Interrelationships among Medication Types and Health Characteristics in Individuals with Bipolar Disorder Receiving Integrated Health Services

Laura Pier Valle
Louisiana State University and Agricultural and Mechanical College, lauravzwam@gmail.com

Recommended Citation
Valle, Laura Pier, "Interrelationships among Medication Types and Health Characteristics in Individuals with Bipolar Disorder Receiving Integrated Health Services" (2017). LSU Master's Theses. 4565.
https://digitalcommons.lsu.edu/gradschool_theses/4565
INTERRELATIONSHIPS AMONG MEDICATION TYPES AND HEALTH CHARACTERISTICS IN INDIVIDUALS WITH BIPOLAR DISORDER RECEIVING INTEGRATED HEALTH 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
Masters of Social Work

in

The School of Social Work

by
Laura Pier Valle
A.B., Princeton University, 2009
May 2017
To Daphne,  
Who kept me going even when I thought it wasn’t possible  

and  

To Stefan,  
Who made it possible.
ACKNOWLEDGMENTS

To my committee chair, Dr. Catherine Lemieux: Thank you for giving me the
opportunity to be a part of this amazing project. Thank you also for your kind guidance and
reassurance when I was feeling overwhelmed. From my opening sentence to my conclusion you
were fully present, helping me improve my writing and analytical skills. You have been a
fantastic academic role model. Your enthusiasm and energy is inspirational. To my committee
members, Dr. Timothy Page and Dr. Mi Youn Yang, thank you for your feedback, contributions,
and flexibility.
# TABLE OF CONTENTS

ACKNOWLEDGMENTS .................................................................................................................. ii  

ABSTRACT ........................................................................................................................................ v  

CHAPTER 1: INTRODUCTION ....................................................................................................... 1  
  Problem Statement ......................................................................................................................... 1  
  Scope and Importance of the Problem ............................................................................................ 2  
  Theoretical Significance ................................................................................................................ 4  
  Unique Contribution to the Field .................................................................................................... 5  

CHAPTER 2: LITERATURE REVIEW .............................................................................................. 7  
  Bipolar Disorder and Health .......................................................................................................... 7  
  Integrated PBHC Models ................................................................................................................ 12  
  Monitoring Physical Health of Persons with SMI: Health Characteristics ......................... 15  
  Self-Assessed Health: Definition and Relevance ......................................................................... 17  
  Medications for Bipolar Disorder ................................................................................................ 20  
  Summary and Implications of Literature Review ....................................................................... 33  

CHAPTER 3: CONCEPTUAL FRAMEWORK ............................................................................... 36  
  Purpose ......................................................................................................................................... 36  
  Research Questions ....................................................................................................................... 36  
  Hypothesis ..................................................................................................................................... 36  
  Key Terms ..................................................................................................................................... 37  

CHAPTER 4: METHODOLOGY .................................................................................................... 39  
  Sample .......................................................................................................................................... 39  
  Original Study ................................................................................................................................. 39  
  Protection of Human Subjects ........................................................................................................ 40  
  Instrumentation .............................................................................................................................. 40  
  Data Analysis ................................................................................................................................. 45  

CHAPTER 5: RESULTS .................................................................................................................. 47  
  Descriptive Statistics of Participant Characteristics ................................................................... 47  
  Medication Regimen and Self-Assessed Health .......................................................................... 53  
  Medication Risk and Differences in Health Characteristics .................................................... 58  

CHAPTER 6: DISCUSSION .............................................................................................................. 62  
  Sample Characteristics .................................................................................................................. 62  
  Medication Regimen and Self-Assessed Health ........................................................................ 70  
  Medication Risk and Differences in Health Characteristics .................................................... 72  
  Conclusions ................................................................................................................................... 74  

REFERENCES ............................................................................................................................... 80
ABSTRACT

Integrated primary and behavioral healthcare (PBHC) programs are a recent development in the field of mental health. The purpose of these programs is to combat the sizeable health discrepancies among persons with serious mental illness (SMI), who suffer from more comorbidities and lower life expectancy than the general population. Bipolar disorder (BPD) is a common SMI diagnosis that is associated with a substantial health burden. Research has shown that Bipolar disorder (BPD) responds well to medication, but clients with BPD often struggle with adherence to a medication regimen. Side effects and other health-related factors are often cited by clients as a reason for nonadherence. This cross-sectional, descriptive study used data from 241 de-identified individuals receiving care through an integrated PBHC program to examine associations between relevant health and psychosocial characteristics and different types of medication for BPD in persons with BPD. The current study used novel coding schemes to organize and analyze psychiatric medications for BPD.
CHAPTER 1: INTRODUCTION

Problem Statement

Finding a proper pharmaceutical treatment for bipolar disorder can be a long and complicated process and positive outcomes depend on a variety of variables, some of them subjective and intangible. Generally, when these medications are administered by a psychiatrist, the doctor fits the right medication to the patient by relying on a list of physical variables such as weight, blood pressure, and susceptibility to side effects. However, the potential impact of medication on individuals with severe mental illness (SMI) can be greater than simply numbers on a doctor’s chart. An individual’s metric for how healthy he or she feels can often be a more holistic determination, taking into consideration the social, environmental, and psychological impacts of medical choices.

The purpose of the proposed project was twofold. The first purpose was to examine the sociodemographic, health, health-risk, and psychosocial characteristics of individuals with bipolar disorder in a community mental health (CMH) setting. The second purpose was to assess the interrelationships between self-rated health among individuals with bipolar disorder and the combinations of psychiatric medications they are prescribed. The present study utilized secondary data previously collected from participants in an integrated primary and behavioral health (PBHC) program in a CMH setting (Lemieux, Richards, Hunter, & Kasofsky, 2015). An integrated PBHC program is particularly suited to research that straddles the boundary between social work and medical disciplines. In an integrated PBHC setting, clients receive interdisciplinary services under the care of one provider or network of providers (Lemieux et al., 2015). From a research standpoint, a variety of health-related and psychosocial data can be easily collected and analyzed.
Scope and Importance of the Problem

The use of psychiatric medication is ubiquitous in the United States. In 2010, one in every five adults was taking a medication to treat a mental illness (Medco Health Solutions, Inc., 2011). Bipolar disorder (BPD) comprises a significant portion of DSM-5 diagnoses in the United States with a 12-month prevalence of 2.6% (American Psychiatric Association [APA], 2013). BPD is a particularly pressing issue in the United States. The proportion of people worldwide that has met the diagnostic criteria for BPD in their lifetime is currently about 2%; however it is twice that high in the United States, at about 4% (Merikangas et al., 2011). This sizable population experiences more years of disability than all cancer diagnoses or major neurological conditions (Merikangas et al., 2011).

For people with BPD, taking unsuitable medications can lead to problems with adherence. Studies of medication nonadherence in people diagnosed with BPD have shown that up to 64% report that they have struggled with adherence to a medication regimen (Leclerc, Mansur, & Brietzke, 2013). Nonadherence to BPD medications in this population can lead to a host of negative mental health consequences including a worsening of the severity of the disease, greater number emergency room visits and inpatient hospitalizations, poor quality of life, and even suicide (Lew, Chang, Rajagopalan, & Knoth, 2006; Sajatovic et al., 2009). The research is fairly conclusive: Higher severity of psychopathology is negatively correlated with quality of life among clients with BPD and the vast majority of mainstream medications for BPD have been empirically shown to effectively reduce symptomology (Awade & Hogan, 1994; Bentley & Walsh, 2006; Vojta, Kinosian, Glick, Altshuler, & Bauer, 2001; Yen et al., 2008). Therefore, medication adherence is a critical clinical issue in an integrated PBHC program concerned about health and wellness.
To solve the problem of nonadherence to medication, practitioners may have to look outside of the medication’s intended impact on symptomology. Treatment adherence rates are largely associated with individual perception of medication treatment and health (Sajatovic et al., 2009). Some characteristics that impact these perceptions include a lack of insight, beliefs regarding the controllability of individual health, experiencing stigma associated with mental health treatment, experience of intolerable or burdensome side effects, and complicated medication regimens (Sajatovic et al., 2009). Of these characteristics, the latter two are of interest to practitioners who prescribe and help to monitor pharmaceutical treatment.

Side effects of medication can also impact cognitive functioning and emotional reactivity, which increases the risk of somatization (Ritsner, 2003; Yen et al., 2008). Additionally, some medications have side effects that impact a client’s self-concept and social life. Side effects most associated with nonadherence include issues like moderate weight gain or sedative side effects; issues that may seem minor to a medical professional, but may notably impact how clients feel about themselves (Johnson et al., 2007; Velligan et al., 2010). These side effects can result in clients feeling unwell because of physical, social, and psychological symptoms that may not be detected by a primary care provider. This inattention to side effects and their impact on subjective well-being may be a potential risk factor for treatment and medication nonadherence (Barraco, Rossi, & Nicolo, 2012; Velligan et al., 2010). When Vargas-Huichochea, Huicochea, Berlanga, and Fresán (2015), for example, asked patients their reasons for feeling dissatisfied with their treatment, the majority cited medication side effects and a “sense of poor medical support” as the reason for their feelings of dissatisfaction (p. 676). Research shows that when patients do not have faith in their treatment team, they do not take their medications as
prescribed (Kleindienst & Greil, 2004). It is therefore crucial that the patients’ perceptions of their own wellness are a priority when managing medications.

The current study did not collect objective measures of medication side effects among the study participants. It is therefore difficult to measure the impact that individual medications have on client perceptions of health despite the fact that medication side effects are often present and onerous (Bentley & Walsh, 2006). The literature suggests that side effects have an impact on clients’ perceptions of their own health and, thus, knowledge about these impacts are valuable in helping to guide practitioners that prescribe and monitor medications (Bentley & Walsh, 2006). Measuring self-assessed health as it varies across medication types is an exploratory method of inquiry into these complex associations. Measurements of self-assessed health are able to capture a clients’ full array of perceived pathology (Idler & Benyamini, 1997). It also can represent complex, subjective judgments about the severity and trajectory of physical health (Idler & Benyamini, 1997). Thus, self-assessed health may be a useful instrument to measure clients’ perception of physical health in the absence of an instrument that directly measures the unintended impacts of medication on health.

**Theoretical Significance**

The theoretical underpinnings of this study are rooted in George Engel’s biopsychosocial framework. The biopsychosocial model was developed in the early twentieth century as a way to integrate biological reductionism and psychoanalytic theory, two theories that were in conflict at the time (Purdy, 2013). Engel criticized the biomedical field of his time, claiming that the biological view of human health was excessively narrow (Borrell-Carrió, Suchman, & Epstein, 2004). The biopsychosocial model was an attempt to humanize the practice of medicine and to empower patients (Borrell-Carrió et al., 2004). Engel developed the most commonly used
formulation of the biopsychosocial model, which has become a benchmark theory throughout modern patient-centered health practice. (Purdy, 2013).

The biopsychosocial method requires practitioners to examine and consider all of the biological, psychological, and social influences on health. These influences exist on a continuum that includes the entire biosphere as well as aspects of human organization such as family, community, and culture. (Purdy, 2013). Drawing heavily on systems theory, Engel posited that different levels of the biopsychosocial organization interact with one another, and that the rules that explain the impact of these different biopsychosocial elements on the person are specific to the individual (Borrell-Carrió et al., 2004). Therefore, the elements of biological, social, and psychological spheres are deterministic of well-being and an individual’s history and development impact the degree to which destabilizing the system will affect his or her health.

In mental health treatment settings, medication and its side effects should be considered the context of the biopsychosocial model of treatment. Psychiatric medications have been developed specifically to impact the individual both physically and emotionally. In addition, both the psychological and biological aspects of taking the medication can, in turn, influence the patients’ social functioning and place in their community (Bentley & Walsh, 2006). Thus, it is important to weigh the impact of these medications accordingly.

**Unique Contribution to the Field**

Integrated PBHC programs are relatively new and represent a unique setting for collecting data on the physical and behavioral health of patients. Very few descriptive studies have been conducted with participants in integrated PBHC (e.g., Gleason et al., 2014; Lemieux et al., 2015). The current cross-sectional study sought to describe medications prescribed for persons with BPD and it examined interrelationships between different medication types and
self-rated health. There is no research to date that has examined BPD medications and their correlates among clients receiving integrated health services in a CMH center. The present study sought to add to the knowledge base by delineating relationships between medication types and important psychosocial characteristics for this unique sub-population of CMH center clients.
CHAPTER 2: LITERATURE REVIEW

This chapter reviews the current literature regarding the health characteristics of persons with BPD, existing literature about integrated health programs, a description the general self-rated health variable and its use in research, and the effectiveness and adverse effects of medications used to treat BPD. This chapter concludes with a discussion of implications of the literature.

**Bipolar Disorder and Health**

In 2014, about 9.8 million adults in the United States were diagnosed with a Serious Mental Illness (SMI) (National Institute of Mental Health [NIMH], 2014a), which is a mental health diagnosis that interferes with one or more aspects of daily living. The 12-month prevalence of BPD is 2.6% of the U.S. adult population (NIMH, 2014b). Of these cases, about 82.9% will be categorized as having an SMI that interferes with major life activities (NIMH, 2014b).

BPD is a term for a cluster of chronic illnesses marked by prolonged episodes of mania, mania and depression, or hypomania and depression (American Psychiatric Association, APA, 2013). Manic and hypomanic episodes are characterized by the same constellation of symptoms including, but not limited to grandiosity, decreased need for sleep, increased goal-directed activities, and risky behavior (APA, 2013). Mania is differentiated from hypomania when symptoms include psychotic features or when the episode is sufficiently disabling to require hospitalization (APA, 2013). Major depressive episodes are defined as prolonged episodes of symptoms including depressed mood, loss of interest or pleasure, appetite and sleep disturbances, fatigue, anhedonia, and feelings of worthlessness and guilt (APA, 2013). There are two primary forms of BPD. Bipolar I Disorder is diagnosed as the result of a single manic
episode. While 60% of manic episodes occur prior to a depressive episode, a depressive episode is not a prerequisite for the diagnosis of Bipolar I Disorder (APA, 2013). Bipolar II Disorder is diagnosed after an individual has met the criteria for at least one hypomanic and one depressive episode (APA, 2013). Both of these disorders can be extremely distressing; about one third of people diagnosed with these disorders will attempt suicide in their lifetimes (APA, 2013).

Between one fifth and two thirds of people diagnosed with bipolar disorder report some type of somatic comorbidity (Castelo et al., 2012; Feldman, Gwizdowski, Fischer, Yang, & Suppes, 2012; Kemp et al., 2013; Krishnan, 2005; Magalhaes et al., 2012; McIntyre et al., 2006; Perron et al., 2009; Vrblevska & Fountoulakis, 2015). The most frequently reported medical concerns include cardiovascular disease, endocrinological disease, gastrointestinal disorders, and pain (Vrblevska & Fountoulakis, 2015). In addition, individuals diagnosed with BPD report an average of 2.7 medical comorbidities, compounding the effects of these deleterious conditions (Kilbourne et al., 2009; McIntyre et al., 2006; Soreca, Frank, & Kupfer, 2009; Vrblevska & Fountoulakis, 2015). Due in a large part to these medical comorbidities, primarily cardiovascular illnesses, individuals with BPD have a life expectancy that falls 20 to 30 years short of the general population (Colton & Masderscheid, 2006; Vrblevska & Fountoulakis, 2015).

**Possible Causal Explanations for Health Disparities**

High rates of medical comorbidity among those diagnosed with BPD are attributed to numerous factors. First, the symptoms of BPD itself can lead to negative health outcomes. Weight gain, for instance, can be a symptom of bipolar depression in general (Morriss & Mohammed, 2005). Additionally, the stress caused by the rapidly changing symptoms of the disease can increase cortisol levels and dysregulation of the hypothalamic-pituitary-adrenal axis, which may put patients at a higher risk for hyperglycemia, metabolic syndrome, and
atherosclerosis (Brindley & Rolland, 1989; Roshanaei-Moghaddam & Katon, 2009; Rosmond & Bjorntorp, 2000).

Differences in lifestyle can also contribute to health disparities experienced by individuals with BPD, as compared to the general population. These include lifestyle factors that may be unavoidable for people with BPD, such as homelessness and poor access to health services (Roshanaei-Moghaddam & Katon, 2009) as well as detrimental lifestyle choices that are more commonly found in people with BPD. People with BPD are 2 to 3 times more likely to start smoking than the general population and they may be less likely to attempt or achieve abstinence (Heffner, Strawn, DelBello, Strakowski, & Anthenelli, 2011). BPD is also comorbid with substance use disorders, with over 50% of patients reporting a past or present substance use disorder (Vrublevska & Fountoulakis, 2015). Substance use disorders, in turn, increase the risk of liver disease and HIV/AIDS infection (Vrublevska & Fountoulakis, 2015).

Problems accessing proper treatment can be a major contributing factor to the disparity in health among people with BPD. There is evidence that people with severe mental disorders receive lower quality healthcare across multiple treatment fields including preventative medicine (Druss, Rosenheck, Desai, & Perlin, 2002; Roshanaei-Moghaddam & Katon, 2009; Thorpe, Kalinowski, Patterson, & Sleath, 2006), diabetes care (Desai, Rosenheck, Druss, & Perlin, 2002; Frayne et al., 2005; Kreyenbuhl et al., 2006), treatment for hypertension (Nasarallah et al., 2006; Roshanaei-Moghaddam & Katon, 2009; Wang et al., 2005), quality of cardiovascular procedures and follow up (Lawrence, Holman, Jablensky, & Hobbs, 2003; Petersen, Normand, Druss, & Rosenheck, 2003; Young & Foster, 2000), and treatment for dyslipidemia (Nasarallah et al., 2006; Roshanaei-Moghaddam & Katon, 2009). This disparity in quality of care can be due to multiple factors. People with BPD may not be able to effectively communicate with their doctors.
about their physical symptoms due to affective and cognitive challenges (Birdwell, Herbers, & Kroenke, 1993; Bowie & Harvey, 2005; Roshanaei-Moghaddam & Katon, 2009). Moreover, at the provider level, bias against people with mental illness can lead to poor quality of care (Jackson & Kroenke, 1999; Lawrence & Coghlan, 2002; Roshanaei-Moghaddam & Katon, 2009). Mental health professionals may also hold certain biases, prioritizing mental health concerns over medical concerns, which can adversely affect patient quality of care (Roshanaei-Moghaddam & Katon, 2009). Nationally, the ability for patients to access healthcare services is a concern. Further, lack of insurance, poor access to services, and the lack of integrated mental and physical healthcare all may contribute to the relatively poorer health of people with BPD (Roshanaei-Moghaddam & Katon, 2009).

Finally, the impact of medication side effects on the physical health of those with BPD is also a notable concern. For example, most medications for BPD are associated with weight gain and antipsychotic treatment is associated with increased rates of diabetes (Morriss, 2009; Vrublevska & Fountoulakis, 2015). Indeed, many medications that are routinely prescribed for BPD, when taken over the long term, can have a profoundly negative impact on rates of morbidity (Chue & Kovacs, 2003; DeHert, 2011).

Impact of Medical Comorbidities on Psychosocial Functioning

Although the literature is limited in scope, at least one large study has shown that an increased burden of medical illness among people with BPD can substantially diminish psychosocial functioning. McIntyre et al. (2006) completed the first cross-national study that explored the functional implications of comorbid medical conditions on BPD. These latter authors found that chronic comorbid medical disorders were associated with more severe
symptoms of BPD, maladjustment at home and work, increased disability payments, and increased use of healthcare services (McIntyre et al., 2006).

Treatment outcomes for BPD itself are considerably worse among patients diagnosed with a comorbid disorder. Research shows that a diagnosis of a chronic health condition is associated with more mood episodes, longer episode duration, comorbid obsessive-compulsive disorder, and higher rates of medication treatment (Gili et al., 2011; Kemp et al., 2013; Kemp, Gao, Chan, Ganoczy, Findling, & Calabrese, 2010; Sylvia et al., 2015; Thompson, Kupfer, Fagiolini, Scott, & Frank, 2006).

BPD is a costly illness even before medical comorbidities are considered. According to the World Health Organization (WHO), BPD is the seventh leading disorder worldwide associated with years lost to illness and disability (Depp, Harmell, & Harvey, 2015). In the U.S., this translates to a $150 billion economic burden each year, with the direct costs totaling $30.7 billion in 2009 (Dilsaver, 2011).

Patients with BPD spend over $12,100 each year on healthcare (Guo, Keck, Li, Jang, & Kelton, 2008). National estimates indicate that about 15% is spent on prescription drugs, 20% on hospitalizations, and 25% on outpatient visits and additional medical care (Guo et al., 2008). However, Guo, Keck, Li, Jang, and Kelton (2008) found that about 67% of the patients’ health care costs were spent treating comorbidities and not BPD itself. These findings indicate that medical and psychiatric comorbidities of BPD may be more expensive to treat than the illness itself (Guo et al., 2008). However, there is limited research examining these healthcare costs.
**Integrated PBHC Models**

Data describing the physical health disparities of people with BPD suggest that new models of care may be necessary to improve the overall health of this population (Roshanaei-Moghaddam & Katon, 2009). Recent literature suggests that integrated healthcare programs that combine primary and behavioral health care better serve persons with SMI (Druss, Rorbaugh, Levinson, & Rosenheck, 2001; Druss et al., 2010; Killbourne et al., 2008; Lemieux et al., 2015; Woltmann et al., 2012). Heath, Wise, Romero, and Reynolds (2013) describe integrated health care programs as existing on a continuum, with three general categories: coordinated, co-located, and integrated. Care is described as coordinated when there is minimal, but purposeful communication between behavioral and primary healthcare providers (Heath et al., 2013). Care is co-located when providers exist in the same facility and have multiple opportunities to communicate about the patients they have in common (Heath et al., 2013). Co-located treatment professionals generally have sufficient dialogue to develop an understanding of each other’s roles (Heath et al., 2013). Finally, care is described as integrated when providers function as a collaborative team (Heath et al., 2013). A fully integrated practice is a structure of integrated care where interdisciplinary providers function as a single health system (Heath et al., 2013). Fully integrated community-based programs are difficult to achieve because they rarely able to secure the resources needed to reach this advanced level of integration (Druss & Walker, 2011). Integrated care approaches have been shown to have a positive effect on multiple facets of wellness. For example, Woltman et al., (2012) analyzed 78 studies of individuals with depression and anxiety receiving collaborative care and found that a variety of outcomes were improved including social function, physical symptoms, clinical symptoms, and quality of life.
CMH settings are ideal for providing integrated health services to people with SMI. In the literature, CMH agencies are defined as a broad range of “public-sector, community-based providers of mental health services” (Druss et al., 2008, p. 917). CMH agencies serve more than 3.5 million people with SMI each year and are acutely aware of the health crisis affecting people with SMI (Druss et al., 2010). A national study showed that CMH agency leaders (90%) agree that the physical health of their clients is a priority for their programs (Druss et al., 2008).

Historically, CMH facilities like these would not have prioritized physical health to such a degree; however, recent events have shifted attitudes toward a more holistic perspective on mental health (Druss et al., 2008). Concerns about the effects of antipsychotics on long term health, the acceptance of the “recovery paradigm and its emphasis on wellness,” and recent reports on the health disparities of people with SMI are factors that have contributed to CMH agencies reprioritizing physical health as an important part of their practice (Druss et al., 2008, p. 918-919). Unfortunately, although CMH agencies are optimal settings for establishing fully integrated care approaches, most do not have the resources to develop such complex services (Druss et al., 2010). However, while full integration of services may not be feasible in CMH settings, collaborative care approaches (e.g., colocation of primary care providers in a CMH agency) show promise for achieving desired clinical outcomes (Druss & Walker, 2011).

Few studies have examined collaborative care interventions in CMH agencies and described populations that may benefit from such interventions. The Primary Care and Evaluation (PCARE) study is the only evaluation study to date that has used a rigorous design to assess an integrated treatment approach in a CMH setting (Druss et al., 2010). Evaluators randomly assigned 407 clients to either an evidence-based care management intervention or to usual services (Druss et al., 2010). Participants in the experimental group regularly saw a
registered nurse care manager who provided information to clients about their medical conditions, provided referrals to local medical providers, and coordinated upcoming medical appointments (Druss et al., 2010). The care manager also acted as an advocate for clients, facilitating contact with primary care providers to make appointments and enrolling them in relevant social services (Druss et al., 2010). Results showed that the care management approach significantly reduced cardiovascular risk factors and improved health-related quality-of-life outcomes (Druss et al., 2010). Further, participants receiving care management services were more likely to obtain an off-site primary care provider (Druss et al., 2010).

In an uncontrolled evaluation, Putz et al. (2015) studied the impact of integrated treatment on 169 adults with SMI in a CMH setting. These latter authors found that over the course of 6 months, participants experienced a significant improvement in multiple cardiometabolic health indicators (e.g., weight loss, improved lipid levels,) and a significant reduction in daily cigarette use (Putz et al., 2015). Horevitz and Maoleas (2013) assessed collaboration between medical professionals and social workers in an integrated setting, but did not describe the patient population. Nover (2013) and Shor and Shalev (2013) analyzed patient satisfaction within small preliminary wellness projects.

Several studies have used integrated health data to describe the characteristics of CMHC patients and professionals. For example, Lemieux et al. (2015) described the health-related and psychosocial characteristics of 125 clients receiving care management services in CMH setting (e.g., socio-demographics, health characteristics, health-risk behaviors, and family history) and examined a variety of interrelationships between these characteristics (e.g., family history and health indicators, race and health indicators, gender and health indicators).
Gleason et al. (2014) described gender differences among 311 clients with chronic mental health conditions enrolled in a co-located integrated PBHC setting. These latter authors found that women had higher rates of mood and anxiety disorders and were more likely to report recent psychological symptoms. Female participants in the study also had an increased waist circumference and BMI. Men were at a greater risk for hypertension and elevated triglyceride levels. Men also consumed larger amounts of tobacco.

Masinter (2016) conducted a descriptive cross-sectional study with 410 clients with Major Depressive Disorder (MDD) in an integrated PBHC setting. This study focused primarily on physical health, health-risk, psychosocial, and social support characteristics among this population.

**Monitoring Physical Health of Persons with SMI: Health Characteristics**

Paramount to the discussion of integrated care for people with SMI is the interrelatedness of health and psychosocial functioning (e.g., Druss & Walker, 2011; Pratt et al., 2008). Cardiometabolic conditions are of particular concern among individuals with SMI (Correll et al., 2010) and health providers should regularly screen for and monitor these conditions. According to De Hert et al. (2011) obesity, hypertension, high triglyceride (TRI) levels, reduced high density lipoprotein (HDL) and high blood glucose are five cardiometabolic conditions that are predictive of the development of diabetes, heart disease, and stroke. Best practices currently dictate that all persons with SMI, and those taking atypical antipsychotics in particular, should be regularly screened for these latter conditions (Correll et al., 2010; De Hert et al., 2011; Parks, Radke, & Mazade, 2008). For this population, the most effective way to monitor for these risks is to systematically track a list of recommended laboratory risk indicators including body mass index (BMI), blood pressure, blood glucose, cholesterol, and lipid levels (Parks, Svendsen,
Singer, & Foti, 2006; Parks et al., 2008). The Center for Integrated Health Solutions (CIHS) (2013) established clinical criteria that define when an individual is at risk for some type of cardiometabolic disorder.

According to the criteria set by CIHS (2013), elevated systolic blood pressure is defined as ≥130 and elevated diastolic is ≥85. Obesity is determined with a BMI score (which is calculated using a height-to-weight ratio). A BMI of ≤24 indicates that the individual is underweight or at a normal weight; 25-29 is considered overweight; and ≥30 is considered obese (CIHS, 2013). These latter two indicators are linked to a variety of different cardiometabolic morbidities. High blood pressure is associated with an increased risk of heart disease, stroke, and hypertension, while obesity is associated with increased risks of type 2 diabetes, heart disease, stroke, and hypertension (Parks et al., 2006; 2008).

According to Parks et al. (2008), lower levels of triglycerides (TRI) and low density lipoprotein (LDL) are associated with a lower risk for diabetes and heart disease. Established CIHS (2013) guidelines indicate that at-risk levels of TRI and LDL are ≥150 mg/dl and ≥130 mg/dl, respectively. Adequate levels of high density lipoprotein (HDL) are associated with lower total cholesterol and a lower risk of obesity (Parks et al., 2008). At-risk levels of HDL are <40 mg/dl in men and <50 mg/dl in women (CIHS, 2013).

Monitoring the health of people with SMI may also necessitate assessing health-risk behaviors such as tobacco, alcohol, and other substance use. These risk behaviors are more prevalent among individuals with SMI than in the general population (Parks et al., 2006). About 75% of people with SMI are regular smokers, which is more than twice the rate of the general population (Hartz et al., 2014). People with SMI are three times more likely to be binge drinkers than the general population and approximately half (50%) smoke marijuana, as compared to 12-
18% in the general population (Hartz et al., 2014). One study showed that over one-fourth of clients with SMI were diagnosed with a co-occurring substance use disorder (Druss et al., 2010).

Lemieux et al. (2015) examined health characteristics of 125 individuals with SMI receiving integrated PBHC in a CMH setting and found that African Americans, women, and those with a family history of cardiometabolic conditions showed worse health outcomes. Women had significantly more co-morbid disorders than men and they were disproportionately affected by cardiovascular disease, in particular (Lemieux et al., 2015). Additionally, African Americans were significantly more likely to have elevated BP or to be diagnosed with hypertension than were whites (Lemieux et al., 2015). Individuals with a family history of cardiac disease or hypertension were more likely to experience heightened diastolic BP than individuals without a family history of cardiac disease or hypertension (Lemieux et al., 2015). Additionally, those with family histories of diabetes were more likely to have higher mean total lipid scores than those without a family history of diabetes (Lemieux et al., 2015).

**Self-Assessed Health: Definition and Relevance**

The general self-rated health (“GSRH”) score is often used as a measure of physical health among health researchers. The purpose of the GSRH instrument is to measure self-assessed health (i.e., how clients would rate their current state of health). Clients are asked to answer to rate their current health on a Likert scale. This single-item question has been extensively used in a large number of major studies because it is a simple way to summarize relevant health-related variables (Krause & Jay, 1994).

**The GSRH as a predictor of mortality**

GSRH is a reliable predictor of mortality. Mossey and Shapiro’s (1982) analysis of the Manitoba Longitudinal Study was the first clear affirmation of this association. These latter
researchers found that the GSRH was a better predictor of 7-year survival than either medical records or self-reported medical conditions for older Canadians (Mossy & Shapiro, 1982). Another large-scale study conducted by DeSalvo, Fan, McDonnell, and Fihn (2005) showed that the GSRH score was just as accurate as the Short Form 36 Health Survey Update and the Seattle Index of Comorbidity for predicting mortality within 12 months for Veterans Affairs patients. The literature describing the predictive ability of GSRH scores is abundant: Three landmark meta-studies have been conducted using available research. Idler and Benyamini (1997) conducted a meta-analysis of 27 longitudinal community studies of self-ratings of health as predictors of mortality and found that the GSRH score was an independent predictor of mortality in 23 (~85%) of the studies. Kawada (2003) analyzed 30 studies and also found that GSRH was an independent predictor of survival that controlled for other health variables. DeSalvo, Bloser, Reynolds, Je, and Munter (2005) analyzed 163 community-based prospective cohort studies and found a statistically significant relationship between poor GSRH scores and an increased risk of mortality. Further, DeSalvo et al., (2005) found that individuals who self-rated their health as “poor” are nearly twice as likely to die as those who rate their health as excellent.

The GSRH as a predictor of other health outcomes

GSRH scores also correlate strongly with other health outcomes. For example, relationships have emerged between GSRH scores and hospitalizations (Bath, 1999; Mutran & Ferraro, 1988; Weinberger et al., 1986), nursing home placements (Bath, 1999; Weinberger et al., 1986), and disability status (Månsson, Merlo, & Östergren, 2002). A longitudinal study conducted by Bath (1999) followed 1042 older adults over the course of 10 years to examine interrelationships among health characteristics. Bath (1999) found that the GSRH score was an independent risk factor for long-term increased medication and health service usage: Participants
with lower GSRH scores were more likely to be on more medications for longer periods of time. In this latter study, GSRH scores were a sensitive predictor of medication and service use (Bath, 1999). For example, fair and average ratings were associated with increased service usage whereas poor self-assessed health was predictive of less service usage (Bath, 1999). Thus, the GSRH score appeared to be a more nuanced predictor of cross-sectional health characteristics than of mortality, suggesting that the GSRH score may be a useful measure for predicting a multitude of health-related outcomes (Bath, 1999).

**Interpretations of the robust associations between GSRH and health outcomes**

The literature proposes several explanations for the consistently strong correlations between GSRH and health outcomes; however, the research is still speculative. GSRH score may be a more inclusive measure of health status than other more objective measures (Idler & Benyamini, 1997). When patients make subjective perspectives about their own health, they may do so based on a combination of factors including family history, their personal habits and hygiene, and even conditions or diseases that have yet to be diagnosed (Idler & Benyamini, 1997). Second, GSRH may be more prospective than other measures of health. For example, when patients make up a subjective determination of their own health, they consider perceptions of their own health trajectory, a complex determination that takes into account an extremely detailed history of functioning (Idler & Benyamini, 1997). Third, patients’ perceptions of their own health may actually influence health and hygiene habits (Idler & Benyamini, 1997). Patients who are preoccupied with perceptions of poor health may be concerned with immediate pain and discomfort and subsequently neglect preventative health practices (Idler & Benyamini, 1997). Finally, perceptions of poor or worse health may also indicate psychosocial difficulties. For example, GSRH scores may reflect patients’ perceptions of the adequacy of their resources (Idler
Negative assessments of health may also indicate existing mental or emotional issues such as depression, perceived loss of control, or loss of hope for the future; all of which are demonstrated to have an adverse effect on health and well-being (Beck, 1967; Grand, Grosclaude, Bocquet, Pous, & Albarede, 1990; Idler & Benyamini, 1997; Wolinsky, Callahan, Fitzgerald, & Johnson, 1993). Thus these latter factors could potentially influence patients’ subjective global assessment of their own health. (Idler & Benyamini, 1997). The GSRH score is a unique and useful method of evaluating and predicting health outcomes. The GSRH score has been demonstrated to be a highly valid and sensitive variable that emphasizes patients’ subjective perceptions.

**Medications for Bipolar Disorder**

This section will briefly introduce medications for treating BPD and discuss the negative effects of medications from a bio-psychosocial perspective. It will then describe the major categories of drugs used to treat BPD, the medications included each category, including a discussion about the purposes of these medications, their effectiveness, and some of their more serious side effects. The pharmaceuticals available for the treatment of BPD are numerous and span several classes of psychoactive substances. When treating individual patients, doctors have a vast number of combinations of medications and dosages to consider. Among these are three major categories of medications: antipsychotics (AP), mood stabilizers (MS), and antidepressants (AD).

**Adverse Effects of Medications for BPD**

Psychoactive substances that have therapeutic and beneficial effects often carry the burden of serious side effects, which can be especially noxious to patients when the medications are not optimally effective. Frustrating, painful, or poor experiences with medication can have
negatively affect a patient’s physical and psychosocial functioning. Thus, practitioners must take care to monitor not only the negative physical side effects, but also the social and psychological impact of medication side effects on patients (Bentley & Walsh, 2006). The adverse effects of medications are more complicated than just physical symptoms, and can even go as far as to impact the clients’ perception of self. (Bentley & Walsh, 2006)

Some common side effects from psychiatric medications include a constellation of symptoms known as anticholinergic effects (ACE), which include dry mouth, blurred vision, constipation, and increase urgency to urinate (Bentley & Walsh, 2006). These effects are a result of the suppression of pyramidal nerve pathways; a term describing constructs of the nervous system that control fine motor activities (Bentley & Walsh, 2006). Further, some antipsychotics can induce an additional constellation of symptoms by adversely impacting the extrapyramidal nervous system. These Extrapyramidal Symptoms (EPS) can be much more severe and result in debilitating, and sometimes permanent deficits in mobility and communication (Bentley & Walsh, 2006). Some examples of EPS are: akathisia (a feeling of an internal state of restlessness), dystonia (an involuntary twisting movement of the body caused by muscle spasms), and parkinsonian effects (shuffling gait, rigidity, drooling, or tremors) (Bentley & Walsh, 2006). Prolonged use of some antipsychotics can cause tardive dyskinesia, a term that refers to a repetitive, involuntary movement of the facial muscles, extremities, or torso (Bentley & Walsh, 2006).

Side effects can be severe. For instance, neuroleptic malignant syndrome is characterized by a high fever, muscle rigidity, fluctuating consciousness, and autonomic instability (Bentley & Walsh, 2006). Although it is a relatively rare effect of antipsychotic medications (for 0.1% of consumers) it is fatal for approximately 15-20% of those affected (Bentley & Walsh, 2006).
Orthostatic hypotension, which is characterized by sudden drops in blood pressure, is another side effect of some medications that can cause the patient to become dizzy, weak, or have difficulty walking (Bentley & Walsh, 2006). Tachycardia (fast heart rate), is a common side effect of antidepressant medications and can be extremely dangerous for patients with heart problems (Bentley & Walsh, 2006).

Less severe side effects from these medications (e.g., sedation or sexual dysfunction) can affect psychosocial functioning and subjective well-being. For example, one study of patients taking antipsychotic medications found that 74% of patients discontinued their medications due to sexual side effects. (Hellewell et al., 1999; Lambert et al., 2004). Weight gain, tremors, subjective measures of impairment, and feelings of sedation are additional effects that most often led to nonadherence (Mago, Borra, & Mahajan, 2014).

**Medications with High Health Risk**

In the long-term, some psychiatric medications for BPD are correlated with heightened risk for developing certain chronic cardiometabolic conditions. For example, a recent large-scale study found that all atypical antipsychotics (viz., clozapine, olanzapine, ridperidone, ziprasidone, and sertindole) were associated with statistically significant increases in rates of diabetes mellitus (De Hert et al., 2011; Kessing, Thomsen, Mogensen, & Andersen, 2010). Quetiapine has also been shown to increase the risk of diabetes mellitus (De Hert et al., 2011; Koller, Weber, Doriaswamy, & Schneider, 2004). Antipsychotics are also generally associated with a heightened risk of mortality from coronary heart disease, cerebrovascular accident, weight gain and obesity, and sudden cardiac death (Allison et al., 1999, 2009; DeHert et al., 2011; Haddad & Sharma, 2007; Holt & Peveler, 2009; Keck & McElroy, 2003; Maina, Salvi, Vitalucci, D’Ambrosio, & Bogetto, 2008; McElroy et al., 2004; Newcomer, 2005, 2007; Osborn et al., 2007; Ray, Chung,
Murray, Hall, & Stein, 2009; Scheen & De Hert, 2007; Stahl, Mignon, & Meyer, 2009; Torrent et al., 2008). Metabolic effects of antipsychotics also include lipid abnormalities and metabolic syndrome, the latter of which is a constellation of metabolic concerns (e.g., abdominal obesity, insulin resistance) that predispose patients to serious cardiometabolic conditions such as atherosclerotic cardiovascular disease and diabetes mellitus (Balon, 2015). Aripiprazole is an atypical antipsychotic medication that has been demonstrated to have very little effect on weight gain and is not strongly related to any particular cardiometabolic condition (De Hert et al., 2011).

Lithium treatment has been associated with an increase in endocrine abnormalities, weight gain, and hypercalcemia (Balon, 2015; De Hert et al., 2011; Shine, McKnight, Leaver, & Geddes, 2015). Shine, McKnight, Leaver, and Geddes (2015) found that long term lithium treatment was strongly correlated with hypothyroidism. In turn, hypothyroidism can cause elevated cholesterol levels and heart failure and even subclinical hypothyroidism can cause narrowing of the arteries (“Thyroid Disorders and Heart Conditions”, 2016). Lithium may also induce certain heart conditions such as slowed heart rate and enlarged heart (Merck Sharp & Dohme Corp. [Merck], 2016).

**Antipsychotic Medications**

Antipsychotic medications (APs) were originally developed to treat psychotic disorders, primarily schizophrenia. The theory behind the development of AP medications was that psychosis is caused primarily by a high concentration of dopamine in the brain or sensitivity to the transmitter at the neural receptor sites (Bentley & Walsh, 2006). Consequently, almost every AP works as a dopamine dampening agent, blocking the postsynaptic dopamine receptors (Bentley & Walsh, 2006). APs differ primarily in the ways in which they interact with other neurotransmitters, their potency, and their adverse effects. (Bentley & Walsh, 2006). APs are
generally split into two categories: typical and atypical. The typical APs are those that were developed before 1980s (Bentley & Walsh, 2006).

Typical antipsychotics. Typical APs are well-known for their high risk and severity of adverse effects, which often include EPS, severe sedation, or both (Bentley & Walsh, 2006). These latter effects are the primary concern when prescribing typical APs because they can have a profoundly negative impact on patient quality of life (Bentley & Walsh, 2006). The EPSs caused by some high potency typical antipsychotics can interfere with day-to-day functioning and become permanent over the long term (Bentley & Walsh, 2006). A number of adjunctive medications can be used alongside the typical APs to treat these symptoms such as benzodiazepines, antiparkinsonian medications, antihistamines, and anticonvulsants. (Bentley & Walsh, 2006).

Atypical antipsychotics. Atypical APs are a second generation of AP medication (Bentley & Walsh, 2006). Like typical APs they work on blocking dopamine receptors; however, atypical APs also target a variety of other neurotransmitters such as serotonin, acetylcholine, and norepinephrine (Bentley & Walsh, 2006). These drugs do not produce EPS in most patients and their adverse effects tend to be much milder (Bentley & Walsh, 2006). These effects include concerns such as nasal congestion, drooling, dizziness, headache, and drowsiness (Bentley & Walsh, 2006). Atypical APs generally have fewer sexual side effects than typical APs, but it’s worth noting that risperidone in particular carries a higher risk of sexual dysfunction than any of the typical APs (Baggaley, 2008; Cutler, 2003; De Hert et al., 2011).

Although atypical APs do not produce the worrying neurological side effects, patients taking these drugs are at a risk for other severe metabolic side effects: Weight gain, hyperglycemia, and hyperlipidemia are especially common (Allison et al., 1999; Lee & Jeong,
Weight gain is a major concern, affecting both rates of adherence to these medications and the health and well-being of the patient. For example, in a study of 96 patients treated with clozapine, Henderson et al. (2005) found a mortality rate of 9% from cardiovascular disease and 43% from new-onset diabetes mellitus over a 10-year period. Even if the health effects of weight gain are not severe enough to negatively affect physical health, the presence of obesity among patients with BPD is strongly associated with a decrease in quality of life (Kolotkin et al., 2008). Despite these concerns, however, when compared to typical APs, atypical APs have been shown to be more tolerable, provide patients with better quality of life, and improve medication-adherence behavior (Vornik & Hirschfeld, 2005). The exact mechanism of weight gain caused by these drugs is not fully understood, but it is well documented and may affect anywhere from 15-72% of patients (Allison et al., 1999, 2009; DeHert et al., 2011; Haddad & Sharma, 2007; Holt & Peveler, 2009; Keck & McElroy, 2003; Maina, Salvi, Vitalucci, D’Ambrosio, & Bogetto, 2008; McElroy et al., 2004; Newcomer, 2005, 2007; Scheen & De Hert, 2007; Stahl, Mignon, & Meyer, 2009; Torrent et al., 2008).

Atypical APs are often used to treat bipolar mania and/or depression, or act as a general mood stabilizer (Bentley & Walsh, 2006; Young, 2008). These medications initially were used to treat the symptoms of acute mania, but in recent years, the medical community has recognized their positive effects on bipolar depression (Young, 2008). Typical APs may also be effective in the treatment of BPD, but they are more likely to cause side effects and may even trigger depressive episodes (Bentley & Walsh, 2006; Ghaemi, 2000).

Some studies show that the effectiveness of atypical APs varies depending on the drug that is being used. For example, Vázquez (2015) found that only three antipsychotic agents,
namely olanzapine, lursidone and quietapine, were effective for bipolar depression, and olanzapine was effective only when paired with an antidepressant.

**Risperidone.** Although risperidone carries a very high risk of sexual side effects (Baggaley, 2008; Cutler, 2003; DeHert et al., 2011), it has relatively mild or moderate levels of adverse effects when compared to other atypical APs (DeHert et al., 2011). However, high doses of risperidone can result in EPS similar to those associated with typical APs (Bentley & Walsh, 2006).

**Olanzapine.** Olanzapine is believed to have a region-specific effect on dopamine receptors, impacting only the pathways that go to the limbic system or prefrontal cortex (Bentley & Walsh, 2006). When it comes to metabolic adverse effects and weight-gain-related disease, olanzapine is of considerable concern. It has been associated with greater amounts of weight gain than almost any other atypical AP (Bobes et al., 2003; DeHert et al., 2011; Leucht, Burkard, Henderson, Maj, & Sartorius, 2007) and, similar to clozapine, is associated with the highest rates of diabetes mellitus (De Hert et al., 2011; Koller & Doraiswamy, 2002; Ramaswamy, Masand, & Nasrallah, 2006; Starrenburg & Bogers, 2009). Nevertheless, the beneficial effect of olanzapine on bipolar mania has been well documented (Bentley & Walsh, 2006).

**Quetiapine.** Quetiapine is an effective serotonin blocker as well as a dopamine antagonist (Bentley & Walsh, 2006). It selectively affects the dopamine pathways most associated with psychosis and is not believed to affect the parts of the brain that would produce EPS (Bentley & Walsh, 2006). Quetiapine has adverse effects that are similar to those of the other drugs in its class, but it is associated with a lower risk of adverse effects than either risperidone or olanzapine (De Hert et al., 2011). Quetiapine has a very short half-life and, therefore, can be taken several times a day (Bentley & Walsh, 2006).
Aripiprazole. Aripiprazole targets dopamine and serotonin, but works differently than the other atypical APs. It is known as a partial antagonist and has a novel way of working at the receptor site (Bentley & Walsh, 2006; Lieberman, 2004). Aripiprazole shows significantly lower rates and severity of adverse side effects (De Hert et al., 2011) and it has a long half life (i.e., 75 hours; Bentley & Walsh, 2006).

Mood Stabilizers

The International Bipolar Foundation (nd.) defines mood stabilizers (MS) as therapeutic approaches that treat or prevent acute mood episodes (mania or depression) and do not worsen any mood episodes or increase cycling. This definition can incorporate a variety of pharmaceuticals (e.g., some atypical APs) and therapies (e.g., electroconvulsive therapy) (International Bipolar Foundation, nd.). However, another common definition of MSs—and the definition that will be used in the current study—is medications that are used primarily to treat mood disorders in a psychiatric context. MS medications include lithium and a variety of medications that were originally developed as anticonvulsants.

Lithium. Lithium is the oldest medication that has been shown to effectively treat BPD, used regularly with bipolar patients for nearly 200 years (Bentley & Walsh, 2006). Lithium, which occurs naturally, is relatively inexpensive and it has a shorter half-life than many APs (it must be taken twice daily) (Bentley & Walsh, 2006). Lithium has a delayed therapeutic effect, usually taking two weeks or more before benefitting the patient. In addition, the difference between therapeutic and toxic levels of lithium in the blood is very small (Bentley & Walsh, 2006). Lithium toxicity is a real concern for anyone taking lithium and it can be fatal (Bentley & Walsh, 2006). It is often insidious, building up in the bloodstream over a period of weeks or months (Bentley & Walsh, 2006; “Lithium is still a first-line option,” 2010). Severe toxicity can
cause anorexia, kidney failure, coma, and eventually death if not treated (Bentley & Walsh, 2006). Consequently, patients taking lithium must have their blood drawn and analyzed monthly for up to six months, which may make lithium treatment difficult for impoverished or indigent patients to access (Bentley & Walsh, 2006).

Lithium can be incorporated in a variety of treatment strategies. It has been shown as useful as monotherapy (i.e., used alone) for acute manic episodes, outperforming not only placebos but also quetiapine (atypical AP), topiramate, and valproate (anticonvulsant MSs) (Bowden et al., 1994, 2005; Kushner, Khan, Lane, & Olson, 2006; “Lithium is still a first-line option,” 2010). Half of all patients who receive lithium treatment while exhibiting manic symptoms will experience a 50% reduction of those symptoms within three weeks (Bentley and Walsh, 2006). However, after the manic symptoms have been reduced or eliminated, patients taking lithium must continue using it for maintenance treatment (Bentley & Walsh, 2006). Lithium has been empirically shown to prevent relapse or recurrence of manic and hypomanic episodes (Bowden et al., 2003; Calabrese et al., 2003; “Lithium is still a first-line option,” 2010).

Evidence for the effectiveness of lithium in preventing and treating depressive episodes is a bit less conclusive (Bowden et al., 2000; Geddes, Burgess, Hawton, Jamison, & Goodwin, 2004; “Lithium is still a first-line option,” 2010; Young, 2008). A meta-analysis of five clinical trials showed that lithium was successful in treating acute bipolar depression, but its effectiveness in preventing a relapse of depression was not demonstrated (Geddes et al., 2004; “Lithium is still a first-line option,” 2010). Further, it continues to be unclear whether lithium can effectively treat rapid-cycling BPD (“Lithium is still a first-line option,” 2010). It has been generally accepted that rapid-cycling BPD does not respond to lithium therapy (Grandjean & Aubry, 2009a; “Lithium is still a first-line option,” 2010); however, there is a preponderance of
evidence suggesting that lithium is somewhat effective for treating short-term symptoms (Kupka, Luckenbaugh, Post, Leverich, & Nolen, 2003; “Lithium is still a first-line option,” 2010).

Lithium is associated with numerous adverse effects (e.g., weight gain, increased urination, blunting of affect) (Grandjean & Aubry, 2009b; “Lithium is still a first-line option,” 2010). Although most of the common side effects of lithium are generally considered transient and benign, the nature of these side effects may affect self-concept and psychosocial wellbeing (Bentley & Walsh, 2006). Side effects such as weight gain, muscle weakness, hair loss, tremor, and slurred speech are relatively common (Bentley & Walsh, 2006) and may impact a patient’s social or vocational life.

**Anticonvulsants.** In addition to lithium, anticonvulsant drugs are commonly used to treat BPD including, carbamazepine, valproate, and lamotrigine, which are considered first-line interventions for treating bipolar mania and/or depression. (Bentley & Walsh, 2006). It is unclear how anticonvulsants specifically impact symptoms of BPD from a physiological perspective (Bentley & Walsh, 2006). It is generally thought that mania is produced by repetitive chemical or electrical stimuli in the limbic system that build into a manic episode, and it is believed that anticonvulsant drugs are thought to work by inhibiting the repetitive firing of these systems (Bentley & Walsh, 2006). Another theory is that they may help increase the level of anti-manic neurotransmitters such as GABA (Bentley & Walsh, 2006).

**Valproate.** Valproate is the second most commonly prescribed mood stabilizer in the United States (after lithium) (Baldessarini, Henk, Sklar, Chang, & Leahy, 2008; Kessing, Hellmund, Geddes, Goodwin, & Andersen, 2011). Valproate has not been shown to be as effective as lithium in the treatment of all symptoms of BPD, but it is used as an alternative to lithium (Kessing et al., 2011). Like lithium, valproate can cause rapid weight gain (De Hert et al.,
2011). Other common side effects include hair loss and sedation, both of which can have an impact on patients’ quality of life. Valproate can also induce symptoms of depression or anxiety (Benley & Walsh, 2006).

**Lamotrigine.** Lamotrigine is a peculiar compound that has not been demonstrated to be effective for treating bipolar mania, but it is an effective prophylactic drug for treating bipolar depression (Bowden et al., 2003). The effects of lamotrigine have also been extensively studied (Bentley & Walsh, 2006; Bowden et al, 2003; Calabrese et al., 1999; Calabrese, Suppes, & Bowden, 2000). It is often prescribed with a warning because it has the potential to cause a fatal skin rash, particularly in minors (Bentley & Walsh, 2006). There is evidence that shows that lamotrigine is unique in its tolerability, and adherence rates are higher than those of any other MS (Baldessarini, et al., 2008; Bowden et al., 2003). This is an important characteristic because MSs, in general, have extremely dismal adherence rates (Baldessarini et al., 2008).

**Antidepressants**

In general, there are four main sub-classes of antidepressant (AD) medication: Selective serotonin reuptake inhibitors (SSRIs), monoamine oxidase inhibitors (MAOIs), serotonin modulators, cyclic ADs, Serotonin-norepinephrine reuptake inhibitors (SNRIs), and Burpropion (Bentley & Walsh, 2006). AD medications can take about 2 to 6 weeks to show therapeutic benefits and the side effects vary greatly depending on the sub-class prescribed (Bentley & Walsh, 2006).

With the exception of fluoxetine-olanzapine polytherapy, ADs are not FDA-approved for the treatment of BPD (Jann, 2014). Regardless, the AD class as a whole consists of the most widely-used classes of medication prescribed to bipolar patients (Baldessarini et al., 2008; El-Mallakh et al., 2015). The use of AD medications remains a highly controversial topic among
researchers. One major concern is that adequate assessments of treatments for bipolar depression are difficult to identify because, despite more than fifty years of inquiries into the effectiveness of ADs as a whole, literature about their impact on bipolar depression, in particular, is limited and inconsistent (Selle, Schalkwijk, Vázquez, & Baldessarini, 2014; Tondo, Baldessarini, & Vázquez, 2013; Vázquez, Tondo, Undurraga, & Baldessarini, 2013; Vázquez et al., 2015). It is difficult to draw any confident conclusions from the literature.

Another concern about the use of ADs with BPD is that much of the literature seems to indicate that they can actually do more harm than good. There is evidence that ADs can worsen rapid-cycling BPD. For example, a recent study by El-Mallakh et al. (2015) found that their subjects that were taking ADs had a three-fold increase in the frequency of their depressive episodes in a 12-month period. Additionally, mood switching on ADs is also a concern. There are several studies that show that AD treatment may place individuals with BPD (particularly BPD type I) at risk for additional manic episodes (Bond, Noronha, Kauer-Sant’Anna, Lam, Yatham, 2008; Pacchiarotti et al., 2013; Parker, 2012; Vázquez, Tondo, & Baldessarini, 2011). However, it appears that for every legitimate study that shows a risk of mood switching among BPD patients on ADs, there is a study that contests that conclusion (Coryell et al., 2003; El-Mallakah et al., 2015; Lewis and Winojur, 1982; McElroy et al., 2010; Pacchiarotti et al., 2013; Sachs et al., 2007). The International Society for Bipolar Disorders Taskforce issued a report stating that it could not make any bold claims regarding whether antidepressants cause mood switching; however, the report concluded that SSRIs and buproprion may have lower risks of mood switching than other antidepressants (Pacchiarotti et al., 2013).

AD effectiveness in treating BPD is also a concern. The literature is divided on whether ADs are effective in treating BPD at all. One recent meta-analysis of clinical trials concluded
that current trials show no support for the efficacy of AD monotherapy in treating bipolar depression (McElroy et al., 2010; Pacchiarotti et al., 2013).

**SSRIs.** The most notable SSRIs include citalopram, fluoxetine, fluvoxamine, paroxetine, and sertraline (Bentley & Walsh, 2006). These ADs selectively affect serotonin receptors. SSRIs have a more tolerable side effect profile than other ADs (Bentley & Walsh, 2006). While they still have anticholinergic side effects, these are markedly lower than other ADs (Bentley & Walsh, 2006).

**Serotonin modulators.** Serotonin modulators include trazodone and mirtazapine (Merck, 2016). Serotonin modulators bind to specific serotonin and norepinephrine receptors (Merck, 2016). They are similar in that their most potent side effect is sedation (Merck, 2016). The effect is so great that Trazodone is often given to depressed patients that experience insomnia (Merck, 2016). Mirtazapine is better tolerated, but can also cause sedation and weight gain (Merck, 2016).

**Cyclic ADs.** Cyclic ADs include most notably amitriptyline, imipramine, nortriptyline, and desipramine (Bentley & Walsh, 2006). These drugs were once a mainstay in treatment of depression, but are no longer regularly prescribed as they cause are more likely to cause anticholinergic side effects than the newer SSRIs (Merck, 2016; Bentley & Walsh, 2006). Cyclic ADs also become toxic during an overdose and have a variety of drug interactions (Merck, 2016; Bentley & Walsh, 2006).

**MAOIs.** MAOIs include isocarboazid, moclobemide, phenylzine, selegiline, and tranylcypromine (Merck, 2016). While MAOIs have been generally considered to be effective in treating depression, some studies show that they are not effective treatments for bipolar depression (Bentley & Walsh, 2006; Taylor, Cornelius, Smith, & Young, 2014). The main
concern when prescribing MAOIs is that consumers of the medication are required to observe multiple dietary restrictions while taking the medication (Bentley & Walsh, 2006). Patients taking MAOIs are at risk for a potentially fatal hypertensive episode if they consume any foods that contain the amino acid tyramine (e.g., beer, chocolate, red wine, caffeine, aged cheese; Bentley & Walsh, 2006).

**SNRIs.** SNRIs include most notably venlafaxine, duloxetine, desvenlafaxine, and levomilnacipran (Merck, 2016). Like serotonin modulators, these medications work at both the serotonin and norepinephrine receptors. SNRIs are not toxic when overdosed and their side effects are similar to SSRIs, albeit slightly sedating (Bentley & Walsh, 2006; Merck, 2016). SNRIs have substantial withdrawal effects including irritability, anxiety, and nausea (Merck).

**Buproprion.** Buproprion is a unique AD that requires its own sub-category. It is the only AD that works on both norepinephrine and dopamine receptor sites. Buproprion is a stimulant so it may be contraindicated for patients with insomnia, but along with depression it can also treat nicotine and cocaine addiction (Bentley & Walsh, 2006; Merck, 2016). Buproprion carries with it a risk of seizures and hypertension (Merck, 2016).

**Summary and Implications of Literature Review**

People with SMI experience a disproportionately large number of medical comorbidities (De Hert et al., 2011). Although a large body of research has described the bio-psychosocial and medical risk factors associated with BPD (De Hert et al., 2011), no study has specifically examined the health of this population in an integrated PBHC setting. Studies examining co-located PBHC approaches have shown that people with SMI have improved health outcomes when their mental and physical healthcare is coordinated (Druss et al., 2010; Kilborne et al., 2008; Woltman et al., 2012); however, the integrated PBHC approach is fairly novel; thus there
are few studies describing characteristics of the consumers of these services (e.g., Gleason et al., 2014; Lemieux et al., 2015). Moreover, the descriptive studies to date sampled clients with both thought and mood disorders, which included, but did not specifically focus on those with BPD. However, BPD is a compelling public health concern, with a prevalence of 2.6% and a $150 billion economic burden (APA, 2013; Dilsaver, 2011). Utilizing an integrated PBHC clinical data set, the current study sought to address this gap in the literature by describing the health and health-risk characteristics of persons with BPD.

Psychiatric medications for SMI are associated with considerable health risks, which is an issue that has received considerable attention in the literature (e.g., Balon, 2015; De Hert et al., 2011; Shine et al., 2015). Researchers have discovered interrelationships between psychiatric medication and the occurrence of numerous chronic health conditions (e.g., obesity (DeHert et al., 2011), cardiovascular disease (De Hert et al., 2011), diabetes mellitus (Kessing, 2010; De Hert et al., 2011), and metabolic syndrome (Balon, 2015). However, descriptive studies of people with BPD in an integrated PBHC setting have not included medications as important correlates of health (see, e.g., Gleason et al., 2014; Lemieux et al., 2015). The current study sought to further contribute to the literature by simultaneously analyzing medication, health, and psychosocial characteristics of persons with BPD in this setting.

Medication utilization (e.g., medication regimens prescribed, methods by which medication is used to treat clients) may also impact clients’ subjective assessments of health. Physical changes caused by medication side effects (e.g., weight gain, hair loss, and sedative effects) may not appear to have an objective impact on overall health, but may still have a large impact on patients from a bio-psychosocial perspective (Johnson et al., 2007; LeClerc et al., 2013; Velligan et al., 2010;). These changes may not pose substantial medical risk, but may still
impact clients on a psychological or social level, affecting the clients' sense of self or how the client is viewed by others (Bentley & Walsh, 2006). Studying self-assessed health provides a unique opportunity to analyze clients’ holistic perceptions of health.

Numerous studies show that self-assessed health is a reliable indicator of health (Bath, 1999; Weinberger et al., 1986) and mortality (DeSalvo et al., 2006; Idler & Benyamini, 1997; Kawada, 2003), even when assessed independently from objective indicators such as health care utilization (Idler & Benyamini, 1997), mechanical and laboratory indicators (e.g., blood glucose, BMI; Idler & Benyamini, 1997), gender (Bath, 1999), and age (Bath, 1999). It is also a holistic assessment, taking into consideration the mental status and hygiene of the individual (Idler & Benyamini, 1997). Lemieux et al. (2015) examined numerous sociodemographic (e.g., employment status, education level, disability status), health-related (e.g., health risks and health indicators), and psychosocial correlates (e.g., level of functioning, psychological distress) of self-assessed health in a co-located PBHC setting, but did not analyze the interrelationship between self-assessed health and psychiatric medication regimen among people with BPD. The proposed study sought to address this gap in the knowledge.
CHAPTER 3: CONCEPTUAL FRAMEWORK

This section summarizes the purpose of the current study and lists the research questions that were analyzed.

**Purpose**

The present study described interrelationships among the sociodemographic, health, health-risk, and psychosocial characteristics of individuals with BPD in an integrated PBHC program in a CMH setting. It specifically focused on the relationship between participants’ self-assessed health and the types of psychiatric medications prescribed for BPD.

**Research Questions**

The study was framed by the following three research questions:

1) What are the sociodemographic, health, health-risk, and psychosocial characteristics of individuals with BPD in an integrated PBHC program in a community mental health setting?

2) Are types of medication associated with self-assessed health?

3) Are there differences in health and psychosocial characteristics between clients with BPD receiving high-health-risk (HHR) psychiatric medications and clients with BPD not receiving HHR psychiatric medications?

**Hypothesis**

The scores of health indicators for individuals prescribed HHR medications are more likely to be in the at-risk range than the scores of health indicators for individuals not prescribed HHR medication.
Key Terms

This section briefly defines the key terms used in the research questions.

Sociodemographic characteristics include age, gender, race, employment status, education level, living arrangement, and disability status. Age is defined as self-reported age at the time baseline data were collected. The variables gender and race were similarly self-reported at the time of enrollment. Employment status was also self-reported and described whether or not the participant was employed and the time of enrollment. The response options for the employment variable included 2 categories of employment (full time, part time) and 5 categories of unemployment (retired, volunteer work, disabled, not looking for work, and looking for work). Education level describes participants’ highest level of schooling attained at the time of enrollment. Living arrangement is defined as the location where the participant was living “most of the time” during the 30 days prior to intake. Disability status refers to whether the participant was receiving disability benefits at the time of enrollment. It is a variable that was created based on the corresponding response option for employment status question. Disability status is a dichotomous variable in the proposed study and will be recorded as either yes or no.

Health characteristics in the current study included health indicators, self-assessed health, and psychiatric medications. Health indicators refer to mechanical (systolic BP, diastolic BP, BMI) and laboratory (HDL, LDL, total cholesterol, TRI, and blood glucose) scores. Self-assessed health was measured with a single GSRH item which asks the participants to rate their overall health. The response categories are ordered (1-5) and correspond to a Likert scale (poor, fair, good, very good, excellent). Psychiatric medications are coded by regimen and health risk. Medication regimen refers to the combinations of medication types prescribed to participants for treating the primary mental disorder. Medication health risk is a dichotomized variable that refers
to whether or not the participant was prescribed medication designated as HHR (viz., lithium and antipsychotics except aripiprazole).

Health-risk characteristics included medical conditions (viz., diabetes, hypertension, and heart disease) and participants’ personal history of alcohol, tobacco, and non-prescribed drug use. Health-risk variables were self-reported by participants at enrollment and recorded in the health record.

Psychosocial characteristics included level of functioning, psychological distress, and social support. Level of functioning refers to participants’ self-reported daily functioning and is measured with an 8-item Perception of Functioning (PF) scale that assesses different elements of daily life (e.g., social situations, housing). The total score of the 8-item PF scale defines the level of functioning variable. Psychological distress is defined as participants’ self-reported symptoms of emotional disturbance (e.g., nervousness, feelings of sadness and worthlessness) and is measured with the K6 scale (Kessler et al., 2010). Social support is defined as participants’ self-assessed support in interpersonal relationships. Social support is measured with the 4-item Perception of Social Connectedness (PSC) scale, which assesses participants’ social networks, perceived social support, and social connectedness.
CHAPTER 4: METHODOLOGY

This section describes the current sample, original study, protection of human subjects, instrumentation, measurement, and data analysis.

Sample

The current cross-sectional descriptive study was based on data previously collected from a clinical sample of 241 participants with BPD who were receiving treatment at a publically funded community mental health (CMH) center between February 2012 and August 2015. The CMH agency has 3 sites in Louisiana and primarily serves underprivileged demographics. The agency generally provides services to people who either have no health insurance or are eligible for public benefits. The present sample (N=241) was chosen from a larger sample of 1270 participants with SMI who were treated at the agency for BPD and admitted to the Integrated Health Program (IHP).

Original Study

The IHP at the present agency was structured much like that described in the PCARE (Druss et al., 2010). At each CMH site, the IHP co-located registered nurses (RN) who conducted regular screenings and tracked the health indicators and outcomes of the participants. The RN Care Managers also linked participants with other primary healthcare providers and provided on-site wellness education (Lemieux et al., 2015).

The RN Care Managers obtained written informed consent from participants upon admission to the IHP program. Clinical data used in reports by Lemieux et al. (2015) and Masinter (2016) did not include identifying information and the studies were exempted from IRB oversight. PBHC services data were measured with the federally mandated National Outcomes Measures Client-level Measures (NOMs) baseline tool and the IHP Baseline Physical Health
Indicators Form (IHP-BPHIF) (Lemieux et al., 2015). The co-located RN Care Managers employed by the IHP administered both instruments to the participants at baseline. In order to abide by HIPAA privacy rules, researchers at each site scanned de-identified data and then entered them into the SPSS 21 database for analysis. (Lemieux et al., 2015).

The NOMs used in the original study is composed of six sections that collect information about demographics, housing, employment, education level, legal history, psychosocial functioning, and social connectedness. (Lemieux, et al., 2015). The NOMs instrument includes the Mental Health Statistics Improvement Program (MHSIP) scale, which was developed by the NASMHPD Research Institute, Behavioral Healthcare Performance Measurement System (Jerrell, 2006; Schacht, 2001). The IHP-BPHIF used in the original study contains seven major sections collecting information about participants’ insurance providers, medications, health indicators, primary diagnoses, personal and family medical and substance history, and various health risk behaviors (Lemieux et al., 2015). The IHP-BPHIF was developed by researchers and IHP program staff to measure health factors not assessed by the NOMs (Lemieux et al., 2015).

**Protection of Human Subjects**

This secondary analysis retained the anonymity of the original study. No identifying information was made available to the researchers and no additional data was collected from the participants. This study presents a minimal level of risk to participants and has been exempted from IRB oversight.

**Instrumentation**

The following section will describe the instrumentation used to measure study variables. Data were collected from participant self-reports and nurse reports of health information recoded in IHP health records.
Sociodemographic Characteristics

The sociodemographic characteristics that were used in the current study include age, gender, race, employment status, education level, living arrangement, and disability status. Participants’ age in years was self-reported on the NOMs form upon enrollment and information about gender was also collected on the NOMs form. Participants selected one answer from two possible response options: male or female. Information about participants’ race was collected with a single self-report item with 7 response options: White, African American, Hispanic, Asian, American Indian, Pacific-Islander, and Alaska Native. Due to the composition of the respondents reported by Lemieux et al., (2015) in the original study, race was be dichotomized as African American (0) and white (1). Employment status was self-reported on the NOMs form with two response options for employed (full time or part time) and five response options for unemployed (retired, volunteer work, disabled, not looking for work, and looking for work). Employment status was dichotomized in the current study (0=unemployed, 1=employed). Educational attainment was self-reported on the NOMs form with 6 response options (e.g., less than 12th grade, high school or GED, vocational diploma, some college, bachelors, or graduate degree) and was dichotomized in the current study as less than high school degree (0) and high school degree and higher (1). Living arrangement was reported on the NOMs with one item asking where participants were living “most of the time” within the 30 days prior to baseline (e.g., owned or rented house, group home, nursing home, homeless). In the current study, living arrangement was dichotomized as owned or rented own home or apartment (0) and living with someone else (1). Disability status refers to whether the participant was receiving disability benefits and was created using the corresponding response option for the employment status item of the NOMs and dichotomized (0=not receiving benefits, 1=receiving benefits).
**Health Characteristics**

The health characteristics that were used in the current study included health indicator scores (viz., systolic BP, diastolic BP, BMI, HDL, LDL, total cholesterol, TRI, and blood glucose), self-assessed health, and psychiatric medications.

**Health indicator scores.** Upon enrollment, the RN Care Managers recorded the mechanical and laboratory health indicator scores for each participant on the IHF-BPHIF form. Mechanical health indicators include systolic BP, diastolic BP, and BMI scores. Laboratory health indicators include HDL, LDL, total cholesterol, TRI and blood glucose scores. Health indicator scores were then dichotomized as not at risk (0) and at risk (1). Health indicator scores designated as at risk were scores that placed the participant at risk for a cardiometabolic disorder according to the Center for Integrated Health Solutions; CIHS, 2013).

**Self-assessed health.** Self-assessed health was measured with one GSRH item on the NOMs form that specifically asked “how would you rate your overall health right now?” (DeSalvo, Bloser, Reynolds, He, & Muntner, 2005). Participants self-reported one of 5 response options (poor=1, excellent=5), with higher scores indicating higher self-assessed health. Self-assessed health was reported as a continuous variable (1-5) when reporting the descriptive statistics of participant characteristics (i.e., research question 1) and it was dichotomized in order to analyze its relationship with medication regimen. A GSRH score of 2 or 1 was coded as “worse” self-assessed health (0) and a GSRH score of 3 or above was coded as “better” self-assessed health (1).

**Psychiatric medications.** Information about participants’ psychiatric medications was collected upon enrollment. Patients were asked to bring all current medication bottles to the IHP intake session. RN Care Managers listed all prescribed medications on the IHP-BPHIF form.
Due to the complexities of the medication variable, was coded two different ways. In order to answer research question number 2, psychiatric medications were coded in terms of medication regimen. Medication regimen is defined as the combination of classes of medication listed on each participants’ medication list. Psychiatric medication classes included antidepressants (AD), antipsychotics (AP), and mood stabilizers (MS), any combination of the three classes, and no medication (N). The variable is composed of 8 possible categories (viz., AP, AD, MS, AP/AD, AP/MS, AD/MS, AP/AD/MS, N).

For the purposes of answering research question number 3, medication regimens were coded as a dichotomous variable depending on whether the participant was prescribed a medication associated in the literature with increased endocrine and cardiometabolic risk factors (e.g., Balon, 2015; De Hert et al., 2011) (0=no, 1=yes). After a review of the literature (e.g., Balon, 2015; De Hert et al., 2011; Shine et al., 2015), for the purposes of the present study, high-health-risk (HHR) psychiatric medications included lithium and all antipsychotics except aripiprazole.

**Health-risk characteristics**

Health risk characteristics included participants’ self-reported history of cardiometabolic conditions (viz., diabetes, hypertension, and heart disease) and substance use (alcohol, tobacco, and non-prescribed drugs) as recorded on the IHP-BPHIF form.

**Cardiometabolic conditions.** Cardiometabolic conditions refer to the number of comorbid cardiometabolic medical conditions (viz., diabetes, hypertension, and heart disease variables) self-reported by participants. Response options for each condition (0=no, 1=yes) were summed to compute the total number of medical conditions (Range=0-3).
**Substance use.** Substance use (viz., alcohol, tobacco, and non-prescribed drug use) refers to whether participants self-reported current use of each. Response options for each substance were dichotomized for the proposed study (0=no, 1=yes). Participants’ substance use was measured using 3 self-report items listed on the IHP-BPHIF. To assess alcohol use, participants were asked “do you drink beer, wine, or alcohol?” To assess tobacco use, participants were asked “do you smoke or chew tobacco?” To assess non-prescribed drug use, they were asked “do you use non-prescribed drugs?”

**Psychosocial characteristics**

Participants’ psychosocial characteristics include level of functioning, psychological distress, and social support.

**Level of functioning.** Participants’ daily level of functioning was measured with the 8-item Perception of Functioning (PF) subscale of the MHSIP (Schacht, 2001). Participants rate how well they felt able to manage their daily life in the 30 days preceding enrollment in several different areas (e.g., daily problems, control, dealing with crisis, getting along with family). Response options used a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The sum of the 8 items yielded a daily functioning score ranging from 8 to 40, with higher scores indicating higher levels of functioning. Lemieux et al. (2015) reported a Cronbach’s alpha of 0.76, indicating adequate reliability.

**Psychological distress.** Psychological distress was measured using the clinically valid K6 scale (Kessler et al., 2010). The scale consists of 6 items that ask participants to report how often in the 30 days prior to intake they have felt nervous, hopeless, restless, depressed, worthless, and that everything was an effort. Response options utilized a Likert scale ranging from 0 (not at all) to 4 (all of the time). The sum of these 6 items yield a total score ranging from 0-24 with higher
scores indicating higher levels of psychological distress. A Cronbach’s alpha of 0.88 was yielded by Lemieux et al. (2015), indicating good reliability.

**Social support.** Social support refers to perceived closeness of personal relationships, the availability of social support during times of crisis, and a feeling of being part of a community. Social support was measured using the PSC subscale of the MHSIP (Schacht, 2001). Participants were asked to rate their level of agreement with 4 statements (viz., I am happy with the friendships I have, I have people with whom I can do enjoyable things, I feel I belong in my community, in a crisis I would have the support I need from family or friends) using a Likert scale consisting of five response options: strongly disagree (1), disagree (2), undecided (3), agree (4), strongly agree (5). The instructions for the PSC scale asked participants to reply based on the 30 day time period prior to admission. Responses were summed to yield a total PSC scale score ranging from 4 to 20 with lower scores indicating lower levels of social support. A Cronbach’s alpha of 0.81 was yielded by Lemieux et al. (2015) indicating good reliability.

**Data Analysis**

A power analysis was conducted to confirm that 241 data points is an adequate sample size to detect a medium effect size (0.80) with an alpha set at 0.05 (Rubin & Babbie, 1997). The study used univariate statistics to summarize and describe the sample and bivariate statistics to analyze the relationships among variables.

The first research question, which sought to describe the sample, was answered using only univariate analysis. Frequencies and their corresponding percentages were reported for non-parametric variables (eg., medication regimen, race, gender). Descriptive statistics for parametric variables (eg., age, health indicator scores) included measures of central tendency (eg., mean), standard deviations, and range (Rubin & Babbie, 1997).
The second research question required a comparison of different medication regimens. To answer this question, two computations were reported. First, a cross-classification table was computed. The table used a dichotomous self-assessed health variable (fair/poor=0, good/very good/excellent=1) and reported the proportion of respondents assessing their health as being worse (0) or better (1) for each of the 8 medication regimens. Second, chi-square tests of significance that were computed (using the dichotomized self-assessed health variable) comparing the most frequently prescribed medication regimens with the hypothesized values (Rubin & Babbie, 1997).

The third research question sought to compare the health and psychosocial characteristics of participants prescribed high-risk versus low-risk medications. T-tests were computed to compare the means between these two groups (Rubin & Babbie, 1997) for each of the 8 laboratory and mechanical health indicator scores (viz., systolic BP, diastolic BP, BMI, HDL, LDL, total cholesterol, TRI, and blood glucose) and 3 psychosocial scales (PF, K6, and PSC). When computing the t-test, the self-assessed health variable was treated as a continuous variable (poor=1, excellent=5).
CHAPTER 5: RESULTS

The present study had two primary purposes. First, it sought to explore and report descriptive biopsychosocial characteristics of people with BPD receiving integrated PBHC in a CMH setting. These included sociodemographic, health, health-risk, and psychosocial characteristics. Second, the study examined interrelationships among different psychiatric medication regimens and health-related characteristics. In the original study (Lemieux et al., 2015), variables were collected at intake at 3 CMH settings and were measured using the IHP-BPHIF and the NOMs forms. According to Rubin and Babbie (1997), regarding statistical power for a bivariate analysis, a sample size of 80-100 is recommended for a medium effect size (0.6) at the 0.05 significance level with standard statistical power of 0.83-0.86. A power analysis confirmed that the obtained sample (N=241) exceeded the minimum number of subjects necessary to detect a medium effect size.

**Descriptive Statistics of Participant Characteristics**

**Sociodemographic Characteristics**

Table 1 provides frequencies and descriptive statistics regarding the sociodemographic characteristics of the sample. Participants’ ages ranged from 18 to 83 years with a mean age of 42.4. As seen in Table 1, the sample was about two thirds female (67.6%) and one third male (32.4%). With regard to race, the majority was white (64.9%). Of the 238 participants, slightly less than three fourths was unemployed (74.4%) and about one fourth was employed either part time or full time (25.6%). The sample tended to be more highly educated; 72.1% of the participants had at least a high school degree at the time of data collection, while 27.9% had less than a high school degree. With regard to living arrangement, 55% of
Table 1. Sociodemographic Characteristics, N=218-241

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>Range</th>
<th>Frequency (n)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>42.4</td>
<td>11.08</td>
<td>18-83</td>
<td>241</td>
<td>-</td>
</tr>
<tr>
<td>Gender</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>241</td>
<td>-</td>
</tr>
<tr>
<td>Male</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>78</td>
<td>32.4</td>
</tr>
<tr>
<td>Female</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>163</td>
<td>67.6</td>
</tr>
<tr>
<td>Race</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>238</td>
<td>-</td>
</tr>
<tr>
<td>African American</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>80</td>
<td>35.1</td>
</tr>
<tr>
<td>White</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>148</td>
<td>64.9</td>
</tr>
<tr>
<td>Employment Status</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>238</td>
<td>-</td>
</tr>
<tr>
<td>Unemployed</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>177</td>
<td>74.4</td>
</tr>
<tr>
<td>Employed</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>61</td>
<td>25.6</td>
</tr>
<tr>
<td>Education</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>240</td>
<td>-</td>
</tr>
<tr>
<td>&lt; High School</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>67</td>
<td>27.9</td>
</tr>
<tr>
<td>≥High School</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>173</td>
<td>72.1</td>
</tr>
<tr>
<td>Living Arrangement</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>218</td>
<td>-</td>
</tr>
<tr>
<td>Own/Rent</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>120</td>
<td>55.0</td>
</tr>
<tr>
<td>Live With Others</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>98</td>
<td>45.0</td>
</tr>
<tr>
<td>Disability Status</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>241</td>
<td>-</td>
</tr>
<tr>
<td>Not Receiving Benefits</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>181</td>
<td>75.1</td>
</tr>
<tr>
<td>Receiving Benefits</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>60</td>
<td>24.9</td>
</tr>
</tbody>
</table>
participants reported that they either owned or rented their own residence, while 45% reported that they lived with other people (see Table 1). Finally, about three fourths of participants (75.1%) were not reportedly receiving disability benefits while one fourth (24.9%) self-reported that they were receiving benefits.

**Health Characteristics**

In the present study, health characteristics included health indicator scores and self-assessed health.

**Health indicator scores.** Health indicator scores refer to specific mechanical and laboratory health characteristics. Table 2 lists the health indicator scores, along with their at-risk cutoffs, as determined by the CIHS (2013) guidelines. As seen in Table 2, the mean scores for systolic BP, diastolic BP, HDL, LDL, total cholesterol, and TRI were not in the at-risk range. However, the mean scores for both BMI and blood glucose exceeded the at-risk cutoff. The mean BMI score was 33.3, which exceeds the at-risk cut off by 33%. Of the 240 participants, 199 (82.9%) had a BMI that exceeded 25, while only 41 (17.1%) were within a healthy range (see Table 2). This score, which is perhaps the most striking, indicates that obesity may be a substantial concern among individuals within this population. As seen in Table 2, just over one third of participants was at risk on measures of diastolic BP, total cholesterol, and TRI; whereas approximately 45% showed at-risk systolic BP scores.

**Self-assessed health.** Table 2 shows the descriptive statistics for participants’ self-assessed health ratings. The mean self-assessed health score was 2.5, with scores ranging from 1-5, indicating that, on average, participants rated their health between fair and good.
Table 2. Health Characteristics, N=214-240

<table>
<thead>
<tr>
<th>Health Indicator</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
<th>Frequency (n)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic BP</td>
<td>126.5</td>
<td>16.2</td>
<td>93-191</td>
<td>237</td>
<td>-</td>
</tr>
<tr>
<td>Not At Risk</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>129</td>
<td>54.4</td>
</tr>
<tr>
<td>At Risk ≥130</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>108</td>
<td>45.6</td>
</tr>
<tr>
<td>Diastolic BP</td>
<td>80.2</td>
<td>11.9</td>
<td>47-116</td>
<td>237</td>
<td>-</td>
</tr>
<tr>
<td>Not At Risk</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>150</td>
<td>63.3</td>
</tr>
<tr>
<td>At Risk ≥85</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>87</td>
<td>36.7</td>
</tr>
<tr>
<td>BMI</td>
<td>33.3</td>
<td>9.0</td>
<td>17.8-68.7</td>
<td>240</td>
<td>-</td>
</tr>
<tr>
<td>Not At Risk</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>41</td>
<td>17.1</td>
</tr>
<tr>
<td>At Risk ≥25</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>199</td>
<td>82.9</td>
</tr>
<tr>
<td>HDL</td>
<td>45.9</td>
<td>12.6</td>
<td>22-115</td>
<td>215</td>
<td>-</td>
</tr>
<tr>
<td>Not At Risk</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>143</td>
<td>66.5</td>
</tr>
<tr>
<td>At Risk &lt;40</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>72</td>
<td>33.5</td>
</tr>
<tr>
<td>LDL</td>
<td>119.7</td>
<td>44.8</td>
<td>30-400</td>
<td>214</td>
<td>-</td>
</tr>
<tr>
<td>Not At Risk</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>146</td>
<td>68.2</td>
</tr>
<tr>
<td>At Risk ≥130</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>68</td>
<td>31.8</td>
</tr>
<tr>
<td>Total Cholesterol</td>
<td>192.1</td>
<td>40.0</td>
<td>101-299</td>
<td>217</td>
<td>-</td>
</tr>
<tr>
<td>Not At Risk</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>134</td>
<td>61.8</td>
</tr>
<tr>
<td>At Risk ≥200</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>83</td>
<td>38.2</td>
</tr>
<tr>
<td>TRI</td>
<td>148.2</td>
<td>87.9</td>
<td>33-485</td>
<td>215</td>
<td>-</td>
</tr>
<tr>
<td>Not At Risk</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>135</td>
<td>62.8</td>
</tr>
<tr>
<td>At Risk ≥150</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>80</td>
<td>37.2</td>
</tr>
<tr>
<td>Blood Glucose</td>
<td>100.8</td>
<td>42.1</td>
<td>41-495</td>
<td>216</td>
<td>-</td>
</tr>
<tr>
<td>Not At Risk</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>151</td>
<td>69.9</td>
</tr>
<tr>
<td>At Risk ≥100</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>65</td>
<td>30.1</td>
</tr>
<tr>
<td>Self-Assessed Health</td>
<td>2.5</td>
<td>1.0</td>
<td>1-5</td>
<td>237</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note.* Health indicator risk was determined according to CIHS (2013) guidelines
Health-Risk and Psychosocial Characteristics

Table 3 lists the frequencies and descriptive statistics for measures of health-risk and psychosocial characteristics.

Health-risk characteristics. Health-risk characteristics include self-reported history of cardiometabolic disease (viz., diabetes, hypertension, and heart disease) and substance use (viz., alcohol, tobacco, and illicit drugs). The vast majority of participants reported no history of either diabetes (83.3%) or heart disease (89.2%). As seen in Table 3, a considerably greater proportion of participants reported a history of hypertension, at approximately 42%. About one third (35%) of participants reported a history of alcohol use, whereas just over half (53.4%) reported a history of tobacco use. Nearly three fourths (72%) of participants denied a history of illicit drug use (see Table 3).

Psychosocial characteristics. Table 3 also reports descriptive statistics of three measures of psychosocial characteristics: level of functioning, psychological distress, and social support. Level of functioning was measured with the Perception of Functioning (PF) scale with total scores of the 7-item scale ranging from 7-35. The mean PF total scale score was 23.7, indicating moderately high levels of functioning. Psychological distress was measured with the 6-item K6 scale (Range=0.24). The mean K6 total scale score was 10.3, indicating moderately low levels of symptomology. Social support was measured with the Perception of Social Connectedness (PSC) scale with total scores ranging from 4-20. The mean PSC total scale score was 15.2 indicating moderately high levels of social support. The Cronbach’s alphas for the PF and K6 were 0.85 and 0.89 respectively, indicating good internal consistency. The PSC scale yielded a Cronbach’s alpha of 0.78, indicating adequate internal consistency.
Table 3. Health-Risk and Psychosocial Characteristics, \( N=227-238 \)

<table>
<thead>
<tr>
<th></th>
<th>( M )</th>
<th>SD</th>
<th>Range</th>
<th>Frequency (( n ))</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td></td>
<td></td>
<td></td>
<td>228</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td>190</td>
<td>83.3</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td>38</td>
<td>16.7</td>
</tr>
<tr>
<td>Hypertension</td>
<td></td>
<td></td>
<td></td>
<td>227</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td>132</td>
<td>58.1</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td>95</td>
<td>41.9</td>
</tr>
<tr>
<td>Heart Disease</td>
<td></td>
<td></td>
<td></td>
<td>232</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td>207</td>
<td>89.2</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td>25</td>
<td>10.8</td>
</tr>
<tr>
<td>Alcohol</td>
<td></td>
<td></td>
<td></td>
<td>237</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td>154</td>
<td>65.0</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td>83</td>
<td>35.0</td>
</tr>
<tr>
<td>Tobacco</td>
<td></td>
<td></td>
<td></td>
<td>238</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td>111</td>
<td>46.6</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td>127</td>
<td>53.4</td>
</tr>
<tr>
<td>Illicit Drugs</td>
<td></td>
<td></td>
<td></td>
<td>236</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td>170</td>
<td>72.0</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td>66</td>
<td>28.0</td>
</tr>
<tr>
<td>Level of Functioning</td>
<td>23.7</td>
<td>5.7</td>
<td>7-35</td>
<td>238</td>
<td></td>
</tr>
<tr>
<td>Psychological Distress</td>
<td>10.3</td>
<td>6.3</td>
<td>0-24</td>
<td>233</td>
<td></td>
</tr>
<tr>
<td>Social Support</td>
<td>15.2</td>
<td>2.9</td>
<td>4-20</td>
<td>236</td>
<td></td>
</tr>
</tbody>
</table>
The current study also analyzed the relationship between medication regimen and participants’ self-assessed health. Medication regimen refers to the combination of specific medications prescribed to participants at intake. It was coded according to certain combinations of relevant medication categories, including antipsychotics (AP), antidepressants (AD), and mood stabilizers (MS). For example, the medication category for participants prescribed only antipsychotics was coded simply as AP, whereas the category for participants prescribed only antipsychotics and mood stabilizers was coded as AP/MS. The current study summarized information about medication regimens as well as identified associations between certain medication regimens and participants’ self-assessed health.

**Medication regimen frequencies.** Table 4 presents frequencies for medication regimens prescribed to participants. As seen in Table 4, one fourth was prescribed an AP/AD regimen, which was the most frequently prescribed regimen. Nearly 20% of participants was prescribed a regimen that included all three medication categories (AP/AD/MS). The next most frequently prescribed regimens were AP only (17.5%), AP/MS (11.3%), AD/MS (10.8%), and AD only (9.4%). These latter regimens were used in subsequent analyses; however the MS regimen (4.7%) and the category of no medication regimen (1.9%) were not used in further analyses due to small subsample sizes.
Table 4. Medication Regimen Frequencies, N=212

<table>
<thead>
<tr>
<th></th>
<th>Frequency (n)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>4</td>
<td>1.9</td>
</tr>
<tr>
<td>AP</td>
<td>37</td>
<td>17.5</td>
</tr>
<tr>
<td>AD</td>
<td>20</td>
<td>9.4</td>
</tr>
<tr>
<td>MS</td>
<td>10</td>
<td>4.7</td>
</tr>
<tr>
<td>AP/AD</td>
<td>53</td>
<td>25.0</td>
</tr>
<tr>
<td>AP/MS</td>
<td>24</td>
<td>11.3</td>
</tr>
<tr>
<td>AD/MS</td>
<td>23</td>
<td>10.8</td>
</tr>
<tr>
<td>AP/AD/MS</td>
<td>41</td>
<td>19.3</td>
</tr>
</tbody>
</table>

*Note. AP=antipsychotic, AD=antidepressant, MS=mood stabilizer*

Association between medication regimen and self-assessed health. Prior to analyzing the association between medication regimen and self-assessed health, the variable measuring self-assessed health (GSRH item) was dichotomized into two categories of health: “worse” (GSRH score of ≤2) and “better” (GSRH score of 3-5). Of the 237 data points in the valid sample, 124 self-assessed their health as “worse” and 113 self-assessed their health as “better.” Table 5 shows the results of chi-square tests of significance that were computed to examine associations between medication regimen and self-assessed health. As seen in Table 5, only one association proved statistically significant. Participants prescribed the AP/MS regimen were significantly more likely to assess their health as “better” (73.9%) than were those not prescribed the AP/MS regimens (44.9%), at $\chi^2(1)=7.027, p<.01$. No other significant associations emerged between medication regimen and self-assessed health (see Table 5).
Table 5. Association between Medication Regimen and Self-Assessed Health, $N=89-118$

<table>
<thead>
<tr>
<th></th>
<th>Worse Health</th>
<th>Better Health</th>
<th>$\chi^2$</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>AP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Prescribed</td>
<td>52.0</td>
<td>104</td>
<td>48.0</td>
<td>96</td>
</tr>
<tr>
<td>Prescribed</td>
<td>54.1</td>
<td>20</td>
<td>45.9</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>.053</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Prescribed</td>
<td>51.4</td>
<td>112</td>
<td>48.6</td>
<td>106</td>
</tr>
<tr>
<td>Prescribed</td>
<td>63.2</td>
<td>12</td>
<td>36.8</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>.972</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP/AD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Prescribed</td>
<td>51.9</td>
<td>96</td>
<td>48.1</td>
<td>89</td>
</tr>
<tr>
<td>Prescribed</td>
<td>53.8</td>
<td>28</td>
<td>46.2</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>.062</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP/MS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Prescribed</td>
<td>55.1</td>
<td>118</td>
<td>44.9</td>
<td>96</td>
</tr>
<tr>
<td>Prescribed</td>
<td>26.1</td>
<td>6</td>
<td>73.9</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>7.027**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AD/MS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Prescribed</td>
<td>50.9</td>
<td>109</td>
<td>49.1</td>
<td>105</td>
</tr>
<tr>
<td>Prescribed</td>
<td>65.2</td>
<td>15</td>
<td>34.8</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>1.698</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP/AD/MS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Prescribed</td>
<td>52.3</td>
<td>103</td>
<td>47.7</td>
<td>94</td>
</tr>
<tr>
<td>Prescribed</td>
<td>52.5</td>
<td>21</td>
<td>47.5</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>.001</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Worse self-assessed health=GSRH$\leq$2; Better self-assessed health=GSRH 3-5

**$p<.01$**
Post-hoc analysis of AP/MS regimens and health indicator risk. In light of the results showing that participants prescribed the AP/MS regimen self-assessed their health as significantly better (73.9%) than those not prescribed AP/MS regimen (44.9%), a post-hoc analysis was conducted to examine the associations between the AP/MS regimen and health indicator risk. Table 6 reports the results of chi-square tests of significance performed using the dichotomized measures (not at risk, at risk) of the 8 mechanical and laboratory health indicators (viz., systolic BP, diastolic BP, BMI, HDL, LDL, total cholesterol, TRI, and blood glucose). As seen in Table 6, the proportions of participants prescribed the AP/MS regimen that were not at risk exceeded the proportions of those prescribed this particular regimen that were at risk, on all health indicators except BMI; however, no statistically significant associations emerged.
Table 6. Associations between AP/MS Regimen and Health Indicator Risk, N=24-237

<table>
<thead>
<tr>
<th></th>
<th>Not Prescribed</th>
<th>Prescribed</th>
<th>$\chi^2$</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td><strong>BP Systolic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at Risk</td>
<td>89.1</td>
<td>115</td>
<td>10.9</td>
<td>14</td>
</tr>
<tr>
<td>At Risk</td>
<td>91.7</td>
<td>99</td>
<td>8.3</td>
<td>9</td>
</tr>
<tr>
<td><strong>BP Diastolic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at Risk</td>
<td>88.7</td>
<td>133</td>
<td>11.3</td>
<td>17</td>
</tr>
<tr>
<td>At Risk</td>
<td>93.1</td>
<td>81</td>
<td>6.9</td>
<td>6</td>
</tr>
<tr>
<td><strong>BMI</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at Risk</td>
<td>90.2</td>
<td>37</td>
<td>9.8</td>
<td>4</td>
</tr>
<tr>
<td>At Risk</td>
<td>89.9</td>
<td>179</td>
<td>10.1</td>
<td>20</td>
</tr>
<tr>
<td><strong>Blood Glucose</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at Risk</td>
<td>89.4</td>
<td>135</td>
<td>10.6</td>
<td>16</td>
</tr>
<tr>
<td>At Risk</td>
<td>93.8</td>
<td>61</td>
<td>6.2</td>
<td>4*</td>
</tr>
<tr>
<td><strong>HDL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at Risk</td>
<td>89.5</td>
<td>128</td>
<td>10.5</td>
<td>15</td>
</tr>
<tr>
<td>At Risk</td>
<td>90.3</td>
<td>65</td>
<td>9.7</td>
<td>7</td>
</tr>
<tr>
<td><strong>LDL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at Risk</td>
<td>87.7</td>
<td>128</td>
<td>12.3</td>
<td>18</td>
</tr>
<tr>
<td>At Risk</td>
<td>94.1</td>
<td>64</td>
<td>5.9</td>
<td>4*</td>
</tr>
<tr>
<td><strong>TRI</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at Risk</td>
<td>89.6</td>
<td>121</td>
<td>10.4</td>
<td>14</td>
</tr>
<tr>
<td>At Risk</td>
<td>90.0</td>
<td>72</td>
<td>10.0</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total Lipids</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at Risk</td>
<td>88.1</td>
<td>118</td>
<td>11.9</td>
<td>16</td>
</tr>
<tr>
<td>At Risk</td>
<td>92.8</td>
<td>77</td>
<td>7.2</td>
<td>6</td>
</tr>
</tbody>
</table>

Note. Health indicator risk was determined according to CIHS (2013) guidelines
* Cell size <5 may indicate insufficient statistical power
Medication Risk and Differences in Health Characteristics

The present study sought to analyze differences in health characteristics between participants prescribed high-health risk (HHR) medications and those not prescribed HHR medications across health-related and psychosocial characteristics. Of the 211 participants in the valid sample, 131 were prescribed HHR medications and 80 were not prescribed HHR medications.

Differences in health characteristics. Table 7 shows the results of 12 independent samples t-tests that were computed to compare the mean scores of relevant characteristics between participants prescribed HHR medications and those not prescribed HHR medications. The key characteristics analyzed included health indicator scores (viz., systolic BP, diastolic BP, BMI, HDL, LDL, total cholesterol, TRI, and blood glucose), self-assessed health (continuous variable), and psychosocial variables (viz., level of functioning, psychological distress, and social support). As seen in Table 7, the mean scores on key characteristics were similar, and some nearly identical (i.e., self-assessed health, LDL, level of functioning, social support), on all measures except for blood glucose and psychological distress; however, no statistically significant differences emerged between participants prescribed HHR medications and those not prescribed HHR medications.

Associations between medication risk and health indicator risk. Table 8 reports the results of chi-square tests of significance that were computed to examine associations between medication risk and health indicator risk. As seen in Table 8, the proportions of participants prescribed HHR medications that were not at risk exceeded the proportions of those prescribed
HHR medications that were at risk, on all health indicators except total cholesterol; however, only one statistically significant association emerged. Participants prescribed HHR medications were significantly less likely to have at-risk blood glucose than those not prescribed HHR medications, at $\chi^2(1)=4.550, p<.05$. 
Table 7. Differences on Key Characteristics across Medication Risk, \(N=211\)

<table>
<thead>
<tr>
<th></th>
<th>Not Prescribed HHR</th>
<th>Prescribed HHR</th>
<th>(t)</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(M)</td>
<td>(SD)</td>
<td>(n)</td>
<td>(M)</td>
</tr>
<tr>
<td>Self-Assessed Health 1-5</td>
<td>2.5</td>
<td>1.0</td>
<td>78</td>
<td>2.5</td>
</tr>
<tr>
<td>Systolic BP</td>
<td>127.3</td>
<td>18.8</td>
<td>77</td>
<td>125.5</td>
</tr>
<tr>
<td>Diastolic BP</td>
<td>81.8</td>
<td>12.7</td>
<td>77</td>
<td>79.3</td>
</tr>
<tr>
<td>BMI</td>
<td>33.8</td>
<td>9.1</td>
<td>79</td>
<td>32.8</td>
</tr>
<tr>
<td>HDL</td>
<td>45.4</td>
<td>10.5</td>
<td>68</td>
<td>46.3</td>
</tr>
<tr>
<td>LDL</td>
<td>121.5</td>
<td>37.0</td>
<td>66</td>
<td>121.2</td>
</tr>
<tr>
<td>Total Cholesterol</td>
<td>194.1</td>
<td>42.8</td>
<td>69</td>
<td>191.5</td>
</tr>
<tr>
<td>TRI</td>
<td>147.9</td>
<td>83.6</td>
<td>67</td>
<td>143.2</td>
</tr>
<tr>
<td>Blood Glucose</td>
<td>104.4</td>
<td>55.3</td>
<td>69</td>
<td>94.1</td>
</tr>
<tr>
<td>Level of Functioning</td>
<td>23.4</td>
<td>5.5</td>
<td>79</td>
<td>23.6</td>
</tr>
<tr>
<td>Psychological Distress</td>
<td>11.4</td>
<td>6.0</td>
<td>78</td>
<td>9.7</td>
</tr>
<tr>
<td>Social Support</td>
<td>15.2</td>
<td>2.9</td>
<td>76</td>
<td>15.1</td>
</tr>
</tbody>
</table>
Table 8. Associations between Medication Risk and Health Indicator Risk, \( N=80-131 \)

<table>
<thead>
<tr>
<th></th>
<th>Not Prescribed HHR</th>
<th>Prescribed HHR</th>
<th>( \chi^2 )</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Systolic BP</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at Risk</td>
<td>54.5  42</td>
<td>55.4  72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At Risk ≥130</td>
<td>45.5  35</td>
<td>44.6  58</td>
<td>.014</td>
<td>1</td>
</tr>
<tr>
<td><strong>Diastolic BP</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at Risk</td>
<td>57.1  44</td>
<td>66.9  87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At Risk ≥85</td>
<td>42.9  33</td>
<td>33.1  43</td>
<td>1.991</td>
<td>1</td>
</tr>
<tr>
<td><strong>BMI</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at Risk</td>
<td>11.4  9</td>
<td>19.8  26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At Risk ≥25</td>
<td>88.6  70</td>
<td>80.2  105</td>
<td>2.536</td>
<td>1</td>
</tr>
<tr>
<td><strong>HDL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at Risk</td>
<td>64.7  44</td>
<td>69.2  81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At Risk &lt;40</td>
<td>35.3  24</td>
<td>30.8  36</td>
<td>.402</td>
<td>1</td>
</tr>
<tr>
<td><strong>LDL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at Risk</td>
<td>66.7  44</td>
<td>68.6  81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At Risk ≥130</td>
<td>33.3  22</td>
<td>31.4  37</td>
<td>.076</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total Cholesterol</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at Risk</td>
<td>63.2  43</td>
<td>62.2  74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At Risk ≥200</td>
<td>36.8  25</td>
<td>37.8  45</td>
<td>.020</td>
<td>1</td>
</tr>
<tr>
<td><strong>TRI</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at Risk</td>
<td>62.7  42</td>
<td>66.1  78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At Risk ≥150</td>
<td>37.3  25</td>
<td>33.9  40</td>
<td>.219</td>
<td>1</td>
</tr>
<tr>
<td><strong>Blood Glucose</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at Risk</td>
<td>60.9  42</td>
<td>75.6  90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At Risk ≥100</td>
<td>39.1  27</td>
<td>24.4  29</td>
<td>4.550*</td>
<td>1</td>
</tr>
</tbody>
</table>

*Note.* Health indicator risk was determined according to CIHS (2013) guidelines  
*p<.05
CHAPTER 6: DISCUSSION

The current cross-sectional study of 241 participants diagnosed with BPD receiving integrated PBHC services in a CMH setting examined interrelationships among health, health-risk, and psychosocial characteristics and psychiatric medications. The study had two primary goals. First, it sought to expand the existing knowledge base on people with SMI receiving integrated PBHC care in CMH settings by describing the subpopulation of participants diagnosed with BPD receiving care in such programs. Due to the paucity of literature describing integrated PBHC services for persons with SMI, descriptive information about clients with BPD is underreported in the literature. Second, the current study sought to describe interrelationships among medications and certain characteristics of clients with BPD receiving integrated PBHC services in CMH settings. To accomplish this, medications were coded according to both regimen type and level of health risk. No previous studies have examined associations between medications for BPD and health, health-risk, and psychosocial characteristics of clients in a CMH setting. An additional aim of the present study was to develop a more holistic profile of clients in order to develop knowledge about the needs of this subpopulation of clients with SMI receiving integrated PBHC services. It lays the groundwork for future research examining the relationship between medications and important health outcomes for clients with BPD from a biopsychosocial perspective.

Sample Characteristics

This section presents key differences between the current study, which examined participants with BPD and the original study by Lemieux et al. (2015), which described a sample of 125 participants with SMI from the same data set. The characteristics of the current sample were, for the most part, consistent with those of the original study. This may be due to the fact
that BPD was overrepresented in the original study. Lemieux et al. (2015) reported that just under one third of participants in the original study was diagnosed with BPD (29.6%), whereas Druss et al. (2010) reported that only 10.7% of participants in the PCARE study was diagnosed with BPD.

**Sociodemographic Characteristics**

The sociodemographic statistics indicate that the typical participant in the current study was white, female, middle-aged, unemployed, and had a high school degree. Due to the population served by the CMH program (Lemieux et al., 2015), participants were also likely to be of low socioeconomic status. Approximately two thirds of participants in the current study were female (67.6%), which is consistent with Lemieux et al. (2015; 67.2% female), but inconsistent with other studies indicating that the gender distribution of BPD is roughly proportional (Diflorio & Jones, 2010). The overrepresentation of women in the current study could be due to differences in help-seeking behavior, as there is literature to suggest that women are more likely to seek help for mental health issues than are men (World Health Organization, n.d.).

The current study reported a slightly higher proportion of whites (64.9%) than was reported by Lemieux et al. (2015; 60.8%). The overrepresentation of whites is consistent with national studies showing that racial minorities are 30% less likely to be diagnosed with a mood disorder than are whites (NIMH, 2014c). The present study reported notably higher rates of high school graduates than did the original study, at 72.1% and 65.6%, respectively (Lemieux et al., 2015). This latter result could possibly be attributed to the age of onset of BPD. The average age of onset of BPD is 25 (NIMH, 2014b), which allows ample time for an individual to complete high school before experiencing the disabling effects of the illness. Conversely,
depression generally develops earlier in life and thus has the opportunity to affect school completion rates (Jones, 2013). Masinter (2016) who used the same data set as that used in the current study, reported that the high school completion rate among clients with depression was 67.6%, which is notably lower than that of the current study. Although schizophrenia generally develops in early adulthood, new research shows that poor school performance is correlated with later development of the illness (Jones, 2013; Van Oel, Sitskoorn, Cremer, & Kahn, 2002). Nevertheless, the proportion of participants completing high school in the current study is considerably smaller than the general population at 88.4% (Ryan & Bauman, 2016).

Participants’ employment status in the current study was comparable to that reported by Lemieux et al. (2015), with both studies showing that about three fourths of the sample was unemployed (at 74.4% and 77.6%, respectively). These rates, however, are substantially higher than the unemployment rate for the general population in the state in which data were collected, which between February 2012 and August 2015 (as data were being collected), ranged from 5.5% to 7.5% (Bureau of Labor Statistics, n.d.). This notable discrepancy is likely due to the symptomology associated with BPD (e.g., lethargy, psychosis, mood swings, anhedonia) that may make it difficult for an individual to consistently perform work duties (APA, 2013).

Despite the markedly high rates of unemployment present in the sample, a much smaller proportion (24.9%) were receiving disability benefits, which is similar to the 24% rate reported by Lemieux et al. (2015) in the original study. According to the National Alliance on Mental Illness (National Alliance on Mental Illness, n.d.) qualifying for disability benefits on mental health grounds can be difficult because such claims are usually not reviewed by qualified mental health professionals and decisions are made based on very specific parameters that do not take into account various lifestyle factors (National Alliance on Mental Illness, n.d.). Thus, although
people with BPD may be unable to work due to the severity of their illness (APA, 2013), the challenge of applying for disability benefits may be too onerous for many to pursue. Additional research is needed to shed light on interrelationships among unemployment, symptomology, and receipt of disability benefits in persons with BPD.

**Health Characteristics**

**Health indicator scores.** In terms of health indicators, the mean BMI, HDL, and blood glucose scores in the current study were in the at-risk range according to CIHS (2013) guidelines, indicating that participants may be disproportionately at risk for cardiometabolic disease, as compared to the general population. Additionally, greater proportions of participants in the present study were at risk on measures of BMI (82.9%) and TRI (37.2%) than in the original study (at 72.2% and 32.8%, respectively). BMI was of particular concern due to the fact that the mean BMI score was about 133% of the at-risk cut off score. This suggests that obesity is a major health concern among this population.

Although these latter results show that participants in the present study were at risk on some indicators of cardiometabolic comorbidities (CIHS, 2013), overall, they may be generally healthier than those in the original study. On most health indicator measures, smaller proportions of participants in the present study were at risk. To be specific, the proportions at risk for systolic BP (45.6%), diastolic BP (36.7%), HDL (33.5%), LDL (31.8%), total cholesterol (38.2%), and blood glucose (30.1%) are smaller than those reported by Lemieux et al. (2015), at 50.4%, 37.6%, 36.8%, 40%, 41.6%, and 34.4%, respectively. Results of the current study, however, are in contrast to those reported by Correll et al. (2010), who found that clients with BPD in an integrated PBHC setting were disproportionally at risk, as compared to CMH clients with other mental disorders on measures of BMI, blood pressure, total cholesterol, HDL, and blood glucose.
These latter inconsistencies may have to do with differences in physician perceptions of bipolar disorder. For example, diagnostic criteria for hypomania are broad (APA, 2013) and subject to considerable variability in practitioner judgment and interpretation. In addition, differentiating Bipolar II from major depressive disorder (MDD) can be very challenging (Benazzi, 2008). Individuals with MDD may have sub-syndromal episodes of hypomania; thus, their experiences may be similar to those diagnosed with Bipolar II (Benazzi, 2008). One study showed that as many as 45% of people diagnosed with MDD actually met criteria for a Bipolar II diagnosis (Benazzi, 1997). Thus, although beyond the scope of the present study, it is possible that the physicians in the Correll et al. (2010) study were more likely to diagnose clients presenting with symptoms of hypomania with Bipolar II, while the physicians in the original study (Lemieux et al., 2015) diagnosed the same symptomology as MDD. Consistent with this latter line of reasoning, Masinter (2016) reported that greater proportions of clients with MDD were at risk on most health indicators, as compared to findings reported by Lemieux et al. (2015). Participants diagnosed with MDD in the original study, therefore, may have included a less functional subsample of the Bipolar II client population. If physicians in the study conducted by Lemieux et al. (2015) diagnosed clients presenting with symptoms of mild hypomania with MDD (rather than BPD), then practitioner judgment could potentially explain the variability in health indicator scores that emerges across studies of clients receiving integrated PBHC services (e.g., Correll et al., 2010) Future research, therefore, should more systematically describe the various mood disorder diagnoses and associated criteria to ensure that BPD diagnoses accurately distinguish those with Bipolar II from clients with MDD.
**Self-assessed health.** The mean self-assessed health score for participants in the current study was 2.50, indicating that participants, overall, rated their health between fair and good, which is slightly higher than the mean score reported in the original study (2.29; Lemieux et al., 2015). This is consistent with the data showing that smaller proportions of participants in the current study than in the original study were at risk in terms of health indicator scores. Participants in the current study have slightly better physical health; hence, it follows that they would assess their health as slightly better than that reported by Lemieux et al. (2015).

**Health-risk characteristics.**

Regarding health-risk characteristics, smaller proportions of participants in the current study self-reported a personal history of diabetes (16.7%), hypertension (41.9%), and heart disease (10.8%) than in the original study, at 17.6%, 43.2%, and 17.2%, respectively (Lemieux et al., 2015). Similar to the health indicator measures, the results of the current study are inconsistent with the findings of Correll et al. (2010), which showed higher rates of diabetes and hypertension in persons with BPD than in CMH clients with other types of mental disorders. The relatively low prevalence of cardiometabolic conditions among those with BPD in the current study may be due to measurement problems (viz., participants’ histories of these conditions were self-reported and not medically verified). However, such conditions often go undiagnosed in CMH clients, and among those that are low income and unable to access primary healthcare services, in particular. Future research in integrated health settings, therefore, should substantiate participants’ self-reports about primary care conditions with information from their health records.
The rates of alcohol (35.0%) and tobacco use (53.4%) reported in the current study are similar to those reported in the original study at (33.6% and 53.2% respectively; Lemieux et al., 2015). Rates of alcohol and tobacco use in the current study are lower than the rates reported in previous studies with similar populations (Druss et al, 2010; Hartz et al., 2014); however they are considerably higher than rates of alcohol and tobacco use among the general population. For example, the proportion of participants in the current study using tobacco was nearly twice that of the general population in the state in which the study was conducted (25.7%; Center for Disease Control and Prevention, 2011). In addition, as compared to 7.9% in the general population, nearly four times as many clients with BPD in the current study reported alcohol use (Substance Abuse and Mental Health Services Administration, 2014). In terms of illicit drug use, nearly three times as many clients with BPD in the current study reported illicit drug use (28.0%) than did clients in the original study (at 9.6%; Lemieux et al., 2015). Among clients with BPD, however, comorbid substance use disorders are associated with more severe symptomology (psychosis and depression), more frequent hospitalizations, and poorer outcomes (Nesvåg et al., 2015). Although the current study did not diagnose substance use disorders, the prevalence of alcohol, tobacco, and illicit drug use is somewhat alarming, and it suggests the possible presence of a heightened vulnerability among clients with BPD. Additional research is therefore warranted, including studies that specifically sample subpopulations of CMH clients with different diagnoses, to identify both level of risk and additional relevant biopsychosocial correlates of elevated risk.

The high rates of self-reported substance use may be associated with a variety of different factors. For example, participants in the present study may use substances to ameliorate their symptoms and may continue to use substances in order to mitigate the severity of their illness
(Druss et al., 2011). Other factors such as socializing with substance users, being poor, and receiving treatment in facilities that allow smoking or alcohol use may also render individuals with BPD more likely to use substances (Druss et al., 2011). Research also suggests that disproportionally high rates of illicit substance use may be associated with diagnostic inaccuracies. The effects of numerous illicit substances (e.g., mood instability and high-risk behaviors) may be misinterpreted by practitioners as symptoms of BPD (Goldberg et al., 2008). Future studies with clients with BPD should substantiate self-reported use of all substances with more objective data (e.g., drug screens), as well as provide sufficient information to ensure that BPD is accurately diagnosed in the context of participants’ patterns of substance use.

**Psychosocial characteristics**

The mean score assessing level of functioning in the current study (23.7) was slightly lower than that reported in the original study (27.4; Lemieux et al., 2015), but not markedly so. In fact, the moderate level of functioning reported by participants is consistent with the relatively lower levels of employment that also were reported. The mean score measuring social support (15.2) was almost identical to that reported in the original study (15.17), indicating that relatively high levels of perceived social support were reported across studies. Conversely, Masinter (2016) reported that participants with MDD reported on average, a relatively lower level of social support (14.7). Although beyond the scope of the current study, which included only clients with BPD, individuals with BPD and MDD do, in fact, experience similar depressive symptoms (APA, 2013); hence, it is possible that pro-social behaviors (e.g., socially goal directed behaviors, hypersexuality, willingness to talk to others; APA, 2013) associated with manic or hypomanic episodes may account for these latter discrepancies. Given the importance of social support as a determinant of health (Uchino, 2006; 2009), future studies should determine
whether differences in social support emerge across clients with different mood disorders. In addition, research is needed to examine whether level of social support systematically varies with mood episodes in clients with BPD.

Participants in the current study reported a markedly lower mean K6 score (10.3) than did participants in the original study (12.1; Lemieux, 2015), indicating a lower level of psychological distress. This is somewhat inconsistent with research showing that persons with BPD die by suicide at a rate that is 15 times that of the general population, and they account for about one fourth of completed suicides (APA, 2013). Further, data show that one in three individuals with BPD will attempt suicide in their lifetime (APA, 2013) and nearly one in five will complete suicide (National Strategy for Suicide Prevention, 2003). These latter rates, which should be associated with greater overall levels of psychological distress, are greater than those for individuals with either schizophrenia (APA, 2013) or depression (National Strategy for Suicide Prevention, 2003). It is likely that clients with BPD receiving integrated treatment in a CMH outpatient setting are more stable than those not enrolled in such programs. Thus, participants in the current sample may have been experiencing lower levels of psychological distress at intake. However, future studies should determine whether differences in symptomology emerge across clients with different diagnoses. In addition, research is needed to determine to what extent psychological distress varies with mood episodes in clients with BPD in integrated health settings.

**Medication Regimen and Self-Assessed Health**

The current study also examined the relationships between type of medication regimen and self-assessed health. Results showed that only one significant association emerged between medication type and self-assessed health (dichotomized as better or worse). Nearly three fourths
of participants prescribed an antipsychotic and mood stabilizer (AP/MS) regimen assessed their health as better, while the majority of participants taking every other regimen of medication reported their health as worse. This result was unexpected and it is particularly striking due to the fact that about 80% of those prescribed the AP/MS regimen were prescribed at least one HHR medication.

A post-hoc analysis was conducted to determine whether the participants prescribed the AP/MS regimen exhibited objective measures of better health in terms of the 8 measured health indicators, which were dichotomized as at risk and not at risk, according to CIHS (2013) recommendations. Although the participants prescribed the AP/MS regimen assessed their health as better, no significant differences emerged on any of the measures in terms of health indicator risk.

The most striking difference between participants prescribed the AP/MS regimen and participants prescribed nearly all other regimens was a lack of antidepressant (AD) medication. It is possible that participants prescribed the AP/MS regimen were not showing symptoms of depression at the time of intake. Research has shown an association between lower self-assessed health scores and higher rates of depression (Thomas, Kelman, Kennedy, Ahn, & Yang, 1992; Koren et al., 1999). Additionally, some symptoms of BPD may include a somatic component (e.g., sleep disturbances, psychomotor agitation or retardation, fatigue, and weight and appetite changes; APA, 2013), which may prompt individuals to perceive their physical health as being worse than what may be indicated by objective measures. If participants who were prescribed the AP/MS regimen were not depressed, and those prescribed AD medications were, then this could explain why participants prescribed the AP/MS regimen assessed their health as being better (rather than worse). Curiously, the participants prescribed the AP-only regimen, which
also did not include AD medications, did not rate their health as better. Although beyond the scope of the present study, this latter finding could indicate that mood stabilizers may have a positive impact on subjective perceptions of health. In fact, some mood stabilizers (e.g., lamotrigine) are uniquely tolerable and have higher adherence rates than the vast majority of other psychiatric medications for BPD (Baldessarini, et al., 2008; Bowden et al., 2003).

It would be remiss not to consider the possibility that the AP/MS regimen actually did have an association with improvements in participants’ subjective assessments of their health. Although there was no indication that the AP/MS regimen objectively improved the health of participants, it is possible that this regimen was effective at reducing symptoms of BPD that may cause individuals with BPD to assess their health as worse (e.g., fatigue, restlessness, sleep disturbance, concentration difficulties, depressed mood; APA, 2013). This study did not analyze casual connections between medication regimen and self-assessed health, but future studies should explore the association between AP/MS regimen and client self-assessments of health.

Further research is needed to better analyze associations among the different medication regimens and self-assessed health in persons with BPD. In addition, future studies should determine whether objective measures of health (e.g., health indicators) are correlated with measures of self-assessed health in this population in order to determine the validity of self-assessed health as an indicator of objective health status.

**Medication Risk and Differences in Health Characteristics**

The present study also analyzed differences in health characteristics between participants prescribed HHR medications and those not prescribed HHR medications. It was hypothesized that participants prescribed HHR medications would be more likely to have at-risk health indicator scores (viz., systolic BP, diastolic BP, BMI, HDL, LDL, total cholesterol, TRI, and
blood glucose. The results did not support this hypothesis. Blood glucose was the only health indicator that distinguished between those who were and were not prescribed HHR medications. The proportion of participants prescribed HHR medications that was not at risk on the measure of blood glucose (39.1%) was greater than the proportion of participants (prescribed HHR medications) who were at risk on the measure of blood glucose (24.3%). There are several possible explanations for the predominantly non-significant, if not somewhat counterintuitive results of these latter analyses. Other health-risk (e.g., tobacco and alcohol use) and psychosocial characteristics (e.g., low income and poor educational attainment) that are associated with objective health outcomes (Druss & Walker, 2011) were not considered. If, for example, participants prescribed HHR medications had better self-care behaviors or more privileged socioeconomic standings than those not prescribed HHR medications, such factors could potentially offset the health risks posed by the medication. However, this is only speculation and additional research is needed to understand the complex interrelationships among medication risk, health, health-risk, and psychosocial characteristics in persons with BPD. Most importantly, the present study examined prescribed medications, not actual adherence rates or medication side effects. Although not directly assessed and beyond the scope of the current study, nonadherence to medication may have played a role among participants. Previous research shows that almost two thirds of individuals with BPD (≈64%) struggle with adherence to a medication regimen (Leclerc, Mansur, & Brietzke, 2013). Side effects known to affect adherence to medication (e.g., weight gain and sedation) are present in all of the medications designated as HHR in the present study (Bentley & Walsh, 2006; DeHert et al., 2011; Velligan et al., 2010). Thus, future research examining health correlates of HHR medication in persons with BPD should assess the extent to
which medications are actually taken as prescribed, as well as collect information about side effects and other reasons for nonadherence.

**Conclusions**

Participants in the current cross-sectional, descriptive study comprised a subsample of persons with BPD receiving integrated co-located PBHC services in 3 CMH settings. Participants with BPD self-reported lower prevalence rates of cardiometabolic conditions (e.g., diabetes, hypertension, and heart disease) than those in the original study. Although participants’ use of tobacco and alcohol was comparable to rates reported in other studies of persons with SMI in CMH settings (Correll et al., 2010; Druss et al., 2010; Lemieux et al., 2015), the current sample reported a higher rate of illicit substance use. A greater proportion of participants in the current study was at risk on measures of BMI and TRI, as compared with participants in the original study (Lemieux et al., 2015). Participants’ levels of functioning and social support in the current study were similar to those reported in the original study; however, the level of psychological distress was lower (Lemieux et al., 2015). Notably, as compared to participants diagnosed with MDD (Masinter, 2016), current study participants reported relatively higher levels of social support.

Participants prescribed the AP/MS medication regimen assessed their physical health as better, despite no statistically significant differences in measures of health indicator risk. Participants prescribed HHR medications, as compared to those not prescribed HHR medications, were less likely to have at-risk blood glucose scores, a counterintuitive result. No other differences between those prescribed and not prescribed HHR medications emerged.
Limitations and Strengths

As with all cross-sectional studies, the current study has limitations that must be acknowledged, including design, sampling, and measurement issues.

In terms of design, the current study collected data from 3 CMH sites in one geographic region; thus results can only be generalized to participants with BPD in similar integrated health programs in similar geographic regions of the US. In addition, the current study did not attempt to examine health outcomes over time. A longitudinal study design is more appropriate for examining associations between medications and other health-related characteristics in clients with BPD who experience mood episodes over time.

Sample size may also have been an issue in the current study. The subsample sizes for some of the different medication regimens analyzed were quite small (e.g., 19), which may have resulted in low statistical power (Rubin & Babbie, 1997). Additionally, the chi-square tests analyzing the AP/MS regimen across health indicators had several small cell sizes (<5), which may have resulted in some inaccuracies (Rubin & Babbie, 1997). Thus, future studies should attempt to obtain a much larger sample of clients with BPD that potentially is more representative of the subsamples prescribed the different medication regimens.

Additionally, the data for this study indicated only that the participants were diagnosed with BPD and did not include the type of BPD with which they had been diagnosed. The APA (2013) currently recognizes 7 diagnostic categories of BPD (viz., bipolar I disorder, bipolar II disorder, cyclothymic disorder, substance/medication-induced bipolar and related disorder, bipolar and related disorder due to another medical condition, other specified bipolar and related disorder, and unspecified bipolar and related disorder). Each of these categories is distinguished
from one another by differences in presenting signs and symptoms (APA, 2013). Future studies of clients with BPD should attempt to distinguish among the different diagnostic categories.

Finally, limitations of the current study include measurement issues, most notably with the medication coding schemes employed. Several psychiatric medications often used to treat BPD and other psychiatric comorbidities (e.g., buspirone, hydroxyzine, and benzodiazepines) did not fit into the different medication regimen categories developed by the researcher and were not included. Nearly one third (32.3%) of participants was prescribed at least one of these medications, which may pose unique health risks that influence clients’ perception of health. Although the HHR medications were classified using the existing literature, future attempts to dichotomize medications into levels of risk should consider additional medication health risks. It is also important to note that it is possible that medications cannot be exclusively categorized into a particular regimen or broadly designated according to health risk. There may be too much variation in the effects of certain biological and psychosocial influences for coding schemes like those used in the current study to detect meaningful differences. For example, the coding schemes used to classify medications in the present study did not account for contextual variables that may have influenced participants’ health (e.g., medication interactions, primary care medications, age, gender, lifestyle factors). Finally, as noted above, the current study did not examine medication adherence and participants were not asked directly about medication side effects. High nonadherence rates among individuals with BPD indicate that client reports may provide more accurate information about medication use (Leclerc, Mansur, & Brietzke, 2013) than existing records that list participants’ prescribed medications.

In terms of other measurement issues, much of the study data relied on participants’ self-reports, which introduces potential problems with reliability and validity. For example, social
desirability bias may have influenced participants’ willingness to accurately report behaviors that are potentially embarrassing (Rubin & Babbie, 1997), such as alcohol and drug use. Participants with BPD in the current study may have been experiencing certain cognitive deficits at baseline (Martínez-Arán et al., 2004), which, in turn, may have influenced their ability to answer survey questions correctly.

Despite its limitations, this is the first known study to examine correlates of medications for BPD among participants in an integrated PBHC program. The coding schemes developed in the current study are completely original, and grounded in peer-reviewed pharmacological and epidemiological research (Balon, 2015; Bentley & Walsh, 2006; De Hert et al., 2011; Kessing, Thomsen, Mogensen, & Andersen, 2010; Shine, McKnight, Leaver, & Geddes, 2015). It is also the first known study to utilize an integrated data set to examine sociodemographic, health, health-risk, and psychosocial characteristics of people with BPD receiving integrated PBHC services in a CMH setting. In addition, the measures used to assess participants’ functioning, symptomology, and social support were deemed reliable for the study sample and the GSRH instrument measuring self-assessed health has been found to be valid instrument across many different populations (DeSalvo, 2006). Another strength of the study is that it is rooted in a biopsychosocial theoretical foundation that considers a holistic perspective on health.

**Implications for social work**

Research. There is a paucity of research in the social work literature that describes clients with BPD receiving integrated PBHC treatment. This study highlights, in particular, the importance of analyzing medication treatments across multiple domains of wellbeing. Future research should seek to identify a more reliable method for coding medications so that
meaningful work can be done uncovering the associations between medication treatments and objective health indicators. This study has shown the value of reliably tracking medication-related data. In order to improve the reliability of such data, future studies should collect information about medication adherence rates, side effects, attitudes about medication treatment, and the duration of time that participants have been taking each medication. A longitudinal study design that tracks health indicators and medication usage over time also has the potential to produce more valid outcomes.

**Advocacy.** The current study also revealed at least one potential opportunity for advocacy. The sociodemographic description of the population indicated that while individuals with BPD in this community mental health setting were very likely to be unemployed, very few were receiving disability benefits. This is likely due to structural barriers within the system. For instance, the government employees that review disability claims are not mental health professionals and subsequently may not be able to effectively determine the impact of the mental illness on daily functioning (NAMI, n. d.). However, when claims are denied, many of the most common reasons for denial are problems that could have been easily remedied by a case manager or disability advocate. Some of these common reasons for denial include issues such as insufficient medical documentation, poorly written doctor’s notes, and a history of nonadherence to treatment (Disability Advocates Group, n. d.). Social workers can make a difference advocating for clients by ensuring that applications for disability benefits are complete and helping to create treatment plans that will optimize clients’ adherence rates.

**Education and Practice.** Changes and advances in healthcare service delivery require that social workers continue to learn new skills in order to practice effectively in integrated PBHC settings (Druss et al., 2010). Schools of social work should continue to develop curricula that
educate social workers about medical and pharmacological interventions. Although social workers do not provide primary healthcare services, they bring a unique professional perspective to medication issues (Bentley & Walsh, 2006). The social work profession acknowledges environmental and psychosocial components of client wellbeing and emphasizes client self-determination, which are crucial to biopsychosocial assessment and interventions that incorporate holistic therapies (Bentley & Walsh, 2006). Social workers employed in diverse health settings likely will provide services to clients who are prescribed some type of psychotropic medication (Bentley & Walsh, 2006). Knowledge about the medications most commonly prescribed in such settings can allow social workers to take an active role in supporting client adherence to treatment recommendations (Bentley & Walsh, 2006).

Using a sample of clients with BPD receiving integrated PBHC services, the current cross-sectional study examined interrelationships among health, health-risk, and psychosocial characteristics and psychiatric medications. It lays the groundwork for future research examining the relationship between medications and important health outcomes for clients with BPD.


89


Purdy (2013) *Citation forthcoming*


APPENDIX: IRB EXEMPTION

ACTION ON EXEMPTION APPROVAL REQUEST

TO: Laura van Zwaan
   Social Work

FROM: Dennis Landin
       Chair, Institutional Review Board

DATE: January 25, 2017

RE: IRB# E10294

TITLE: Interrelationships among Medication Types and Health Characteristics in Individuals with Bipolar Disorder Receiving Integrated Health Services


Review Date: 1/24/2017

Approved X Disapproved

Approval Date: 1/24/2017 Approval Expiration Date: 1/23/2020

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.
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 (44 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

Laura Valle is a current MSW candidate at the Louisiana State University School of Social Work. In 2009 she received her Bachelor’s degree in Sociology from Princeton University. As part of her studies, she interned at La Fortaleza de la Mujer Maya, a women’s non-profit organization in San Cristobal de las Casas, Mexico and UNREC (U.N. Department for Disarmament and Peace) in Lomé, Togo. Upon graduation from Princeton, she completed an undergraduate thesis entitled, *In the Pursuit of Success: Ethnicity and Social Capital in the Professional Workplace* and received a certificate in Latin American Studies. Laura is a member of the Alpha Delta Mu and Phi Kappa Phi honors societies at Louisiana State University.