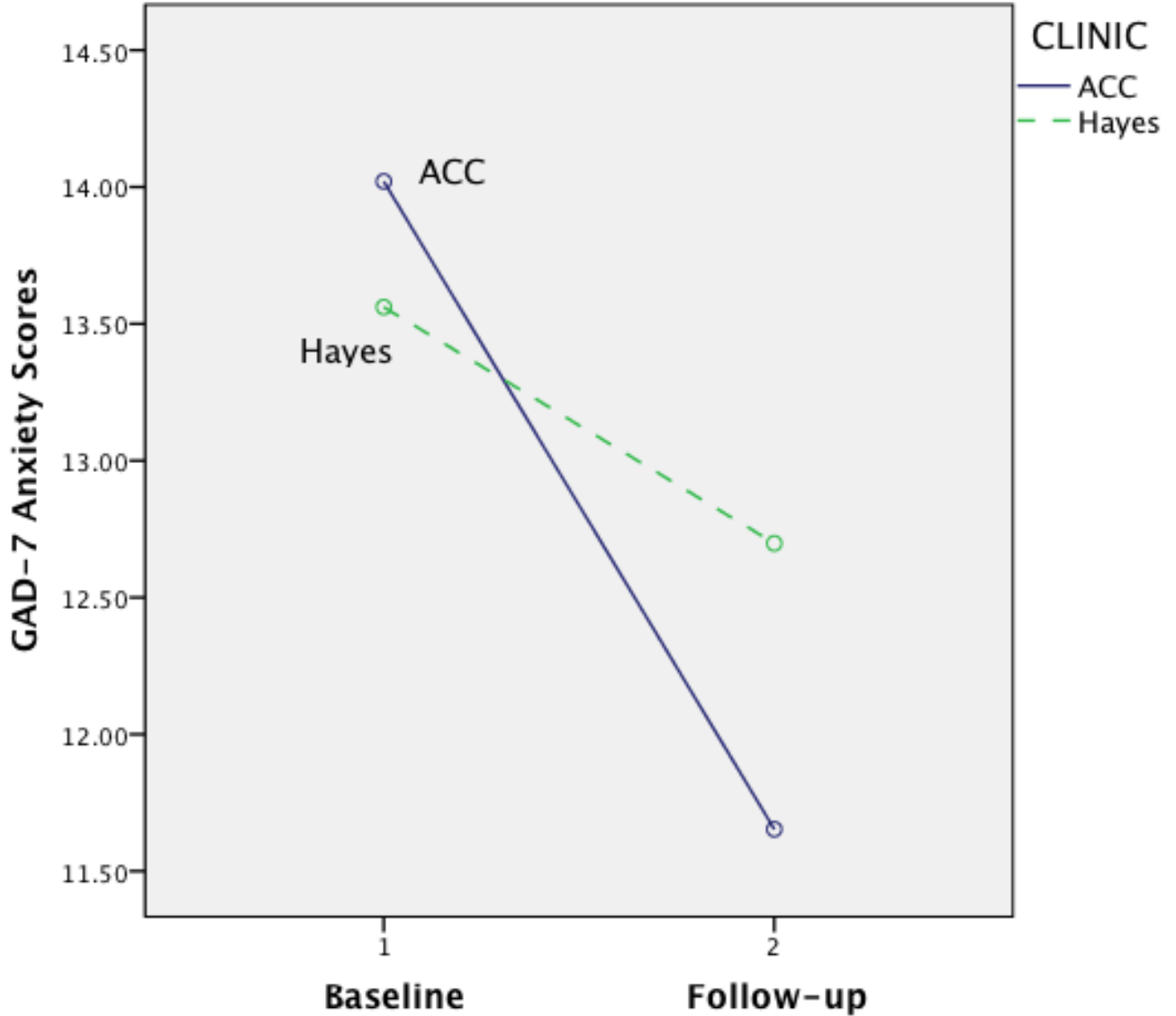


Figure 3. Pre and post GAD-7 anxiety scores for participants from the Hayes Clinic and the ACC at VCUHS

Clinical Significance of Changes in Depression and Anxiety

In order to determine whether participants experienced clinically significant changes in depression, we calculated the percentage of participants who experienced a 5-point decrease in their PHQ-9 scores. The severity scores for the PHQ-9 are divided into 5-point intervals by the

authors of the scale (Kroenke et al., 2001): 0-4 (no depression), 5-9 (mild depression), 10-14 (moderate depression), 15-19 (moderately severe depression), and 20-27 (severe depression). These cut-offs were determined by comparing the results of a mental health professional interview with 580 study participants' self-reported PHQ-9 scores. Results showed that a PHQ-9 score greater or equal to 10 had a sensitivity of 88% and specificity of 88% for major depression (Kroenke et al., 2001). Each severity range score (i.e. 0-4, 5-9, 10-14, 15-19, and 20-27) corresponds to a positive likelihood ratio for major depression disorder (i.e. 0.04, 0.5, 2.6, 8.4, and 36.8, respectively; Kroenke et al., 2001). Thus, a decrease of 5 points on the PHQ-9 was used to infer a clinically significant change in depression.

In order to determine whether participants experienced clinically significant changes in anxiety, we once again calculated the percentage of participants who experienced a 5-point decrease in their GAD-7 scores. The severity scores for the GAD-7 are also divided into 5-point intervals by the authors of the scale (Spitzer et al., 2006) and thus a decrease of 5-points on the GAD-7 was used to infer a clinically significant shift in anxiety. The severity scores for the GAD-7 are as follows: 0-4 (no anxiety), 5-9 (mild anxiety), 10-14 (moderate anxiety), and 15-21 (severe anxiety). In order to determine clinically significant cut-off scores for the GAD-7, mental health professionals conducted a structured interview with patients using the Diagnostic and Statistical Manual of Mental Disorders (4th Edition) and this was compared to patients' self-reported GAD-7 scores. Results showed that a summary score of 10 or greater was the cut off point to yield optimal sensitivity of 89% and a specificity of 82% for generalized anxiety disorder (Spitzer et al., 2006).

Table 6 presents the frequencies and percentages of participants from the Hayes Clinic and the ACC at VCUHS whose scores on the PHQ-9 and GAD-7 changed over time and

specifically the number who experienced clinically significant changes in their depression and anxiety scores (i.e. ≥ 5 point decrease). Approximately 30% of participants from the ACC at VCUHS experienced a clinically significant decrease in the PHQ-9 and GAD-7. Table 7 further illustrates the changes in PHQ-9 and GAD-7 severity scores over time by providing the frequency and percentage of participants in each severity category for pre and post assessment.

Table 6.

PHQ-9 and GAD-7 change scores for participants at the ACC at VCUHS and Hayes Clinic

Score Changes	PHQ-9		GAD-7	
	ACC N = 147	Hayes N = 139	ACC N = 147	Hayes N = 139
Score Decrease	N = 86 (58.50%)	N = 63 (45.32%)	N = 89 (60.54%)	N = 69 (49.64%)
No change	N = 14 (9.52%)	N = 11 (7.91%)	N = 11 (7.48%)	N = 15 (10.79%)
Score Increase	N = 47 (31.97%)	N = 65 (46.76%)	N = 47 (31.97%)	N = 55 (39.57%)
≥ 5 Point decrease	N = 46 (31.29%)	N = 35 (25.18%)	N = 44 (29.93%)	N = 30 (21.58%)
≥ 5 Point Increase	N = 12 (8.16%)	N = 28 (20.14%)	N = 11 (7.48%)	N = 22 (15.83%)

Table 7.

Changes in PHQ-9 and GAD-7 severity scores for participants from the ACC at VCUHS and Hayes Clinic

PHQ-9 Depression Severity Levels	ACC N = 147		Hayes N = 139	
	Pre-scores	Post-scores	Pre-scores	Post-scores
Severe	N = 44 (29.9%)	N = 32 (21.8%)	N = 28 (20.1%)	N = 39 (28.1%)
Moderate/Severe	N = 41 (27.9%)	N = 39 (26.5)	N = 39 (28.1%)	N = 35 (25.2%)
Moderate	N = 27 (18.4%)	N = 33 (22.4%)	N = 44 (31.7)	N = 30 (21.6%)
Mild	N = 24 (16.3%)	N = 18 (12.2%)	N = 21 (15.1%)	N = 21 (15.1%)
Normal	N = 11 (7.5%)	N = 25 (17%)	N = 7 (5%)	N = 14 (10.1%)
GAD-7 Anxiety Severity Levels				
Severe	N = 80 (54.4%)	N = 56 (38.1%)	N = 67 (48.2%)	N = 65 (46.8%)
Moderate	N = 33 (22.4%)	N = 34 (23.1%)	N = 40 (28.8%)	N = 33 (23.7%)
Mild	N = 28 (19.0%)	N = 30 (20.4%)	N = 26 (18.7%)	N = 24 (17.3%)
Normal	N = 6 (4.1%)	N = 27 (18.4%)	N = 6 (4.3%)	N = 17 (12.2%)

Effects of Psychotropic Medication Use

Data on frequency and percentage of psychotropic medication usage for participants from the Hayes Clinic and the ACC at VCUHS during the course of the assessment period are presented in Table 8. Included in the table are the following medication classes: common antidepressants, benzodiazepines, anxiolytics, antipsychotics, tricyclics, and hypnotics. We also included opioids because research has indicated that patients with pain are at higher risk for depression and treating pain can reduce depressive symptoms (Banks & Kerns, 1996; Ohayon & Schatzberg, 2003). We inferred that participants prescribed these medications were being

prescribed medication for depression and/or anxiety. Therefore we categorized the samples into two groups, participants who had been prescribed traditional medication for depression and/or anxiety (these did not include participants who were prescribed opioids) and those who had not. Table 9 shows the overall frequency and percentage of participants from the Hayes Clinic and the ACC at VCUHS who were prescribed medication for depression and/or anxiety (not including opioids). A chi-square analysis revealed a significant association between clinic type and the percentage of participants who were prescribed medications for depression and/or anxiety, $\chi^2(1) = 11.89, p = .001$, such that participants in the Hayes clinic were prescribed medication less frequently than participants from the ACC at VCUHS.

Table 8.

Frequency and percentage of participants prescribed medication for depression and/or anxiety

	MCV* N = 147 (N (%))	Hayes N = 315 (N (%))	Hayes eligible* N = 139 (N (%))
Common Antidepressants	50 (34%)	47 (14.9%)	23 (16.5%)
Benzodiazepines	23 (15.6%)	17 (5.4%)	12 (8.6%)
Anxiolytics	4 (2.7%)	7 (2.2%)	2 (1.4%)
Antipsychotics	4 (11%)	9 (2.9%)	7 (5%)
Tricyclics	11 (7.5%)	8 (2.5%)	6 (4.3%)
Hypnotics	7 (4.8%)	5 (1.6%)	4 (2.9%)
Mood Stabilizers	1 (.7%)	3 (1%)	1 (.7%)
Opioids	51 (34.7%)	65 (20.6%)	31 (22.3%)

Table 9.

Overall frequency and percentage of participants prescribed medication for depression and/or anxiety

CLINIC	No Medication	Medication
ACC (<i>N</i> = 147)	<i>N</i> = 72 (49.0%)	<i>N</i> = 75 (51.0%)
Hayes (<i>N</i> = 139)	<i>N</i> = 96 (69.1%)	<i>N</i> = 43 (30.9%)

We then added opioids to our list of medications prescribed for depression and/or anxiety and once again looked at the relationship between frequency of prescription and clinic type. The relationship remained significant, once again indicating that participants from the Hayes Clinic were prescribed medication less frequently than participants at the ACC at VCUHS, $\chi^2(1) = 9.26, p = .002$.

Because of the potential impact of psychotropic medications on decreasing anxiety and depression, we hypothesized that psychotropic medication use would affect the changes in patients' depression and anxiety scores over time. Therefore the difference between patients' initial and follow-up GAD-7 and PHQ-9 assessment scores, respectively, were regressed on medication use. Participants taking medication had marginally larger decreases in depression scores ($M = -1.49, SD = 5.75$) than participants not taking medication ($M = -.38, SD = 5.28; F(1, 284) = 2.81, p = .10, r(286) = -.10, p = .09$). Medication use had no effect on anxiety scores, $F(1, 284) = .62, p = .43, r(286) = -.05, p = .43$. These relationships remained non-significant when excluding opioids (which are not primarily used for treating depression and anxiety), $F(1, 284) = 1.11, p = .29, r(286) = -.06, p = .29$ for change in depression scores; $F(1, 284) = .26, p = .61, r(286) = -.03, p = .61$ for change in anxiety scores.

Nonetheless, given the significantly different rates of medication prescriptions for patients from the ACC at VCUHS compared to patients at the Hayes Clinic, we conducted a regression to determine if clinic type significantly impacted changes in patients' depression scores after controlling for medication use. We entered medication in block one and clinic type in block two. Results revealed that patients at the ACC had significant decreases in depression when controlling for medication use (including opioids) (F Square Change (1, 283) = 6.33, p = .012; R Square Change = .022) as well as when opioids were excluded from the medication list (F Square Change = (1, 283) = 6.82, p = .009; R Square Change = .023; See Tables 10 and 11).

Table 10.

Hierarchical regression of clinic type and change in PHQ-9 depression scores after controlling for medication use

Models	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	$df1$	$df2$	Sig. F Change
1	.099	.010	.006	5.54	.010	2.81	1	284	.095
2	.177	.031	.025	5.49	.022	6.33	1	283	.012

1. Entered into Block 1: Medication (including opioids)
2. Entered into Block 2: Clinic Type

Table 11.

Hierarchical regression of clinic type and change in PHQ-9 depression scores after controlling for medication use (excluding opioids)

Models	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	$df1$	$df2$	Sig. F Change
1	.062	.004	.000	5.56	.004	1.11	1	284	.292
2	.165	.027	.020	5.50	.023	6.82	1	283	.009

1. Entered into Block 1: Medication (excluding opioids)
2. Entered into Block 2: Clinic Type

We also assessed whether clinic type was associated with changes in patients' anxiety scores if we controlled for medication use. We entered medication in block one and clinic type in block two and results were significant with and without opioids included in the medication list (F Square Change (1, 283) = 5.19, $p = .023$, R Square Change = .018; F Square Change = (1, 283) = 5.42, $p = .021$, R Square Change = .019; See Tables 12 and 13).

Table 12.

Hierarchical regression of clinic type and change in GAD-7 anxiety scores after controlling for medication use

Models	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	$df1$	$df2$	Sig. F Change
1	.047	.002	-.001	5.37	.002	.62	1	284	.433
2	.142	.020	.013	5.33	.018	5.19	1	283	.023

1. Entered into Block 1: Medication (including opioids)
2. Entered into Block 2: Clinic Type

Table 13.

Hierarchical regression of clinic type and change in GAD-7 anxiety scores after controlling for medication use (excluding opioids)

Models	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	$df1$	$df2$	Sig. F Change
1	.030	.001	-.003	5.37	.001	.26	1	284	.609
2	.140	.020	.013	5.33	.019	5.42	1	283	.021

1. Entered into Block 1: Medication (excluding opioids)
2. Entered into Block 2: Clinic Type

The Relationship Between Charlson Scores and Initial Depression and Anxiety

We expected there to be positive relationship between patients' Charlson scores and their initial levels of depression and anxiety. Charlson scores had a non-significant relationship with patients' PHQ-9 depression scores ($r(286) = -.02$, $p = .34$); however the Charlson age-adjusted

score had a negative relationship with depression scores ($r(286) = -.11, p = .038$). Charlson scores and Charlson age-adjusted scores were negatively correlated with GAD-7 anxiety scores ($r(286) = -.10, p = .049$; $r(286) = -.16, p = .003$). These findings are not consistent with expectation. Table 14 presents the frequency and percentage of participants from the Hayes Clinic and the ACC at VCUHS who have various medical conditions. Total Charlson scores and total Charlson Age adjusted scores did not differ according to clinic type ($F(1, 284) = 2.25, p = .14$; $F(1, 284) = .05, p = .82$).

Table 14.

Charlson Co-morbidity Index categories by clinic

	ACC* <i>N</i> = 147 (<i>N</i> (%))	Hayes eligible* <i>N</i> = 139 (<i>N</i> (%))
Myocardial Infarction	3 (2%)	2 (1.4%)
Congestive Heart Failure	9 (6.1%)	7 (5%)
Peripheral Vascular Disease	0	0
Cerebrovascular Disease	3 (2%)	4 (2.9%)
Dementia	0	0
COPD	14 (9.5%)	22 (15.8%)
Rheumatic Disease	8 (5.4%)	4 (2.9%)
Peptic Ulcer Disease	0	0
Mild Liver Disease	6 (4.1%)	5 (3.6%)
Diabetes w.o Complications	35 (23.8%)	28 (20.1%)
Diabetes w Complications	3 (2%)	3 (2.2%)
Paraplegia and Hemiplegia	0	0
Renal Disease	5 (3.4%)	2 (1.4%)
Cancer	1 (.7%)	5 (3.6%)
Moderate or Severe Liver Disease	1 (.7%)	2 (1.4%)
Metastatic Carcinoma	0	0
AIDS/HIV	0	6 (4.3%)
Charlson	<i>M</i> = .90, <i>SD</i> = 1.29	<i>M</i> = 1.17, <i>SD</i> = 1.64
Charlson (age adjusted)	<i>M</i> = 1.83, <i>SD</i> = 1.68	<i>M</i> = 1.88, <i>SD</i> = 1.84

We also assessed whether clinic type significantly impacted changes in patients' depression scores if we controlled for their Charlson Co-morbidity scores. We entered the Charlson score into block one and clinic type into block two and results were significant (F Square Change_(1, 283) = 8.05, p = .005, R Square Change = .028; see Table 15).

Table 15.

Hierarchical regression of clinic type and change in PHQ-9 depression scores after controlling for Charlson score

Models	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	$df1$	$df2$	Sig. F Change
1	.033	.001	-.002	5.57	.001	.310	1	284	.578
2	.169	.029	.022	5.50	.028	8.05	1	283	.005

1. Entered into Block 1: Charlson
2. Entered into Block 2: Clinic Type

We also assessed whether clinic type significantly impacted changes in patients' anxiety scores after controlling for their Charlson Co-morbidity scores. We entered the Charlson in block one and clinic type in block two and results were significant (F Square Change (1, 283) = 5.39, p = .021, R Square Change = .019; See Table 16).

Table 16.

Hierarchical regression of clinic type and change in GAD-7 anxiety scores after controlling for Charlson score

Models	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	$df1$	$df2$	Sig. F Change
1	.048	.002	-.001	5.37	.002	.66	1	284	.416
2	.145	.021	.014	5.33	.019	5.39	1	283	.021

1. Entered into Block 1: Charlson
2. Entered into Block 2: Clinic Type

Effects of Additional Mental Health Services on Anxiety and Depression

Although systematic integrated psychological services were not available for most Hayes participants, we obtained self-report data on whether they were receiving any additional services for depression or anxiety from a physician, psychiatrist, psychologist, social worker, counselor, and/or spiritual leader either through the Hayes Clinic or elsewhere. Participants were asked about these services during their initial and follow-up assessment and thus we were able to identify if services rendered to participants changed during the course of the study. Unfortunately we could not collect these data for participants from the ACC at VCUHS because a retrospective database was used for this sample.

Data from the Hayes sample revealed that almost half of participants (48%) initially reported being treated for depression and/or anxiety. Of the 68 participants reportedly receiving services, 32 reported receiving services from their primary care physician at the Hayes Clinic, 10 from the social worker at the Hayes Clinic, and 32 were seen by a psychologist, psychiatrist, counselor, or religious leader outside of the Hayes Clinic. In the interim between the initial and follow up assessment, 56 (40.9%) participants were still not receiving additional mental health services for depression or anxiety, 59 (43.16%) were receiving continual treatment, 7 (5.1%) stopped seeing a provider for depression and anxiety, and 15 (10.9%) participants started receiving additional mental health services (see Table 17). Analysis of variance showed that change scores for depression and anxiety did not differ as a function of receipt of mental health services ($F(3, 133) = .88, p = .46$; $F(3, 133) = 1.23, p = .30$, respectively). Although patients who began a new service for depression and/or anxiety had the greatest decrease in their scores on the PHQ-9 ($M = 2.33$ point decrease, $SD = 6.79$) and the GAD-7 ($M = 3.40$ point decrease, $SD = 6.39$), post hoc comparisons using the Tukey HSD test showed these change scores were not

significantly different than the change scores for patients receiving no treatment ($p = .52$ for depression; $p = .30$ for anxiety), continual treatment ($p = .37$ for depression; $p = .29$ for anxiety), or those who lost services ($p = .86$ for depression; $p = .51$ for anxiety). Of note, during the follow-up assessment, 22 participants (15.8%) from the Hayes Clinic made unsolicited requests for information about services to address their symptoms of depression and/or anxiety.

Table 17.

Services for depression and anxiety at follow-up

Services	Frequency	Percent
No Treatment	56	40.9
Continual Treatment	59	43.1
New Treatment Added	15	10.9
Discontinued Treatment	7	5.1
Total	137	100.0

The Influence of Demographic Variables on Depression and Anxiety Scores

We used t-tests to explore the influence of demographic variables (i.e. age, gender, race, marital status, unemployment) on depression and anxiety scores in both samples. Our hypothesis that Caucasians would have significantly higher initial levels of depression and anxiety than African Americans was not supported ($t(277) = .63, p = .54$; $t(277) = .04, p = .97$, respectively). In addition, although Caucasians had relatively higher initial depression scores ($N = 98, M = 15.27, SD = 6.42$) than African Americans ($N = 181, M = 14.78, SD = 6.02$) and relatively lower levels of post depression scores ($M = 13.63, SD = 6.95$) than African Americans ($M = 13.96, SD = 7.12$), the interaction between racial group and time periods for depression scores was non-significant ($F(1, 277) = 1.37, p = .24$).

There were significant differences in prescription of medication for depression and anxiety as a function of race, as hypothesized. Table 18 shows the frequencies and percentages

of Caucasian and African American participants who were prescribed medication for depression and/or anxiety. If participants were prescribed medications from the following classes: common antidepressants, benzodiazepines, anxiolytics, antipsychotics, tricyclics, and hypnotics, we inferred that they were taking medication for either depression or anxiety. African American participants were prescribed relatively fewer medications than Caucasian participants, $\chi^2(1) = 4.71, p = .03$. We then added opioids to our list of medications prescribed for depression and/or anxiety because research suggests that there is a strong relationship between pain and depression and thus an opioid may mitigate depression symptoms. We again looked at the relationship between the frequency at which medications are prescribed and race. The relationship was less pronounced and only marginally significant, $\chi^2(1) = 3.31, p = .069$.

Table 18.

Racial differences in medication prescriptions for depression and/or anxiety

Race	No Medication (not including opioids)	Medication (not including opioids)	No Medication (including opioids)	Medication (including opioids)
Caucasians <i>N</i> = 98	<i>N</i> = 48 (49.0%)	<i>N</i> = 50 (51.0%)	<i>N</i> = 36 (36.7%)	<i>N</i> = 62 (63.3%)
African Americans <i>N</i> = 181	<i>N</i> = 113 (62.4%)	<i>N</i> = 68 (37.6%)	<i>N</i> = 87 48.1%	<i>N</i> = 94 (51.9%)

We conducted a one-way analysis of variance to test our hypothesis that women would report higher initial levels of depression and anxiety than men and found no gender differences for depression (Men: *N* = 81, *M* = 14.43, *SD* = 6.33; Women: *N* = 205, *M* = 14.98, *SD* = 6.20; $F(1, 284) = .44, p = .51$). Women reported slightly higher initial levels of anxiety (*N* = 205, *M* = 14.16, *SD* = 5.04) than men (*N* = 81, *M* = 12.88, *SD* = 5.38) but this only trended towards significance ($F(1, 284) = 3.63, p = .058$). However these patients were preselected for having

anxiety and depression scores in the moderate to severe range and so participants with lower anxiety or depression scores were not included in the sample, making it difficult to accurately determine if gender differences existed. Therefore, we examined gender differences using a larger sample that included all of the Hayes participants, including participants whose scores were in the mild range, and all eligible participants from the ACC at VCUHS sample. Analysis of variance showed that women reported significantly higher depression ($N = 316, M = 11.45, SD = 7.75$) than men ($N = 146, M = 9.76, SD = 7.61; F(1, 460) = 4.82, p = .029$) and also significantly higher anxiety ($N = 316, M = 10.66, SD = 6.95$) than men ($N = 146, M = 8.95, SD = 6.65; F(1, 460) = 6.20, p = .013$).

In accordance with our hypothesis, older adults had lower levels of initial anxiety ($N = 22, M = 11.27, SD = 4.84$) than younger adults ($N = 264, M = 14.01, SD = 5.14; t(284) = 2.41, p = .017$) and we also found that they had lower levels of depression ($M = 11.45, SD = 6.25$) than younger adults ($M = 15.10, SD = 6.16, t(284) = 2.67, p = .008$). Younger adults were defined as less than 65 years old and older adults were defined as 65 years old or older. A correlational analysis revealed that although there was a negative relationship between age and GAD-7 scores and age and PHQ-9 scores, the relationships were non-significant ($r(286) = -.09, p = .065; r(286) = -.09, p = .075$).

A one-way between groups analysis of variance was conducted to explore the relationship between marital status and initial levels of depression and anxiety. There was a statistically significant difference for depression ($F(4, 281) = 4.94, p = .001$) and anxiety ($F(4, 281) = 2.64, p = .034$). Post-hoc comparisons using the Tukey HSD test indicated that the mean depression score for married participants ($N = 55, M = 12.62, SD = 5.78$) was significantly lower than scores for divorced ($N = 72, M = 16.35, SD = 5.43$) or separated ($N = 30, M = 17.47, SD =$

6.65) participants (see Table 19 for means and standard deviations for PHQ-9 and GAD-7 scores). A similar trend was seen for anxiety scores; however married participants' scores did not significantly differ from divorced ($p = .082$) or separated ($p = .059$) participants. Planned contrasts between marital statuses indicated that there was a significant difference between the weighted mean of depression scores for married participants and the combined weighted mean for divorced and separated participants ($t(281) = -4.08, p < .001$). This relationship was also seen for anxiety scores ($t(281) = -3.08, p = .001$). Married participants had the lowest weighted mean scores compared to the combined weighted means of single, divorced, separated, and widowed participants for both depression ($t(281) = 2.72, p = .001$) and anxiety ($t(281) = 2.38, p = .019$).

Table 19.

PHQ-9 depression scores and GAD-7 anxiety scores according to marital status

	PHQ-9	GAD-7
Married ($N = 55$)	$M = 12.62, SD = 5.78$	$M = 12.13, SD = 5.15$
Widowed ($N = 16$)	$M = 12.69, SD = 7.41$	$M = 12.56, SD = 4.91$
Single ($N = 113$)	$M = 14.52, SD = 6.23$	$M = 13.98, SD = 5.18$
Divorced ($N = 72$)	$M = 16.35, SD = 5.43$	$M = 14.46, SD = 5.01$
Separated ($N = 30$)	$M = 17.47, SD = 6.65$	$M = 15.23, SD = 5.02$

Contrary to our hypothesis, unemployment was not associated with higher levels of depression and anxiety. Planned contrasts between employment statuses indicated that there was a non-significant difference between the combined weighted mean for depression and anxiety scores for employed and self-employed participants and the combined weighted mean of unemployed and disabled participants ($p = .29$ (depression), $p = .19$ (anxiety)).

Treatment Resistance Factors

A one-way between groups analysis of variance was conducted to explore the impact of participants' initial depression severity score category on changes in their depression score over time. Our hypothesis was that participants from the ACC at VCUHS with higher initial

depression scores may be more resistant to treatment change than participants with somewhat lower scores. Results indicated Levene’s test of homogeneity of variance was violated ($F(4, 142) = 2.77, p = .029$) and so equal variance was not assumed. A planned contrast indicated that patients with severe depression (i.e. PHQ-9 ≥ 20) had significantly greater decreases in depression scores than the combined weighted mean of participants with no depression (PHQ-9 = 0-4), mild depression (PHQ-9 = 5-9), and moderately severe depression (PHQ-9 = 15-19), $t(83.52) = 2.64, p = .01$ (see Table 20 for means and standard deviations for the PHQ-9 change scores according to initial severity score range). Similarly, we used planned contrasts to explore whether participants with higher initial anxiety scores were more resistant to treatment change than participants with lower scores. Equal variances were not assumed. Results showed that there was a significant difference between the weighted mean change scores for participants with severe levels of anxiety (i.e. GAD-7 ≥ 15) compared to the combined weighted mean of participants with no anxiety (GAD-7 = 0-4), mild anxiety (GAD-7 = 5-9), and moderate anxiety (GAD-7 = 10-14), $t(31.91) = 3.83, p = .001$ (see Table 21 for means and standard deviations for the GAD-7 change scores according to initial severity score range). We also looked at changes in depression and anxiety scores as function of initial severity score for the Hayes patients and found similar trends, such that scores appeared to regress to the mean.

Table 20.

Average PHQ-9 depression change scores (i.e. follow-up scores minus initial scores) as a function of initial severity score levels

PHQ-9 Severity Scores	ACC at VCUHS	Hayes Clinic
No depression (0-4)	$N = 11, M = .73, SD = 2.15$	$N = 7, M = 2.43, SD = 5.00$
Mild Depression (5-9)	$N = 24, M = 1.04, SD = 4.78$	$N = 21, M = 3.86, SD = 5.50$
Moderate Depression (10-14)	$N = 27, M = -2.04, SD = 5.83$	$N = 44, M = -.20, SD = 6.15$
Moderately Severe Depression (15-19)	$N = 41, M = -2.98, SD = 5.70$	$N = 39, M = -1.05, SD = 5.97$
Severe Depression (20-27)	$N = 44, M = -2.98, SD = 4.50$	$N = 28, M = -2.04, SD = 3.46$

Table 21.

Average GAD-7 anxiety change scores (i.e. follow-up scores minus initial scores) as a function of initial severity score levels

GAD-7 Severity Scores	ACC at VCUHS	Hayes Clinic
No Anxiety (0-4)	$N = 6, M = 1.33, SD = 4.13$	$N = 6, M = 3.83, SD = 6.40$
Mild Anxiety (5-9)	$N = 28, M = -.14, SD = 4.18$	$N = 26, M = 1.08, SD = 4.91$
Moderate Anxiety (10-14)	$N = 33, M = -1.73, SD = 5.16$	$N = 40, M = .08, SD = 5.17$
Severe Anxiety (15-21)	$N = 80, M = -3.69, SD = 5.40$	$N = 67, M = -2.60, SD = 5.00$

Lastly we tested our hypothesis that participants from the ACC at VCUHS with comorbid anxiety and depression would be less reactive to treatment effects than participants with anxiety alone or depression alone. An analysis of variance was conducted to explore the impact of diagnosis on changes in depression and anxiety scores over time. Participants from the ACC at VCUHS were divided into four groups based upon their initial scores on the PHQ-9 and GAD-7: no diagnosis (PHQ-9 and GAD-7 < 10), depressed (PHQ-9 > 10), anxious (GAD-7 > 10), or both (PHQ-9 and GAD-7 > 10). There was overall significance for changes in depression scores (according to the Welch statistic, which was used because equal variance was not assumed; $F(3, 25.68) = 6.34, p = .002$) and overall significance for changes in anxiety scores ($F(3, 143) = 3.69, p = .014$). A planned contrast revealed that although participants with depression had slightly greater decreases in their PHQ-9 scores ($M = 2.82$ point decrease on the PHQ-9, $SD = 6.72$) than participants with depression and anxiety ($M = 2.74$ point decrease on the PHQ-9, $SD = 5.12$), the difference was not significant ($p = .97$). Similarly, participants with anxiety alone had greater decreases in their GAD-7 scores ($M = 4.25$ point decrease on their GAD-7, $SD = 5.14$) than participants with depression and anxiety ($M = 2.98$ point decrease on their GAD-7, $SD = 5.42$), however this difference was not significant ($p = .42$).

Discussion

This study compared the self-reported depression and anxiety scores of patients from the ACC at VCUHS who received integrated psychological services to those treated at a comparison clinic, the Hayes E. Willis Health Center. Therefore, this study serves as an evaluation of integrated primary care psychology services.

Characteristics of the Sample

Fortunately, the Hayes E. Willis Clinic and the ACC at VCUHS proved to be demographically similar clinics, which supports the use of the Hayes Clinic as an appropriate comparison clinic. The main differences in patient composition were that the Hayes Clinic had a younger patient population and also fewer of their patients were unemployed. Additionally the eligible Hayes participants who completed the study did not differ demographically from those who were eligible but did not complete the study. There were also no differences in initial depression and anxiety scores and no difference in the percentage of patients prescribed medication for depression and/or anxiety. However, patients who completed the study had more medical diagnoses (as measured by the Charlson Co-Morbidity Index) than patients who did not complete the study. Thus, despite patient drop-out (14.72%), the study sample for the Hayes Clinic was an accurate representation of patients who met study criteria.

As expected, there were relatively fewer older adults referred to the psychology clinic at the ACC at VCUHS for depression and/or anxiety treatment than in the general population of patients at the primary care clinic at VCUHS. This is consistent with literature that indicates mental health problems in older adults are often undetected (German et al., 1987; Klap, Unroe, & Unützer, 2003). Studies also indicate that older adults are less likely to seek mental health services (Mackenzie, Scott, Mather, & Sareen, 2008). A study examining the treatment-seeking

attitudes of older adults with depression found that mental health stigma was a significant barrier to seeking treatment, particularly for African Americans (Conner et al., 2010). However, a closer look at the differences between attitudes of older and younger adults revealed that old age did not predict negative attitudes towards seeking mental health services and negative attitudes about the benefit of treatment. This study recommends increasing access to services for older adults, including access to geriatric mental health professionals as well as developing better mental health evaluation measures for older adults (Mackenzie et al., 2008).

As hypothesized, relatively fewer African Americans were referred to the psychology clinic for depression or anxiety, however this relationship only trended towards significance. According to a National Ambulatory Medical Care Study from 1995-2005, African Americans were less likely to be diagnosed and referred for counseling for depression and/or anxiety (Stockdale et al., 2008). A survey of low-income, depressed African Americans revealed that they were less likely to seek counseling services compared to Caucasian patients with similar levels of distress and they identified stigma, shame, and denial as barriers to seeking services (Cruz et al., 2008). Perhaps as mental health stigma wanes and physicians become more conscience of racial disparities, this trend will become less pronounced.

Effects of Psychological Intervention on Anxiety and Depression

The primary analysis showed that patients from the ACC at VCUHS who received psychological intervention from an integrated primary care psychology clinic had significantly greater decreases in scores compared to patients from the Hayes Clinic who did not receive integrated psychological services. Although statistically and clinically significant, the decrease in scores was small to medium, according to effect size. At minimum, the primary care psychology intervention at the ACC at VCUHS was two sessions lasting approximately 30 minutes. The first

assessment occurred at the beginning of patients' first visit and the final assessment occurred at the beginning of their third primary care psychology appointment, prior to intervention. At the maximum, study participants from the ACC at VCUHS received four sessions lasting approximately 30 minutes. Thus, the intervention was brief and the impact was within expectation. Approximately thirty percent of patients experienced a significant decrease in depression and anxiety, with the majority of patients experiencing a decrease in depression scores (59%) and anxiety (61%).

The research literature supports the successful treatment of depression (Bruce et al., 2004; Cuijpers et al., 2009; Unützer, 2002) and anxiety (Cape et al., 2010; Roy-Byrne et al., 2010) within a primary care clinic and that in particular brief interventions are effective (Bryan et al., 2009; Lucock et al., 2011) and maintained over time (Ray-Sannerud et al., 2012). A study similar to the present one showed that after four thirty-minute sessions over the course of four weeks, 250 participants had their depression scores drop from the moderately severe range ($M = 15.82$, $SD = 5.92$) to the mild range ($M = 8.79$, $SD = 4.57$) (McFeature & Pierce, 2012). In contrast, participants from the present study decreased from the moderately severe range ($M = 15.20$, $SD = 6.66$) to the moderate range ($M = 13.33$, $SD = 7.27$) and similarly anxiety decreased from the high end of the moderate range ($M = 14.02$, $SD = 5.28$) to the lower end of the moderate range ($M = 11.65$, $SD = 6.25$). One possible explanation for our more modest results is that our participants received between 2 and 4 sessions over an average of 7.5 weeks compared to a more concentrated treatment regimen of weekly appointments over the course of a 4-week treatment period. In addition, our patient population was comprised of racially diverse patients of lower socioeconomic status, which may have impacted the treatment effect. A study of lower socioeconomic women receiving one hour of multidisciplinary treatment from medical

providers, psychologists, and social workers experienced increased depression scores (Chan et al., 2011). The authors of the study hypothesized that patients may have become more depressed because they were focusing on the gravity of their problems without having the resources to fulfill their basic needs. Participants from the present study may have experienced a similar reaction to treatment, resulting in less significant gains.

Effects of Psychotropic Medication Use

Our two samples differed on the percentage of patients prescribed medication for depression and anxiety. Overall, the Hayes Clinic patients received less medication for depression and anxiety. We assumed that patients prescribed these medications would experience a significant decrease in their scores over time; however, medication did not produce this effect. One possible explanation is that we did not have data on the exact start date of the medications and so some patients with long-term medication use may have experienced tachyphylaxis. In one study, tachyphylaxis, the progressive decrease in the effect of a medication after repeated use, occurred 25% of the time in which a subject continued to take medication after an episode of major depression (Solomon et al., 2005). A review of the literature on tachyphylaxis stated the rate of tachyphylaxis for depression treatment could be as high as 33% (Katz, 2011). Another review of the literature indicated that tachyphylaxis is not the only explanation for persistent depressive symptoms and suggests that some depressed patients initially respond to antidepressants but over time, continuing to take the medication at high doses results in a neuroplastic process termed tardive dysphoria (El-Mallakh, Gao, & Roberts, 2011). Therefore, future studies should account for the length of time a patient has been taking an antidepressant when conducting analyses.

The impact of medication was not a primary focus of the present study but rather one of many variables explored to assess whether or not it was a confound, especially considering the two clinics had differing percentages of participants who had been prescribed medication. After controlling for the impact of medication on changes in depression and anxiety scores, the clinic setting remained a significant predictor of decreasing depression and anxiety. Therefore the psychological intervention influenced changes in patients' depression and anxiety above and beyond the impact of medication. Thus the overall non-significant impact of medication suggests that this variable was not a confound for the present study and so the results have not been obscured by the effects of medication on patients' self-reported mood.

The Relationship Between Charlson Scores and Initial Depression and Anxiety

Patients' incidence of medical diagnosis was not associated with increases in depression and anxiety scores and in fact the age-adjusted Charlson score was negatively correlated with depression and anxiety scores. The age-adjusted score is derived by taking the patients' co-morbidity scores and adding 1 point for patients in their 50's, 2 points for patients in their 60's, 3 for 70's, 4 for 80's, and 5 for 90's. An analysis of variance confirmed that older patients had significantly lower depression and anxiety scores than younger adults and so age is the factor responsible for this unexpected relationship. However we expected the Charlson Co-Morbidity score to be positively associated with patients' depression and anxiety because studies support that people with chronic illness have higher levels of depression (e.g. Ani et al., 2009).

One possible explanation is that the Charlson scale lists many chronic conditions that rank higher than acute conditions. For example, a heart attack (ranked a 1) may cause a patient more anxiety and depression than a more chronic, insidious condition such as diabetes (ranked a 2). Patients with higher Charlson scores may have conditions that they have been coping with for

years and thus their depression and anxiety scores are not as elevated. This is supported by the fact that inpatients have higher depression than outpatients (McHale, 2002) and many medical conditions ranked low on the Charlson require immediate inpatient care. Depression is also common in patients with hypertension (McHale, 2002), which is associated with lower ranking items on the Charlson. Another possible explanation for why the Charlson was not positively correlated with depression and anxiety is that we did not have data on when medical conditions were diagnosed and depression and anxiety have been found to decrease over time after initial diagnosis. For example, in a study of 222 females with early breast cancer, half had depression, anxiety, or both within the first year of the diagnosis but that percentage dropped to 25% for the 2nd, 3rd, and 4th year after the diagnosis, and then dropped to 15% in the 5th year (Burgess et al., 2005). Without data on onset of a diagnosis, we cannot predict if patients will be in a period of acute distress or if they are more emotionally stable after years of learning to cope with a diagnosis. Lastly, another major predictor of depression and anxiety after a diagnosis is patients' history of anxiety and or depression (McHale, 2002). Future studies should take into account when medical conditions were diagnosed as well as history of mental health problems when examining the relationship between the Charlson Co-morbidity Index and patients' self-reported depression and anxiety.

In the present study, as hypothesized, the effect of the psychological intervention was still significant even after controlling for participants' Charlson score, providing further credibility to the impact of the intervention.

Effects of Additional Mental Health Services on Anxiety and Depression

Patients at the Hayes Clinic and the ACC at VCUHS may have received additional services for depression and/or anxiety, which could have influenced their depression and anxiety

scores. We used a retrospective database for the ACC at VCUHS patients and so do not have information on types of psychological services received outside of the primary care psychology clinic. However, we did collect these data for Hayes patients. Almost half of the Hayes participants received additional psychological services and of those receiving services, about half received services off-site from a psychologist, psychiatrist counselor, or religious leader. We assume that patients at the ACC at VCUHS and the Hayes Clinic had equal opportunities to seek out additional mental health services. Patients at both clinics could have consulted with their primary care physician or the on-site social worker (there were social workers on-site at the ACC at VCUHS as well as the Hayes Clinic), or sought services outside of the primary care clinic from psychiatrists, psychologists, counselors, or spiritual leaders. The one distinction between the two groups was that the patients at the ACC at VCUHS had access to integrated primary care psychology services, whereas the Hayes patients did not. It is possible that because this treatment option was not available to Hayes patients they opted to seek psychological services elsewhere, whereas patients from the ACC at VCUHS receiving integrated psychological services were less likely to do so. This is a potential confound that was not accounted for in the present study. Future studies should collect data from both the experimental and comparison clinic so that the receipt of additional psychological services can be controlled for.

Between initial and follow up assessment 5% (7 participants) of Hayes Clinic participants discontinued a service for depression and/or anxiety, whereas 11% (15 participants) started receiving additional mental health services. More patients were increasing their treatment than decreasing, suggesting that Hayes patients' scores would be more likely to decrease due to the net increase in services. However, although patients who had increased psychological services had the greatest decrease in depression and anxiety (compared to those who had no treatment,

continual treatment, or a decrease in treatment) changes on neither variable reached significance. Thus the addition of psychological services, although a factor, did not significantly impact the results of the present study although future studies should account for this variable in both treatment and comparison group so that a more accurate comparison can be conducted.

The Influence of Demographic Variables on Depression and Anxiety Scores

We expected differences in depression and anxiety scores as a function of race, age, and gender. However, we inaccurately predicted that Caucasians would have higher initial depression and anxiety scores than African Americans and that Caucasians would have significantly greater decreases in depression scores over time. In actuality, initial scores were not significantly different and race did not influence the effectiveness of treatment. Our hypothesis was primarily based on findings from the Sadock et al. (2014) study that investigated depression and anxiety in the primary care psychology clinic at the ACC at VCUHS. They found Caucasians had higher depression scores than African Americans, though this only trended towards significance, and that after receiving treatment from the primary care psychology clinic Caucasians experienced significantly greater decreases in depression scores than African Americans. The study also found that Caucasians had higher initial levels of anxiety than African Americans. However, research on racial disparities for depression and anxiety has been mixed. While studies show that African Americans are less likely to have Major Depressive Disorder during their lifetime than Caucasians, they are more likely to have chronic depression than Caucasians (Williams et al., 2007). Some research indicates that Caucasian primary care patients have greater prevalence of Generalized Anxiety Disorder than African American patients (Kertz & Woodruff-Borden, 2011), other studies have found no differences in anxiety rates (Brown et al., 1999) and still others show that African Americans have significantly more anxiety than Caucasians (Neal &

Turner, 1991). Therefore, while our hypothesis was not supported, our results are consistent with the extant literature that suggests racial disparities involve a complex interaction of variables with overall mixed findings.

Sadock et al. (2014) conjectured that discrepancies between treatment effects for Caucasians and African Americans may have been due to African Americans being prescribed medications less frequently than Caucasians. The present study found that African Americans were prescribed significantly fewer traditional medications for depression and anxiety, but when opioids were included as part of the medication list this relationship was only marginally significant. This finding is consistent with a study that examined physician treatment practices. When physicians were not following a mandated, standardized, research protocol, African Americans received similar mental health treatment but were less likely to be prescribed psychotropic medication for their depression than Caucasians (Snowden & Pingitore, 2002). Even though African Americans were prescribed fewer medications for depression and/or anxiety in the present study, this did not result in Caucasians having significantly greater decreases in anxiety and depression scores over time. Given that we know that the combination of therapy and medication is most effective for treating depression (Pampallona et al., 2004), African American patients may have had even greater decreases in depression and anxiety scores had they been prescribed medication at similar rates as Caucasian patients. Differences in medication prescriptions according to race is a complex area of study that includes various factors such as patient preference, patient adherence, patient-physician communication, physician bias, and other factors and so the present study offered a minor contribution to this important area of study.

Consistent with our hypothesis, women reported higher levels of depression and anxiety than men. However, when examining only eligible participants, who were chosen due to their levels of depression and anxiety, the relationship was no longer significant. This was because men who reported lower levels of anxiety or depression were not included in the sample and thus the final sample contained relatively fewer males (26.6%, $N = 37$) than the sample of Hayes patients (32.4%, $N = 102$) who were initially recruited to participate in the study. Our findings are consistent with current findings; a study of 1,000 primary care patients showed that women were more likely to have mental disorders, mood disorders, anxiety disorders, and somatoform disorders than men (Linzer et al., 1996) and prevalence rates show that women are two times more likely to have depression and three to four times more likely to have major depressive disorder than men (Culbertson, 1997). The ratio of lifetime male to female anxiety disorders is 1 to 1.7 and one-year male to female prevalence rate is 1 to 1.79 (McLean et al., 2011).

Our prediction that older adults would have lower anxiety scores was supported and is consistent with prior research indicating that older adults report experiencing considerably fewer minor stressors than young adults (Almeida & Horn, 2004; Stawski, Sliwinski, Almeida, & Smyth, 2008). Findings for both major and minor stressors may be due to increased motivation to avoid situations that induce negative emotions (Carstensen, Fung, & Charles, 2003) or to health limitations that constrain activity level and reduce opportunity to experience stressors in older adults (Stawski et al., 2008). Older adults have higher resiliency factors and have developed enhanced coping strategies over time (Aldwin & Yancura, 2010; Hardy et al., 2002). We did not predict that depression scores would be influenced by participant age, although we found that older adults had significantly lower depression scores than younger adults. The literature on rates of depression in older adults is mixed; one study showed that depression

increases with age, but if risk factors such as marital status, SES, and education are controlled for there is a downward trend in levels of depression as well as anxiety (Jorm 2000).

As predicted, married participants had lower anxiety and depression than single, divorced, separated, and widowed participants. Participants who had separated from their partners had the highest levels of depression and anxiety, followed by those who were divorced, those who were single, and those who were widowed. These results are consistent with literature that indicates that people who are separated or divorced have higher depression than people who are widowed or single (Cotton, 1999), whereas marriage to a supportive partner is a buffer for psychological disorders (Coombs, 1991).

Unemployment was not associated with higher level of depression and anxiety as predicted. This hypothesis was based on research suggesting unemployment was a risk factor for developing depression (Montgomery et al., 1999) and that unemployed patients were more likely to have depression and anxiety (regardless of psychological vulnerability prior to termination of employment), as well as insomnia, and cardiovascular risk factors (Harris et al., 2010). However, unemployment data were incomplete for many participants, such that different employment statuses were listed for the same individual, calling into question the accuracy of this particular variable. We also were unable to extract when patients had a change in their employment status. According to a 2013 Gallup poll, people with long-term unemployment have a higher likelihood of being treated for depression than those who are recently unemployed and depression leads to higher work absenteeism (Crabtree, 2014). Future studies investigating the relationship between unemployment and depression and anxiety should record the dates when a transition in employment status occurs and use time as a variable.

Treatment Resistance Factors

Finally, we found that participants who initially scored in the severe range for depression and anxiety had significantly greater decreases in their depression and anxiety scores over time compared to participants whose scores were initially in a lower severity range. Past research suggests that patients with higher initial depression scores, along with unemployment and less social support, are more likely to have moderate or severe symptoms of depression at follow-up (Prins et al., 2011). However, these patients may have had similar decreases in scores relative to patients with lower levels of anxiety and depression but simply had a higher starting point. Research has also suggested that patients with more severe symptoms may benefit from attending a specialty mental health clinic that could provide more consistent and intensive care (Knowles, 2009). Additionally, Sadock et al. (2014) found that patients who attended more primary care psychology appointments than the average patient (greater than 5 visits) had fewer treatment gains, which suggested they had more chronic anxiety and depression. Thus, we expected that perhaps patients with higher initial depression and anxiety scores could not be treated as effectively within a primary care setting and may be more appropriate for a specialty mental health referral. However, our results showed the opposite effect, which suggests that the primary care is an effective setting for treating patients with high levels of depression and anxiety because treatment gains are evident. Patients with high levels of depression and anxiety may still benefit from a referral to long-term mental health care, although it is encouraging that some treatment progress can be made within a briefer care model. It is also important to consider the possibility that the scores are regressing to the mean. Participants who had lower initial levels of depression and anxiety on average experienced an increase in depression and anxiety scores, whereas participants who had higher initial levels of depression and anxiety experienced a decrease in their scores over time. This trend was true for patients in both the intervention clinic

(ACC at VCUHS) and the comparison clinic (Hayes).

Similarly, we measured whether participants with co-morbid depression and anxiety would be more treatment-resistant than participants with depression alone or anxiety alone. Although participants with co-morbid depression and anxiety had less decrease in their scores than patients with just anxiety or just depression, the relationship was not significant. Studies have suggested that patients with a co-morbid diagnosis of depression and anxiety are much more difficult to treat (e.g. Lecrubier, 2001) but the present findings suggest that these patients will respond to treatment. This provides encouragement to primary care psychology providers who may have felt less optimistic about patients with more complex mood presentations.

Study Limitations

ACC at VCUHS. There were many identified limitations for the retrospective data collected on patients receiving integrated psychological services at the ACC at VCUHS. Specifically, there were incidents when therapists forgot to administer the PHQ-9 and GAD-7 assessment measures to patients and also when patients refused to fill out the measures. Thus not all patients who were treated for anxiety and/or depression and received three or more clinic visits could be evaluated due to unfortunate gaps in the data.

Another suspected limitation is that there might have been misreporting of symptoms by some participants. Anecdotal and research evidence suggests that patients who are seeking social security disability over-endorse symptoms to convey a high level of distress (Samuel & Mittenberg, 2005). The population from which the current sample was drawn has a high rate of disability-seekers and thus this may have skewed some of the results. In the future, it is recommended that researchers record which patients are seeking disability so that this variable can be taken into consideration.

The primary care model also presents certain challenges with capturing patient progress. It is impossible to assess patients who choose not to return for a follow-up appointment. There are many reasons why patients do not return for follow-ups. Some patients simply do not want the services provided, but in many cases patients do not return if their symptoms improve. Patients are also frequently told not to return unless they experience distress or have a need for additional treatment. Therefore resolution of problems and decreases in depression and anxiety are often not captured, resulting in an underestimation of treatment success.

Additionally, physicians referred patients to primary care psychology who were in distress, perhaps from an acute stressor. For example, referrals were made as a result of patients crying during their medical appointments. Therefore, patients were often treated by primary care psychology when they were at their most vulnerable and the results of the assessment measures reflect their acute distress. Intervention sessions may be helpful in decreasing patients' anxiety and depression (for example), however patients may return to primary care psychology only when they are once again feeling particularly vulnerable and in crisis. Thus, the impact of a previous intervention session is not always captured during follow-up crisis-control visits. To truly capture change, questionnaires would be administered more frequently, especially in between sessions. However, the PHQ-9 and GAD-7 were designed as brief assessments in accordance with the primary care therapy model and are used to guide the treatment session by identifying the extent to which the psychologist should address patients' mood. Thus in implementing more rigorous assessments for research purposes, the external validity of the intervention would be compromised because the data collection would be inconsistent with typical assessment practices in primary care clinics.

In addition, while participants from the ACC at VCUHS were likely completing their

assessment measures during times of distress, the Hayes participants were completing their assessments under different conditions. Initial assessments for Hayes participants occurred during a primary care medical visit (although it is possible some primary care patients were picking up a prescription from the clinic and did not have a scheduled visit), and many patients find primary care appointments to be stress-inducing (Lacy, Paulman, Reuter, & Lovejoy, 2004; Vinyoles, et al., 2010). A qualitative study investigating patients' reasons for not showing for their scheduled primary care appointments revealed the following underlying constructs: emotions, perceived disrespect, and not understanding the scheduling system (Lacy et al., 2004). Of the 34 participants, 65% attributed their no-show to emotional barriers, including fear of a diagnosis or bad news, general dislike of going to the doctors, and desire to avoid uncomfortable procedures. It can be deduced that patients attending their primary care appointments might experience similar fears and therefore it is possible that their anxiety scores may be elevated. This is further supported by the "white coat syndrome" in which 29% of patients experience an increase in blood pressure during medical visits, often misinterpreted as hypertension (Vinyoles et al., 2010). Thus patients from the Hayes Clinic may have had higher anxiety during their initial visit at the clinic, similar to the distress experienced by participants from the ACC at VCUHS. However, Hayes participants were contacted over the phone for their follow-up assessment and so they were most likely at home and presumably experiencing less situational stress. This may account for the significant decrease in anxiety scores for Hayes Clinic participants between their initial and follow-up assessment despite no intervention. Ideally Hayes participants would have been reassessed when they returned for their next medical appointment. However this would have prevented us from conducting follow-up assessments at the appropriate time intervals.

Hayes Clinic. Limitations were identified for the data collection process at the Hayes Clinic. First, participants may have experienced a reaction to the measurements and to the researcher. Hayes participants met with the research coordinator for approximately 20 minutes to complete the consent form and the PHQ-9 and GAD-7 assessment measures, compared to the experimental group whose treatment sessions were only slightly longer, lasting approximately 30-45 minutes and including assessment and a brief intervention. The Hayes participants may have inadvertently received a therapeutic effect from the assessment, despite the study coordinator's efforts to remain impartial and deliver the study information to each participant in the same manner. According to study protocol, those participants who endorsed suicidal ideation were further assessed and in some cases were required to meet with the on-site social worker and so they received further treatment. In addition, patients seeking more support were given an IRB-approved referral contact list for mental health services. The study coordinator was also empathetic to patients who became tearful while answering the questionnaires. Although the coordinator did not provide an evidence-based assessment, her demeanor was supportive, even though the interaction was brief. Lastly, some participants commented that they were pleased to contribute to research. Many of these patients were unemployed (around 20%) and may have been in search of meaningful activities. In sum, there are many factors that may have increased participants' mood, such as emotional support from the study coordinator and the on-site social worker, perceived support from receiving a list of referrals for mental health services, and having a sense of purpose or accomplishment for contributing to research. This may explain the decrease in Hayes participants' anxiety over time. Of note, initial treatment sessions for participants from the ACC at VCUHS who endorsed severe depression and suicidal ideation

often included assessment and supportive therapy and so the assessment and support that the Hayes participants received may have been similar to that of the intervention group.

It is difficult to determine how the study could have been conducted to avoid diffusion of the treatment effect because the consenting process must be orchestrated by a trained professional who can explain the scope of the study and ensure that the participant fully understands and agrees to the conditions of the study. Further, a trained professional is also needed to answer participants' questions about the PHQ-9 and GAD-7 to ensure accurate measurement. However, ideally, the consenting and assessment process would be electronic and thus there would be no influence from the researcher. For ethical reasons, it was also necessary for the researcher to ensure that the participants were not suicidal and so was required to respond to participants' distress with concern. However, despite the possible therapeutic impact of consenting and assessing Hayes patients, patients from the ACC at VCUHS still had significantly greater decreases in their depression and anxiety scores over time than participants in the Hayes clinic, further bolstering the study findings.

Although the experimental and comparison clinic were composed of similar patient populations, the nature of the clinics differed greatly. The ACC at VCUHS is a resident training clinic and so patients are treated by different primary care providers. Patients are unable to form a relationship with any one provider for long before the provider changes rotations. In contrast, patients from the Hayes Clinic see one primary care provider and thus are presumably able to build a relationship with their provider. Physicians in the Hayes Clinic may be more aware of changes in their patients' mood due to their long-term relationship with their patients and so more likely to treat their patients' depression and anxiety than providers at the ACC at VCUHS. One study found that length of relationship increases patient-physician communication, trust, and

the physicians' accumulated knowledge and understanding of a patient, which leads to more comprehensive patient care (including mental health care) (Parchman & Burge, 2004). Specifically, the length of the relationship and the communication between physician and patient predicted accumulation of knowledge about the patient by the physician, and this knowledge predicted trust, and finally trust predicted the delivery of preventive services (Parchman & Burge, 2004). This study suggests that the patient-physician relationships at the Hayes Clinic may be stronger than those at the ACC at VCUHS because patients at the Hayes Clinic typically have longer relationships with their physicians, which results in more discussions about holistic care. It is possible that as a result of these differences, Hayes patients received more mental health support from their physicians. Some Hayes patients also reported having consistent contact with the on-site social worker to discuss their mood. Thus, the primary care providers and social worker at the Hayes Clinic may provide stronger mental health support for patients than the residents and social worker at the ACC at VCUHS. Further, because the Hayes Clinic does not have integrated psychological services it is possible that the medical providers and on-site social worker play a more active role in addressing patients' mental health, which could have decreased the strength of the study findings. Ideally the participants from the experimental and comparison clinics would have the same type of relationship with their physicians.

Lastly, this study failed to capture the cost-benefit of employing psychologists in the primary care clinic. The literature supports that integrated psychological services help decrease medical costs. Psychologists in this setting are involved in preventative care and help patients modify behaviors that are linked to more chronic, severe diseases that are expensive to treat (Mokdad et al., 2004). Also, patients experiencing psychological distress such as depression are three times more likely to be non-compliant with medical recommendations, resulting in medical

complications, increased medical visits, and increased hospital costs (DiMatteo et al., 2000). Furthermore, a meta-analysis of primary care psychology clinics from 1967-1997 revealed that the average savings for integrating psychological services was 20% (Chiles, Lambert, & Hatch, 2006). Although we cannot definitively determine that integrating primary care psychology reduced hospital costs in the present study, we would expect to obtain similar cost reductions as found in other studies. The reason we were unable to conduct cost-benefit analyses, as originally proposed, was because it was not possible to do an accurate cost-analysis within the time-frame of the present study. We would have needed to collect post-utilization data one year after we conducted the follow-up assessments for the patients in our database (i.e. data would not be available until April 2015 at the earliest). Currently Lanoye et al. (in preparation) are analyzing the cost-benefit of the primary care psychology clinic at the ACC at VCUHS and so this question is being adequately addressed.

Study Strengths

The most prominent strength of the present study is its external validity. The measures administered are useful for clinical as well as research purposes. The GAD-7 and PHQ-9 are frequently used in primary care settings and were administered in typical fashion. Furthermore, patients from the ACC at VCUHS were not aware that their data would be used retrospectively for research purposes, eliminating the potential for reactivity of measures and demand characteristics. Finally, there were very few exclusionary criterion applied to patients in the present study and so the study adequately sampled typical primary care patients seen at the ACC at VCUHS and the Hayes Clinic.

Another strength is that this study obtained quantitative measures of mood from patients. Other studies of primary care psychology have been solely qualitative and descriptive in nature,

often merely describing the primary care model or types of interventions administered (Edwards, Garcia, & Smith, 2007; Funderburk et al., 2011; Funk & Ivbijaro, 2008; Lopez et al., 2008). Only a few studies have provided quantitative evidence to support program efficacy (Bruce et al., 2004; Cape et al., 2010; Cuijpers et al., 2009; Lucock et al., 2010; McFeature & Pierce, 2012; Sadock et al., 2014; Unützer, 2002), however there were notable limitations. For example, some of these studies only focused on depression in samples of older adults (Bruce et al., 2004; Krahn et al., 2006; Unützer, 2002), whereas the present study collected data on both depression and anxiety and was able to explore age-related differences between older and younger adults. Other studies lacked a control group (Bryan et al., 2009; McFeature & Pierce, 2012; Ray-Sannerud et al., 2012; Sadock et al., 2014) and had small sample sizes with potential selection bias (Chan et al., 2011), limiting the scope of the results. The present study also measured potentially confounding variables such as the Charlson Co-morbidity Index, psychotropic medication prescriptions, unemployment, marital status, and the use of additional mental health services, thereby enhancing confidence that the receipt of psychological services was the primary contributor to the observed decline in depression and anxiety levels.

This study adds to the literature supporting the benefits of integrated psychological services in primary care. Primary care is often where mental health disorders are first identified and therefore an ideal setting for immediate treatment, coordinated by patients' physicians (American Academy of Family Physicians, 2004 as cited in Westheimer et al., 2008). The majority of patients desiring treatment for their depressive symptoms prefer counseling over medication (Dwight-Johnson et al., 2000) and so on-site psychologists can provide patient-centered care, consistent with patient preference. Integrated psychological services have the added benefit of convenience for patients, providing them with one-stop shopping for their

physical and mental health needs and also providing a setting where they can receive mental health services without the barrier of stigma that can accompany seeking mental health services in a specialty mental health clinic (Ayalon et al., 2007; Rowan & Runyan, 2005). There are also positive outcomes associated with patients who attend integrated primary care services, such as greater adherence to their medical regimens, better health outcomes, and fewer future visits (Robinson & Strosahl, 2009). Psychologists can support physicians as well by identifying and diagnosing patients with psychological disorders and then administering appropriate, targeted interventions. This results in better use of physician time and in turn likely increases physician morale as a result of “sharing” the care of distressed patients with psychologists. A survey administered to 42 residents at the Medical College of Virginia (MCV) in June 2011 showed that 68.75% reported that they would be more likely to work in primary care if they had psychologists integrated into the program. Thus, in addition to the quantitative evidence found in the present study, there are many reasons why the integration of psychological services into primary care settings helps improve overall patient care.

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Appendix A

Measures and Patient Contact:

1. Generalized Anxiety Disorder (GAD-7; Spitzer, Kroenke, & Williams, 2006)
2. Patient Health Questionnaire-9 (PHQ-9; Spitzer, Kroenke, & Williams, 1999)
3. Script for approaching patients in the waiting room
4. Demographic and Mental Health Exposure Form
5. Telephone script for follow-up phone call
6. Reminder letter (via mail and/or VCU health portal)
7. Reminder text message
8. Counseling Services - Referral Information
9. Gift card letter

1. Generalized Anxiety Disorder (GAD-7; Spitzer, Kroenke, & Williams, 2006)

GAD-7 Anxiety

Over the last 2 weeks, how often have you been bothered by the following problems? <i>(Use "X" to indicate your answer)</i>	Not at all	Several Days	More than half the days	Nearly every day
1. Feeling nervous, anxious or on edge	0	1	2	3
2. Not being able to stop or control worry	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid as if something awful might happen	0	1	2	3

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

Not difficult at all

Somewhat difficult

Very difficult

Extremely difficult

2. Patient Health Questionnaire-9 (PHQ-9; Spitzer, Kroenke, & Williams, 1999)

PHQ-9 Depression

Over the last 2 weeks, how often have you been bothered by any of the following problems? <i>(Use "X" to indicate your answer)</i>	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself – or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

2. If you checked off any problem on this questionnaire so far, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people? (PLEASE CIRCLE)

Not Difficult At All Somewhat Difficult Very Difficult Extremely Difficult

3. Script for approaching patients in the waiting room:

Hi my name is Elizabeth Sadock. I am working with the medical staff. I am doing a research study that looks at how everyday problems change for people getting medical care at the Hayes Clinic. If you are interested I'll tell you more about the study and then ask you to fill out a 5-10 minute questionnaire. Afterwards I'll call you in about a month to have you fill out the questionnaire again. If you are eligible and complete the follow up questionnaire, I'll send you a \$10 gift card.

4. Demographics and Mental Health Exposure Form

Name _____

Date _____

DOB _____

Experience with Mental Health Services

Are you currently receiving services from a therapist for **depression** or **anxiety**? (i.e. your physician, psychiatrist, psychologist, social worker, counselor, spiritual leader)

Y / N (circle)

If yes, are you receiving the services at the Hayes Clinic? With whom?

Y / N (circle) _____

5. Telephone Script for Follow-up Phone Call

(If participant is unavailable)

*Hello, may I please speak to ____ (participant's name) ____?
Would there be a better time to call back? Would it be OK if I left my name and number so that
(he/she) can call me back at (his/her) convenience?
My name is Elizabeth Sadock and my number is ____ (telephone number) _____. Thank you.*

(If reach participant's voicemail)

*Hello, this is Elizabeth Sadock calling for ____ (participant's name) _____. Please give me a call
back at ____ (telephone number) _____ so that I can ask you a few questions. If I am unable
to answer, please feel free to leave a message with your name and the best day and time to reach
you.*

(If participant answers)

*Hello, may I please speak to ____ (participant's name) ____?
This is Elizabeth Sadock, we met a few weeks ago at the Hayes Clinic and you agreed to
participate in my research study. I gave you a questionnaire about how you have been feeling
over the past two weeks. It is good to speak with you again.
I am calling to give you the follow up questionnaire. As a reminder, you can choose to stop your
participation in the study at any time and so you do not need to answer any questions you do not
want to answer.
Is now a good time to talk? Are you in a private place where you feel comfortable answering
these questions? If not, when might be a good time to call you back?*

*Before we get started, I just wanted to verify your date of birth. (verification that participant is
who he says he is)*

*I will be asking you how often you have been bothered by some problems over the last 2 weeks.
Your answers will be on a scale from 0-3. Zero means that you have not been bothered by
problems at all, 1 means you have been bothered by problems on several days, 2 means you have
been bothered more than half the days, and 3 means you have been bothered nearly every day.
How often have you:*

(READ QUESTIONNAIRES ALOUD)

(If participant endorses suicidal ideation)

*You said that you are having suicidal thoughts. I want to make sure that you are safe. Is
there someone you could call for support? Here are numbers for national suicide hotlines
1-800-784-2433 or 1-800-273-8255. If you are unsafe, it is always best to call 911. If you
want to go to counseling, I can provide you with some local resources. (See Appendix
#6). If you would like, I can send you an email attachment with the local resources listed.*

(Closing comments)

*Thank you for your time today. We appreciate your participation in our study. We will be sending you a \$10 gift card to Wal-Mart for all of your help. You should receive it within the next few weeks. Do you have any questions?
Thank you again and have a great day.*

6. Reminder letter (via mail and/or VCU health portal)

Dear _____,

A few weeks ago at the Hayes Clinic you agreed to participate in a research study, "Evaluation of Psychological Services Provided in a University Based Primary Care Clinic," where you answered some questions about how you have been feeling. I would like to conduct the follow-up questionnaire with you, which as a reminder will take about 10 minutes. Your participation in the follow-up questions is your choice. If you do choose to call me to complete the study you will receive a \$10 gift card to Wal-Mart. Please contact me (Elizabeth Sadock) at ____ (telephone number).

Thank you and I look forward to hearing from you soon.

Sincerely,

Elizabeth Sadock

7. Reminder Text Message

Please call __ (telephone number) __ to complete Hayes Clinic Research Study. Thanks!

8. Counseling Services – Referral Information

Community Services Boards

Richmond Behavioral Health Authority (City of Richmond)
Counseling and psychiatry services: (804) 819-4000
Emergency services: (804) 819-4100
<http://rbha.org/child-mental-health.htm>

Hanover County
All Services (Emergency included): (804) 365-4200
<http://www.co.hanover.va.us/csb/default.htm>

Henrico County
Counseling and psychiatry services: (804) 727-8500
Emergency services: (804) 727-8484
<http://www.co.henrico.va.us/mhmr>

District 19 (Petersburg and Tri-Cities)
Counseling and psychiatry services: (804) 863-1689
Emergency services: (804) 862-8000
<http://www.d19csb.com>

Chesterfield County
Counseling and psychiatry services: (804) 768-7203
Emergency services: (804) 748-6356
<http://www.chesterfield.gov/content.aspx?id=3194>

Therapy Clinics

Accept Medicaid or affordable sliding fee scale

Center for Psychological Services and Development
612 North Lombardy Street, Richmond, VA 23284
(804) 828-8069 • <http://www.has.vcu.edu/psy/cpsd/>

Jewish Family Services: *Accepts families of all faiths*
6718 Patterson Ave, Richmond, VA 23226
(804) 282-5644 x 234 • <http://www.jfsrichmond.org>

Dominion Behavioral Healthcare
Midlothian: Courthouse Rd (804) 794-4482; Harbor Pointe (804) 639-1136
West End: Pembroke Medical Center (804) 270-1124

Therapy Clinics

Accept Private Insurance

Westhampton Family Psychologists
1503 Santa Rosa Rd, Suite 105 Richmond, VA 23229 (*Near West End*)
(804) 673-0100 • <http://wfp-help.com>

Commonwealth Counseling Associates
Locations in Hanover, West End, and Chesterfield
(804) 730-0432 • <http://www.commonwealthcounseling.com>

The Westwood Group
Locations in Southside, West End
(804) 264-0966 • www.thewestwoodgroup.org

If it is an emergency: CALL 911

Suicide Hotlines: 1-800-784-2433 or 1-800-273-8255

9. Gift Card Letter

Dear _____

Thank you very much for your participation in the research study: Evaluation of Psychological Services Provided in a University-based Primary Care Clinic. To show appreciation for your participation in our study, please find enclosed a \$10.00 gift card to Wal-Mart.

Have a great day!

**Elizabeth Sadock
Research Coordinator**

Appendix B

1. Consent Form

RESEARCH SUBJECT INFORMATION AND CONSENT FORM (Patient)

TITLE: EVALUATION OF PSYCHOLOGICAL SERVICES PROVIDED IN A UNIVERSITY-BASED PRIMARY CARE CLINIC

VCU IRB NO.: HM15047

This consent form may contain words that you do not understand. Please ask the study staff to explain any words that you do not clearly understand. You may take home an unsigned copy of this consent form to think about or discuss with family or friends before making your decision.

PURPOSE OF THE STUDY

The purpose of this study is to find out how patients' everyday problems change over time when they are receiving medical care. You are being asked to participate in this study because you are a patient being treated in the Department of Family Medicine at the Hayes E. Willis Health Center.

DESCRIPTION OF THE STUDY AND YOUR INVOLVEMENT

If you decide to be in this study, you will be asked to sign this consent form after you have had all of your questions answered and understand what will happen to you.

In this study you will be asked to respond to a one-page questionnaire about how you have been feeling over the past two weeks. This will take 5 to 10 minutes. If we determine that you are appropriate for this study, I will contact you once in approximately 2 – 10 weeks via telephone (i.e. call or text) to ask those same questions again. If I am unable to reach you on the first try, I will call you again and leave a message with my telephone number. However, if I am unable to reach you via telephone, I will send you a message through the VCU Health Portal (*myVCUhealth*) or through the mail asking you to contact me for a follow-up phone call. Also, I will try to meet with you when you come in for your next scheduled medical appointment. The phone call or in-person meeting will last 5 to 10 minutes. If you complete the follow-up questionnaire, you will be provided with a \$10.00 gift card to Wal-Mart. We expect that approximately 215 patients from the Hayes Clinic will participate in this study.

We will also look at your medical record to find out basic information about you, your medication, and medical conditions to see how this information might be related to how you have been feeling in the last two weeks.

RISKS AND DISCOMFORTS

You will be asked about how you have been feeling in the last two weeks. You do not need to answer any questions you do not want to answer and you may stop at any time. If you say that you have been having some troubling thoughts about hurting yourself, then we will ask that you talk to the Social Worker, Mr. David Bemis, after you complete the form to make sure that you are safe and that you get help and support if you need it. You will not be charged for this service. We will also provide you with a list of counseling resources in the community. If you express thoughts of hurting yourself during our phone conversation, we will provide you with the resource list over the phone. If you need immediate help, we will direct you to call 911 or go to

the emergency room.

BENEFITS TO YOU AND OTHERS

You may not get any direct benefit from this study, but the information we learn from people in this study may help us implement new programs to improve patient care.

COSTS

There are no costs for participating in this study other than the time you will spend filling out questionnaires.

PAYMENT FOR PARTICIPATION

You will receive a \$10.00 gift card to Wal-Mart when you complete the follow up questionnaire if the researchers deem that you are an appropriate fit for our study. Your gift card will be mailed to your address on file.

ALTERNATIVES

This is not a treatment study. Your alternative is to not participate.

CONFIDENTIALITY

Potentially identifiable information about you will be on the questionnaires you complete, and information taken from your medical record. Data are being collected only for research purposes. A code number will be assigned to you and put on your questionnaires and information we extract from your file. Data will be stored in a locked research area. All personal identifying information will be kept in password-protected files and these files will be deleted five years after the study ends. Access to all data will be limited to study research personnel. We will not tell anyone the answers you give us; however, information from the study and information from your medical record and the consent form signed by you may be looked at or copied for research or legal purposes by Virginia Commonwealth University. What we find from this study may be presented at meetings or published in papers, but only group data will be presented and your name will never be used in these presentations or papers. Study staff are required by law to report any statements of intent to harm yourself or others to the appropriate authorities. We will not tell anyone your answers, but if you report wanting to hurt yourself or others, we will inform the on-site Social Worker, Mr. David Bemis, and he will ask you some follow-up questions. If you report wanting to hurt yourself or others when we have our follow-up phone call, we will provide you with suicide hotline numbers and the contact information for local counseling services.

VOLUNTARY PARTICIPATION AND WITHDRAWAL

You do not have to participate in this study. If you choose to participate, you may stop at any time without any penalty. You may also choose not to answer particular questions that are asked in the study. Your decision will not affect your present or future medical care at this clinic. Your participation in this study may be stopped at any time by the study staff without your consent if you are not considered appropriate for the specific purposes of the study.

QUESTIONS

In the future, you may have questions about your participation in this study. If you have any

questions, complaints, or concerns about the research, contact:

Elizabeth Sadock, M.S.
Clinical Psychology Doctoral Student
Virginia Commonwealth University
806 West Franklin Street
Richmond, VA 23284-2018
(203) 249-0395 (cell)

Or

Stephen M. Auerbach, Ph.D.
Professor of Psychology
Virginia Commonwealth University
806 West Franklin Street
Richmond, VA 23284-2018
(804) 828-1172

If you have any questions about your rights as a participant in this study, you may contact:

Office for Research
Virginia Commonwealth University
800 East Leigh Street, Suite 113
P.O. Box 980568
Richmond, VA 23298
Telephone: 804-827-2157

CONSENT

I have been given the chance to read this consent form. I understand the information about this study and my questions have been answered. My signature says that I am willing to participate in this study. I will receive a copy of the consent form once I have agreed to participate.

Participant name printed *Participant signature* *Date*

Name of Person Conducting Informed Consent
Discussion
(Printed)

Signature of Person Conducting Informed Consent
Discussion

Date

Principal Investigator Signature

Date

Vita

Elizabeth Sadock was born on November 14, 1984, in New Haven Connecticut, and is an American citizen. She graduated from Greenwich High School, Greenwich, Connecticut in 2003. She received her Bachelor of Science in Psychology from The College of William and Mary, Williamsburg, Virginia in 2007 and subsequently worked for two years as a research assistant for the Psychiatric and Neurodevelopmental Genetics Unit at Massachusetts General Hospital, Boston, Massachusetts. She enrolled in the clinical psychology doctoral program at Virginia Commonwealth University in Richmond, Virginia in 2009 and in 2012 received her Master of Science.