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Characteristics Associated with Improvements in Health Among Community Mental Health Clients with Thought Disorders Receiving Co-Located Primary Care Services

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CHARACTERISTICS ASSOCIATED WITH IMPROVEMENTS IN HEALTH AMONG
COMMUNITY MENTAL HEALTH CLIENTS WITH THOUGHT DISORDERS RECEIVING
CO-LOCATED PRIMARY CARE SERVICES

A Thesis

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Master of Social Work

in

The School of Social Work

by
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ABSTRACT

Individuals with serious mental illness (SMI) are disproportionately impacted by preventable physical health conditions, which put them at risk for premature mortality. Integrated primary and behavioral health care (PBHC) programs have demonstrated promise in treating comorbid physical and mental health conditions, common to individuals diagnosed with SMI. The current study focused on individuals with thought disorders (i.e., schizophrenia, schizoaffective disorder, and brief psychotic disorder), as those diagnosed are more likely to be retained in care. Treatment retention is especially important, as adherence slows down the progression of psychiatric symptoms and physical health diseases. Extant research has focused on evaluation of the efficacy of PBHC programs. This exploratory secondary analysis contributes to the growing knowledge base of research on integrated PBHC programs and the clients who receive these services by examining relevant correlates (i.e., sociodemographic, health, health-risk, and treatment-related characteristics) of health and psychosocial improvements among 311 individuals with thought disorders receiving co-located services in 3 community mental health (CMH) settings. Variables significantly associated with improvements in health and psychosocial characteristics included employment status, disability status, living situation, access to reliable transportation, and clinic site, suggesting that social determinants are relevant for this population. Directions for future research and implications for social work practice and education are discussed.

CHAPTER 1: INTRODUCTION

Serious mental illness (SMI) is a major social welfare issue of concern for social workers employed in diverse health and mental health settings. The current study examined correlates of health and psychosocial improvements among individuals with thought disorders (i.e., schizophrenia, schizoaffective disorder, brief psychotic disorder) receiving integrated primary and behavioral health care (PBHC) services in community mental health (CMH) settings. This chapter provides an overview of the pervasiveness of SMI and the health disparities that this population faces, with a special focus on thought disorders. Additionally, the biopsychosocial (BPS) model is introduced as a relevant theoretical framework for conceptualizing the topic of study. Finally, the study's significance to the field of social work is discussed.

Problem Statement

It is well known that individuals with SMI are disproportionately affected by physical health conditions, which often lead to the development of serious comorbidities and premature mortality (Parks, Svendsen, Singer, & Foti, 2006). Efforts have been made to eliminate existing health disparities through federally-supported grants (Scharf et al., 2013), and evaluative studies (Druss et al., 2010; Putz et al., 2015) have demonstrated the effectiveness of government-funded PBHC programs in CMH settings. However, prior to this analysis, no study to date had examined potential correlates (i.e., sociodemographic, health, health-risk, and treatment-related characteristics) of health and psychosocial improvements among individuals with thought disorders receiving integrated services in CMH settings. New knowledge about potential predictors of improvement may help guide social workers in direct practice and policy-practice roles with regard to developing resources and systematic efforts to strengthen services to this vulnerable subpopulation of clients with SMI.

Importance of the Problem

SMI can be very debilitating for affected individuals, as those diagnosed experience a variety of complex psychiatric symptoms (American Psychiatric Association [APA], 2013), stigma (Stuart & Arboleda-Flórez, 2012), and high rates of comorbid physical health conditions (Parks et al., 2006). This crisis extends beyond the individual level, impacting family members of those affected and the public at large (Kennedy, 2013). Loved ones of persons with SMI often face some level of stigma (Sartorius, 2002) and are often left with the hefty financial costs of treatment (Kennedy, 2013). Further, in terms of public health resources, communities are impacted by the frequent emergency room visits, hospitalizations, and incarcerations of individuals with SMI (Kennedy, 2013).

Scope of the Problem

SMI, defined by the Substance Abuse and Mental Health Services Administration (SAMHSA, 2016) as any mental or behavioral disorder that causes significant impairment in an individual's day-to-day living, includes both mood disorders (e.g., major depression, bipolar disorder) and thought disorders. Approximately 4% of adults in the United States (an estimated 9.8 million) have SMI (SAMHSA, 2016).

The extent research shows that persons diagnosed with SMI live, on average, 25 years less than the general population (Parks et al., 2006). According to Parks et al. (2006), 60% of premature deaths among those specifically diagnosed with thought disorders can be attributed to preventable physical health conditions (e.g., cardiovascular disease, pulmonary disease, infectious disease). Further, most of the risk factors that contribute to these diseases (e.g., smoking, alcohol consumption, drug use, poor nutrition, sedentary lifestyle) are modifiable (Parks et al., 2006).

Despite the high prevalence rates of physical health conditions among individuals with SMI, evidence from a variety of sources shows that they are less likely to visit physicians for routine medical care than the general population (Druss & Walker, 2011). Further, studies conducted in the last decade or so show that those who do have some source of routine medical care often receive subpar services (Miller, Druss, Dombrowski, & Rosenheck, 2003). As individuals with SMI are more likely to seek health care services through CMH centers, these agencies are the ideal locations to provide coordinated, integrated PBHC services (Druss et al., 2010). The shift toward integrated care is relatively new (Scharf et al., 2013), so little research evaluating program effectiveness has been published. However, two studies (Druss et al., 2010; Putz et al., 2015) examining the effectiveness of integrated programs in CMH settings have demonstrated promising results with regard to improved health outcomes. The next step for researchers is to examine relevant correlates of health and psychosocial improvements, and this study precisely sought to identify empirically relevant predictors of improvement among clients with thought disorders receiving integrated PBHC services.

This exploratory secondary analysis used existing data collected at baseline and follow up from clients with thought disorders enrolled in integrated PBHC programs at three CMH centers. The current study sought to determine which sociodemographic, health, health-risk, and treatment-related characteristics were associated with health and psychosocial improvements.

Theoretical Significance

The current study is rooted in BPS theory. George L. Engel, a psychiatrist, first introduced the BPS model in 1977. This theory claims that an individual's wellbeing is impacted by biological, psychological, and social factors (Engel, 1977); further, BPS theory asserts that a holistic approach addressing all three of the aforementioned dimensions is necessary when

treating individuals (Engel, 1977). As people with SMI experience numerous psychiatric symptoms and comorbid physical health conditions, which are often created or exacerbated by environmental factors (Druss & Walker, 2011), an understanding of the multiple factors and their interrelationships is critical for conceptualizing this descriptive study.

Contributions to the Field of Social Work

According to the National Association of Social Workers' (NASW, 2017) Code of Ethics, social workers have an ethical responsibility to “pursue social change, particularly with and on behalf of vulnerable and oppressed individuals and groups of people.” Individuals with SMI are still among the most stigmatized groups in society (Stuart & Arboleda-Flórez, 2012), and in addition to suffering from a variety of complex psychiatric symptoms (APA, 2013), people with SMI are disproportionately affected by comorbid physical health conditions (Parks et al., 2006). Individuals with SMI are at increased risk for experiencing stigma, chronic diseases, and premature mortality (Parks et al., 2006); thus, social workers must focus their efforts towards eliminating these disparities.

According to NASW (n.d.), social workers account for 60% of the mental health workforce. As such, they are in the ideal position to advocate for individuals with SMI. As systems of care move toward greater integration (Gerrity, Zoller, Pinson, Pettinari, & King, 2014), understanding the characteristics associated with improvements in health and psychosocial outcomes among CMH clients with SMI enrolled in integrated PBHC programs is timely. The current study focused specifically on clients with thought disorders, as they are less understood and more likely to receive social rejection and less compassion (Angermeyer & Deitrich, 2006). In addition, recent investigations show that CMH clients with thought disorders are more likely than those with mood disorders to be retained in care (Thomas, 2017; Lemieux,

Thomas, Newransky, Khalifa, & Hebert, 2017). This is important because treatment retention is associated with improved health and psychosocial outcomes for this particular population (Druss & Walker, 2011; Adair et al., 2005). Results generated from this study may help social work and other health practitioners identify potential predictors (i.e., sociodemographic, health, health-risk, and treatment-related characteristics) that indicate areas of risk and resilience regarding health and psychosocial improvements among individuals with thought disorders. Such knowledge may guide social workers engaged in direct practice and policy-practice roles to develop and test relevant interventions, including recovery support services that target health- and psychosocial-related risks and resiliencies.

CHAPTER 2: REVIEW OF THE LITERATURE

This chapter reviews existing literature on the pervasiveness of SMI and the increased physical health risks among this population. The analysis has a special focus on thought disorders; thus, discussion focuses on diagnostic criteria, prevalence rates, best practices, risks for deterioration, information on mental health stigma, and statistics on physical and mental health comorbidity. Models of integrated PBHC have demonstrated promise in treating comorbid mental and physical health conditions, and a summary of major evaluation findings and implications will be provided. Finally, treatment retention and disengagement will be reviewed.

An Overview of Serious Mental Illnesses and Thought Disorders

According to SAMHSA (2016), SMI can be defined as any mental or behavioral disorder that causes significant impairment in one's functioning and one's ability to complete major activities. Approximately 4% of adults in the United States (an estimated 9.8 million) have SMI (SAMHSA, 2016). Of the portion of adults with SMI, roughly 5% are female and about 3.1% are male (SAMHSA, 2015). Whites have higher prevalence rates (4.4%) than Hispanic/Latinos (3.5%), Blacks (3.1%), and Asians (2.4%; SAMHSA, 2015). Individuals without health insurance are more likely to be diagnosed with SMI than individuals with health coverage (SAMHSA, 2015). Additionally, individuals who live below the federal poverty level are almost 2 times more likely to have SMI than those who live above the federal poverty level (SAMHSA, 2015).

SMI includes both mood disorders (e.g., major depression, bipolar disorder) and thought disorders (i.e., schizophrenia, schizoaffective disorder, brief psychotic disorder). This analysis will focus on different aspects of thought disorders.

Schizophrenia

Prevalence and Incidence. According to the World Health Organization (WHO, 2016), approximately 21 million people are affected by schizophrenia worldwide. The American Psychiatric Association (APA, 2013) stated that prevalence rates range from 0.3% to 0.7%, with some variation across countries. The median incidence of schizophrenia is roughly 0.20 per 1,000 persons annually (Messias, Chen, & Eaton, 2007).

Symptoms and Primary Diagnostic Criteria. In order for a diagnosis of schizophrenia to be established, there must be an active phase, that is, a period in which at least two of the following symptom categories are present: delusions, hallucinations, disorganized speech, behavioral disturbances of either disorganization or catatonia, and negative symptoms (APA, 2013). Furthermore, at least one of the two required symptom categories are delusions, hallucinations, or disorganized speech. Negative symptoms include diminished emotional expression, avolition (i.e., decreased motivation and interests), alogia (i.e., poverty of speech), anhedonia, and asociality (APA, 2013).

Additional criteria must be met for a diagnosis of schizophrenia. Symptoms must last at least 6 months, a portion of which must include an active phase of at least 1 month's duration, but it can be shorter if treatment reduces the length of the symptomatic period (APA, 2013). Active-phase symptoms must not appear solely in the context of a mood episode. Symptoms of the prodromal-phase (i.e., a period preceding or leading up to an active phase) or the residual-phase (i.e., a period following an active phase) must include negative symptoms or reduced forms of active-phase symptoms. Symptoms cannot be the result of a substance or some other health condition. Finally, the disorder must interfere with functioning in work, relationships, or activities of daily living (APA, 2013).

Gender and Race Considerations. Men are more likely than women to receive a diagnosis of schizophrenia (WHO, 2016), and men with the disorder usually experience their first psychotic episode at an earlier age than women with the disorder (Andreasen & Black, 2006). Overall, women tend to experience less severe functional deficits prior to the onset of the illness, as well as experience fewer symptoms as the disorder progresses (Canuso & Pandina, 2007).

Although White individuals have a higher prevalence of SMI than other races, Black individuals are disproportionately diagnosed with schizophrenia, with race emerging as the most influential factor when diagnosing schizophrenia in a hospital setting (Barnes, 2013). After controlling for age, gender, education, and number of prior hospitalizations, Barnes (2013) found that Black clients were twice as likely as White clients to be diagnosed with schizophrenia. Another earlier study by Barnes (2008) showed that White clients were more likely than Black clients to be diagnosed with a mood disorder than with schizophrenia. As noted by Barnes (2008), misdiagnosis of schizophrenia can lead to individuals being prescribed medications that are inappropriate for their actual diagnoses, which can expose them to unnecessary side effects and other health problems.

Racial disparities also emerge in the pharmacological treatment of schizophrenia. For example, Kreyenbuhl, Zito, Buchanan, Soeken, and Lehman (2003) analyzed data collected with the Schizophrenia Patient Outcome Research Team (PORT) and showed that Black persons with schizophrenia were 3 times more likely than White persons with schizophrenia to receive long-acting injectable antipsychotics. Results also showed that Black individuals were 76% less likely than White individuals to receive the newer atypical antipsychotic medications, even after

controlling for age, gender, education, and number of prior hospitalizations (Kreyenbuhl et al., 2003).

Best Practices and Treatment Considerations. According to Chien and Yip (2013), the use of antipsychotic medication continues to be the primary form of treatment for individuals with schizophrenia. Additionally, recent meta-analyses suggest that psychosocial interventions in combination with medications are effective in reducing acute psychotic symptoms, slowing illness progression, and maintaining remission (Chien & Yip, 2013).

Keating et al. (2017) completed a systematic review of existing clinical practice guidelines on treating positive symptoms in first-episode schizophrenia. A total of 3,299 articles containing treatment recommendations were retrieved from PubMed and EMBASE databases (Keating et al., 2017). After comparing clinical practice guideline content from included studies, Keating et al. (2017) compiled a list of recommendations. Overwhelmingly, clinical practice guidelines concurred/showed that typical and atypical antipsychotics were equally effective in treating first-episode psychotic symptoms (Keating et al., 2017). Results also indicated that the benefits of an antipsychotic medication regimen are generally evident within the first 2 weeks; however, 4 weeks is the generally recommended duration for determining the benefit of a particular antipsychotic regimen (Keating et al., 2017).

Recently, there has been much debate over the potential superiority of second-generation (atypical) antipsychotics over first-generation antipsychotics. Tandon et al. (2008) examined the effectiveness of 62 antipsychotic (51 first-generation and 11 second-generation) medications using data from about 1,600 clinical trials and concluded that second-generation antipsychotics were as effective as first-generation antipsychotics with regard to treating positive symptoms (Tandon et al., 2008). However, the superior benefits of second-generation medications for

negative symptoms, cognition, and depression were not consistently demonstrated (Tandon et al., 2008). The atypical antipsychotic clozapine was superior to the first-generation antipsychotics and the other second-generation antipsychotics, and also had the most benefit for treatment-resistant psychosis (Tandon et al., 2008). Nevertheless, due to the risk of neutropenia (i.e., excessively low numbers of white blood cells) clozapine is reserved for people who have failed two or more trials of antipsychotic medications (Tandon et al., 2008).

Keating et al. (2017) concluded that consideration of medication side effects is the most important factor in selecting an antipsychotic medication. Atypical agents, compared to neuroleptic medications, have a lower risk of extrapyramidal side effects (i.e., muscle tightening or movement problems) and tardive dyskinesia (Tandon et al., 2008). However, second-generation medications generally pose greater risks for the metabolic effects of weight gain, diabetes, and dyslipidemia, all of which are risk factors for heart disease and increased mortality (Tandon et al., 2008). Metabolic side effects vary by agent among the atypical antipsychotics, with clozapine and olanzapine resulting in the greatest degree and ziprasidone causing the least (Tandon et al., 2008). The balanced risk of adverse side effects should be considered when selecting the best psychotropic medication for a particular individual.

The Schizophrenia PORT also generated several treatment recommendations based on systematic reviews of existing literature (Kreyenbuhl, Buchanan, Dickerson, & Dixon, 2010). Pharmacological treatment recommendations paralleled those suggested by Tandon et al. (2008), but Kreyenbuhl et al. (2010) extended their systematic analysis further by investigating existing psychosocial treatment recommendations. Medications fail to adequately treat negative symptoms; thus, psychosocial treatments are critical for enhancing quality of life and medication adherence (Elis, Caponigro, & Kring, 2013). For example, cognitive behavioral therapy was

effective in reducing symptom severity, and family-based services of at least 6 to 9 months in duration helped to significantly decrease rates of relapse (Kreyenbuhl et al., 2010). A key factor in family therapy is addressing the issue of expressed emotion, “an empirically derived index of criticism, overinvolvement, and hostility” (p. 164), by family members of individuals with schizophrenia (Bustillo, Laurielle, Horan, & Keith, 2001). Research has shown that changes in expressed emotion (from higher to lower levels) are associated with decreased rates of relapse (Bustillo et al., 2001).

Risk Factors for Deterioration/Hospitalizations. According to Keating et al. (2017), relapse (i.e., a worsening of symptoms after a period of improvement or return of symptoms following remission) occurs in about 3 out of 4 people with schizophrenia. Weiden, Kozma, Grogg, and Locklear (2004) examined 4,325 Medicaid pharmacy refill and claims forms of individuals with schizophrenia to determine the relationship between adherence to antipsychotics and hospitalization. Results indicated that even small gaps in medication adherence (i.e., 1 to 10 days) significantly increased the likelihood of hospitalization (Weiden et al., 2004). Results also showed that hospitalization occurred more frequently among Black individuals and among Medicare-eligible individuals (Weiden et al., 2004). Other studies suggest that relapse is strongly associated with lower premorbid functioning (Üçok, Polat, Çakır, & Genç, 2006), co-occurring substance use disorders (SUD; Malla et al., 2008), and lack of insight (Drake et al., 2007). Further, as previously noted, higher levels of expressed emotion within families are associated with increased rates of relapse (Bustillo et al., 2001).

Approximately 11% of the homeless population has schizophrenia, and this type of living arrangement is associated with worse outcomes (Foster, Gable, & Buckley, 2012). Many individuals with schizophrenia who are homeless receive subpar service planning, as well as

discontinue using available treatment (Foster et al., 2012). Individuals with SMI who are homeless may discontinue their medication regimens because they are not closely monitored in the community; as a result, many deteriorate quickly and are hospitalized (Lamb & Bachrach, 2001).

Schizoaffective Disorder

Prevalence and Incidence. According to the APA (2013), schizoaffective disorder is not as common as schizophrenia and has a lifetime prevalence rate of 0.3%. Incidence rates are unclear due to recent changes in diagnostic criteria (Brannon, 2012). Prior to the DSM-5, the diagnosis was used more frequently than intended. Current criteria emphasize the lifetime course of the illness, as opposed to consideration of potentially isolated episodes described in previous manuals (Malaspina et al., 2013). The change is intended to ensure that criteria are consistently applied, which ultimately will lead to reduced rates of schizoaffective diagnoses (Malaspina et al., 2013).

Symptoms and Primary Diagnostic Criteria. In order to establish a diagnosis of schizoaffective disorder, an episode of a mood disorder must occur along with an active phase of schizophrenia (APA, 2013). In addition, there must also be a period of at least 2 weeks of hallucinations or delusions without a mood episode (in order to rule out a psychotic mood disorder), mood episodes must occur over most of the active and residual phases of the disorder, and symptoms cannot be the result of a substance or some other health condition (APA, 2013).

Gender and Race Considerations. Women are more likely than men to receive a diagnosis of schizoaffective disorder (APA, 2013), and a study by Robinson et al. (1999) found that female participants with first-episode schizoaffective disorder responded better to antipsychotics than did male participants. Although Black individuals are more likely to receive

a diagnosis of schizophrenia than White individuals, racial differences are not apparent among individuals diagnosed with schizoaffective disorder (Neighbors, Trierweiler, Ford, & Muroff, 2003).

Best Practices and Treatment Characteristics. According to Levinson, Umapathy, and Musthaq (1999), the majority of individuals diagnosed with schizoaffective disorder are treated with antipsychotics, thymoleptics (i.e., drugs that modify mood), antidepressants, or a combination of medications. Levinson et al. (1999) examined 18 treatment studies of schizoaffective disorder and found that antipsychotics alone were just as effective as combinations when treating acute symptoms; however, once psychotic symptoms were in remission, a combination of both antidepressants and antipsychotics helped alleviate symptoms of major depression (Levinson et al., 1999). On the other hand, lithium (a thymoleptic) was not effective in treating depressive symptoms or mania (Levinson et al., 1999).

Risk Factors for Deterioration/Hospitalizations. As with schizophrenia, the risk of relapse is common among individuals with schizoaffective disorder (Gaebel et al., 2010). Robinson et al. (1999) sought to determine the characteristics associated with relapse among individuals with first-episode schizophrenia ($N=71$) and schizoaffective disorder ($N=33$) who had achieved remission following initial episodes and found that nonadherence to antipsychotic medication made relapse 5 times more likely. In addition, Robinson et al. (1999) demonstrated that poor premorbid functioning and social withdrawal correlated with earlier relapse and that despite careful monitoring, second and third relapses were common among individuals who had recovered from first relapses. Murru et al. (2012) completed a longitudinal study with 76 individuals diagnosed with schizoaffective disorder and found that individuals who did not

adhere to treatment recommendations ($N=32$) primarily experienced psychotic (non-affective) symptom episodes.

Brief Psychotic Disorder

Prevalence and Incidence. According to the APA (2013), approximately 9% of all first-onset psychotic disturbances in the United States meet criteria for brief psychotic disorder. Castagnini, Bertelsen, and Berrios (2008) found that the median incidence of brief psychotic disorder is roughly 9.6 per 100,000 persons annually. Women are twice as likely as men to receive a diagnosis of brief psychotic disorder, and the condition occurs more frequently in developing countries (APA, 2013).

Symptoms and Primary Diagnostic Criteria. In order to establish a diagnosis of brief psychotic disorder, delusions, hallucinations, or disorganized speech must occur for at least 1 day, but for no more than 1 month (APA, 2013). The episode may also include disorganized behavior or catatonia. The psychosis may occur with or without a stressor, and it may appear in a peripartum period (APA, 2013). In addition, any psychosis associated with a mood episode, the influence of a substance, and the effect of a medical condition must be ruled out (APA, 2013).

Best Practices and Treatment Considerations. With brief psychotic disorder, the goal of treatment is to help individuals return to their previous level of functioning (APA, 2013). According to Memon (2015a), symptoms of brief psychotic disorder should be treated with antipsychotic medications, and because psychotic episodes are time limited, medication regimens should not extend beyond 1 month. Currently, there is no evidence supporting the superiority of atypical agents over neuroleptics in treating the disorder (Memon, 2015a). Intramuscular ziprasidone (Brook, Lucey, & Gunn, 2000) and rapid tranquilization with olanzapine (Karagianis et al., 2001) have been demonstrated to be effective in treating acute psychotic aggression.

Individuals with brief psychotic disorder are at greater risk of harming themselves and others during acute episodes (Jorgensen & Mortensen, 1990). Thus, Memon (2015a) recommends hospitalization if safety is a concern.

Risk Factors for Deterioration/Hospitalizations. Typically, brief psychotic disorder has a good prognosis, and 50-80% of those diagnosed experience no major subsequent psychiatric issues (Memon, 2015b). Correll et al. (2008) observed that individuals with brief psychotic disorder who also demonstrate executive functional deficits may go on to develop schizophrenia; whereas those with co-occurring brief psychotic disorder and anxiety symptoms may eventually develop bipolar disorder (Correll et al., 2008).

Stigma and Its Consequences

According to Stuart and Arboleda-Flórez (2012), “Mental illness stigma occurs when individuals are devalued or treated unfairly by others because of their mental health condition” (p. 1). Despite increased public awareness of mental illnesses, people with mental disorders are still among the most stigmatized groups in society (Stuart & Arboleda-Flórez, 2012), and this burden extends to family members, as well as to mental health providers, whose careers are not acknowledged and valued as much as those of professionals in other health disciplines (Sartorius, 2002).

Data collected from the general public and from those with mental disorders indicate widespread prevalence of mental illness stigma. For example, Angermeyer and Deitrich (2006) reviewed national ($N=33$) and local ($N=29$) surveys of public attitudes to determine the magnitude of mental health stigma and found that individuals with schizophrenia or SUD received less sympathy and more social rejection than individuals with depression. Pescosolido, Monahan, Link, Stueve, and Kikuzawa (1999) extracted a random sample of interviews

($N=1,444$) from the 1996 General Social Survey, which prompted respondents to evaluate the competence of individuals in a variety of case vignettes. The majority of respondents believed that individuals with schizophrenia were incapable of making treatment decisions (75.3%), unable to manage money (70.2%), and likely to commit violent acts against others (60.9%). The belief that persons with mental illness are violent is one of many prejudices held by the public at large, and these attitudes engender discriminatory actions against individuals with mental disorders (Arboleda-Flórez & Sartorius, 2008).

Wahl (1999) conducted a large-scale survey of people with mental illness in order to examine the impact of stigma on their lives. Of the 1,388 individuals who completed the survey, 74% indicated that they avoided disclosing their mental health diagnoses to non-family members, 71% denied having a mental illness on applications to evade discrimination, 31% reported having been turned down for a job due to their mental illness, and 10% reported hesitancy to seek treatment due to fear of judgment (Wahl, 1999). Thornicroft et al. (2009) surveyed 732 individuals with schizophrenia across 27 countries and found that almost half (47%) of the respondents reported experiencing some type of discrimination (e.g., inability to make or keep friends, judgment by family members, trouble finding and keeping work, difficulty finding a romantic partner). Most notably, almost three fourths (72%) of respondents reported concealing their diagnoses to avoid anticipated discrimination (Thornicroft et al., 2009). A study by Brohan, Elgie, Sartorius, Thornicroft, and GAMIAN-Europe Study Group (2010) analyzed 1,229 surveys from individuals diagnosed with schizophrenia or other psychotic disorders and found that 69% believed that the general population thought negatively about them, 48% experienced discrimination, 47% suffered alienation, and 45% resorted to social withdrawal. Stuart and Arboleda-Flórez (2012) underscored the negative impact of stigma on recovery and

recommended that mental health professionals promote client empowerment, identify prevention strategies, and educate the public about common misconceptions.

A substantial portion of the general public erroneously believes that individuals with schizophrenia and other thought disorders are inherently violent, and Lamb and Bachrach (2001) suggest that some of these misconceptions might stem from the collateral effects of deinstitutionalization. In 1955, approximately 559,000 individuals with SMI occupied state mental hospital beds, a number that drastically decreased to only 57,151 in 1998 (Lamb & Bachrach, 2001). During this period, proponents of deinstitutionalization believed that community-based care would be more humane, beneficial, and cost-effective than state hospital care (see, e.g., Bachrach, 1976; Bachrach, 1978; Thornicroft & Bebbington, 1989). However, many deinstitutionalized individuals with SMI received fragmented services and were not provided affordable housing options (Carling, 1993; Räsänen et al., 2000), and large numbers became homeless (Lamb & Bachrach, 2001). Baum and Burnes (1993) estimated that as much as one half of all individuals who are homeless have some type of SMI, a vulnerable group at risk of deteriorating quickly from improper treatment and the effects of substance use (Lamb & Bachrach, 2001). Alcohol and illicit drug use contribute to medication nonadherence and can exacerbate symptoms, which may result in bizarre behavior; and individuals with SMI who exhibit odd behavior in public are often inappropriately arrested and incarcerated (Lamb & Bachrach, 2001).

In the 1970s and 1980s, due to major policy changes and inadequate community-based treatment, the criminal justice system increasingly assumed the role of state hospitals (Borzecki & Wormith, 1985). In fact, Foderaro (1994) reported that by the 1990s, there were more individuals with SMI in jails and prisons than in psychiatric hospitals. The criminalization of

mental illness is a complex and multifaceted contemporary public health issue, and changes on multiple levels must be implemented to ensure that those with SMI are provided with appropriate community-based treatment and support (Lamb & Bachrach, 2001). In addition, Stuart and Arboleda-Flórez (2012) assert that challenging mental health stigma is a public health priority and that initiatives to redress discrimination are needed to ameliorate existing social disparities.

In sum, thought disorders can be debilitating for affected individuals, so practitioners must be knowledgeable about the prevalence, diagnostic criteria, effective pharmacological and psychosocial interventions, and relevant risk factors. Treatment of individuals with schizophrenia and other thought disorders typically involves antipsychotic medications (Chien & Yip, 2013); however, second-generation antipsychotics cause a variety of metabolic side effects (e.g., weight gain, dyslipidemia), which may lead to the development of chronic health diseases (Tandon et al., 2008). These side effects, in addition to other factors affecting health status, result in individuals with thought disorders being disproportionately affected by comorbid physical health conditions.

Comorbidity, Risk Factors, and the Importance of Screening

It is well established that individuals with SMI live, on average, 25 years less than individuals without SMI (Parks, Svendsen, Singer, & Foti, 2006). According to Parks et al. (2006), preventable physical health conditions (e.g., cardiovascular disease, pulmonary disease, infectious disease) account for 60% of early deaths in individuals diagnosed with schizophrenia, and several of the risk factors (e.g., smoking, alcohol consumption, drug use, poor nutrition, sedentary lifestyle) that contribute to these physical health conditions are modifiable (Parks et al., 2006). Efforts have been made to address this public health crisis through federally-supported grants (Scharf et al., 2013), discussed below.

Comorbidity Among Individuals With Thought Disorders

Extant research shows that certain cardiometabolic conditions (e.g., obesity, hypertension, high blood sugar, elevated triglyceride [TRI] levels, reduced high-density lipoprotein [HDL] levels) increase an individual's chances of developing diabetes, heart disease, or stroke (De Hert et al., 2011). This section reviews statistics drawn from a variety of sources that describe the co-occurrence of physical health conditions and diseases among individuals with SMI, with a special focus on individuals with schizophrenia and other thought disorders.

The prevalence rates of comorbid health conditions and largely preventable diseases are higher among individuals with schizophrenia and schizoaffective disorder. Correll et al. (2010) conducted a large-scale study of 10,084 individuals with mental illness and found that among individuals with schizophrenia, 79% were overweight or obese, 52% had metabolic syndrome, 51% had hypertension, 40% had hypertriglyceridemia, 37% had hyperglycemia, and 30% had dyslipidemia. The National Comorbidity Survey Replication ($N=9,282$) determined that approximately 68% of adults with mental disorders, including those with diagnoses on the schizophrenia spectrum, had at least one co-occurring physical health condition (Alegria, Jackson, Kessler, & Takeuchi, 2003). In a large-scale, population-based study, Carney, Jones, and Woolson (2006) found that individuals with schizophrenia and schizoaffective disorder were significantly more likely than control group participants (with no mental disorders) to have one or more chronic health conditions, and of the 1,074 participants with thought disorders, 33% had three or more chronic health conditions. Carney et al. (2006) further reported that individuals with thought disorders were more likely than controls to experience health conditions across multiple organ systems, as well as experience co-occurring substance abuse and dependence (i.e., alcohol, illicit drugs, nicotine).

Smaller-scale studies have demonstrated similar results. For example, Baughman et al. (2016) compared health information from 203 adults with SMI to similar data collected from a matched sample of adults without SMI and found that individuals with SMI had higher prevalence rates of 7 out of 9 chronic diseases (i.e., chronic pain, respiratory problems, arthritis, cardiovascular disease, headaches, diabetes, ulcers in the stomach/intestine; Baughman et al., 2016). Jones et al. (2004) examined a subsample of Medicaid claims of adults diagnosed with SMI (e.g., schizophrenia, schizoaffective disorder) to determine the prevalence of comorbid physical conditions. Of the 147 cases reviewed, 75% of participants had at least one chronic health condition, and 50% had two or more chronic health conditions (Jones et al., 2004). The most common chronic health problem was pulmonary illness, at 31% (Jones et al., 2004).

Diabetes is a notable problem among persons with schizophrenia due to obesity. These individuals are 2 times more likely than the general population to develop diabetes, and they are more likely to develop the condition at a younger age (De Hert et al., 2010). Additionally, individuals with schizophrenia (and other thought disorders) and comorbid diabetes experience a more complicated course of the disease than is experienced by the general population (Carney et al., 2006). This disproportionate rate of diabetes likely can be explained by obesity, which often predicts the development of the disease (Gough, 2005). For example, Coodin (2001) showed that persons with schizophrenia are 2.8 to 3.5 times more likely than the general population to be obese. In addition, a study of 262 adults with SMI (i.e., schizophrenia, schizoaffective disorder, bipolar disorder) found that individuals with schizoaffective disorder had the highest rates of obesity, after controlling for relevant demographic characteristics (Chouinard et al., 2016).

Descriptive studies of individuals with comorbid mental disorders and physical health conditions have examined differences across gender and race. Lemieux, Richards, Hunter, and

Kasofsky (2015), for example, examined individuals ($N=125$) receiving integrated health services at 3 different CMH centers and determined that female participants had significantly more comorbid physical health conditions (0.86) than male participants (0.53). In addition, women reported comorbid cardiac disease at a rate 4 times that of men (at 22.1% and 5%, respectively; Lemieux et al., 2015). Gleason et al. (2014) also examined gender differences between men ($N=167$) and women ($N=144$) receiving integrated services in a CMH setting. Analyses showed that female participants had significantly higher waist circumference and body mass index (BMI) scores, as compared to men (Gleason et al., 2014). Although more men than women had hypertension, men and women were equally at risk for developing diabetes and metabolic syndrome (Gleason et al., 2014).

Racial differences also emerged in the study by Lemieux et al. (2015). Blacks were more likely than Whites to have more comorbid conditions, as well as show higher BMI and blood pressure (BP) scores (Lemieux et al., 2015). Conversely, Whites had higher low-density lipoprotein (LDL) and TRI scores than Blacks (Lemieux et al., 2015).

Risk Factors for Developing Comorbid Health Conditions

This section provides an overview of identified factors that place individuals with SMI at risk for developing physical health conditions, namely smoking, substance use, poor nutrition, sedentary lifestyle, and medication side effects. Research shows that the majority of these risk factors are modifiable (Parks et al., 2006).

Smoking. According to the Centers for Diseases Control and Prevention (CDC, 2013), smoking is the primary cause of preventable diseases and deaths in the United States. Results from the 2009-2011 National Survey on Drug Use and Health revealed that 36% of adults with mental illness smoke as compared to 21% of adults without mental illness (SAMHSA, 2011).

Results also showed that smokers with mental illness were less likely to quit than smokers without mental illness, despite the fact that many indicated a desire to do so (SAMHSA, 2011).

Hartz et al. (2014) conducted a large-scale study of smoking and compared individuals with severe psychotic disorders (i.e., bipolar disorder with psychosis [$N=1,507$], schizoaffective disorder [$N=2,037$], schizophrenia [$N=5,586$]) to individuals without the conditions ($N=10,311$). Results showed that individuals with psychotic disorders were far more likely than control participants to have smoked at least 100 cigarettes in a lifetime (bipolar disorder with psychosis [74%], schizoaffective disorder [79%], schizophrenia [74%], control participants [33%]) and to be daily smokers (bipolar disorder with psychosis [71%], schizoaffective disorder [77%], schizophrenia [72%], control participants [29%]; Hartz et al., 2014). Dickerson et al. (2013) examined 991 individuals with schizophrenia ($N=421$), bipolar disorder ($N=126$), and no psychiatric illnesses ($N=444$) and found that 64% of the individuals with schizophrenia, 44% of the individuals with bipolar disorder, and 19% of the individuals without psychiatric illnesses smoked. Subsequent analyses determined that the following characteristics were strongly associated with higher rates of cigarette consumption among those with SMI: male gender, co-occurring substance use, White race, and lower education level (Dickerson et al., 2013).

Studies have attempted to determine the cause of increased rates of smoking among individuals with schizophrenia and other thought disorders. Miller (1977) hypothesized that individuals who take first-generation antipsychotics smoke to reduce extrapyramidal side effects associated with the medications. Higher rates of smoking might also be explained by central nervous system tolerance, associated with long-term use of nicotine (Adler et al., 1998). Additionally, some individuals might be seeking the reduction of anxiety or elevation of mood that can result from nicotine usage (Kirch, Gerhardt, Shelton, Freedman, & Wyatt, 1987).

Finally, because persons with schizophrenia have problematic function of nicotinic acetylcholine receptors, these individuals might smoke to generate a pharmacodynamics effect (i.e., activation of neuronal receptors by the substance; Adler et al., 1998).

Alcohol and Other Substance Use. According to SAMHSA (2016), approximately 1% of adults in the United States (an estimated 2.3 million) have co-occurring SMI and SUD.

Although the use of certain substances is known to ameliorate negative symptoms of psychotic disorders (e.g., anhedonia, boredom; Batel, 2000), individuals with co-occurring SUD are more prone to adverse events, such as exacerbated psychotic symptoms, poorer medication compliance, homelessness, and a variety of preventable physical health problems (Dixon, 1999).

Dixon (1999) suggested that roughly 50% of all individuals with schizophrenia struggle with co-occurring SUD, and most frequently misuse alcohol and marijuana. Hartz et al. (2014) examined 5,586 individuals with schizophrenia and found that 28% consumed more than 4 drinks a day, 43% smoked marijuana more than 21 times a year, and 35% had used other recreational drugs more than 10 times during their lifetime. However, rates were slightly higher for participants diagnosed with schizoaffective disorder ($N=2,037$): 29% consumed more than 4 drinks a day, 53% smoked marijuana more than 21 times a year, and 52% had used other recreational drugs more than 10 times during their lifetime (Hartz et al., 2014).

According to Hartz et al. (2014), rates of substance use vary markedly across race and gender in the general population. For example, among participants in the control group ($N=10,311$), Whites had higher rates of substance use than Hispanics and Asians, and men had higher rates than women. However, these demographic differences were not evident among individuals with severe psychotic disorders, whose rates of use were relatively consistent across race and gender (Hartz et al., 2014).

Poor Nutrition. According to Peet (2003), numerous studies have linked poor nutrition to the development of heart disease, diabetes, and several cancers, and it is well known that many persons with schizophrenia have substandard diets. Dipasquale et al. (2013) reviewed 31 studies of nutrition among individuals with schizophrenia and found that the majority of participants consumed large amounts of saturated fats and small amounts of fiber and fruit. Strassnig, Brar, and Ganguli (2003) administered a nutrition assessment to 146 psychiatric patients with schizophrenia, schizoaffective disorder, and other psychotic disorders and compared their responses to an age-adjusted group from the general population. Results revealed that percentages of intake for protein, carbohydrates, and fat were not different between the two groups; however, individuals with schizophrenia ate higher quantities of food (Strassnig et al., 2003).

Studies have attempted to determine the reasons for dietary differences between individuals with schizophrenia and the general population. Suvisaari, Keinänen, Eskelinen, and Mantere (2016) suggested that poverty could be a major barrier to obtaining higher-quality foods. Further, atypical antipsychotics might increase hunger sensations, which ultimately results in overeating (Blouin et al., 2008).

Sedentary Lifestyle. According to Mokdad, Marks, Stroup, and Gerberding (2004), low levels of physical activity and poor diet are the second leading causes of death in the United States and may become the leading causes of death in the country. Rates of chronic diseases are prevalent among individuals with SMI; thus, this population could experience substantial benefits from increased levels of physical activity (Daumit et al., 2005). Blair et al. (1995) found that even after years of inactivity, people can significantly improve their health by increasing their levels of exercise.

Galletly et al. (2012) collected data from 1,825 outpatients, including individuals with schizophrenia ($N=857$) and schizoaffective disorder ($N=293$), and found that almost all (96.7%) participants engaged in low (63.1%) or very low (33.6%) levels of physical activity. Gender differences in level of physical activity were not evident; however, younger individuals were more likely to report low levels of physical activity, and older adults were more likely to report very low levels of physical activity (Galletly et al., 2012). Daumit et al. (2005) conducted a smaller-scale study comparing 185 individuals with SMI (including individuals with schizophrenia and schizoaffective disorder) to a subset of individuals from the National Health and Nutrition Examination Survey ($N=2,705$). Results showed that over one fourth of individuals with SMI (25.7%) engaged in no physical activity during the previous month, as compared to controls, at 17.5% (Daumit et al., 2005).

Researchers have attempted to determine the reason for low levels of physical activity among individuals with thought disorders. Negative symptoms might inhibit the desire to maintain adequate levels of physical activity (Lambert, Velakoulis, & Pantelis, 2003). Suvisaari et al. (2016) suggested that individuals with schizophrenia might be less able to afford gym memberships (due to low socioeconomic status) and that this obstacle might also contribute to subpar levels of physical activity levels.

Medications. Second-generation antipsychotics significantly increase the likelihood of gaining weight and developing diabetes and dyslipidemia, and specific agents (e.g., clozapine and olanzapine) are associated with even higher rates of these metabolic conditions (Tandon et al., 2008). Allison et al. (1999) conducted a meta-analysis of 81 studies to determine the impact of various antipsychotic medications on weight after 10 weeks of standard dosages of included agents. Results revealed that the first-generation drug molindone was associated with a mean

weight reduction of 0.39 kg; however, the other analyzed conventional antipsychotic, thioridazine, was associated with a mean weight gain of 3.19 kg (Allison et al., 1999). All atypical antipsychotics included in the research synthesis were associated with weight increases: clozapine (4.45 kg), olanzapine (4.15 kg), sertindole (2.92 kg), risperidone (2.10 kg), and ziprasidone (0.04 kg).

Although first-generation medications are less likely to cause these adverse metabolic effects (Smith et al., 2008), physicians might be hesitant to prescribe them because of extrapyramidal side effects and risk of developing tardive dyskinesia (Tandon et al., 2008). According to Keating et al. (2017), consideration of all medication side effects is the most important factor in selecting an antipsychotic medication.

The Importance of Screening

According to Parks et al. (2006), early detection is key to reducing rates of cardiometabolic conditions among individuals with SMI. Providers should systematically track mechanical (i.e., BMI, systolic BP, diastolic BP) and laboratory (i.e., blood glucose, HDL, LDL, TRI) health indicators in order to effectively monitor the physical health of individuals with SMI (Parks, Radke, Mazade, & Mauer, 2008). BMI is used to detect obesity, a condition that leads to increased risk of diabetes, heart disease, and hypertension (Parks et al., 2008). Monitoring BP is important, as higher BP predisposes individuals to developing heart disease, hypertension, and stroke (Parks et al., 2008). Increased HDL is associated with lower risk of heart disease and serves as a protective factor; conversely, higher LDL and TRI are associated with diabetes, heart disease, and obesity (Parks et al., 2008). In addition to routine monitoring, Parks et al. (2008) also noted the importance of gathering family and personal history of cardiometabolic conditions, along with personal history of alcohol, drug, and tobacco use.

Screening is important for primary, secondary, and tertiary health interventions (Parks et al., 2008). Individuals without cardiometabolic conditions should be screened regularly and encouraged to participate in activities that prevent the development of these conditions (Parks et al., 2008). When cardiometabolic conditions are present, individuals with SMI should be linked to specific wellness interventions to improve their prognosis and to prevent the development of chronic diseases (e.g., diabetes, heart disease, or stroke; Parks et al., 2008). Finally, individuals diagnosed with comorbid diseases should be frequently monitored in order to restore functioning and to prevent the development of disease-related complications (Parks et al., 2008).

Treatment Utilization and Barriers Among Individuals with Thought Disorders

Despite the high prevalence rates of physical health conditions among individuals with SMI, they are less likely to visit physicians for routine medical care than the general population (Druss & Walker, 2011; Lu et al., 2008; Roesenberg et al., 2007). Craddock-O'Leary, Young, Yano, Wang, and Lee (2002) reviewed 175,653 patient records from the Department of Veterans Affairs (VA) databases to analyze medical care usage and found that individuals with SMI had far fewer medical visits than those without any type of mental illness. Young male adults with schizophrenia, in particular, had an elevated risk for not receiving medical care (Craddock-O'Leary et al., 2002). Correll et al. (2010) offered free metabolic screenings to 10,084 patients with mental illness, including schizophrenia, in order to determine rates of undertreatment of medical conditions. Of the adult participants with schizophrenia, 57% of those with dyslipidemia, 56% of those with metabolic syndrome, 49% of those with hypertension, and 41% of those with diabetes reported having received no treatment for the conditions (Correll et al., 2010).

Extant research indicates that individuals with SMI tend to overuse emergency services for medical care (Hackman et al., 2006; Salsberry, Chipps, & Kennedy, 2005) because of inadequate access and numerous barriers to routine and preventative care (Parks et al., 2006). Miller et al. (2003), for example, surveyed 59 CMH clients about access to primary care and the quality of that care and found that almost two thirds (63%) could not identify the names of their primary care providers offhand. Of the individuals who did have a consistent source of primary care (14%), many reported relying on emergency services for their physical health issues (Miller et al., 2003). Finally, for those who reported receiving some type of primary care, scores on the Primary Care Assessment Tool showed that participants were receiving less than ideal care, in that mental health providers often failed to ask about physical conditions, and, conversely, medical providers failed to ask about mental health issues (Miller et al., 2003).

Individual factors also contribute to disparities in health care utilization (Druss & Walker, 2011). Paranoia and negative symptoms (e.g., amotivation) may prevent individuals with thought disorders from obtaining needed medical treatment (Parks et al., 2006). Others are hesitant to seek treatment out of fear of judgment (Wahl, 1999). Socioeconomic circumstances may also play a role. Studies by Gleason, Truong, Biebel, Hobart, and Kolodziej (2017) and Thomas (2017) showed that access to transportation was associated with treatment engagement.

Providers also create barriers to adequate primary care in both physical and behavioral health settings. Druss and Walker (2011) suggested that stigma surrounding mental illness might discourage primary health providers from treating persons with SMI. Conversely, psychiatrists might feel ill prepared to treat the various medical needs of people with SMI (Druss & Walker, 2011). Gleason et al. (2017) further found that inconvenient appointment times were also barriers to treatment engagement. However, Parks et al. (2006) maintained that the principal barrier to

satisfactory primary care is the poor coordination between multiple providers that operate in separate systems of health care.

The Importance of an Integrated Health Approach

An integrated health approach directly addresses fragmentation between separate systems of care. Integrated care, broadly speaking, refers to health care arrangements that combine primary and mental health services in the same setting (Scharf et al., 2013). According to Gerrity, Zoller, Pinson, Pettinari, and King (2014), integrated PBHC programs use different strategies to coordinate physical and mental health care services for persons with multiple chronic conditions, including SMI. There are several models of integrated care: coordinated, co-located, and fully integrated (Heath, Wise, Romero, & Reynolds, 2013). Coordinated care involves communication between providers of separate facilities (Heath et al., 2013). This particular model of integration typically utilizes care managers who can provide outside referrals to clients, assist clients in connecting with external resources, and follow up with clients' various providers (Druss & Walker, 2011). Co-located care involves the provision of physical health services in CMH centers or, conversely, mental health treatment in primary care clinics (Heath et al., 2013). This particular integrated PBHC model is a feasible alternative when full integration is not possible (Druss & Walker, 2011). Finally, fully integrated PBHC organizations, such as the VA (Druss & Walker, 2011), have the capacity to provide all necessary physical and mental health services to individuals with comorbid conditions (Heath et al., 2013).

Little research has evaluated interventions to improve the physical health of persons with SMI (Druss, Rohrbaugh, Levinson, & Rosenheck, 2001; Kilbourne et al., 2008), and most of the existing research on integrated treatment approaches has been conducted within fully integrated organizations, such as the VA (Druss & Walker, 2011). In 2015, approximately two thirds of

adults with SMI reported receiving behavioral health services during the previous year (65.3%; SAMHSA, 2016). Individuals with SMI are more likely to seek health care services through CMH centers, thus, these agencies are the ideal locations to provide coordinated care (Druss et al., 2010).

Druss et al. (2008) surveyed CMH centers across the country to assess their capacity to provide primary care services to clients. Of the 181 CMH centers that responded, the majority routinely screened for hypertension (80%) and for obesity (72%), but less than half screened for diabetes (47%) and dyslipidemia (44%). Other sites referred clients out for medical screenings (Druss et al., 2008). Although well over two thirds (71%) of the CMH centers reported an ability to provide on- or off-site medical screenings, only about half (51%) reported having the capacity to provide treatment for identified medical problems (Druss et al., 2008). Respondents reported several barriers to provision of medical services, including issues around reimbursement (72%), limited staff (69%), physical space limitations (61%), and a lack of community referral options (56%; Druss et al., 2008).

SAMHSA funded the Primary and Behavioral Health Care Integration (PBHCI) grants program to improve the overall health of individuals with SMI via co-location of various primary care services in CMH settings (Scharf et al., 2013). CMH centers that received grant funding were required to provide physical health screenings and referrals, develop a health needs and outcomes tracking system, offer care management services, and implement wellness programs (Scharf et al., 2013). In an uncontrolled evaluation, the RAND Corporation assessed the success of the PBHCI grants program and reported many accomplishments, including the establishment of multidisciplinary teams that offered a variety of wellness programs (Scharf et al., 2013). However, grantees also experienced several unforeseen challenges (e.g., low consumer

enrollment, issues with financial sustainability, communication problems between team members; Scharf et al., 2013). Nevertheless, Scharf et al. (2013) concluded that the PBHCI program, overall, was successful in creating necessary services for underserved and vulnerable community-based populations, and they suggested that efforts should be made to increase consumer access to integrated PBHC services and that strategies should be developed to improve sustainability.

Although efforts have been made to implement integrated services in CMH settings, few studies have evaluated the impact of these programs on health outcomes (Gerrity et al., 2014). The Primary Care Access and Referral (PCARE) study by Druss et al. (2010) randomly assigned CMH clients to either care management services ($N=205$) or to usual care ($N=202$). Nurse care managers educated treatment group participants about their medical conditions, provided them with specialty referrals, and created action plans with them mapping out medical care and lifestyle change goals. At 12 months out, well over half of the participants in the care management intervention group received primary services (58.7%), a rate almost twice that of participants in the control group (21.8%; Druss et al., 2010). Lab work indicated that the risk of developing cardiovascular disease decreased by 11.8% in the treatment group, but increased by 19.5% in the control group. Additionally, a greater number of previously undiagnosed physical health conditions were discovered in the care management group (Druss et al., 2010). These latter results are promising in terms of the potential effectiveness of co-located care, given that most CMH centers do not have the resources to provide fully integrated services.

In an uncontrolled evaluation study, Putz et al. (2015) collected longitudinal data from a sample of 169 adults with SMI receiving a collaborative care intervention at a CMH center. Participants received comprehensive health assessments upon program entry, were assigned a

case manager, and were offered a variety of wellness programs. At 6 months out, significant improvements in health outcomes were observed, including weight loss, decreases in smoking and LDL, and increases in HDL (Putz et al., 2015). Results demonstrated by Druss et al. (2010) and Putz et al. (2015) suggest that co-located integrated health approaches resulted in improved outcomes for CMH clients with SMI.

SMI, Treatment Disengagement, and Treatment Retention

Treatment engagement is critical for individuals with SMI, as those who drop out are at greater risk of experiencing increased morbidity (Davis et al., 2012), intensified psychiatric symptoms, frequent hospitalizations, homelessness, legal problems, and suicidal ideation (Dixon et al., 2009; Fischer et al., 2008). According to Druss and Walker (2011), ongoing contact with providers helps individuals with SMI to manage symptoms and medications. Adair et al. (2005) conducted a longitudinal study of 486 adults with SMI to examine the relationship between continued care and health outcomes and found that treatment continuity was associated with better quality of life, improved functioning, reduced symptom severity, and increased service satisfaction. Adair et al. (2005) suggested that efforts should be made in health settings to improve continuity of care, which was defined by Bachrach (1981) as “a process involving the orderly, uninterrupted movement of patients among the diverse elements of the service delivery system” (p. 1449).

The majority of individuals with SMI often do not complete the recommended course of treatment (Wang, 2007; Wang et al., 2000). Olfson et al. (2009) examined a subsample of individuals ($N=1,664$) with various psychiatric diagnoses from the National Comorbidity Survey Replication in order to determine patterns and predictors of primary care and mental health treatment dropout. Results indicated that over one fifth of participants (22.4%) dropped out of

treatment prematurely and that individuals were more likely to discontinue primary care services (31.6%) than mental health services (15.1%; Olfson et al., 2009). Analyses revealed that Blacks were more likely than Whites to discontinue treatment and that younger individuals were more likely than older individuals to withdraw from care (Olfson et al., 2009). Education level and employment status, however, were negatively associated with treatment disengagement (Olfson et al., 2009).

Kreyenbuhl, Nossel, and Dixon (2009) also sought to determine patterns and predictors of treatment dropout. However, unlike Olfson et al. (2009), Kreyenbuhl et al. (2009) exclusively focused on mental health treatment disengagement among individuals with schizophrenia. A comprehensive literature review revealed that up to one third of those with schizophrenia discontinue treatment prematurely (Kreyenbuhl et al., 2009), a rate substantially higher than the range reported by Olfson et al. (2009; 15.1%-31.6%). Kreyenbuhl et al. (2009) noted that younger age, male gender, minority group membership, and lower levels of functioning were positively associated with treatment disengagement and that individuals with early-onset psychosis and co-occurring SUD were particularly at risk of discontinuing care. Finally, Kreyenbuhl et al. (2009) found that clients' perspectives about the care they received also impacted treatment dropout, in that individuals who felt unheard were more likely to disengage from treatment.

A recent study showed that treatment reengagement is associated with decreased mortality rates (Davis et al., 2012). In a large-scale study by Davis et al. (2012), VA staff members contacted 3,306 veterans with SMI who had failed to return for follow-up visits for at least 1 year in an attempt to reengage them in care. Of those contacted, approximately 72% ($N=2,375$) resumed treatment (Davis et al., 2012). Individuals who declined to return reported

that they did not perceive a need for care, they were dissatisfied with VA services, they faced transportation barriers, or several of these reasons (Davis et al., 2012). Clients who restarted treatment were almost 6 times less likely to experience early mortality than individuals who did not return for care (Davis et al., 2012).

Few studies have examined retention rates in integrated health programs. Data collected from 56 federally-funded PBHC programs revealed that among the 25,648 enrollees, roughly 22% ($N=5,755$) terminated treatment at around 7 months from program enrollment (Scharf et al., 2013). However, the reported rate of disengagement did not include program participants who disengaged from care immediately following preliminary enrollment interviews (Scharf et al., 2013). Two smaller-scale studies assessing PBHC outcomes (Druss et al., 2010; Putz et al., 2015) reported client retention rates as part of their evaluations. Among 205 CMH clients who received care management services in Druss et al.'s (2010) PCARE study, 78% remained in treatment at 12-month follow up; however, among those who received usual care ($N=202$), 69.3% were retained at 12 follow up. In Putz et al.'s (2015) evaluation of 169 CMH clients receiving a collaborative care intervention, 86.9% ($N=147$) were retained at 6 months, and 70.4% ($N=119$) were retained at 12 months out.

Thomas (2017) focused specifically on correlates of treatment retention among individuals with SMI, including individuals with thought disorders ($N=119$) and mood disorders ($N=192$), receiving integrated services in a CMH setting. Of the 359 participants included in the study sample, approximately half (47.1%) were retained at 6 months, while only 29.2% were retained at 12 months (Thomas, 2017). Analyses revealed that reliable access to transportation, abstaining from substance use, and retention at 6 months were associated with 12-month retention (Thomas, 2017). Further, individuals with thought disorders were more likely than

individuals with mood disorders to be retained at 12 months (at 31.1% and 25.5%, respectively; Thomas, 2017).

Lemieux et al. (2017) expanded upon the research of Thomas (2017). Clinical data from 446 PBHC program clients (148 with thought disorders and 240 with mood disorders) were analyzed to examine predictors of treatment retention at 6 months (Lemieux et al., 2017). Results of multivariate analyses showed that 6-month retention was associated with type of disorder, overall health, greater number of prescribed medications, laboratory data at baseline, having a primary care provider, reliable transportation, and living alone (Lemieux et al., 2017). Among these latter correlates, only two predicted retention in care at 6 months (Lemieux et al., 2017). The number of medications prescribed at baseline and having a thought disorder increased the likelihood of retention (Odds Ratios = 1.20 and 1.99; Lemieux et al., 2017).

Summary and Implications

SMI affects 4% of the U.S. population, notably compromising the functioning and ability of those impacted (SAMHSA, 2016). Thought disorders are especially debilitating, and people with these conditions, such as schizophrenia, face a variety of complicated psychiatric symptoms (APA, 2013) and also stigma (Stuart & Arboleda-Flórez, 2012). Further, individuals with schizophrenia have higher rates of early mortality than the general population, with research showing that approximately 60% of early deaths among individuals diagnosed with thought disorders are preventable (Parks et al., 2006). Efforts have been made to address the health disparities faced by individuals with SMI through federally-supported grants (Scharf et al., 2013); however, scant research has rigorously evaluated the effectiveness of integrated programs in CMH settings (Gerrity et al., 2014), and even fewer studies have specifically analyzed

treatment retention and correlates of treatment continuation among integrated PBHC program enrollees (Thomas, 2017; Lemieux et al., 2017).

Treatment engagement is critical, with a large body of research indicating that continued contact with providers helps individuals with SMI manage their symptoms (Druss et al., 2011). In addition, reengagement with services following a period of disengagement is associated with considerably lower rates of premature mortality (Davis et al., 2012). Research undertaken with diverse populations of clients with SMI indicates that treatment retention is associated with better outcomes, in terms of symptomology and functioning (Adair et al., 2005), and health and wellbeing (Adair et al., 2005). Studies have also shown that certain sociodemographic (e.g., employment status; Olfson et al., 2009), psychosocial (e.g., higher levels of functioning; Kreyenbuhl et al., 2009), health (e.g., abstinence from substance use; Kreyenbuhl et al., 2009), and treatment-related characteristics (e.g., access to transportation; Davis et al., 2012) are associated with retention among clients with SMI. However, only 2 studies specifically examined correlates of treatment retention among CMH clients in integrated health programs. Thomas (2017) found that the strongest predictor of treatment retention at 12 months was retention at 6 months. Further, individuals with thought disorders were more likely than those with mood disorders to be retained at 12 months, at 31.1% and 25.5%, respectively (Thomas, 2017). Lemieux et al. (2017) used a multivariate approach to extend the work of Thomas (2017) and found that among the 7 correlates of treatment retention, 2 health-related characteristics predicted 6-month retention. Individuals with thought disorders were almost twice as likely as those with mood disorders to be retained in care at 6 months (Lemieux et al., 2017). Frequency of medications also slightly increased the likelihood of 6-month retention (Lemieux et al., 2017).

The few longitudinal evaluations of integrated PBHC programs indicate that CMH clients who are retained in care show improvements on critical biomarkers of health and other measures of psychosocial functioning and wellbeing (Druss et al., 2010; Putz et al., 2015). However, prior to this analysis, no study to date had examined the extent to which CMH clients diagnosed with thought disorders in integrated PBHC programs showed improvement on critical health and psychosocial outcomes. As systems of care move toward greater integration (Gerrity et al., 2014), evaluators are better positioned to include objective biomarkers of health, consistent with recommendations by Parks et al. (2006; 2008), and empirically-supported psychosocial measures when examining outcomes among individuals with SMI. The current study sought to identify and describe health and psychosocial improvements among individuals with thought disorders receiving integrated services in CMH settings, as well as identify the sociodemographic, health-related, and treatment-related characteristics that are associated with improvement. This study also sought to increase existing knowledge about persons with thought disorders receiving integrated PBHC services by examining relevant correlates (i.e., sociodemographic, health, health-risk, treatment-related) of improvements in health and psychosocial characteristics.

CHAPTER 3: CONCEPTUAL FRAMEWORK

This section outlines the purpose of the current study, the research questions that were investigated, and definitions of relevant key terms.

Purpose

The current study is an exploratory secondary analysis that is longitudinal in scope, as outcome measures were re-administered to particular participants at a later time (6 months; Caruana, Roman, Hernández-Sánchez, & Solli, 2015). It examined the sociodemographic, health, health-risk, and treatment-related characteristics that are associated with health and psychosocial improvements among individuals with thought disorders. The present study used preexisting data collected at baseline and follow up from clients enrolled in integrated PBHC programs at three CMH centers in Louisiana. The data include information collected from surveys and objective health-indicator scores recorded in clinical records.

Research Questions

The current correlational study focused on the following questions:

1. What are the sociodemographic, health, health-risk, treatment-related characteristics of individuals with thought disorders receiving integrated PBHC in CMH settings?
2. What proportion of participants with thought disorders is retained at 6 months out?
3. Do participants with thought disorders show improvement from baseline to 6 months out on relevant health and psychosocial characteristics?
4. Are sociodemographic, health, health-risk, and treatment-related factors associated with improvements in psychosocial characteristics from baseline to 6 months out?

5. Are sociodemographic, relevant health, health-risk, and treatment-related characteristics associated with clinically meaningful improvements on objective measures of health from baseline to 6 months out?

Key Terms

This section defines key terms included in the research questions. Chapter 4 focuses on methodology and describes, in detail, how each variable was measured.

Sociodemographic Characteristics

Sociodemographic characteristics for the current study include age, gender, race, employment status, disability status, living arrangement, and education level. All of the aforementioned characteristics were self-reported by participants at baseline. Participants reported their age, gender, and race to nurse care managers upon enrollment. Employment status includes two categories, employed and unemployed. Employed participants reported working either full time or part time. Unemployed participants reported that they were looking for work, volunteering, retired, or not looking for work. Disability status refers to whether a participant was receiving disability benefits. Living arrangement is defined as whether participants lived in their own house or apartment or lived with someone else 30 days prior to enrollment. Finally, education level is defined as whether a participant had less than a high school education or a high school education or greater.

Health Characteristics

Health characteristics for the current study include the total number of prescribed medications, whether or not antipsychotic medications were prescribed at baseline, and self-assessed health. Prescribed medications include the frequency and type of all medications prescribed to participants that were recorded by nurse care managers at baseline, including those

for both mental disorders and comorbid conditions. Self-assessed health is participants' self-reported perceptions of physical health, as measured with a general self-rated health (GSRH) question. Health-risk characteristics include participants' self-reported use of alcohol, tobacco, and illicit or non-prescribed drugs, as well as self-reports indicating whether participants had ever been diagnosed with hypertension, diabetes, and heart disease.

Treatment-Related Characteristics

Treatment-related characteristics include access to reliable transportation, the number of clinic services received, whether participants had a primary health care provider at baseline, and clinic site. Reliable transportation reflects participants' self-reports of having access to reliable transportation. Number of clinic services is defined as the total number of health and mental health services (e.g., case management, treatment planning, primary care) received by participants, as recorded by nurse care managers. Primary health care provider at baseline refers to whether participants reported the name of a primary care physician at baseline, as recorded by nurse care managers. Finally, clinic site refers to 1 of 3 CMH sites where participants were receiving integrated PBHC services.

Improvement in Psychosocial Characteristics

Psychosocial characteristics include level of functioning, level of social support, and severity of symptomology. Level of functioning is participants' self-reported perceptions of their day-to-day functioning, as measured with the 8-item Perception of Functioning (PF) scale. Level of social support reflects participants' self-reported perceptions of social connectedness, which is measured with a 4-item Perception of Social Connectedness (PSC) scale. Finally, severity of symptomology is defined as participants' self-reported feelings (e.g., nervous, hopeless, restless, depressed, worthless) during the 30 days prior to baseline and is assessed with the 6-item K6, a

measure of psychological distress. Improvement in psychosocial characteristics is defined as increases in both PF and PSC scale scores and a decrease in K6 scale scores.

Improvement in Health

Clinically-meaningful improvement in health is defined as moving out of risk, as defined by Center for Integrated Health Solutions (CIHS, 2013) guidelines, on any one of the mechanical (i.e., systolic and diastolic BP, BMI) biomarkers of health using scores recorded in participants' clinical records at intake and at 6 months out.

CHAPTER 4: METHODOLOGY

This section describes the study sample, the original study from which the data were drawn, how study variables were measured, and data analysis methods.

Design and Study Sample

This exploratory secondary analysis examined existing data collected from participants with thought disorders who received integrated PBHC services in three different CMH settings. The sample includes all individuals with thought disorders and was drawn from an existing database of 1,270 participants with SMI (Lemieux et al., 2015). Participants in the original study were primarily low-income, uninsured, and eligible for government aid (Lemieux et al., 2015).

Original Study

In the original study (Lemieux et al., 2015), clients enrolled in three, publicly funded CMH centers were provided care management services, similar to those described in the PCARE study (Druss et al., 2010), from February 2012 to August 2015. Clients included those who lacked primary care providers, had not received a physical examination during the previous year, or presented with physical health complaints (Lemieux et al., 2015). Study participants were systematically screened by co-located nurse care managers who collected and recorded health information and provided primary care referrals, on-site wellness program referrals, prevention services, and education to enrolled clients (Lemieux et al., 2015).

Nurse care managers administered the National Outcomes Measures Client-level Measures (NOMs) survey and the Integrated Health Program Baseline Physical Health Indicators Form (IHP-BPHIF) to program participants at the time of enrollment (Lemieux et al., 2015). Client data were de-identified, consistent with requirements of the Health Insurance Portability and Accountability Act, and entered by the evaluators into SPSS 21 for analysis (Lemieux et al.,

2015). The original study was exempted from oversight by the Institutional Review Board of the researchers' affiliated university (Lemieux et al., 2015).

The NOMs survey collects information about demographics, psychosocial functioning, housing, education, employment, criminal history, perception of care, and social connectedness. This measurement tool includes the Mental Health Statistics Improvement Program (MHSIP) scale, which was created by the National Association of State Mental Health Program Directors Research Institute (Jerrell, 2006). The IHP-BPHIF, developed by the study's researchers and CMH staff members, gathers information about participants' health insurance, physical and mental health diagnoses, prescription medications, health indicators, health-risk behaviors, personal and family history of medical conditions, and substance use history (Lemieux et al., 2015).

CMH clients enrolled in the Integrated Health Program (IHP) were reassessed at 6-month intervals until they were discharged (Lemieux et al., 2015). Nurse care managers re-administered the NOMs and also completed the Integrated Health Program Reassessment Health Indicators Form (IHP-RHIF) at every 6-month follow up (Lemieux et al., 2015). The latter form collects data on referral and wellness activities, health indicators, and medication changes (Lemieux et al., 2015).

Instrumentation

Dependent Variables

The dependent variables for the current study are improvement in health and improvement in psychosocial characteristics at 6 months out from baseline.

Improvement in Health. Improvement in health was defined as moving from *at risk* to *not at risk* on any one of the mechanical (i.e., systolic and diastolic BP, BMI) health indicators,

using cut-off scores recommended CIHS (2013). Health indicators were dichotomized according to the recommended cut-off scores and coded as 0 (not at risk) and 1 (at risk).

CIHS (2013) provided the following cut-off scores for the health indicators of interest:

1. Systolic BP \geq 130 = at risk
2. Diastolic BP \geq 85 = at risk
3. BMI (%) \leq 24 = normal (not at risk)

BMI 25-29 = overweight (at risk)

BMI 30-39 = obese (at risk)

In the current study, BMI scores of 24 or lower were coded as 0 (not at risk). Scores higher than 25 were coded as 1 (at risk).

Improvement in Psychosocial Characteristics. Improvement in psychosocial characteristics was defined an increase in PF scale scores, an increase in PSC scale scores, and a decrease in K6 scale scores.

Level of functioning, defined as participants' self-reported perceptions of their day-to-day functioning, was measured with the 8-item PF scale on the NOMs (Schacht, 2001). The PF measure asks participants about their coping during the 30 days prior to study enrollment. For example, PF scale items include: "I deal effectively with daily problems," and "I am able to deal with crisis." A 5-point Likert scale is used to measure participants' responses to each of the 8 items, from *strongly disagree* (1) to *strongly agree* (5). Responses to the 8 items are summed to compute that person's total daily functioning score, ranging from 8 to 40. Higher scores indicate higher levels of functioning. Lemieux et al. (2015) and Thomas (2017) reported Cronbach's alphas of 0.76 and 0.79, respectively, indicating satisfactory internal consistency.

Level of social support reflects participants' self-reported perceptions of social connectedness, which was measured with the 4-item PSC scale on the NOMs (Schacht, 2001). The PSC measure asks participants about their personal relationships, excluding mental health providers, during the 30 days prior to study enrollment. PSC scale items include: "I am happy with the friends I have," and "I feel I belong in my community." A 5-point Likert scale is used to measure participants' responses to each of the 4 items, from *strongly disagree* (1) to *strongly agree* (5). Responses to the 4 items are summed to compute that person's total PSC score, ranging from 4 to 20. Higher scores indicate higher levels of perceived social support. Lemieux et al. (2015) and Thomas (2017) reported Cronbach's alphas of 0.81 and 0.78, respectively, indicating adequate internal consistency.

Finally, severity of symptomology was defined as participants' self-reported feelings (e.g., nervous, hopeless, restless, depressed, worthless) during the 30 days prior to study enrollment, as measured with the 6-item K6 scale (Kessler et al., 2010). A 5-point Likert scale is used to measure participants' responses to each of the 6 items, from *not at all* (0) to *all of the time* (4). The K6 items are summed to compute that person's level of psychological distress, ranging from 0 to 30. Higher scores indicate higher levels of distress. Lemieux et al. (2015) and Thomas (2017) reported Cronbach's alphas of 0.88 and 0.91, respectively, indicating good internal consistency.

Independent Variables

Sociodemographic Characteristics. Sociodemographic characteristics, collected with the NOMs survey at baseline, included age, gender, race, employment status, disability status, living arrangement, and education level. Age was measured in years based on participants' responses to the age-related NOMs item. Gender information was obtained from participants

with one self-report item and was dichotomized as *male* (0) and *female* (1). With regards to race, participants were asked to report whether they identified as Black, White, Hispanic, Asian, Pacific Islander, Alaska Native, or American Indian; however, given the response distribution reported by Lemieux et al. (2015), the current study dichotomized race as *White* (0) and *Black* (1). Employment status and disability status information was obtained from participants with one self-report NOMs item. Employment status included two categories, *employed* (1) and *unemployed* (0). Disability status was dichotomized as *yes* (1) and *no* (0), and coding was based on whether or not participants marked “disabled” as a reason for unemployment on the employment status self-report item. Regarding living arrangement, participants were asked to report type of residence (e.g., own house or apartment, with someone else, group home) 30 days prior to study enrollment. Responses of house or apartment ownership were coded as 1, and responses of living with someone else were coded as 0. Finally, education level was measured based on self-reported responses to the NOMs item inquiring about participants’ highest level of education completed. Response options included less than 12th grade, high school diploma or GED, vocational diploma, some college, and bachelor’s or graduate degree. Education level was dichotomized in the study as *less than a high school education* (0) and *high school education or greater* (1).

Health Characteristics. Health characteristics for the study included the total number of prescribed medications, whether or not antipsychotic medications were prescribed at baseline, and self-assessed health. Information about prescribed medications included the frequency and type of all medications prescribed to participants that were recorded by nurse care managers at baseline. The number of prescribed medications was tallied using medication lists recorded on IHP-BPHIF forms by nurse care managers. Participants who were prescribed antipsychotic

medications at baseline were coded as 1 (yes), and participants who were not were coded as 0 (no). Finally, self-assessed health was measured with the GSRH question incorporated in the NOMs survey. This item asked: “How would you rate your overall health right now?” GSRH response options ranged from 1 (poor) to 5 (excellent).

Health-risk characteristics included participants’ self-reported use of alcohol, tobacco, and illicit or non-prescribed drugs at baseline, as well as self-reports indicating whether participants had ever been diagnosed with hypertension, diabetes, and heart disease. Three self-report items on the IHP-BPHIF assessed participants’ current use of alcohol, tobacco, and illicit or non-prescribed drugs. Use of each of the three substances was coded as 0 (no) or 1 (yes). Finally, three self-report items on the IHP-BPHIF asked participants whether they had ever been diagnosed with hypertension, diabetes, and heart disease. Response options for these latter items were dichotomized (0=no, 1=yes).

Treatment-Related Characteristics. Treatment-related characteristics included access to reliable transportation, the number of clinic services received, whether participants had a primary health care provider at baseline, and clinic site. Access to reliable transportation was assessed with one IHP-BPHIF item asking participants to self-report whether they had access to reliable transportation. Responses for access to reliable transportation were dichotomized as *no* (0) and *yes* (1). Number of clinic services was defined as the total number of monthly health and mental health services (e.g., case management, treatment planning, primary care) received by participants, as recorded by nurse care managers at follow up on the NOMs 6-month reassessment survey. Primary health care provider at baseline refers to whether or not participants reported the name of a primary care physician at baseline, as recorded by nurse care managers on the IHP-BPHIF. Responses for primary health care provider at baseline were

dichotomized as *yes* (1) and *no* (0). Finally, clinic site refers to 1 of 3 CMH sites where participants were receiving integrated PBHC services. Center for Adult Behavioral Health (CABH), Margaret Dumas Mental Health (MDMH), and Gonzales Mental Health (GMH) were coded as 1, 2, and 3, respectively.

Data Analysis

A power analysis was conducted to confirm that a sample size of 311 was sufficient to detect a medium effect size (0.80), with a *p* value set at 0.05 (Rubin & Babbie, 1993). To summarize data, descriptive statistics for non-parametric variables (e.g., gender, race, employment status) are reported using frequencies and their percentages (Rubin & Babbie, 2017). Descriptive statistics for parametric variables (e.g., number of health and mental health services, self-rated health) were computed, and the mean, standard deviation, and range are reported (Rubin & Babbie, 2017).

Paired samples *t*-tests were used to determine whether participants showed improvements from baseline to follow up on level of functioning, level of social support, and severity of symptomology (Rubin & Babbie, 2017). Bivariate analyses were used to examine associations between key variables of interest (i.e., sociodemographic, health, health-risk, treatment-related characteristics) and improvements in health and psychosocial functioning at 6 months out. Chi-square tests of independence were computed to examine differences in the distribution of responses among categorical variables (e.g., disability status, health indicators, reliable transportation; Rubin & Babbie, 2017). Independent samples *t*-tests were computed to assess whether the mean scores on measures of continuous variables (e.g., age, number of medications) differed between those who did and did not show improvements in health and psychosocial functioning (Rubin & Babbie, 2017).

CHAPTER 5: RESULTS

The current study examined associations between key variables of interest (i.e., sociodemographic, health, health-risk, and treatment characteristics) and health and psychosocial improvements in a sample of 311 CMH clients enrolled in integrated health programs.

Sociodemographic Characteristics

As seen in Table 1, the study sample included 157 men (51.1%) and 150 women (48.9%). The average age of participants was 45.7 ($SD=13.1$, Range=18-75). Nearly three fourths of the participants were Black (72.3%), and just over one fourth was White (27.7%). The majority was unemployed (87.7%), and just under one half (44.3%) was receiving disability benefits (see Table 1). A slightly greater proportion of participants reported living on their own (51.8%) than with someone else (48.2%). As seen in Table 1, well over half of participants reported having at least a 12th grade education (61.5%).

Table 1. Sociodemographic Characteristics ($N=272-307$)

	<i>M</i>	<i>SD</i>	Range	Frequency	Valid %
Age	45.7	13.1	18-75	-	-
Gender					
Male	-	-	-	157	51.1
Female	-	-	-	150	48.9
Race					
Black	-	-	-	211	72.3
White	-	-	-	81	27.7
Employment Status					
Unemployed	-	-	-	265	87.7
Employed	-	-	-	37	12.3
Disability Status					
No Benefits	-	-	-	170	55.7
Benefits	-	-	-	135	44.3
Living Arrangement					
With Another	-	-	-	131	48.2
Own/Rented	-	-	-	141	51.8

(Table 1 continued)

	<i>M</i>	<i>SD</i>	Range	Frequency	Valid %
Education					
<12 th Grade	-	-	-	117	38.5
≥ 12 th Grade	-	-	-	187	61.5

Health Characteristics

Table 2 displays information about the study sample's health characteristics. On average, participants reported taking 4 prescription medications ($SD=2.4$, Range=0-12), and 87.1% reported being prescribed an antipsychotic medication. The mean score for participants on the measure of self-assessed health was 2.8 ($SD=1.1$, Range=1-5), indicating that, on average, participants viewed their health as between good and fair.

Table 2. Health Characteristics ($N=301-311$)

	<i>M</i>	<i>SD</i>	Range	Frequency	Valid %
Number of Meds Baseline	4.0	2.4	0-12	-	-
Antipsychotic Meds Baseline					
Yes	-	-	-	271	87.1
No	-	-	-	40	12.9
Self-Assessed Health	2.8	1.1	1-5	-	-

Health-Risk Characteristics

Table 3 shows information about relevant health-risk characteristics. Just over three fourths (76.6%) reported no alcohol use, and slightly over half (53.1%) reported tobacco use. A small proportion of the study sample (12.6%) reported using illicit or non-prescribed drugs. In terms of personal history of cardiometabolic disorders, over one half of participants reported a personal history of hypertension (54.2%), about one fifth reported a personal history of diabetes (20.2%), and just under one half (47.4%) reported a personal history of heart disease (see Table 3).

Table 3. Health-Risk Characteristics (N=272-305)

	<i>M</i>	<i>SD</i>	Range	Frequency	Valid %
Personal Hx: Alcohol					
Yes	-	-	-	71	23.4
No	-	-	-	232	76.7
Personal Hx: Tobacco					
Yes	-	-	-	162	53.1
No	-	-	-	143	46.9
Personal Hx: Drugs					
Yes	-	-	-	38	12.6
No	-	-	-	263	87.4
Personal Hx: HBP					
Yes	-	-	-	163	54.2
No	-	-	-	138	45.8
Personal Hx: Diabetes					
Yes	-	-	-	60	20.2
No	-	-	-	237	79.8
Personal Hx: Heart Disease					
Yes	-	-	-	129	47.4
No	-	-	-	143	52.6

Treatment-Related Characteristics

As seen in Table 4, over three fourths of participants (78.3%) had access to reliable transportation. On average, enrollees received 1.6 clinical services each month (*SD*=0.9, Range=0-4.8), and just over half (55.1%) reported that they did not have a primary care physician at baseline. In terms of clinic site, Table 4 shows that 148 individuals were enrolled at MDMH (47.9%), 119 were enrolled at CABH (38.5%), and 42 were enrolled at GMH (13.6%).

Table 4. Treatment-Related Characteristics (N=159-309)

	<i>M</i>	<i>SD</i>	Range	Frequency	Valid %
Reliable Transportation					
Yes	-	-	-	173	78.3
No	-	-	-	48	21.7

(Table 4 continued)

	<i>M</i>	<i>SD</i>	Range	Frequency	Valid %
Number Clinic Services	1.6	0.9	0-4.8	-	-
PCP Baseline					
Yes	-	-	-	127	44.9
No	-	-	-	156	55.1
Clinic Site					
MDMH	-	-	-	148	47.9
CABH	-	-	-	119	38.5
GMH	-	-	-	42	13.6

Retention

Among 311 participants, approximately half ($N=152$, 48.9%) was retained at 6 months.

Improvement in Psychosocial Characteristics

Paired samples *t*-tests were performed to determine whether participants showed improvements from baseline to follow up on measures of functioning (K6), social support (PSC), and symptomology (PF). As seen in Table 5, the mean follow-up K6 score ($M=6.5$) was significantly lower than the mean baseline K6 score ($M=8.1$), indicating decreased psychological distress. The mean PSC score increased from 15.4 (baseline) to 15.9 (follow up), and the mean PF score increased from 25.3 (baseline) to 27.8 (follow up). Improvements in level of social support and severity of symptomology were significant (see Table 5).

Table 5. Differences from Baseline to Follow Up on Key Psychosocial Variables

	Baseline Score		Follow Up Score		95% CI for Mean Difference		<i>T</i>	<i>df</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	Lower	Upper		
K6	8.1	6.2	6.5	5.8	.75096	2.42364	3.756***	125
PSC	15.4	2.8	15.9	2.4	-.90890	-.14219	-2.711**	136
PF	25.3	4.3	27.8	4.1	-3.20087	-1.93513	-8.031***	124

* $p<.05$, ** $p<.01$, *** $p<.001$

Improvement in Health

As seen in Table 6, a smaller proportion of participants was at risk at follow up (40.7%) than at baseline (48.2%) with regard to systolic BP. However, slightly greater proportions showed at-risk diastolic BP and BMI scores at follow up (at 29.7% and 82.1%, respectively) than at baseline (at 28.8% and 80.7%, respectively).

Table 6. Proportions of Participants at Risk at Baseline and Follow Up

	Frequency	Baseline Valid %	Frequency	Follow Up Valid %
Systolic BP				
At Risk	149	48.2	59	40.7
Not at Risk	160	51.8	86	59.3
Diastolic BP				
At Risk	89	28.8	43	29.7
Not at Risk	220	71.2	102	70.3
BMI				
At Risk	192	80.7	64	82.1
Not at Risk	46	19.3	14	17.9

Factors Associated with Improvement in Psychosocial Characteristics

Chi-square tests of independence were conducted to examine proportional differences in psychosocial functioning across key categorical sociodemographic, health, health-risk, and treatment characteristics (see Tables 7, 8, and 9). As seen in Table 8, unemployed individuals were significantly more likely to demonstrate improvement in functioning compared to those who were employed, at $X^2 = 12.035$, $df = 1$, $p < .001$. Individuals who did not receive disability benefits were more likely than those receiving assistance to show improvement in functioning, at $X^2 = 4.861$, $df = 1$, $p < .05$ (see Table 8). Compared to those who lived with someone else, those who owned or rented a home were more likely to exhibit improvement in functioning, at $X^2 = 4.926$, $df = 1$, $p < .05$ (see Table 8). With regard to social connectedness, those who did not

receive disability benefits were more likely than those receiving assistance to perceive higher levels of social connectedness, at $X^2 = 4.145$, $df = 1$, $p < .05$ (see Table 9). Finally, those with access to reliable transportation were significantly more likely to perceive higher levels of social connectedness than those without reliable transportation, at $X^2 = 11.072$, $df = 1$, $p < .001$ (see Table 9).

Table 7. Proportional Differences: Improvement in Symptomology (K6)

	No Improvement		Improvement		<i>p</i>
	<i>N</i>	Valid %	<i>N</i>	Valid%	
Gender					
Male	24	50.0	40	52.6	
Female	24	50.0	36	47.4	.775
Race					
Black	30	65.2	56	76.7	
White	16	34.8	17	23.2	.173
Employment Status					
Unemployed	42	89.4	63	84.0	
Employed	5	10.6	12	16.0	.405
Disability Status					
No Benefits	25	52.1	39	52.0	
Benefits	23	47.9	36	48.0	.993
Living Arrangement					
With Another	15	34.9	31	43.7	
Own/Rented	28	65.1	40	56.3	.354
Education					
<12 th Grade	18	37.5	24	32.0	
≥12 th Grade	30	62.5	51	68.0	.530
Antipsychotic Meds Baseline					
Yes	44	88.0	67	88.2	
No	6	12.0	9	11.8	.979
Personal Hx: Alcohol					
Yes	11	22.4	16	21.3	
No	38	77.6	59	78.7	.883
Personal Hx: Tobacco					
Yes	30	61.2	41	54.7	
No	19	38.8	34	45.3	.471
Personal Hx: Drugs					
Yes	3	6.1	11	14.7	
No	46	93.9	64	85.3	.142

(Table 7 continued)

	No Improvement		Improvement		<i>p</i>
	<i>N</i>	Valid %	<i>N</i>	Valid %	
Personal Hx: HBP	26	52.0	49	65.3	.136
	24	48.0	26	34.7	
Personal Hx: Diabetes					.504
Yes	13	26.5	16	21.3	
No	36	73.5	59	78.7	
Personal Hx: Heart Disease					.555
Yes	4	9.1	9	12.7	
No	40	90.9	62	87.3	
Reliable Transportation					.253
Yes	33	84.6	45	75.0	
No	6	15.4	15	25.0	
PCP Baseline					.256
Yes	24	54.5	31	43.7	
No	20	45.5	40	56.3	
Clinic Site					.391
MDMH	22	44.9	41	54.7	
CABH	23	46.9	26	35.7	
GMH	4	8.2	8	10.7	

Table 8. Proportional Differences: Improvement in Functioning (PF)

	No Improvement		Improvement		<i>p</i>
	<i>N</i>	Valid %	<i>N</i>	Valid %	
Gender					.985
Male	18	48.6	42	48.8	
Female	19	51.4	44	51.2	
Race					.383
Black	22	66.7	62	74.7	
White	11	33.3	21	25.3	
Employment Status					.001
Unemployed	24	66.7	78	91.8	
Employed	12	33.3	7	8.2	
Disability Status					.027
No Benefits	25	67.6	39	45.9	
Benefits	12	32.4	46	54.1	
Living Arrangement					.026
With Another	20	54.1	26	32.5	
Own/Rented	17	45.9	54	67.5	
Education					.471
<12 th Grade	11	29.7	31	36.5	
≥12 th Grade	26	70.3	54	63.5	

(Table 8 continued)

	No Improvement		Improvement		<i>p</i>
	<i>N</i>	Valid %	<i>N</i>	Valid %	
Antipsychotic Meds Baseline					
Yes	34	89.5	78	89.7	
No	4	10.5	9	10.3	.976
Personal Hx: Alcohol					
Yes	9	23.7	16	18.8	
No	29	76.3	69	81.2	.536
Personal Hx: Tobacco					
Yes	22	57.9	42	49.4	
No	16	42.1	43	50.6	.384
Personal Hx: Drugs					
Yes	4	10.5	11	12.9	
No	34	89.5	74	87.1	.705
Personal Hx: HBP					
Yes	18	50.0	58	66.7	
No	18	50.0	29	33.3	.083
Personal Hx: Diabetes					
Yes	6	17.6	24	27.6	
No	28	82.4	63	72.4	.255
Personal Hx: Heart Disease					
Yes	3	8.8	9	11.1	
No	31	91.2	72	88.9	.714
Reliable Transportation					
Yes	20	76.9	58	80.6	
No	6	23.1	14	19.4	.694
PCP Baseline					
Yes	14	45.2	39	47.6	
No	17	54.8	43	52.4	.820
Clinic Site					
MDMH	15	40.5	51	59.3	
CABH	17	49.5	27	31.4	
GMH	5	13.5	8	9.3	.160

Table 9. Proportional Differences: Improvement in Social Connectedness (PSC)

	No Improvement		Improvement		<i>p</i>
	<i>N</i>	Valid %	<i>N</i>	Valid %	
Gender					
Male	41	48.2	26	51.0	
Female	44	51.8	25	49.0	.757
Race					
Black	56	71.8	37	74.0	
White	22	28.2	13	26.0	.785

(Table 9 continued)

	No Improvement		Improvement		<i>p</i>
	<i>N</i>	Valid %	<i>N</i>	Valid %	
Employment Status					
Unemployed	74	88.1	41	82.0	
Employed	10	11.9	9	18.0	.328
Disability Status					
No Benefits	39	45.9	32	64.0	
Benefits	46	54.1	18	36.0	.042
Living Arrangement					
With Another	33	40.7	19	42.2	
Own/Rented	48	59.3	26	57.8	.871
Education					
<12 th Grade	30	35.3	16	32.0	
≥12 th Grade	55	64.7	34	68.0	.697
Antipsychotic Meds Baseline					
Yes	79	91.9	43	84.3	
No	7	8.1	8	15.7	.171
Personal Hx: Alcohol					
Yes	19	22.4	9	18.0	
No	66	77.6	41	82.0	.547
Personal Hx: Tobacco					
Yes	41	48.2	32	64.0	
No	44	51.8	18	36.0	.076
Personal Hx: Drugs					
Yes	8	9.4	8	16.0	
No	77	90.6	42	84.0	.253
Personal Hx: HBP					
Yes	53	63.1	28	56.0	
No	31	36.9	22	44.0	.417
Personal Hx: Diabetes					
Yes	18	21.4	13	26.5	
No	66	78.6	36	73.5	.502
Personal Hx: Heart Disease					
Yes	10	12.5	5	10.9	
No	70	87.5	41	89.1	.786
Reliable Transportation					
Yes	62	89.9	24	63.2	
No	7	10.1	14	36.8	.001
PCP Baseline					
Yes	40	51.3	19	40.4	
No	38	48.7	28	59.6	.239
Clinic Site					
MDMH	48	56.5	23	46.0	
CABH	30	35.3	21	42.0	
GMH	7	8.2	6	12.0	.474

Independent samples *t*-tests were computed to assess whether the mean scores on measures of continuous sociodemographic, health, and health-risk variables differed between those who did and did not show improvement in psychosocial functioning (see Tables 10, 11, and 12). No significant differences emerged between participants who did and did not demonstrate improvement in psychosocial functioning across any of the latter characteristics.

Table 10. Mean Differences: Improvement in Symptomology (K6)

	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
Age					
No Improvement	45.6	12.1			
Yes Improvement	47.5	12.4	-.842	120	.401
Number of Meds Baseline					
No Improvement	4.2	3.1			
Yes Improvement	4.4	2.5	-.413	121	.681
Self-Assessed Health					
No Improvement	2.9	1.1			
Yes Improvement	2.6	1.1	1.072	120	.286
Number Clinic Services					
No Improvement	1.7	0.8			
Yes Improvement	1.7	0.9	-.065	118	.948

Table 11. Mean Differences: Improvement in Functioning (PF)

	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
Age					
No Improvement	44.1	10.4			
Yes Improvement	48.5	12.7	-1.842	119	.068
Number of Meds Baseline					
No Improvement	4.4	3.1			
Yes Improvement	4.5	2.7	-.141	122	.888
Self-Assessed Health					
No Improvement	2.9	1.2			
Yes Improvement	2.6	1.1	1.216	119	.227
Number Clinic Services					
No Improvement	1.5	0.7			
Yes Improvement	1.7	1.0	-1.133	118	.260

Table 12. Mean Differences: Improvement in Social Connectedness (PSC)

	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
Age					
No Improvement	47.8	11.5			
Yes Improvement	45.8	12.7	.909	132	.365
Number of Meds Baseline					
No Improvement	4.6	2.7			
Yes Improvement	4.2	2.9	.740	132	.461
Self-Assessed Health					
No Improvement	2.7	1.1			
Yes Improvement	2.8	1.3	-.531	130	.596
Number Clinic Services					
No Improvement	1.6	1.0			
Yes Improvement	1.7	0.9	-.433	129	.666

Characteristics Associated with Improvement in Health

Chi-square tests of independence were conducted to examine proportional differences in health across key categorical sociodemographic, health, health-risk, and treatment characteristics (see Tables 13, 14, and 15). As seen in Table 13, individuals who lived with someone else were significantly less likely to be at risk on systolic BP than those who owned or rented a home, at $X^2 = 7.371$, $df = 1$, $p < .01$. Participants who received services at MDMH were more likely to have diastolic BP scores in the normal range (59.0%) compared to participants who received care at CABH (29.0%) and GMH (12.0%), at $X^2 = 14.036$, $df = 1$, $p < .001$ (see Table 14). Those who received disability benefits were significantly less likely to have at-risk BMI scores than those who were not receiving assistance, at $X^2 = 4.447$, $df = 1$, $p < .05$ (see Table 15). Although not statistically significant, the proportion of Black participants who were not at risk with regard to systolic BP (85.3%) was considerably greater than White participants (14.7%; see Table 13). Further, a greater proportion of individuals without diabetes (81.0%) were not at risk with regard to systolic BP compared to individuals with diabetes (19.0%).

Table 13. Proportional Differences: Improvement in Systolic BP

	No Improvement		Improvement		<i>p</i>
	<i>N</i>	Valid %	<i>N</i>	Valid %	
Gender					
Male	16	43.2	19	54.3	
Female	21	56.8	16	45.7	.349
Race					
Black	22	66.7	29	85.3	
White	11	33.3	5	14.7	.074
Employment Status					
Unemployed	31	83.8	29	85.3	
Employed	6	16.2	5	14.7	.861
Disability Status					
No Benefits	18	48.6	19	55.9	
Benefits	19	51.4	15	44.1	.542
Living Arrangement					
With Another	8	21.6	17	53.1	
Own/Rented	29	78.4	15	46.9	.007
Education					
<12 th Grade	13	35.1	7	21.2	
≥12 th Grade	24	64.9	26	78.8	.198
Antipsychotic Meds Baseline					
Yes	36	94.7	31	88.6	
No	2	5.3	4	11.4	.338
Personal Hx: Alcohol					
Yes	9	23.7	10	28.6	
No	29	76.3	25	71.4	.634
Personal Hx: Tobacco					
Yes	18	47.4	15	42.9	
No	20	52.6	20	57.1	.699
Personal Hx: Drugs					
Yes	6	15.8	6	17.1	
No	32	84.2	29	82.9	.876
Personal Hx: HBP					
Yes	29	78.4	26	74.3	
No	8	21.6	9	25.7	.683
Personal Hx: Diabetes					
Yes	19	33.3	16	19.0	
No	38	66.7	68	81.0	.054
Personal Hx: Heart Disease					
Yes	5	15.2	6	17.6	
No	28	84.8	28	82.4	.783

(Table 13 continued)

	No Improvement		Improvement		<i>p</i>
	<i>N</i>	Valid %	<i>N</i>	Valid %	
Reliable Transportation					
Yes	22	73.3	21	77.8	
No	8	26.7	6	22.2	.697
PCP Baseline					
Yes	19	54.3	15	45.5	
No	16	45.7	18	54.5	.467
Clinic Site					
MDMH	27	46.6	43	50.6	
CABH	20	34.5	34	40.0	
GMH	11	19.0	8	9.4	.251

Table 14. Proportional Differences: Improvement in Diastolic BP

	No Improvement		Improvement		<i>p</i>
	<i>N</i>	Valid %	<i>N</i>	Valid %	
Gender					
Male	9	39.1	8	50.0	
Female	14	60.9	8	50.0	.501
Race					
Black	17	73.9	10	76.9	
White	6	26.1	3	32.1	.841
Employment Status					
Unemployed	19	82.6	14	93.3	
Employed	4	17.4	1	6.7	.339
Disability Status					
No Benefits	13	56.5	7	46.7	
Benefits	10	43.5	8	53.3	.552
Living Arrangement					
With Another	11	50.0	4	28.6	
Own/Rented	11	50.0	10	71.4	.204
Education					
<12 th Grade	9	40.9	5	33.3	
≥12 th Grade	13	59.1	10	66.7	.641
Antipsychotic Meds Baseline					
Yes	19	82.6	15	88.2	
No	4	17.4	2	11.8	.622
Personal Hx: Alcohol					
Yes	8	34.8	6	35.3	
No	15	65.2	11	64.7	.973
Personal Hx: Tobacco					
Yes	12	52.2	10	58.8	
No	11	47.8	7	41.2	.676

(Table 14 continued)

	No Improvement		Improvement		<i>p</i>
	<i>N</i>	Valid %	<i>N</i>	Valid %	
Personal Hx: Drugs					
Yes	7	30.4	4	23.5	
No	16	69.6	13	76.5	.629
Personal Hx: HBP					
Yes	18	81.8	16	94.1	
No	4	18.2	1	5.9	.255
Personal Hx: Diabetes					
Yes	8	34.8	6	37.5	
No	15	65.2	10	62.5	.862
Personal Hx: Heart Disease					
Yes	4	17.4	3	20.0	
No	19	82.6	12	80.0	.839
Reliable Transportation					
Yes	13	68.4	12	75.0	
No	6	31.6	4	25.0	.668
PCP Baseline					
Yes	11	57.9	9	69.2	
No	8	42.1	4	30.8	.515
Clinic Site					
MDMH	11	25.6	59	59.0	
CABH	25	58.1	29	29.0	
GMH	7	16.3	12	12.0	.001

Table 15. Proportional Differences: Improvement in BMI

	No Improvement		Improvement		<i>p</i>
	<i>N</i>	Valid %	<i>N</i>	Valid %	
Gender					
Male	49	44.1	3	75.0	
Female	62	55.9	1	25.0	.223
Race					
Black	78	73.6	2	50.0	
White	28	26.4	2	50.0	.298
Employment Status					
Unemployed	90	82.6	4	100.0	
Employed	19	17.4	0	0.0	.360
Disability Status					
No Benefits	59	53.6	0	0.0	
Benefits	51	46.4	4	100.0	.035
Living Arrangement					
With Another	40	38.1	1	33.3	
Own/Rented	65	61.9	2	66.7	.867

(Table 15 continued)

	No Improvement		Improvement		<i>p</i>
	<i>N</i>	Valid %	<i>N</i>	Valid %	
Education					
<12 th Grade	38	35.2	1	25.0	
≥12 th Grade	70	64.8	3	75.0	.675
Antipsychotic Meds Baseline					
Yes	101	89.4	4	100.0	
No	12	10.6	0	0.0	.491
Personal Hx: Alcohol					
Yes	27	24.1	1	25.0	
No	85	75.9	3	75.0	.967
Personal Hx: Tobacco					
Yes	57	50.9	1	25.0	
No	55	49.1	3	75.0	.309
Personal Hx: Drugs					
Yes	13	11.6	1	25.0	
No	99	88.4	3	75.0	.419
Personal Hx: HBP					
Yes	71	64.0	3	75.0	
No	40	36.0	1	25.0	.651
Personal Hx: Diabetes					
Yes	32	29.1	0	0.0	
No	78	70.9	4	100.0	.203
Personal Hx: Heart Disease					
Yes	11	10.7	1	25.0	
No	92	89.3	3	75.0	.373
Reliable Transportation					
Yes	69	83.1	4	100.0	
No	14	16.9	0	0.0	.370
PCP Baseline					
Yes	56	56.0	2	66.7	
No	44	44.0	1	33.3	.714
Clinic Site					
MDMH	20	31.3	6	42.9	
CABH	30	46.9	5	35.7	
GMH	14	21.9	3	21.4	.676

Independent samples *t*-tests were computed to assess whether the mean scores on measures of continuous sociodemographic, health, and health-risk variables differed between those who did and did not show improvement in health (see Tables 16, 17, and 18). No

significant differences emerged between participants who did and did not demonstrate improvement in health across any of the latter characteristics.

Table 16. Mean Differences: Improvement in Systolic BP

	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
Age					
At Risk	48.3	11.3			
Not at Risk	50.1	9.5	-.732	70	.467
Number of Meds Baseline					
At Risk	4.5	2.9			
Not at Risk	4.4	2.7	-.129	70	.898
Self-Assessed Health					
At Risk	2.6	1.1			
Not at Risk	2.9	1.1	1.196	70	.236
Number Clinic Services					
At Risk	1.5	0.9			
Not at Risk	1.7	0.9	1.649	137	.101

Table 17. Mean Differences: Improvement in Diastolic BP

	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
Age					
At Risk	44.8	11.7			
Not at Risk	49.3	10.1	1.255	37	.217
Number of Meds Baseline					
At Risk	3.3	1.8			
Not at Risk	4.3	2.1	1.575	37	.124
Self-Assessed Health					
At Risk	2.5	1.1			
Not at Risk	2.4	1.2	-.129	35	.898
Number Clinic Services					
At Risk	1.5	0.8			
Not at Risk	1.7	1.0	1.363	147	.175

Table 18. Mean Differences: Improvement in BMI

	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
Age					
At Risk	46.8	12.2			
Not at Risk	54.8	4.5	1.294	112	.198
Number of Meds Baseline					
At Risk	4.6	2.8			
Not at Risk	5.0	3.6	.307	114	.759

(Table 18 continued)

	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
Self-Assessed Health					
At Risk	2.8	1.1			
Not at Risk	3.3	1.3	.873	112	.384
Number Clinic Services					
At Risk	1.7	1.1			
Not at Risk	1.6	1.0	-.338	72	.736

CHAPTER 6: DISCUSSION

The current study examined correlates (i.e., sociodemographic, health, health-risk, and treatment-related characteristics) of health and psychosocial improvements among individuals with thought disorders receiving integrated PBHC services in 3 CMH settings. Prior to this analysis, no longitudinal study to date had examined correlates of improvement on critical health and psychosocial outcomes among CMH clients diagnosed with thought disorders in integrated PBHC programs.

Sociodemographic, Health, Health-Risk, and Treatment-Related Characteristics

As with the community-based PCARE trial (Druss et al., 2010), African-American participants were overrepresented in the current study (72.3%). This latter finding is consistent with extant research demonstrating that African Americans are disproportionately diagnosed with schizophrenia (Barnes, 2008, 2013). Participants in the present study represented a relatively disadvantaged group of individuals with thought disorders. Although over half had a high school education or greater (61.5%), the vast majority (87.7%) was unemployed. In addition, a slightly greater portion of IHP enrollees (44.3%) was receiving disability benefits than PCARE enrollees (39.3%).

The prevalence of comorbid health conditions among participants in the current study is similar to that reported in the few existing studies that have sampled CMH clients. For example, about half of participants with thought disorders in both the current study and the national cardiometabolic screening program study (Correll et al., 2010) had hypertension (at 54.2% and 51.0%, respectively). These rates of high BP are slightly greater than those reported by Druss et al. (2010) in the PCARE study (at 45.5%). Rates of self-reported diabetes were also slightly higher in the current study (20.2%) than in the PCARE study (Druss et al., 2010; 17.9%). Nearly

half of participants in the current study (47.4%) reported comorbid cardiovascular disease, consistent with research showing disproportionate prevalence of cardiac disease among clients in CMH agencies (Parks et al., 2006).

The prevalence of co-occurring tobacco, alcohol, and other substance use was much lower than that reported by Hartz et al. (2014). Just over half of the current study sample were daily smokers; this prevalence is markedly less than the rates of smoking reported in Hartz et al.'s (2014) large-scale epidemiological study of patients with thought disorders (at 73.4%). Rates of self-reported alcohol use (23.4%) were also considerably lower than those described by Hartz et al. (2014; 28.3%). Use of illicit substances was reported by 12.6% of participants in the current study, also a lower rate than that reported by Hartz et al. (2014; 39.4%). The differences in reported rates of health-risk behaviors may be explained by underreporting in the current study. First, objective measures (e.g., urinalysis testing) were not utilized to confirm self-reported use of substances, which was recommended by Thomas (2017). In addition, participants may have been reluctant to disclose actual amounts because of social desirability bias (Rubin & Babbie, 2017).

Factors Associated with Improvement in Psychosocial Characteristics

One major objective of the current study was to examine correlates of certain psychosocial characteristics among individuals with thought disorders. Participants in the current descriptive study showed improvement in level of functioning and level of social support at 6 months out. With regard to sociodemographic characteristics, employment status, disability status, and living arrangements were significantly associated with improvement in level of functioning at 6 months out. Individuals who were unemployed at baseline were more likely to demonstrate improvement in level of functioning at follow up than those who were employed.

This latter finding seems counterintuitive because existing research has shown positive correlations between employment and social functioning, symptom severity, and quality of life among individuals with thought disorders (e.g., Marwaha & Johnson, 2004). It is possible that individuals who were employed full time or part time upon study enrollment may have exhibited better functioning prior to enrolling in the program. Conversely, unemployed individuals, potentially lower functioning at baseline, may have experienced greater gains upon receiving integrated PBHC services. It is also possible that employed participants were not able to avail themselves of a sufficient amount of services because of scheduling constraints. Thus, additional research is needed to understand the relationship between participants' employment status and its relationship to service utilization and client outcomes, including level of functioning.

Individuals who did not receive disability benefits demonstrated greater improvement in level of functioning at 6 months out. It is likely that participants who were not receiving benefits upon IHP enrollment were much higher functioning than those who qualified for benefits because of more severe symptomology. Compared to those who lived with someone else, individuals who owned or rented a home were more likely to exhibit improvement in level of functioning at follow up. Existing studies have yielded conflicting results with regard to living arrangement. Salokangas (1997) conducted a longitudinal study of 227 first-contact schizophrenia patients and found that those living with family members exhibited better functional outcomes than those not living with their families. However, Hansson et al. (2002) found that people with schizophrenia who lived independently ($N=251$) had a better quality of life and higher levels of perceived independence than those living with family members ($N=78$). It is possible that participants in the current study who owned or rented their own home had the ability to live independently, which suggests that they were higher functioning at baseline. Those

who lived with others may have either needed assistance or were caring for others who needed assistance, which compromised their day-to-day functioning. However, information about activities of daily living and caregiving responsibilities was not collected in the present study. The association between a particular living arrangement and level of functioning is decidedly complex and warrants further exploration in future studies. Finally, individuals who did not receive disability benefits were more likely to perceive higher levels of social connectedness than those who did. A reason for this finding could be that participants who were not receiving benefits may have relied on family and kinship networks for material (e.g., transportation) and emotional support (McFarlane, Dixon, Lukens, & Lucksted, 2003), which subsequently influenced their perception of social connectedness. From this perspective, those who were not receiving benefits may have had more robust social support systems out of necessity. Conversely, participants who were receiving disability benefits may have relied on more formal sources of support. The current study did not measure specific activities of daily living. Thus, additional conceptualization of key variables is needed to shed light on the complex interrelationships among sociodemographic and psychosocial characteristics of persons with thought disorders receiving integrated PBHC services.

Individuals with access to reliable transportation were significantly more likely to perceive higher levels of social connectedness. Palmer et al. (2002) conducted a study with 83 middle-aged and older-adult outpatients with schizophrenia and found that those who drove (43.4%) exhibited better functional capacity. It is possible that participants with reliable transportation had easier access to organizations and agencies that offer informal sources of recovery and other supports (e.g., IHP wellness programs, self-help groups, adult day care programs, church groups), thereby increasing their perception of social connectedness. On the

other hand, it is also possible that participants with less social support had fewer individuals in their social networks to assist them with transportation.

No health or health-risk characteristics were associated with improvements on any psychosocial characteristics. In other words, medications, health-risk behaviors, and health conditions did not distinguish those who improved from those who did not on measures on functioning, social connectedness, and psychological distress. These findings are inconsistent with those published by Lemieux et al. (2015), who reported significant interrelationships among key health and psychosocial variables. It is possible that attrition, program length, and sample differences contributed to disparate findings.

Characteristics Associated with Improvement in Health

The second major objective of the current study was to examine correlates of improvement in health among individuals with thought disorders. A notable proportion of IHP participants experienced improvement in systolic BP (with at-risk rates decreasing from 48.2% to 40.7%), consistent with Putz et al. (2015). However, unlike participants in the latter study who demonstrated marked improvement in diastolic BP, a slightly greater proportion of IHP participants showed at-risk diastolic BP scores at follow up (29.7%) than at baseline (28.8%). Also inconsistent with findings by Putz et al. (2015), who reported significant decreases in participants' BMI scores, a slightly greater proportion of IHP participants had at-risk BMI scores at follow up (82.1%) than at baseline (80.7%). Increases in diastolic BP and BMI scores in the current sample may be explained by the influence of antipsychotic medications and associated metabolic side effects (Tandon et al., 2008). Future studies should examine type of psychotropic medication when examining correlates of improvement in this population.

With regard to sociodemographic factors, characteristics of living arrangements and disability status were significantly associated with improvement in certain health characteristics at 6 months out. A significantly greater proportion of individuals who lived with someone else experienced improvement in systolic BP, as compared to those who lived on their own. It is possible that those who lived with someone else received medication reminders from family members, subsequently resulting in improved systolic BP. Without additional information about the nuances of participants' living situations, it is difficult to interpret this latter association with confidence. As compared to those who did not receive disability benefits, those who did receive assistance were significantly more likely to experience improvement in BMI from baseline to follow up. It is possible that those with benefits were afforded greater continuity of IHP programs, resulting in a reduction in BMI; however, such speculation would need to be confirmed with additional data about service utilization.

Although not statistically significant, the proportion of Black participants who showed improvement on systolic BP was substantially greater than that of White participants. It is plausible that a greater proportion of Blacks than Whites were at risk on systolic BP at baseline, and the improvement could reflect adherence to prescribed BP medications. The design of the current study does not allow definitive conclusions to be drawn. Not significantly but in a clinically meaningful fashion, a notably greater proportion of individuals who reported that they did not have diabetes at baseline showed improvement from baseline to follow up on systolic BP, as compared to those who did report having diabetes at baseline. It is likely that participants without diabetes at baseline had fewer complications and cardiometabolic conditions (Parks et al., 2006). Conversely, those with diabetes may have faced additional risks. For example, Gough

(2005) showed that individuals with comorbid thought disorders and diabetes faced a variety of health challenges, hampering progress in treatment.

With regard to treatment-related characteristics, clinic site was significantly associated with improvement in health at follow up. Individuals who received IHP services at MDMH were more likely to experience improvement in diastolic BP than participants who received services at CABH and GMH. Anecdotal reports from MDMH staff suggest that the client population was more stable and experienced greater continuity of treatment (C. Lemieux, personal communication, November 27, 2017). Although not assessed in the current study, it is plausible that clinic characteristics influence treatment continuity and subsequent improvements in health. The current study did not examine site differences. Thus, additional research is needed to examine the influence of provider and clinic characteristics on participants' health outcomes.

None of the health and health-risk characteristics were associated with improvement in objective indicators of health. This means that number of prescribed medications, whether or not antipsychotic medications were prescribed at baseline, self-assessed health, and self-reported history of substance use and cardiometabolic conditions did not distinguish those who experienced improvements on objective measures of health from those who did not. These findings are also inconsistent with those reported by Lemieux et al. (2015), who reported significant interrelationships among key health-related factors and health outcomes. As mentioned previously, differences may be explained by attrition, program length, and sample differences.

Conclusions

Key findings in the current study highlight the relevance of certain sociodemographic (i.e., employment status, disability status, living arrangement) and treatment-related (i.e., reliable

transportation, clinic site) characteristics to health and psychosocial improvements in a sample of CMH clients enrolled in co-located PBHC programs. No health or health-risk characteristics were significantly associated with improvement at 6 months out. Additional concluding observations can be made regarding study limitations, study strengths, future research, and implications for the social work field.

Limitations and Strengths

As with all longitudinal studies, it is important to consider the methodological limitations that may have impacted study results. Firstly, the current study is correlational in design, so causality cannot be inferred. Data were collected from 3 CMH settings in one geographical area, limiting generalizability of the findings to other co-located PBHC programs. The sample size ($N=311$) is also a weakness, as smaller samples increase the likelihood of Type II errors (Hackshaw, 2008). Further, attrition resulted in a notable amount of missing data on several study variables, decreasing the number of paired cases in correlational analyses (Rubin & Babbie, 2017). Larger confirmatory studies should be conducted in attempts to replicate the findings of the present study. Future studies should employ random stratification sampling, and data should be collected from multiple sites to increase representativeness. Future analyses should also include additional longitudinal data, as 6 months may have been insufficient for participants to show improvements. Measurement may be a problematic issue, as self-report items introduce potential problems with reliability and validity. For example, individuals may have underreported certain self-report items (e.g., use of illicit substances) because of social desirability bias (Rubin & Babbie, 2017). Also related to measurement, there may have been data entry errors, subsequently resulting in inaccuracies. Finally, the current study utilized secondary data, limiting the number of potential research questions and study variables. There may be

relevant correlates of psychosocial and health improvements that were not measured in the original study. For example, studies have found that religiosity and spirituality are associated with a number of variables that are relevant to health, such as level of psychopathology, social integration, suicide risk, and substance use (Grover, Davuluri, & Chakrabarti, 2014). Religiosity has also been associated with treatment compliance (Grover et al., 2014). Given the overrepresentation of African Americans in the current study, along with a substantial corpus of research underscoring the importance of religious belief and spirituality among African Americans (Sanchez, Chapa, Ybarra, & Martinez, 2012), future research should incorporate measures of these latter concepts when examining health and wellbeing.

Despite its limitations, the current study contributes to the growing knowledge base on integrated PBHC programs and the clients who receive these services. It is the first known longitudinal study to examine correlates of improvements in health and psychosocial characteristics among individuals with thought disorders receiving integrated PBHC services in CMH settings. The few published studies that sampled CMH clients receiving co-located services focused exclusively on program outcomes (Druss et al., 2010; Putz et al., 2015) and descriptive information (Lemieux et al., 2015), not the variables that may predict improvement. Results from the current study showed that non health-related factors emerged as significant correlates of improvement among individuals with thought disorders, suggesting that social determinants are relevant for this population. No health or health-risk characteristics were significantly associated with improvement. These findings are counterintuitive, as existing studies (Lemieux et al., 2015) suggest the importance of both psychosocial and health-related characteristics when considering whole-person health.

Implications for Social Work Research

Research focused on recipients of co-located PBHC services is scant and remains a worthy pursuit. The current study examined associations among sociodemographic and treatment-related characteristics and improvements in health and psychosocial characteristics. Future studies should attempt to replicate these findings with larger samples (Hackshaw, 2008), and data should be collected from multiple sites in different geographical areas. Further, future analyses should implement stratified sampling methods to increase representativeness. Researchers should design studies that collect objective data (Thomas, 2017) in order to confirm participant self-reports, and these analyses should gather additional longitudinal data in order to allow more time for improvement. Future research should include potentially influential variables that may predict improvement, such as religion and spirituality (Grover et al., 2014), caregiving responsibilities, and peer support (Lemieux et al., 2015). Finally, future studies should attempt to collect follow-up data from all participants, even those who do not return for services, in order to better understand differences between those who do and do not show improvement.

Implications for Social Work Practice

The current study highlights the relevance of social determinants of health among individuals with thought disorders. Social workers should ask clients questions about their material (e.g., transportation and disability benefits) and emotional (e.g., family and peers) resources as part of a comprehensive assessment. Practitioners should also conduct regular follow-up assessments to capture changes in these resources. The present study also highlights the longstanding health disparities faced by individuals with thought disorders and the cumulative effects of inadequate access to health care. In attempts to eliminate these disparities,

social workers should use plain language when discussing health concerns with clients and also help to coordinate care when clients need specialty services (Druss et al., 2010). Further, social workers should adopt educational roles in CMH settings, teaching other providers about CMH clients' unique needs. Finally, many participants in the current study did not return for services at follow up, so social workers should work towards improving treatment adherence and appointment attendance, both of which are significantly associated with health and psychosocial improvements (Adair et al., 2005; Druss & Walker, 2011). This might involve helping clients secure access to reliable transportation when needed.

Implications for Social Work Education

Training and education are necessary to enhance competencies among social workers who serve CMH clients receiving integrated PBHC services. Schools of social work should expand existing curricula to prepare graduates for practice in integrated health settings. For example, faculty may introduce core competencies for behavioral health and primary care (see, e.g., Hoge, Morris, Laraia, Pomerantz, & Farley, 2014) in practice and diagnostic courses. Diversity classes should highlight the overlapping and interdependent systems of discrimination and disadvantage experienced by CMH clients in order to increase cultural competency and understanding of the unique needs of individuals with SMI. Additionally, social work students should have the opportunity to apply new knowledge in the field, subsequently improving their ability to function professionally in integrated settings. Finally, it is critical that social workers engage in continuing education in order to learn the latest knowledge about clients with SMI and comorbid conditions and best practice in integrated settings.

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APPENDIX: LSU IRB APPROVAL FOR EXEMPTION FROM INSTITUTIONAL OVERSIGHT



ACTION ON EXEMPTION APPROVAL REQUEST

TO: Mary Heintz
Social Work

FROM: Dennis Landin
Chair, Institutional Review Board

DATE: October 5, 2017

RE: IRB# E10651

TITLE: Characteristics Associated with Improvements in Health Among Community Mental Health Clients With Thought Disorders Receiving Co-Located Primary Care Services

Institutional Review Board
Dr. Dennis Landin, Chair
130 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.5983
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New Protocol/Modification/Continuation: New Protocol

Review Date: 10/4/2017

Approved **Disapproved**

Approval Date: 10/4/2017 **Approval Expiration Date:** 10/3/2020

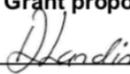
Exemption Category/Paragraph: 4a

Signed Consent Waived?: N/A

Re-review frequency: (three years unless otherwise stated)

LSU Proposal Number (if applicable):

Protocol Matches Scope of Work in Grant proposal: (if applicable)

By: Dennis Landin, Chairman 

PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING –

Continuing approval is CONDITIONAL on:

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants, including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. **SPECIAL NOTE: When emailing more than one recipient, make sure you use bcc. Approvals will automatically be closed by the IRB on the expiration date unless the PI requests a continuation.**

* All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at <http://www.lsu.edu/irb>

VITA

Mary Elizabeth Heintz was raised in Baton Rouge, Louisiana. She graduated summa cum laude with a Bachelor of Science in Psychology from Louisiana State University in 2015. As an undergraduate, she was highly involved at the Crisis Intervention Center, where she gained extensive experience in crisis intervention. Mary also gained experience in research as a student worker at Pennington Biomedical Research Center and as a research assistant under Dr. Alex Cohen at Louisiana State University.

In fall of 2016, Mary matriculated at the Louisiana State University School of Social Work to pursue her Master of Social Work degree. Over the course of two years, she has interned at the Baton Rouge General Medical Center and Capital Area Center for Adult Behavioral Health, where she gained experience in conducting comprehensive psychosocial assessments, medical social work, and individual and group counseling. Mary serves as the co-president of Social Workers Advocating for Equality, a student organization that seeks to promote LGBTQ education, support, service, and pride through a variety of activities. She was awarded the School of Social Work Entering Class of 1951 Fellowship Fund in fall of 2017 for her commitment and leadership in promoting diversity. Mary is interested in adult behavioral health and plans to gain further clinical experience working as a social worker in a mental health setting upon graduation. She plans to continue her education in the future through doctoral studies after acquiring her Licensed Clinical Social Worker credential.