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Mental Health Disorders as Predictors of Relapse in Previously Detoxified Individuals

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Abstract

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Individuals

by

Toni Lee Simonson

MS, University of Wisconsin, 2000

MS, University of Wisconsin, 1994

BA, University of Wisconsin, 1986

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Psychology

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Abstract

Researchers have shown a relationship between mental health disorders and alcohol dependence. However, only 5-10% of individuals with substance use problems co-occurring with mental health problems are correctly identified. The purpose of this research was to identify predictors of relapse using three different instruments of varying complexity: the Patient Health Questionnaire-9 (PHQ-9), the Modified Mini Screen (MMS), and the Millon Clinical Multiaxial Inventory-III (MCMI-III). Researchers have found that using alcohol produces relief, similar to a pharmacological intervention, from troublesome mental health symptoms that individuals experience. Considering this association, the self-medication hypothesis was the conceptual lens used for the study as it provides a practical framework for analyzing the relationship between mental health disorders and relapse. At the request of this researcher, data were collected on 45 individuals who were provided detoxification services at a public treatment facility in central Wisconsin. Regression analyses were conducted and identified a statistically significant, although weak, predictive relationship between relapse and the variable of depression as measured by the PHQ-9 ($R = .311^a$, $R^2 = .097$, $p = .037$), and depression as measured by the MCMI-III ($R = .364^a$, $R^2 = .133$, $p = .014$). The implications for positive social change from this study include the potential to increase the effectiveness and efficiency in identifying co-occurring mental health disorders among individuals who are treated for alcohol detoxification, enhancing the accuracy of referrals for aftercare, and reducing readmissions for detoxification amongst the individuals served.

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Dedication

I dedicate my dissertation work to my husband, Eric, whose words of encouragement supported me throughout my doctoral program. Thank you for your continued love and support.

Acknowledgments

Completing my doctoral program has been one of the most significant academic challenges I have ever faced. This accomplishment would not have been achieved without the support, patience, and guidance from the following people. It is to them I owe my deepest gratitude.

My husband, Eric, thank you for supporting me through this endeavor and for your understanding during those times when I needed to focus on research and was not able to participate in other activities. I know this process has taken a long time to complete, and I would not have been successful without your support.

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Dr. Henry Cellini, my committee methodology expert. Thank you for your wisdom, expertise in the field, for your feedback, and for giving up time on Saturdays to meet with me when I needed guidance on the statistical components of my research.

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Chapter 1: Introduction to the Study

Introduction

This exploratory study examines depression, anxiety, psychosis, and personality disorders, as identified by three different instruments: the Patient Questionnaire-9 (PHQ-9), the Modified Mini Screen (MMS), and the Million Clinical Multiaxial Inventory-III (MCMI-III). These instruments were utilized to identify predictors of relapse in individuals who have been previously detoxified from alcohol. The criterion variable involved in this study was the number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification.

An additional possible outcome of this research included the potential to improve identification of co-occurring mental health disorders in individuals presenting for alcohol detoxification. Other possible outcomes were implementation of standardized instrumentation to identify individual mental health disorders in detoxification settings, and increased emphasis on rehabilitation and recovery services following alcohol detoxification. The overall intent of this research was to improve the human and social conditions for people with co-occurring disorders.

This chapter includes a summary of the literature, the research problem and questions, hypotheses tested, theoretical framework, basic definitions, assumptions, scope, limitations, and significance. Additionally, the nature of the study is summarized in this chapter.

Background

Readmission rates are a commonly used, yet poorly-understood quality indicator

for alcohol detoxification services. When researchers focus on readmission rates rather than the interrelated co-occurrence of mental health disorders, they may support treating these conditions independently (McGovern, Xie, Segal, Siembab, & Drake, 2006).

According to the Diagnostic and Statistical Manual, Fifth Edition (DSM-V), there is an association between mental health disorders and alcohol dependence, and symptoms of mental health disorders often present prior to the onset of alcohol abuse (American Psychiatric Association, 2013). Drake, O'Neal, and Wallach (2008) found that when mental health symptoms are not addressed, the likelihood of treatment dropout increases. Researchers have shown that patients who receive post discharge treatment have better outcomes in both abstinence from alcohol use and decreased readmission rates (Daley, Argerious, & McCarty, 1998).

Green-Hennessy (2002) indicated the likelihood of receiving treatment increases with the presence and severity of mental health disorders. However, Harris and Edlund (2005) found that only 5-10% of individuals with mental health disorders co-occurring with alcohol use problems are correctly identified; therefore, they may not be referred to the appropriate treatment programs. Researchers have found that predicting relapse after alcohol detoxification is important to ensure that people are directed to the most appropriate aftercare services (Pedersen & Hesse, 2009). A valid and practical instrument for predicting risk for relapse does not exist; therefore, individuals may not be correctly targeted for aftercare services. If individuals are not provided with the appropriate aftercare services, the likelihood of relapse increases (Nakajima & al'Absi, 2012).

The co-occurrence of alcohol use disorders with mental health disorders has been extensively documented, however literature examining mental health disorders as predictors of relapse in previously detoxified individuals is lacking. Multiple literature searches were conducted which yielded thousands of articles focused on the co-occurrence of alcohol use disorders with mental health disorders. However; literature that specifically examines the impact of mental health disorders as a predictor of repeated admissions for detoxification from alcohol is minimal. In my dissertation I sought to address this gap in the literature by examining the interaction between mental health disorders with alcohol to predict relapse in detoxified patients.

Problem Statement

Alcohol abuse has multiple causes, with genetic, physiological, psychological, and social factors all playing a role (Drake et al., 2008). For some individuals, mental health disorders prompt excessive alcohol use. Some individuals use alcohol to cope with psychological problems. Co-occurring disorders are associated with an increased severity of alcohol dependence as compared with alcohol use disorders alone (Chakroun, Johnson, & Swendsen, 2010). Chávez, Dinsmore, and Hof (2010) indicated that being diagnosed with a personality disorder is a strong predictor of alcohol use disorders.

Lagoni, Crawford, and Huss (2011) found that individuals with mental health disorders are significantly more likely to have alcohol use disorders as compared to the general population, are less likely to be successful in treatment, and are more likely to relapse following treatment. Identifying mental health disorders in individuals who present for alcohol detoxification, and subsequently referring these individuals to the

appropriate treatment services, provides the opportunity to address the source of the issue, thus enhancing the potential for recovery and reducing the risk of relapse (Bradizza et al., 2009). The identification of predictors of relapse in the population of people receiving alcohol detoxification services may be useful to ensure that individuals who have the highest need for aftercare services are identified, and to make the best use of the limited resources that are available (Pedersen & Hesse, 2009).

Purpose of the Study

This was a quantitative study and utilized a nonexperimental design to answer the research questions. The purpose of this study was to identify predictors of relapse in patients detoxified from alcohol. Predictor variables of this study included depression, anxiety, psychosis, and personality disorders as measured by three different instruments (PHQ-9, MMS, and MCMI-III). The criterion variable involved in this study was the number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification.

Research Questions and Hypotheses

The following research questions and hypotheses were developed to explore if the three selected instruments effectively measure variables, which in turn are potentially able to predict relapse in individuals who have been previously detoxified from alcohol. Three different instruments of varying complexity were selected for use in this study to solicit data targeted to answer the research questions.

Research Question 1: Does depression, as measured by the Patient health Questionnaire-9 (PHQ-9), significantly predict relapse among individuals within 90 days following alcohol detoxification?

Ho_1: Depression does not significantly predict relapse in previously detoxified individuals.

Ha_1: Depression significantly predicts relapse in previously detoxified individuals.

Research Question 2: Does depression, as measured by the Modified Mini Screen (MMS), significantly predict relapse among individuals, within 90 days following alcohol detoxification?

Ho_2: Depression does not significantly predict relapse in previously detoxified individuals.

Ha_2: Depression significantly predicts relapse in previously detoxified individuals.

Research Question 3: Does depression, as measured by the Millon Clinical Inventory-III (MCMI-III), significantly predict relapse among individuals, within 90 days following alcohol detoxification?

Ho_3: Depression does not significantly predict relapse in previously detoxified individuals.

Ha_3: Depression significantly predicts relapse in previously detoxified individuals.

Research Question 4: Does anxiety, as measured by the MMS, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

Ho$_4$: Anxiety does not significantly predict relapse in previously detoxified individuals.

Ha$_4$: Anxiety significantly predicts relapse in previously detoxified individuals.

Research Question 5: Does anxiety, as measured by the MCMI-III, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

Ho$_5$: Anxiety does not significantly predict relapse in previously detoxified individuals.

Ha$_5$: Anxiety significantly predicts relapse in previously detoxified individuals.

Research Question 6: Does psychosis, as measured by the MMS, significantly predict relapse among, individuals within 90 days following alcohol detoxification?

Ho$_6$: Psychosis does not significantly predict relapse in previously detoxified individuals.

Ha$_6$: Psychosis significantly predicts relapse in previously detoxified individuals.

Research Question 7: Does psychosis, as measured by the MCMI-III, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

Ho$_7$: Psychosis does not significantly predict relapse in previously detoxified individuals.

Ha$_7$: Psychosis significantly predicts relapse in previously detoxified individuals.

Research Question 8: Do personality disorders, as measured by the MCMI-III, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

Ho$_8$: Personality disorders do not significantly predict relapse in previously detoxified individuals.

Ha$_8$: Personality disorders significantly predict relapse in previously detoxified individuals.

An element of this study design was the use of multiple instruments that measure similar clinical issues. This information may be important for clinicians and program administrators to know to assist in facilitating the use of the most effective and efficient instrument in alcohol detoxification settings.

The facility the study was conducted in uses the PHQ-9 and MMS within their mental health and substance abuse outpatient clinics, therefore familiarity with these instruments existed. The use of the same instruments for this study occurred to align with current practice and anticipated future practice within the organization. However, the PHQ-9 is only designed to potentially identify one predictor variable, depression, and the MMS identifies only three potential predictor variables: depression, anxiety, and psychosis. The MCMI-III was selected for use as it has the capability to potentially identify all predictor variables included in the study: depression, anxiety, psychosis, and personality disorders.

Data were collected by facility staff at my request to allow the study to be

conducted. Table 1 identifies each predictor variable, and the specific instrument or instruments used to identify these variables.

Table 1

Instrumentation Utilized to Identify Predictor Variables

Predictor Variable	PHQ-9	MMS	MCMI-III
Depression	X	X	X
Anxiety		X	X
Psychosis		X	X
Personality Disorders			X

Bivariate regression analyses were conducted to explore and examine the ability of each predictor variable as identified by each of the three instruments in predicting relapse in the study population. A more thorough explanation of the research methods and design are discussed in Chapter 3 of this dissertation.

Theoretical Framework for the Study

Self-Medication Hypothesis

Building upon his earlier research, Khantzian (1985) explored the psychotropic effects of heroin and cocaine, and the interaction that occurs with mental health disturbances and unpleasant affective states. He noted that individuals addicted to heroin and cocaine often had histories of aggression and depression that long preceded their use of any illegal drugs. Additionally, Khantzian found that many individuals reported relief from depressive symptoms, anger, and rage when using these drugs, and subsequently

used them as medication to alleviate disturbing symptoms (Khantzian, 1985). Potvin, Stip, and Roy (2003) described the self-medication hypothesis similarly to Khantzian, indicating alcohol is used in place of a pharmacological intervention, to obtain relief from distressing mental health symptoms. Therefore, with relief of certain target symptoms, substance use and subsequent need for detoxification services may be less of a necessity (Potvin et al., 2008).

Primary theoretical propositions of the self-medication hypothesis include: some individuals have an inability to tolerate strong negative affect; the inability to tolerate strong affect is a primary motivator for substance use in these individuals; and mental health conditions are the causal agent in substance use. Chakroun et al. (2010) provided support for these propositions by reporting certain individuals use substances in an attempt to self-medicate intolerable affective states. According to this hypothesis, an individual's use of alcohol or other substances is not accidental, but chosen for its ability to relieve distressing symptoms or feelings (McDonald & Meyer, 2011).

The self-medication hypothesis has been identified as a potential explanation for co-occurring disorders; however according to Mueser, Drake, and Wallach (1998), a review of etiological theories finds little evidence for this hypothesis. According to Hall and Queener (2007), few theories exist explaining the origination of alcohol dependence, how this dependence is maintained, and how such self-destructive behavior can be preferred in spite of such significant negative consequences. While there are some contrary findings, much of the relevant research supports the self-medication hypothesis. The self-medication hypothesis has over 30 years of empirical research behind it and has

received recognition and acceptance in professional literature, which has resulted in the use of this theory for this study. A detailed review of the self-medication hypothesis occurs in Chapter 2 of this dissertation.

This study examined if depression, anxiety, psychosis, and personality disorders, were able to significantly predict relapse following alcohol detoxification services. Research questions were designed to examine the predictive relationship between specific mental health disorders and relapse from alcohol detoxification services.

Nature of the Study

Rationale

Pharmaceutical interventions have been proven helpful for individuals who are plagued with troubling symptoms of mental illness (Witkiewitz, 2011). However, if such interventions are not available, individuals may choose to use alcohol or another substance to manage distressful symptoms. Castaneda, Galanter, and Franco (1989) presented three factors necessary for substance use to be considered self-medication; the presence of a mental health disorder that typically responds to treatment with medication, the absence of such medication, and the self-administration of a chemical that is a substitution for medication. Considering the concept of self-medication, a primary question related to readmissions for alcohol detoxification in this population arises; are mental health disorders a predictor of relapse in detoxified patients?

A quantitative approach was chosen for this study as it provided an opportunity to utilize data collected by the facility staff, as requested by this researcher, to explore whether or not the selected predictor variables can each adequately predict relapse, the

criterion variable. Predictor variables including depression, anxiety, psychosis, and

personality disorders, were collected and measured using validated instruments, which

included the MMS, the MCMI-III, and the PHQ-9. The criterion variable, number of days

to relapse, within the first 90 days following initial detoxification, resulting in

readmission for alcohol detoxification, was collected by monitoring the daily census of

the detoxification units and identifying admissions. The daily census was monitored 90

days post discharge from detoxification services for each subject to obtain actual number

of days to relapse. Data collected was analyzed using the statistical procedure of

bivariate, simple linear regression.

Key Study Variables

As indicated earlier, the predictor variables included depression as measured by

the PHQ-9, depression as measured by the MMS, depression as measured by the MCMI-

III, anxiety as measured by the MMS, anxiety as measured by the MCMI-III, psychosis

as measured by the MMS, psychosis as measured by the MCMI-III and personality

disorders as measured by the MCMI-III. The criterion variable was number of days to

relapse, within the first 90 days following initial detoxification, resulting in readmission

for alcohol detoxification.

Definition of Key Terms. Key terms used throughout the current research study

are defined below:

Aftercare: stage of treatment that follows current services after the patient no longer

requires such intensity. Such services are designed to support and sustain the process of

recovery (Wisconsin Administrative Code, 2011).

Ambulatory detoxification: medically monitored detoxification services that are delivered on an outpatient basis (Wisconsin Administrative Code, 2011).

Co-occurring disorders is defined as the presence of one or more mental health disorders in addition to an alcohol use disorder (Jahng et al., 2011).

Detoxification is defined as the resolution of alcohol intoxication (Wisconsin Administrative Code, 2011).

Psychotropic drug is defined as a prescription drug that is used to treat or manage a mental health symptom or challenging behavior (Wisconsin Administrative Code, 2014).

Relapse is defined as number of days from discharge to readmission for detoxification services (Witkiewitz, 2011).

Wisconsin Uniform Placement Criteria (WI-UPC) is defined as a placement instrument that generates a placement recommendation as to an appropriate level of care at which a patient should receive services (Wisconsin Administrative Code, 2011).

Assumptions

Given that the screening tools used to identify mental health disorders in the target population rely on the self-report of participants, it was assumed that participants would answer honestly. Additionally, it was assumed that the diagnoses selected as predictor variables in the study had the potential to predict relapse.

Scope and Delimitations

Focusing on mental health disorders in the population of people who present for detoxification from alcohol was selected as the specific focus of this study. Providing

detoxification services in isolation of addressing such disorders may be treating the symptom without addressing the cause. This may result in the recurrence of symptoms (Regier et al., 1990). Predicting relapse after detoxification from alcohol may be useful in targeting patients for aftercare services to make the best use of limited resources (Chavez, Dinsmore, & Hof, 2010).

The facility the study occurred in has two detoxification programs. One is located within the psychiatric hospital and the other is an ambulatory detoxification program. All patients admitted to alcohol detoxification services, throughout the state of Wisconsin, are required to meet criteria based on a state approved placement instrument. The state of Wisconsin has approved the use of two placement instruments; the Wisconsin Uniform Placement Criteria (WI-UPC) and the American Society of Addiction Medicine placement criteria (ASAM). The facility the study occurred in, utilizes the WI-UPC. The use of this instrument provides assurance that patients are placed into the appropriate level of care to meet their presenting care needs (Wisconsin Administrative Code, 2011).

The readmission rates identified above represent only the hospital based program. Effective January 1, 2014, data collection for the measurement of readmission rates in the ambulatory detoxification program was initiated. It was anticipated that the overall readmission rates for the combined detoxification programs may increase due to the inclusion of the ambulatory detoxification program. This study used a convenience sample; therefore the results are only generalizable to populations that share similar demographics.

Limitations

Limitations of this study included the use of a small convenience sample and reliance on self-report. Using a convenience sample limits the generalizability of the results, therefore this needs to be considered if applying or considering results in other settings.

Significance

Understanding predictors of relapse requiring admission for alcohol detoxification services is important for improving the treatment and prevention of mental health and alcohol use problems. Timely identification and treatment of mental health disorders may be a key in the recovery of individuals with co-occurring disorders (Lagoni et al., 2011). If the standardized screening instruments used in this study are able to effectively identify co-occurring mental health disorders in the study population, the use of such instruments may be a practice to consider implementing in detoxification settings.

Placing an emphasis on the importance of rehabilitation and recovery services following detoxification and implementing strategies to engage this population into such aftercare services has the potential to improve the quality of life for individuals with alcohol dependence. Additionally, to make the best use of limited resources, it is important to identify individuals who demonstrate a need for aftercare services and focus on getting these individuals into services following detoxification. The intent of this research was to improve the human and social conditions for people with co-occurring disorders.

Summary

This study aimed to identify predictors of relapse in patients detoxified from alcohol at a public treatment facility, located in central Wisconsin. Predictor variables selected for use in this study included depression, anxiety, psychosis, and personality disorders as measured by three different instruments (PHQ-9, MMS, and MCMI-III). The PHQ-9 was used to identify depression; the MMS was used to identify depression, anxiety, and psychosis; and the MCMI-III was used to identify depression, anxiety, psychosis, and personality disorders.

The criterion variable involved in this study was number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification. If identified properly, individuals with mental health disorders can be referred for aftercare to address their mental health needs, which may improve their potential for a successful recovery from alcohol abuse, and potentially decrease future need for repeated detoxification services.

The literature review that follows in Chapter 2 integrates research that addresses the relationship between alcohol use and mental health disorders, as well as the impact of the co-occurrence of these issues.

Chapter 2: Literature Review

Introduction

Individuals with mental health disorders are significantly more likely to have alcohol use disorders as compared to the general population, are less likely to be successful in treatment, and are more likely to relapse following treatment (Lagoni et al., 2011). Identifying mental health disorders in individuals who present for alcohol detoxification, and subsequently referring these individuals to the appropriate treatment services, provides the opportunity to address the source of the issue, thus enhancing the potential for recovery and reduce the risk of relapse (Bradizza et al., 2009).

The purpose of this study was to explore and evaluate the potential impact of mental health disorders as possible predictors of relapse in patients detoxified from alcohol. The ability to predict relapse after treatment for detoxification from alcohol may be useful to ensure that individuals who have the highest need for aftercare services are identified and to make the best use of the limited resources that are available (Pedersen & Hesse, 2009).

The co-occurrence of alcohol use disorders with mental health disorders has been extensively documented, however literature examining mental health disorders as predictors of relapse in previously detoxified individuals is lacking. Multiple literature searches were conducted which yielded thousands of articles focused on the co-occurrence of alcohol use disorders with mental health disorders. However, literature that specifically examines the impact of mental health disorders as a predictor of repeated admissions for detoxification from alcohol is minimal. In my dissertation I sought to

address this gap in the literature by examining the interaction between mental health disorders with alcohol to predict relapse in detoxified patients.

The literature review presented in this chapter is divided into six sections. The first section provides an overview of the literature search. The second section presents a rationale for the present study, which includes two components: exploring the relationship between mental health disorders and relapse to alcohol use after detoxification has occurred, and examining mental health disorders as valid predictors of relapse.

The concept of co-occurring disorders is addressed in the third section, which is followed by a review of three different frameworks that have been used to examine self-medication in the fourth section. The final section entails a detailed review of the self-medication hypothesis, which is the hypothesis of primary interest for this research.

Rationale

Several researchers including Heinz et al. (1999), Franken and Hendriks (1999), Driessen et al. (2001), Strowing (2000), Chakroun et al. (2010), Littlefield and Sher (2010), and Dick et al. (2010) have reported findings indicating the presence of depression increases the risk of relapse in individuals who have stopped using alcohol. However, Greenfield et al. (1998) and Grant et al. (2004) indicated that depressive symptoms are not valid predictors of relapse. In general, findings from research conducted on the effects of mental health disorders on relapse are contradictory at best.

This purpose of this study was to evaluate the impact of mental health disorders including depression, anxiety, psychosis, and personality disorders, on predicting relapse

in previously detoxified patients. Witkiewitz and Villarroel (2009) defined relapse as a return to alcohol use after a period of abstinence. Addtionally, Witkiewitz and Villarroel found that a negative affect is linked to reinitiation of alcohol use after sustaining a period of time without such use. Later work conducted by Witkiewitz (2011) suggested that a 90 day period of time, is an effective measure of relapse.

Literature Search

The databases used in the literature search included EBSCO, MEDLINE with Full Text, PsycARTICLES, Psych BOOKS, PsycEXTRA, PsycINFO, and SocINDEX with Full Text. Additionally, the following web sites were searched for pertinent literature: (a) National Institute on Alcohol Abuse and Alcoholism, (b) Firstgov.gov, (c) The Substance Abuse and Mental Health Services Administration, and (d) Science.gov. An open year search, limited to peer reviewed sources, was conducted. The following terms were used to search each database individually and in combination with each other: alcohol, alcohol abuse, alcohol use disorder, AOD, AODA, detoxification, predictors, relapse, mental illness, mental health, mental health disorders, co-occurring, comorbidity, self-medication, self-medication hypothesis, depression, mood disorders, anxiety disorders, psychotic disorders, personality disorders, remission, treatment, literature review, and meta-analysis.

Articles were selected for inclusion into the current research if they specifically addressed a relationship between mental health disorders and alcohol use which results in admission for detoxification services. The use of prescribed drugs to address symptoms of mental health disorders was not explored in this literature search. The majority of the

articles reviewed did not address the connection between mental health disorders and the use of alcohol resulting in detoxification services. Research obtained was used to explore this connection and confirm or negate whether or not this connection shows relevancy regarding relapse after detoxification has occurred.

Current scientific literature focused on the connection between mental health disorders and alcohol is abundant; however, there is a lack of information focused on the potential of a connection between the use of alcohol detoxification services and presence of a mental health disorder. Additionally, the majority of study designs relied on the long term recall of selected samples of patients with advanced alcohol use disorders. Individuals may not accurately recall the sequence of the onset of mental health symptoms and alcohol use.

Much of the research that is relevant to the proposed study is older than five years. The current research will bridge this gap by relating new findings to previous findings, with the intended goal of determining if there is evidence that suggests having a mental health disorder increases the likelihood of repeated admissions for alcohol detoxification services, and if specific mental health disorders can predict the likelihood of such repeated admissions.

Co-Occurring Disorders

Definition and Prevalence

Co-occurring disorders, also known as comorbidity, can be defined as the expression of two or more disorders or conditions that coexist, however each can also stand independently (McGovern, Wrisley, & Drake, 2005). While two or more disorders

may occur at the same time in an individual, the prevalence of some combinations are much higher than others.

Deykin, Levy, and Wells (1987) conducted research that utilized the Diagnostic Interview Schedule (DIS), on 424 college-age students, aged 16 to 19 years old. Male and female students who met criteria for alcohol abuse or dependence were more likely to be diagnosed with a major depressive disorder than those who did not meet criteria. Males were approximately four times more likely and females six times.

Regier et al. (1990) published a widely-known study addressing the issue of co-occurring disorders. Data for this research were obtained from the Epidemiological Catchment Area (ECA) study of the National Institute of Mental Health (NIMH), which utilized the DIS and included 20,291 adults, aged 18 years and older. Of those with alcohol use disorders, 36% had a mental health disorder. Over half (53.1%) of those with a drug use disorder had a psychiatric disorder. The odds of having a mental health disorder if the person had an alcohol or drug use disorder doubled and quadrupled, respectively (Regier et al., 1990).

These investigators also examined the rates of alcohol use disorders among those with specific mental health disorders and found that 25% to 33% also had a substance use disorder (Regier et al., 1990). Regier et al. (1990) identified the highest lifetime prevalence of alcohol use disorders in the population of people with bipolar disorder, 56.1%, followed by those with schizophrenia at 47%.

Chávez, Dinsmore, and Hof (2010) examined the correlation between antisocial and borderline personality disorders and alcohol use disorders. They found that both

personality disorders are associated with high rates of alcohol abuse. Eighty-five percent of those with antisocial personality disorder were diagnosed with alcohol abuse, whereas 47% of those with borderline personality disorder were diagnosed with alcohol abuse. Kimonis, Tatar, and Cauffman (2012) conducted similar research on juvenile offenders and reported results consistent with research conducted on adults. They found that juveniles with secondary variants of mental health disorders are at increased risk for alcohol use disorders.

The National Comorbidity Studies (NCS), conducted by Kessler, which were published in 1994 and 1997, are foundational studies in the area of co-occurring disorders. The NCS utilized a national study approach and utilized a fully structured interview, entitled the NCS Interview Schedule, and subsequently the NCS-Replication (NCS-R) Interview Schedule, that was administered face-to-face by trained lay interviewers. This scope of this study ($N = 8,098$) was large and included the general population to identify the proportion of the population that disorders occur in. Using a national study approach avoids selection biases and results in statistics that are generalizable for the population as a whole.

Kessler et al. (1994) found at least one mental health disorder in almost half of the population. Approximately 60% of the population identified with a mental health disorder had a co-occurring substance abuse disorder. Even higher rates of co-occurrence were found in study participants with schizophrenia and bipolar disorder; however, the incidence of depression is higher in the general public, which results in more people with concurrent substance use and depression.

Other examples of using a national study approach are the Epidemiologic Catchment Area Study (Robins & Regier, 1991) and the National Longitudinal Alcohol Epidemiologic Survey (Grant, 1995). Like the NCS, the Epidemiologic Catchment Area Study sampled the general population and used the DIS to identify mental health disorders. Whereas the 42,862 participant National Longitudinal Alcohol Epidemiologic Survey conducted by Grant (1995) focused specifically on depression and the co-occurrence of alcohol use in the civilian, noninstitutionalized, U.S. adult population. The Alcohol Use Disorder and Associated Disabilities Interview Schedule – DMS IV Version (AUDADIS-IV), which is a structured diagnostic interview designed for use by lay interviewers, was utilized to gather data from participants.

Kessler, Chiu, Demler, and Walters (2005) conducted a replication of the National Comorbidity Survey (NCS-R) that included 9,282 adults from across the United States. This replication survey found that although mental health disorders are widespread, serious cases are concentrated amongst a relatively small portion of cases with high co-occurrence, which concurred with results from the original research. Results from the NCS-R identified the same three most prevalent disorders as the NCS, which include specific phobia, social phobia, and major depressive disorder. This research also found the prevalence of anxiety disorders was higher than mood disorders, and that mood disorders are more prevalent than alcohol use disorders. The implications of these findings suggest it is more likely to have alcohol use disorders co-occur with another mental disorder than to have an alcohol use disorder alone.

Cacciola, Alterman, Rutherford, McKay, and Mulvaney (2001) conducted an extensive literature review examining prevalence rates of mental health disorders in addiction treatment settings. These authors reported a wide variability in prevalence rates across a number of studies; however this variability is noted to be the result of different measures, methods, settings, populations, and diagnostic criteria utilized to obtain results. In spite of the variability, a consistent pattern did emerge, indicating that people with alcohol use disorders are likely to suffer from mood and anxiety disorders. Cacciola et al. went on to conduct a study that included 310 lower socio-economic, opiate dependent patients who were in their first 3-6 weeks of treatment.

The Structured Clinical Interview for DSM-III-R (SCID) was used to determine eligibility for the study. Individuals with dementia, mental retardation, schizophrenia, and active psychosis were excluded due to the extensive assessment process. The SCID for DMS-III Personality (SCIDP-R), Addiction Severity Index (ASI), and SCID were utilized to obtain research data. Cacciola et al. (2001) observed that a majority (75.2%) of participants had a co-occurring mental health disorder. Additionally, these authors found that 78% of the participants had personality disorders, which suggests such disorders tend to co-occur in the substance abuse population.

Drake, Mueser, and Brunette (2007) conducted a review of literature to examine the relationship between severe mental health disorders and substance use disorders. These researchers reported that 50% or more of adults with severe mental health disorders had a co-occurring substance use disorder. Drake et al. recommended that all programs designed for people with severe mental health disorders should embrace the

fact, that having both a mental health disorder, along with a substance use disorder is the norm, rather than the exception, and should consider and prepare their programs to be geared toward co-occurring disorders.

Bradizza et al. (2009) researched a population of 278 individuals who were diagnosed with severe mental health disorders including schizophrenia-spectrum or bipolar disorder and a co-occurring alcohol use disorder. Participants were assessed prior to beginning treatment and six months later using the Brief Symptom Inventory, the Structured Clinical Interview for the Positive and Negative Syndrome Scale (SCI-PANSS), and the DIS-IV.

Treatment consisted of group and individual sessions. Group sessions covered topics such as education regarding co-occurring disorders, changing negative thinking, overcoming denial, coping with negative emotions, relapse prevention, coping with craving, and an introduction to 12-step groups. Individual sessions focused on coping with relapse, education regarding substance abuse, social services, housing, and dealing with social stressors. Psychiatric services, including psychopharmacology were also included in this program. Results of this study demonstrate a favorable prognosis for alcohol outcomes when treating the mental health disorder and alcohol use disorder together and incorporating psychosocial intervention as part of the treatment (Bradizza et al., 2009).

Grant et al. (2004) published the results of their study entitled the "National Epidemiologic Survey on Alcohol and Related Conditions" (NESARC), which focused on the most common disorders in the general population: mood, substance use, and

anxiety disorders. Combined, these disorders affect as many as 60 million people in the United States alone. The purpose of this research was to examine the prevalence and associations of substance use disorders and independent mood and anxiety disorders. The target population included civilian, non-institutionalized, adults who reside in the United States, including Alaska and Hawaii, and included 43,093 respondents. The AUDADIS-IV was utilized to gather data from participants. Findings from this study were consistent with Regier and colleagues and suggest about one in five persons with a substance use disorder had either a mood or anxiety disorder. Individuals with drug use disorders were more likely than those with alcohol use disorders to have a mental health disorder.

There is likely a difference between people who have a problem and do not seek treatment and those who do seek treatment, and it could be assumed that those who seek treatment are suffering greater degrees of severity or impairment. However, when examining the rates of co-occurring disorders among those seeking treatment, the Grant et al. study found the degree of overlap to dramatically increase, particularly among those with substance use disorders. Mood disorders were identified in 40.69 % of those with an alcohol use disorder and anxiety disorders were identified in 33.98% of this population. Like Regier et al. (1990), Grant et al. (2004) demonstrated rates that increased significantly when considering drug use, with 60.31% of people being identified with a co-occurring mood disorder and 42.63% with a co-occurring anxiety disorder.

Another avenue to examine co-occurring disorders is by using clinical investigation. Clinical investigation occurs within programs that are targeted for

individuals with specific disorders. Researchers identify two specific disorders they intend to investigate and then select samples with one of the two. Measuring the incidence of the second disorder then identifies co-occurrence.

Two different approaches are possible when using a clinical investigation to examine co-occurrence. One approach is to select for the mental health disorder first. Bibb and Chambless (1986) conducted research utilizing a clinical investigation and the mental health disorder first approach. Two hundred fifty four individuals receiving treatment for agoraphobia were involved in the study. Using the Michigan Alcohol Screening Test (MAST), these investigators found that 21% of the study population had co-occurring alcohol abuse.

Thyer et al. (1985) also studied a population of 156 individuals in treatment for agoraphobia, utilizing the mental health disorder first approach and found, using the MAST, that 17.3% had co-occurring alcohol abuse. Additionally, Thyer et al. reported that agoraphobic patients with a co-occurring affective disorder were especially prone to abuse alcohol.

Breslau, Andreski, and Kilbey (1991) utilized the mental health disorder first approach when conducting research on individuals who had a history of major depression and then looked for nicotine dependence within the study population. This study included 1,007 young adults and found, using the Fagerström Tolerance Questionnaire (FTQ), which measures physiological dependence, individuals who have major depression are more likely to have co-occurring nicotine dependence.

The other approach is to examine co-occurrence is by selecting for the substance use disorder first. The literature base utilizing this approach is much more robust, potentially due to the overtness of substance use disorders and the vast number of individuals who seek treatment for such issues. Many researchers have used this approach in studies including Woody, O'Brien, and Rickels (1975), Keeler, Taylor, and Miller (1979), Martin (1980), Rounsaville, Weissman, and Crits-Cristoph (1982), Rounsaville, Weissman, Kleber, and Wilber (1982), Schuckit (1985), Khantzian (1985), Rounsaville, Dolinsky, Babor, and Meyer (1987), Brown and Schuckit (1988), Castaneda et al. (1989), Rounsaville et al. (1991), Hughs (1993), Pomerleau, Collins, Shiffman, and Pomerleau (1993), Brown et al. (1995), Kinnunen, Doherty, Militello, and Garvey (1996), Lerman, Caporaso, Main, Audrain, and Boyd (1998), Cacciola et al. (2001), Willinger et al. (2002), and Suh et al. (2008). These researchers all select the substance use disorder first and look for mental health disorders within this population.

Studies that are particularly relevant to the current research include those conducted by Keeler et al. (1979), Schuckit (1985), Rounsaville, Dolinsky, Babor, and Meyer (1987), Brown et al. (1995), Willinger et al. (2002), and Suh et al. (2008) as they utilize the substance use disorder first approach, with the substance of investigation being alcohol. Additionally, Khantzian's seminal research, "The Self-Medication Hypothesis of Addictive Disorders: Focus on Heroin and Cocaine Dependence," conducted in 1985 is of significant interest as it has provided the foundation for future research using the self-medication hypothesis of addiction and utilized the substance use disorder first approach.

Theoretical Foundation

Two major theoretical frameworks, namely; the hypothesis of comorbidity and the self-medication hypothesis have been used to explain the relationship between mental health disorders and alcohol use. The self-medication hypothesis has been selected for use in the proposed research; however both hypotheses are thoroughly reviewed in the following sections of this chapter.

Hypothesis of Comorbidity

A large literature base exists supporting a relationship between mental health disorders and alcohol use, however what is less clear is the processes in which this relationship occurs (Swendsen & Merikangas, 2000). Considering the abundant base of literature on this relationship and the void of research related to the processes of the relationship, an examination of why this relation exists is in order.

Looking at the association between anxiety disorders and alcohol use, Kushner, Abrams, and Borchardt (2000) reviewed laboratory studies that examined the interaction between anxiety symptoms and alcohol use, clinical studies that looked at the effect of one co-occurring disorder upon the course of the other, family studies examining mental health disorders in the families of probands with at least one co-occurring disorder, and prospective studies examining the longitudinal relationship of co-occurring disorders. After synthesizing the research, these authors report that findings converge on the conclusion that both anxiety disorders and alcohol use disorders can initiate the other, especially in cases of alcohol dependence verse alcohol abuse alone. Further, evidence

from clinical studies suggests that anxiety disorders can contribute to ongoing alcohol abuse and dependence (Kushner et al., 2000).

Finally, Kushner et al. (2000) posited that short-term anxiety reduction from alcohol use, in concert with longer-term anxiety induction from chronic drinking and withdrawal, can initiate a vicious circular pathway of increasing anxiety symptoms and alcohol use that results in co-occurrence.

A primary challenge that exists when evaluating the relation between alcohol use and mental health disorders is the fact that depression is a frequent side effect of withdrawal from alcohol (Curran, Flynn, Kirchner, & Booth, 2000). Therefore, certainty that depression observed during the withdrawal period is the result of removing the alcohol is questionable.

In an attempt to explain co-occurring disorders, Merikangas (1990) identified two tracks into which the phenomena of co-occurrence can be classified: causal explanations, and those of shared etiology. Four hypotheses have stemmed from the two tracks, each having a strong following from experts in the field of comorbidity. Hypotheses include shared-etiology, causal, artifactual, and self-medication.

Shared etiology hypothesis. According to Hasin and Grant (2002) fundamental genetic and environmental factors are shared resulting in the co-existence of mental health disorders and substance abuse. Researchers such as Cadoret et al. (1996) and Maier and Merikangas (1996) have proposed this hypothesis as an explanation to co-occurring disorders, however have also suggested this hypothesis has often been inconclusive and has received mixed support.

Causal hypothesis. The Causal Hypothesis suggests that mental health disorders, primarily depression, are often found co-occurring with substance abuse, especially alcohol abuse, because abusing alcohol causes depression either directly or indirectly (Hasin & Grant, 2002).

Abraham and Fava (1999) postulated the direction of the relationship between depression and substance abuse depends on the substance used. Strong support for this hypothesis was found by these researchers in a study that included 385 patients, with major depressive disorder, and were evaluated for co-occurring drug dependence using the SCID. Results indicate that alcohol dependence following the onset of first life depression was more likely to occur in the population of study participants who used alcohol than those who used other substances.

Artifactual hypothesis. The premise of this hypothesis is that depression and depressive symptoms are often misdiagnosed and symptoms of substance use disorders mimic those of depressive disorders resulting in artificially high co-occurrence rates. In an attempt to determine if alcohol dependence and depression were associated, after ruling out the effects of acute intoxication and withdrawal, Hasin and Grant (2002) conducted a study that included 6,050 former drinkers who did not use drugs or smoke in the previous year. Hasin and Grant used the AUDADIS and found that an association was present, which contradicts the artifactual hypothesis and suggested that individuals who are in recovery from alcohol use should be provided treatment for depression as their symptoms are likely not related to withdrawal.

The final explanation regarding the co-occurrence of mental health and substance use disorders is the self-medication hypothesis. This hypothesis will be delved into in significant detail and is the psychological theory the current study is based on.

Self-Medication Hypothesis

Background. The self-medication hypothesis is the most widely accepted psychological theory of addiction and has over 30 years of research supporting it. Early explanations of substance dependence focused on issues such as euphoria-seeking, self-destruction, and peer pressure as a basis for the initiation of substance abuse and subsequent dependence. However, concurrently, psychoanalysts began to consider a different paradigm that included the potential of an association between substance abuse and mental health disorders (Khantzian, 1985).

In 1977, in research conducted by Edward Khantzian, focused on heroin and cocaine addiction, one of the first Self-Medication Hypotheses was developed (Khantzian, 1985). Khantzian explored the psychotropic effects of these drugs and how they interact with mental health disturbances and unpleasant affective states. This study found that unpleasant mental health states were relieved by use of these drugs and these drugs became irresistible to susceptible individuals (1985).

Prior to Khantzian, Conger (1951) proposed the tension-reduction hypothesis as a model for alcohol consumption. The model assumes that alcohol can reduce tension and people seek alcohol to avoid or reduce unpleasant stress (Young, Oei, & Knight, 1990). The theoretical framework of Conger's tension-reduction hypothesis and Khantzian's first version of the Self-Medication Hypothesis bear little difference (Lewis &Vogeltanz-

Holm, 2002). Khantzian and Conger's theories are similar in that both view substance use as a reactive behavior, a response to specific presenting situations. Khantzian conceptualized these situations as "painful affect," and suggests the presence of these factors increase the susceptibility of alcohol abuse (Khantzian, 1985). On the other hand, Conger's theory considers alcohol abuse as a relief response to alleviate the unpleasant feelings that go along with tension (Conger, 1951).

The concept of coping comes into play when examining the impact of engaging in a behavior while in a negative affective state. Maisto, Carey, and Bradizza (1999) utilize social learning theory to explain the high prevalence of alcohol use in the college student population. This theory suggests that alcohol consumption is a method of coping utilized by college students to deal with daily demands. Drinking to cope is unquestionably synonymous with self-medication (Milkman & Frosch, 1973).

Milkman and Frosch (1973) conducted a study focused on coping, and in particular, the relationship between psychological defense mechanisms and substance abuse. These researchers found a connection between the specific drug chosen and an individual's compensatory defense needs. Study participants who selected heroin as their drug of choice reported doing so to provide relief of withdrawal and isolation, and those who selected amphetamines were typically seeking to increase their sense of self-worth and self-confidence. Milkman and Frosch considered these patients as being unable to improve self-worth and self-confidence without the assistance of these drugs due to their underlying mental health disorders.

Strahan, Panayiotou, Clements, and Scott (2011) explained why people with anxiety often present with alcohol problems. The self-medication hypothesis was examined to assess the relationship between social anxiety and alcohol use. The primary finding of the study was the identification of a significant relationship between social anxiety and alcohol use in the male individuals. Women did not show a significant relationship between social anxiety and alcohol use, which suggests that gender, may be an important moderator.

The psychodynamic view of self-medication implies that substances are used to compensate for deficient ego function, whereas the substance used provides a buffer to reality for the individual (Koob, 2006). While this does not fully address the conscious behaviors of those that abuse substances, it does help to explain aspects of the dysfunctional and non-purposeful cycle of self-medication that seem to be contradictory. In summary, self-medication hypotheses conceptualize substance abuse as a response to alleviate a negative state. Self-medication assumes that individuals who have a mental health condition, typically depression or anxiety, might use substances in an effort to free themselves, even if only temporarily, from mental anguish. Self-medication could also be seen as using substances to achieve outcomes that could potentially be more effectively gained through prescribed medication (McKim, 2003).

Theory-Grounded Conceptualizations of the Self-Medication Hypothesis

   Cognitive-intentional. Looking at self-medicating behavior as a cognitive and intentional choice is one way to conceptualize substance use. This view suggests that individuals are contemplating their actions, and specifically choose to use a specific

substance to achieve a specific anticipated result. The choice is purposeful with the goal of reducing a negative state, most likely emotional distress. Self-medication has been suggested as an explanation in the causation of substance abuse by researchers (Henwood & Padgett, 2007; Khantzian, 1985; Martin, 1980; Schaub, Fanghaenel, & Stohler, 2008; Suh et al., 2008 Simon, 1981; & McDonald & Meyer, 2011). Supporters of the cognitive-intentional model claim that substance use is directly related to the pharmacological effects of the drug. So, as a replacement for a medication that is prescribed for the individual, instead they seek out alternatives that mimic the actual intended effects of prescription medication. A concern regarding this hypothesis is that it is largely based on data derived from the self-report of substance users (Weiss, Griffin, & Mirin, 1992).

In an early study using the self-medication as a hypothesis, Weiss et al. (1992) examined a group of 494 hospitalized drug abusers and focused on the self-medication of depression. These researchers used a "substance-first," approach in the selection of study participants. Depression was selected as the disorder of focus due to the high frequency of depressive symptoms in individuals who abuse substances, and the proven effectiveness of pharmacological intervention to treat depression (Keeler et al., 1979; Weissman, 1979; Rounsaville, Wiessman, & Crits-Cristoph, 1982). Psychiatrists, using the Diagnostic and Statistical Manual of Mental Disorders, as a diagnostic guide, conducted repeated clinical interviews. Researchers compared reported frequency and effectiveness of substance use on depressive symptoms and found support for the self-medication hypothesis and the cognitive-intentional component. Sixty-three percent of patients reported using substances to reduce depressive symptoms they were experiencing

(Weiss et al., 1992). Participants experiencing major depression demonstrated even higher rates, with 89% reporting the use of substances specifically for the purpose of reducing their symptoms.

Another finding of interest was that 100% of men who were diagnosed with depression reported abusing substances for self-medicative purposes; whereas 81% of depressed women reported abusing substances for this purpose. In contrast, 55% of men who were not diagnosed with depression reported using substances for self-medicative purposes and 75% of non-depressed women reported using substances as self-medication (Weiss, et al., 1992). These results suggest that a primary component of the self-medication hypothesis, the desire to reduce depressive symptoms, is acknowledged in the majority of those who abuse substances. This research suggests that self-medication in men increases along with symptom severity. However, self-medication in women does not appear to be impacted by symptom (Weiss et al., 1992).

The Weiss study does present some limitations, including the reliance on self-report and as the homogeneity of the study population, which makes generalizability of this research difficult. An additional limitation of the Weiss study is the use of retrospective self-reports, which rely on the memory of study participants, bringing into question the reliability of data collected (Weiss et al., 1992).

Kinnunen, Doherty, Militello, and Garvey (1996) supported the self-medication model. This research involved 269 individuals and used several instruments to obtain data including; the Center for Epidemiologic Studies Depression Scale (CES-D), the Stress Index and Coping Resources Scale, the Health and Withdrawal Symptoms Scale,

the Reasons for Smoking Scale, the Attitudes Toward Quitting Scale, and the Fagerström

Test for Nicotine Dependence. These researchers identified an association between

depression and smoking as participants reported engaging in smoking to increase energy

level and improve their mood.

Lerman, Caporaso, Main, Audrain, and Boyd (1998) investigated cigarette

smoking from a self-medication model, using the Horn-Waingrow Reasons for Smoking

Scale (1966), and found that significantly more "negative-affect reduction" smoking ($t =$

3.7, $p < .0003$) occurred in depressed individuals than in non- depressed individuals. An

additional finding of this study was the dopamine receptor genotype that appears to be

connected to self-medication, is active in approximately 76% of the population (Lerman

et al., 1998).

Kumari and Postma (2005) reviewed research on nicotine that used individuals

with schizophrenia as the subject group. These authors indicate the rate of nicotine use is

up to four times as high as seen in the general population. Kumari and Postma examined

whether the widespread smoking behavior observed in the population of people with

schizophrenia is a manifestation of common underlying physiology, and if these

individuals smoke in an attempt to self-medicate. The review of literature conducted by

Kumari and Postma suggests that smoking in schizophrenia appears to represent an

attempt to self-medicate some of the cognitive deficits of this disorder. These researchers

go on to share that the interaction of nicotine with dopaminergic and glutamatergic

transmitter systems result in improved cognitive functioning in the population studied

(Kurami & Postma, 2005). These conclusions provide support for self-medication as an

explanation of the high incidence of nicotine dependence seen in individuals with depression and schizophrenia.

In 2012, Nakajima and al'Absi, studied negative mood states and smoking. These researchers were able to demonstrate that depression, anxiety, anger, and perceived stress were able to predict relapse to smoking within 12 months of abstinence in women. Findings from this study suggest that women use smoking to manage, or self-medicate, mood.

Biobehavioral. Another model for conceptualizing substance use is though a biobehavioral approach. The biobehavioral model does not include components of thought and awareness on the part of the substance user who may be self-medicating. According to Pomerleau, O., Collins, Shiffman, and Pomerleau, C. (1993) the use of a substance results in a reward component regardless of the individual's mental state. However, if a person's mental state is one of pain or distress, the reward component may be more intensive. Therefore, individuals who are experiencing a negative mental state likely have an increased response compared to those whose mental status is stable.

According to this model, self-medication may develop completely independent of thought or intention (Pomerleau et al., 1993). Corrigall, Franklin, Coen, and Clark (1992) conducted research on male rats trained to self-administer nicotine on a fixed ratio schedule of reinforcement. Post mortem analysis of brain tissue found the effects the nicotine had on the transmission of dopamine were reinforcing causing the rats to become addicted to this substance (Corrigall et al., 1992).

Markou, Kosten, and Koob (1998), investigated the reward and motivational properties of substance abuse and depression, which further support the self-medication hypothesis. The brain's reward and motivational systems are compromised in individuals with depression and substance abuse (Markou et al., 1998). These researchers indicate that drug dependence can be defined as the occurrence of neuroadaptations resulting from repeated substance use that has led to and altered behavior. The result of these neuroadaptations appears to be a dynamic in which the substance user is positively rewarded for use in a subjective manner, such as relieve from a negative mental state. Whereas, negative reinforcement occurs when the use of substance is discontinued and the withdrawal effects become unpleasant, leading to further use (Hughes, 1993). Depression is an example of such negative reinforcement. Research indicates that depressive symptomatology increases after a substance user discontinues using (Hughes, 1993).

Markou et al. (1998) indicated that for individuals with depression who had an onset prior to substance abuse, self-medication might develop "through experimentation with several drugs and through the simultaneous use of multiple drugs, people determine the drug or drug combination that best normalizes their neurochemical imbalance that is expressed behaviorally as depression" (p. 158). These researchers explain self-medication in depression that has an onset after the initiation of substance abuse as "repeated drug use can be conceptualized as self-medication to counterbalance the neuroadaptations produced with chronic drug administration, and thus, used as treatment for withdrawal symptomatology" (p. 158).

Biophysical. Similar to the biobehavioral model, the biophysical model does not rely on intentional behavior or thought. The focus is on the biochemical characteristics of the mental health disorder, primarily depression, and the effects of substances on those specific characteristics. Therefore, self-medication is an attempt to balance and correct the biochemical imbalances associated with a negative affective state (Castaneda et al., 1989).

In a study conducted by Castaneda et al. (1989) that included 32 patients hospitalized for mental health symptoms and co-occurring substance use, including heroin, 100% of the heroin users and the majority of alcohol users acknowledged temporary relief from their mental health symptoms after substance use occurred. In spite of the substance users recognizing the damaging effects of ongoing use, they persisted to use it, which provides an explanation of the biophysical effect that substances have.

According to Markou et al. (1998) the self-medication hypothesis suggests that substance use is intended to make people experiencing depression feel normal by reversing some of the neurobiological abnormalities associated with this illness. These authors posit that this explanation of the Self-Medication Hypothesis works regardless if depression or substance abuse occurs first (Markou et al., 1998).

Markou et al.'s (1998) theory is supported by the finding that substance use in depressed individuals declines when they are treated with antidepressants, whether or not the depression occurred prior to, or after, the initiation of substance use. When symptoms of depression are reduced, the need to self-medicate is also reduced (Markou et al., 1998).

Additional Support for the Self-Medication Hypothesis

The self-medication hypothesis has been explored outside treatment facilities and the usefulness of this theory has been substantiated. Deykin et al. (1987) conducted research, using the DIS, on 424 college students, 271 females and 153 males, who were diagnosed with an alcohol use and depressive disorder. Retrospective self-reports from this population indicate that the likelihood of depression occurring prior to the onset of alcohol abuse was the norm with 75% indicating depression came first (Deykin et al., 1987).

Additional support for the self-medication hypothesis is demonstrated in the results from the National Institute of Mental Health (NIMH) Epidemiologic Catchment Area study, which included 9,543 individuals aged 18 to 30 years and utilized the DIS to gather data (Christie, et al., 1988). In their exploration into the sequence of mental health disorders and substance abuse, 75% reported the development of their affective disorder preceding that of their substance abuse. These findings demand special attention due to the sampling techniques used in the Catchment Program. Door-to-door sampling occurs in non-clinical populations, which sampling bias that comes from surveying only clinical populations (Christie et al., 1988).

Effectiveness of Self-Medication

Bibb and Chambless (1986) conducted a study, which applied the MAST on 43 participants. This study examined the co-occurrence of alcoholism and agoraphobia and found that 10-20% of individuals diagnosed with agoraphobia meet criteria for a diagnosis of alcohol dependence. These researchers also conducted a comparison

between alcohol dependent and non-alcohol dependent agoraphobics, finding that those with alcohol dependence had a higher incidence of depression and social phobia. Of the alcohol dependent population, 91% reported their primary motivation for substance use was aimed at reducing distressing symptoms, primarily anxiety, compared to 43% of non-dependent population reporting substance use for this reason (Bibb & Chambless, 1986).

The research conducted by Bibb and Chambless (1986) also reveals that self-medication is not effective in the long-term. In fact, Bibb and Chambless share that substance use appears to increase the very symptoms it is intended to relieve. According to Weiss et al. (1992) there is evidence to support that self-medication is effective at relieving symptoms in the short-term which contributes to maintain the behavior of self-medication.

Aneshensel and Huba (1983) conducted a study, which included 742 adults and spanned over a one-year period of time. Four symptom scales including; the CES-D, the Psychiatric Epidemiology Research Interview (PERI), the General Well-Being Questionnaire, and a death-ideation scale were used. Results from the study suggest that heavy drinking does appear to increase depression levels. However, this effect does not seem to appear until approximately 12 months after the heavy drinking begins. Additionally, results of this study suggest as depressive symptoms increase, impulsive use increases, which leads to further increase in symptoms and eventual uncontrolled use (Aneshensel & Huba, 1983).

Summary

The self-medication hypothesis provides a valid theoretical framework to explore the connection between mental health disorders and relapse to alcohol use. A gap exists in the literature examining the possibility of mental health disorders being a predictor of relapse in previously detoxified patients. This study may help to bridge this gap and provide useful information related to the importance of identifying individuals with co-occurring disorders to ensure they are referred to the most appropriate aftercare services following alcohol detoxification. The next chapter explains how the study was conducted, including the research design, description of the participants, and description of the study site.

Chapter 3: Methodology

Introduction

The purpose of this exploratory study was to examine depression, anxiety, psychosis and personality disorders, as identified by three different instruments; the PHQ-9; the MMS; and the MCMI-III, as predictors of relapse in individuals that have been previously detoxified from alcohol. The criterion variable in this study was number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification.

This was a quantitative study and utilized a nonexperimental design to answer the research questions. The site for the study was a public behavioral health facility, located in central Wisconsin. Participants were drawn from the detoxification units located within this facility.

Specific information was provided, by staff from the facility where the research was conducted, to this researcher including; demographic information, alcohol detoxification events, and scores from instrumentation used. Data collection began after approval for the study was received from the Institutional Review Board (IRB approval number: 08-06-14-0084988) and continued until a sample size of 45 was achieved.

The research that was conducted for this dissertation was a clinical investigation utilizing the substance use disorder first approach. This method was selected, as the target population for this study was individuals who relapse to alcohol use, requiring detoxification services within 90 days of being discharged from a detoxification service. The standard benchmark used by the Centers for Medicare & Medicaid Services (CMS)

is the 30-day readmission rate; however the facility the study will occur within

experiences almost a doubling of the readmission rate within the 90-day time frame.

Therefore 90-day readmission data will be utilized for this study in order to acquire

adequate data and meaningful results. Witkiewitz (2011) supported the use of a 90 day

time frame, indicating that the largest percent of relapse is likely to occur within this time

frame. The study population will be examined to determine if the presence of mental

health disorders can predict an increased risk for relapse.

The design, methodology, and validity of the research study are reviewed in this

chapter. Each tool selected for use in the study, as well as the validity of each, is

described below.

Research Design and Rationale

Study Variables

Predictor variables including depression, anxiety, psychosis, and personality

disorders, were collected and measured using validated instruments, which included the

MMS, the MCMI- III, and the PHQ-9. The criterion variable, number of days to relapse,

within the first 90 days following initial detoxification, resulting in readmission for

alcohol detoxification, was collected by monitoring the daily census of the detoxification

units and identifying admissions. The daily census was monitored 90 days post discharge

from detoxification services for each subject to obtain actual number of days to relapse.

Data collected was analyzed using the statistical procedure of bivariate linear regression

analysis.

Design

A nonexperimental design was utilized in the study to answer the research

questions. Bivariate linear regression analysis was conducted utilizing SPSS 21 software.

Identifying which of the variables might be able to predict the criterion variable was the

intended outcome of conducting a regression analysis for each potential predictor

variable.

This design choice is consistent with past research using the theoretical

framework of the self-medication hypothesis as described in the literature reviewed in

Chapter 2 of this dissertation. The purpose of using such a design was intended to add to

the research base, providing new information which has the potential of expanding

knowledge in the field of co-occurring disorders.

Time

This study covered a time span that extended 90 days after the final participant

was enrolled, beginning August 6, 2014 and extending through November 22, 2014.

Ninety days post final participant enrollment was based on the study's definition of

relapse.

The time period of 90 days was selected as the duration in which to measure

relapse, as according to data from the facility the study occurred within, the rates of

relapse resulting in readmission for detoxification services are measured at 30, 90, and

180 day intervals. Relapse rates at these time points for 2013 were 9.1%, 20.6%, and

26.2% respectively.

Methodology

Population

Participants for the study were obtained from a public behavioral health facility

that provides detoxification services, located in central Wisconsin. Data collection began

after IRB approval and extended until the required sample size was attained. All

participants were least 18 years of age, approximately 3/4 of the population was male and

1/4 was female, the vast majority of clients are Caucasian. Central Wisconsin is fairly

isolated and has limited diversity.

Sampling and Sampling Procedures

The instruments used in the study were adopted by the facility as standard

practice, prior to the study beginning. The substance abuse counselors' employed at the

setting facilitated the completion of the instruments. Instruments were presented to

patients for completion during the discharge planning process. Completing the

instruments near the end of a patient's stay provided assurance that intoxication was not a

confounding factor.

Inclusion criteria. All patients, male and female, who were admitted to the

detoxification units during the study period, were attempted to be included in the study.

Those who were able to comprehend the English language, completed all of the study

instruments, and scored positive for having a mental health disorder were included in the

study data provided to this researcher.

Exclusion criteria. Participants were required to comprehend the English

language, as study instruments were not be available in other languages. Individuals who

did not meet criteria for having a mental health disorder, based on scores from study

instruments were excluded from the study. Individuals who relapsed and returned to the

detoxification unit multiple times during the designated study period were excluded from

the data after their first participation, to ensure that each participant was counted only one

time.

      Power analysis. A minimum of 34 participants were required for the study as

determined by conducting an *a priori* power analysis using PASS-13 Sample Size

Software obtained from the NCCS Statistical Software website found at www.ncss.com.

Specific criteria used to determine sample size included using a 1-tailed test, a large (.50)

effect size, a 0.05 alpha level, and a power level of 0.95. Faul et al. (2009) recommend

these parameters when using the statistical test of bivariate regression analysis. To ensure

an adequate sample size, data for 45 individuals was provided to this researcher from the

facility where this study was conducted.

Procedures for Recruitment, Participation, and Data Collection

      Recruitment and participation. The site for the study was a public behavioral

health facility, located in central Wisconsin. The instruments used in the study were

adopted by the facility as standard practice, prior to the study beginning. The substance

abuse counselors' employed at the setting provided patients with an overview of the three

instruments used to measure the predictor variables and the actual instruments to

complete prior to discharge. The three instruments used to measure the predictor

variables included the MMS, the MCMI III, and the PHQ-9. A data file containing basic

demographic information, previous detoxification status, and study instrument results was provided to this researcher by officials at the research site.

   Informed consent. Considering the instruments used in the study were adopted as standard practice, at the request of this researcher, by the facility the research was conducted in prior to the initiation of the study, informed consent was not required. The facility staff administered the three instruments used to measure the predictor variables and provided the researcher with the results of the instrumentation used. Results were provided using two choices, positive or negative. Positive, meaning that criteria were met for the presence of having predictor variable, and negative, meaning that criteria were not met for the presence of having the predictor variable. All information provided to this researcher related to study participants included only pseudo-identifiers, therefore confidentiality was not compromised.

   Data was collected using three different instruments: the MMS, the MCMI-III, and the PHQ-9, which are all described in detail in the following section. All instruments were completed by the participants and are self-report measures. Instruments were provided to participants during the discharge-planning meeting, after they were no longer intoxicated.

   The criterion variable, number of days to relapse, within the first 90 days following detoxification, resulting in readmission for alcohol detoxification, was collected by monitoring the daily census of the detoxification units and identifying admissions. The daily census was monitored for study participant relapses, for a period of 90 days from discharge from the initial detoxification event.

Instrumentation and Operationalization of Constructs

The MMS, the MCMI-III, and the PHQ-9 were selected to measure the predictor variables of; depression, anxiety, psychosis, and personality disorders, in this study as together they provide a comprehensive screening for mental health disorders including both major mental disorders, and personality disorders.

Modified Mini Screen (MMS)

The MMS was developed by the New York State Practice Improvement Collaborative, under a grant from the United States Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Treatment (New York State Office of Alcoholism & Substance Abuse Services, 2001). The MMS was utilized in the current study to identify mental health disorders. The MMS is a 22-item questionnaire that takes approximately 15 minutes to administer and consists of questions and threshold criteria found in the Diagnostic Statistical Manual IV (DSM-IV0, the Structured Clinical Interview for Diagnosis (SCID) and the Mini International Neuropsychiatric Interview (M.I.N.I.) (Alexander, Layman, Haugland, & Tang, 2003).

The screen is divided into three sections, which include the three major categories of mental health disorders; mood disorders, anxiety disorders, and psychotic disorders. Scoring of the MMS is straightforward and simple, with a Yes response converting to 1 point, and a No converting to 0 points. The clinician adds all the positive (yes) responses to obtain a total score, which can range from 1 to 22 points (Alexander et al., 2003).

Recommendations for using the MMS include three different cutpoints, each identifying a different plan of action for the client. Cutpoint 1 is ≤ 5, with no further action required. Cutpoint range 2 is between 6 and 9, and suggests a treatment team decision should occur regarding need for a mental health assessment. Cutpoint 3 is any one the following: a score of ≥ 10, a positive response to question #4 which addresses suicidality, or a positive response to both question #14 and #15 as they target post-traumatic stress disorder. Individuals who score in Cutpoint 3 should be referred for a mental health assessment. For the purpose of this study, those who scored in the Cutpoint 2 and Cutpoint 3 range were considered to be positive for a mental health disorder (Alexander et al., 2003).

Validity. Validity of the MMS has been tested, with two primary studies showing up in the literature; the New York State Practice Improvement Collaborative (PIC) compiled by Brandau, Alexander, and Haugland in 2001 (New York State Office of Alcoholism & Substance Abuse Services, 2001), and the Mental Health Screening in Addiction, Corrections and Social Services Settings validation study by Alexander, Haugland, Lin, Bertollo, and McCorry (2008).

New York State Practice Improvement Collaborative (PIC) validation study. To ensure that all clients with co-occurring disorders entering behavioral health treatment would be identified and assessed, the New York State PIC sponsored a validation study, as part of the ongoing collaboration between the Office of Alcohol and Substance Abuse Services (OASAS) and Office of Mental Health (OMH). This purpose of this study was to validate two screening instruments, the MMS, for use in the OASAS system, and the

Dartmouth Assessment of Life Inventory 8 (DALI), for use in the OMH system of care

(New York State Office of Alcoholism & Substance Abuse Services, 2001),

The two agencies came together and sought out the Nathan Kline Institute's

Center for the Study of Issues in Public Mental Health (NKI) to conduct the study. All

seventeen OASAS sites, throughout the state of New York were included in the study, in

addition to a New York City shelter and a county jail in a New York City suburb. The

OASAS sites included a variety of settings including; two addiction treatment centers,

two methadone treatment programs, three therapeutic communities, nine medically

supervised outpatient programs, and one jail-based medically supervised outpatient

program. Overall, 485 clients were administered the MMS. Additionally, all clients

participated in an interview, which utilized the Structured Clinical Interview for

Diagnosis (SCID). The validation criterion was the presence of a mood, anxiety, or

psychotic disorder based on the SCID, which was administered by interviewers

experienced in working with this tool (New York State Office of Alcoholism &

Substance Abuse Services, 2001).

The validation study confirmed the value of the MMS as a screening tool for use

by OASAS providers with an overall accuracy of rate of .70 to .74, depending on the cut-

point employed to define a positive result. The instrument performed equally well across

both genders, various ethnic and racial groups, and across all modalities (New York State

Office of Alcoholism & Substance Abuse Services, 2001).

Mental Health Screening in Addiction, Corrections and Social Service Settings

validation study. Alexander et al. (2008) conducted a MMS validation study on 476

individuals in chemical dependency treatment settings, jails, shelters, and outreach settings. This study also conducted validation interviews on all participants, utilizing the SCID. Researchers used Receiver Operating Characteristic (ROC) curve analysis to determine the optimal range of cut points for identifying mental health problems; calculate overall accuracy, sensitivity, specificity; and identify positive and negative predictive values for the MMS (Alexander et al., 2008).

Forty three percent of the sample met criteria for a DSM-IV diagnosis of anxiety, mood or psychotic disorder. At cutpoints of 6 to 9, the sensitivity of the MMS ranged from .63 to .82, its specificity ranged from .61 to .83, and its overall accuracy ranged from .70 to .75, which aligns with the results of Brandau et al. study conducted several years earlier. At these cutpoints, the MMS screen performed equally well for men and women, and for African Americans and Caucasians (Alexander et al., 2008). Alexander et al. concluded the MMS performs well in naturalistic chemical dependency treatment settings, jails, shelters, and street outreach programs across gender and ethnic groups, and can provide a useful tool in service systems for persons with co-occurring mental health and substance abuse problems. The MMS was used to identify anxiety, depression, and psychosis in the present study.

Reliability. According to Alexander et al. (2003), validation efforts indicate the MMS demonstrates three indices of reliability; internal consistency, test re-test, and inter-rater reliability, that range from good to excellent. These three indices will be reviewed in further detail below.

Internal consistency and test-retest. Cronbach's alpha was calculated to evaluate the internal consistency of all 22 items included in the MMS (α = .9) (Alexander et al., 2003). These results indicate that the MMS has a high level of internal consistency. Test-retest reliability was evaluated to identify if the MMS is reliable over time. Forty individuals who completed the MMS were invited to take the MMS again within two weeks of the original MMS administration. Retest results were not normally distributed; therefore a Spearman's rho was used to calculate test-retest reliability. The MMS scores at the first administration ($\overline{X}$ = 5, *SD* = 5), indicating that the MMS is a reliable instrument (rho = .71, *p* < .001) (Alexander et al., 2003).

Interrater reliability. The MMS is a self-report measure; therefore raters are those who the measure is being used on. According to Alexander et al. (2003), for individuals in chemical dependency treatment, sensitivity of the MMS in predicting a need for further mental health assessment ranged from 63% - 82%, and specificity for correctly assessing no need for an assessment referral ranged from 61% - 83%, which represents good reliability.

Millon Clinical Multiaxial Inventory-III (MCMI-III)

The MCMI-III was developed by Theodore Millon, Carrie Million, Roger Davis, and Seth Grossman and is intended to be an evolving assessment tool, to be refined and strengthened as needed based on advances in theoretical logic, research data, and professional nosology (Millon, Millon, Davis, & Grossman, 2009). The MCMI-III is a 175-item self-report inventory of personality that provides information on both clinical syndromes and personality disorders. This inventory consists of 14 personality disorder

scales, 10 clinical syndrome scales, 5 correction scales, and 42 Grossman personality facet scales. The personality disorder scales include; schizoid, avoidant, dependent, histrionic, narcissistic, antisocial, aggressive/sadistic, compulsive, passive-aggressive, self-defeating, and depressive. Severe dysfunctional variants include; schizotypal, borderline, and paranoid. Anxiety disorder, somatoform disorder, bipolar disorder, dysthymic disorder, alcohol dependence, drug dependence, thought disorder, major depression, delusional disorder, depressive personality, and post-traumatic stress disorder make up the clinical syndrome scales. The Correction scales detect random responses, and the Grossman scales are based on Seth Grossman's theories of personality and psychopathology (Millon, T., Millon, C., Davis, & Grossman, 2009).

Test results may be considered invalid based on a number of different response patterns on the modifying indices. The Disclosure scale is the only scale in the MCMI-III in which the raw scores are interpreted and in which a particularly low score is clinically relevant. A raw score above 178 or below 34 is considered to not be an accurate representation of the patient's personality style as they either over-or under-disclosed and may indicate questionable results (Millon et al., 2009).

The invalidity index is a measure of random responding, ability to understand item content, appropriate attention to item content, and as an additional measure of response style. The scale is very sensitive to random responding. Scores on this scale determine whether the test protocol is valid or invalid. A base rate score of 75 or greater on the desirability or debasement scales indicate that the examiner should proceed with caution (Millon et al., 2009)

For the personality and clinical syndrome scales, base rate scores of 75-84 are taken to indicate the presence of a personality trait, or the presence of a clinical syndrome. Scores of 85 or above indicate the persistence of a personality trait or a clinical syndrome (Millon et al., 2009).

Validity. The MCMI-III has undergone three different stages of validation: theoretical-substantive, internal-structural, and external-criterion (Millon et al., 2009). This three-stage model is often referred to as the tripartite model of test construction and synthesizes the strengths of each development phase by rejecting items that are found to be deficient in specific respects. This process ensures that the final scales of an inventory do not optimize one particular parameter of test construction; instead, together satisfy multiple requirements which then leads to increased generalizability of the end product (Millon et al. 2009).

Theoretical-substantive stage. During the theoretical-substantive stage, items for each different syndrome were identified that adhere to criteria set forth by the Diagnostic and Statistical Manual of Mental Disorders. This stage used a deductive approach and involved developing a large pool of items; the number of items was reduced based on a rational approach according to the degree to which they fit the theory, as well as elimination of items based on simplicity, grammar, content, and relevance to the scale (Millon et al., 2009).

Internal-structural stage. During the internal-structural stage, the items that made it through the theoretical-substantive stage underwent analysis to ensure internal consistency. Internal consistency is the extent to which the items on a scale generally

measure the same thing. Items that had higher correlations with scales for which they were not intended were re-examined against theoretical criteria and reassigned or dropped all together (Millon et al., 2009).

External-criterion stage. The final validation stage was assessed by examining the items in terms of their ability to discriminate among clinical groups rather than between clinical groups and normal individuals. According to Millon et al. (2006), in every generation of the MCMI, the external-criterion stage of validation has emphasized data in which target diagnostic groups were contrasted with a population of representative, but undifferentiated, psychiatric patients. Using a population with mental health disorders, rather than a normal population, improves the discriminative efficiency of scales and thereby heightens differential diagnosis (Millon et al., 2009).

The MCMI-III was used to confirm or negate the presence of depression, anxiety, psychosis, and personality disorders. The MCMI-II/III Interpretive System software was used by the facility to analyze data and generate interpretive reports on the data entered from the MCMI-III tests that are completed. Individuals with base rate scores of 75 and above on the predictor variables; depression, anxiety, psychosis, or personality disorders were considered positive for the presence of such variables.

Reliability. The MCMI-III has demonstrated reliability based on internal consistency and test-retest results. Together, internal consistency and test-retest results have demonstrated the reliability of the MCMI-III.

Internal consistency. Internal consistency was appraised through examining the consistency of the scales used in the MCMI-III using Cronbach's alpha, which is the

mean of all possible split-half reliabilities. Internal consistency results for the clinical scales range from .66 - .90, with major depression demonstrating the highest level of internal consistency ($\alpha = .90$). Internal consistency was based on the cross-validation of 398 tests (Millon et al., 2009).

   Test-retest reliability. According to Millon et al. (2009) test-retest reliability is as important as internal consistency. To examine test-retest reliability, 87 subjects were readministered the MCMI-III five to fourteen days after the initial administration. Data from the second administration were used to estimate retest stability of the MCMI-III scales. Results range from .82 to .96, with a median stability coefficient of .91. This result suggests that MCMI-III results are very stable over short periods of time (Millon et al., 2009).

Patient Health Questionnaire (PHQ-9)

   The Primary Care Evaluation of Mental Disorders (PRIME-MD) was an instrument developed and validated by Kurt Kroenke and Robert Spitzer in the early 1990s with the purpose of efficiently diagnose five of the most common types of mental health disorders including; depression, anxiety, somatoform, alcohol, and eating disorders (Kroenke & Spitzer, 2002). The PHQ-9 is a self-administered version of the PRIME-MD instrument designed to detect depression, as well as grade depressive symptom severity (Martin, Rief, Klaiberg, & Braehler, 2006).

   The PHQ-9 consists of the nine criteria, on which the diagnoses of DSM-V depressive disorders are based, and is able to provide provisional depressive diagnoses. Major depression is diagnosed if five or more of the nine depressive symptom criteria

have been present at least half the days over the past two weeks, and one of the symptoms is depressed mood or anhedonia (Kroenke & Spitzer, 2002).

As a severity measure, the PHQ-9 score ranges from 0 to 27, as each of the 9 items can be scored from 0 (not at all) to 3 (nearly every day). Cutpoints of 5, 10, 15, and 20 represent the thresholds for mild, moderate, moderately severe, and severe depression, respectively. A single screen cutpoint of 10 or greater was used in this study, as demonstrated sensitivity and specificity for major depression at this cutpoint is 88% (Kroenke & Spitzer, 2002).

Validity. The diagnostic validity of the 9-item PHQ-9 was established in studies involving 8 primary care and 7 obstetrical clinics. PHQ-9 scores of 10 or greater had a sensitivity of 88% and a specificity of 88% for Major Depressive Disorder. According to Kroenke and Spitzer (2002), reliability and validity of the tool have indicated it has sound psychometric properties. Criteria validity was established by conducting 580 structured interviews by a mental health professional. Results from these interviews showed that individuals who scored high of 10 or greater on the PHQ-9 were between 7 to 13.6 times more likely to be diagnosed with depression by the mental health professional. On the other hand, individuals scoring 4 or below on the PHQ-9 had a less than a 1 in 25 chance of having depression (Kroenke & Spitzer, 2002).

Martin et al. (2006) conducted a validity study of the PHQ-9 with the main aim the purpose of assessing the validity of the PHQ-9 in the general population. While there was already a significant body of evidence that supports its validity in medical settings, no data had been available on its validity in the general population. This study

consistently found a strong positive association between depression and disability, and a strong negative association between depression and functional health status across the PHQ-9 diagnostic groups.

These results provide strong support for the ability of the PHQ-9 to discriminate depressed from non-depressed individuals. The PHQ-9 was used to identify the presence of depression in participants involved in the study.

Reliability. The internal reliability of the PHQ-9 was examined by mental health professionals conducting validation interviews on 580 subjects within 48 hours after completing the PHQ-9 instrument. Agreement between the PHQ-9 diagnoses and the mental health professional's diagnoses was examined. The internal reliability of the PHQ-9 was excellent with a Cronbach's alpha ($\alpha = 0.84$). Additionally, the mean scores were almost identical for the PHQ-9 ($M = 5.08$) and the mental health professionals validation interview ($M = 5.03$) (Kronke, Spitzer, & Williams, 2001).

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Threats to Validity

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In this study, it is important to note that a convenience sample was utilized, therefore any speculative generalizations that are made, must be done so considering only similar populations. Also, the lack of random assignment in the non-experimental design method may present concerns in terms of internal validity.

Limitations of each of the instruments used in this study also pose potential threats to the validity of this study. Although, the instruments used in this study have been thoroughly researched and tested, and determined to be valid, studies that use self-report measures have potential validity concerns (Kroenke & Spitzer, 2002). Individuals

may over-report or under-report the severity or frequency of symptoms in order to maximize or minimize their problems. Readers of this research must keep these limitations in mind to ensure that results are not generalized or interpreted beyond the scope intended.

The MMS is a screening tool, and as such, may either under-identify or over-identify the condition it is designed to detect. When the MMS is used, the likelihood of identifying individuals who have a mental health disorder increases. However, the potential exists to incorrectly identify some individuals as exhibiting signs or symptoms of a mental health disorder when such a disorder is not present.

The MCMI-III was normed based entirely on clinical samples rather than the general population. The diagnostic scale cutoffs and profile interpretations within the MCMI-III are oriented to the majority of individuals who take the inventory. Therefore, a diminished degree of diagnostic and interpretive validity occurs for individuals who score on the low and high ends of the scales. There is not a distinct division between Axis I (major mental health disorders) and Axis II (personality disorders) phenomena, which is an additional limitation of the MCMI-III. Efforts have been made to rephrase the MCMI-III items from one version to the next to more clearly separate clinical phenomena from trait character phenomena; however the potential exists for occasional personality disorders misidentification (T. Millon, Davis, C. Millon, & Grossman, 2009).

The PHQ-9 was developed and normed on patients presenting in primary care settings and has not been thoroughly examined for administration to patients with mental health disorders (Inoue et al., 2012). Tools identified for use in this study have been

selected to be used in combination, in an attempt to minimize the limitations of each of the tools independently.

Ethical Procedures

Access. The facility where the study took place was interested in this research occurring within their organization as a part of their ongoing quality improvement program. All data that was collected and reported included only pseudoidentifiers to protect the privacy of participants.

Treatment of human participants. The overall intent of this research was to improve the human and social conditions for people with co-occurring disorders. Thus, it may be used to assist researchers in determining ways to improve the health and well-being of individuals with co-occurring disorders.

The intent of this research was to produce useful results and increase knowledge in the field of alcohol addiction and co-occurring disorders. The exclusion criteria for this study was minimal, therefore it is expected to demonstrate equitable participant selection. No risks have been identified for participants of the proposed study. Informed consent was not required for this study, as the research instruments were adopted by the facility prior to the study beginning.

Treatment of data. Pseudoidentifiers, rather than personal identifiers, were utilized to protect confidentiality. All data related to this study was provided to this researcher in a data file and will be maintained for a minimum of 5 years after completion of this dissertation.

Study conducted within researches own work environment. The research study was conducted within my own work environment, however I had no authority over the programs or staff the study was conducted in. The study environment was within the Inpatient Service Line at the facility, where both detoxification programs exist. My role is within the Outpatient Service Line, which includes no involvement in the oversight or accountability for the detoxification programs.

Summary

Together, results from the MMS, the MCMI-III, and the PHQ-9 were used to identify if, and which type of mental health disorders exist in study participants, and if a relationship exists between mental health disorders and repeated alcohol detoxification events.

The scientific method of inquiry was utilized in this study to identify predictors of relapse in patients detoxified from alcohol. The study was designed to answer the research questions and test the hypotheses based on the theoretical framework of the self-medication hypothesis. The self-medication hypothesis suggests that people with mental health disorders use alcohol and other substances to self-medicate the symptoms they experience. The next chapter, Chapter 4, describes the actual study conducted, including data collected, analysis of the data, and results of the study.

Chapter 4: Results

The purpose of this quantitative study was to identify predictors of relapse in patients detoxified from alcohol. The potential predictor variables selected for this study included depression, anxiety, psychosis, and personality disorders as measured by three different instruments (PHQ-9, MMS, and MCMI-III). The criterion variable involved in this study was number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification.

The research questions were:

1. Does depression, as measured by the PHQ-9, significantly predict relapse among individuals within 90 days following alcohol detoxification?

2. Does depression, as measured by the MMS, significantly predict relapse among individuals within 90 days following alcohol detoxification?

3. Does depression, as measured by the MCMI-III, significantly predict relapse among individuals within 90 days following alcohol detoxification?

4. Does anxiety, as measured by the MMS, significantly predict relapse among individuals within 90 days following alcohol detoxification?

5. Does anxiety, as measured by the MCMI-III, significantly predict relapse among individuals within 90 days following alcohol detoxification?

6. Does psychosis, as measured by the MMS, significantly predict relapse among individuals within 90 days following alcohol detoxification?

7. Does psychosis, as measured by the MCMI-III, significantly predict relapse among individuals within 90 days following alcohol detoxification?

8. Do personality disorders, as measured by the MCMI-III, significantly predict

relapse among individuals within 90 days following alcohol detoxification?

This chapter includes a description of the data collection process, setting,

demographics, data analysis, evidence, results, and summary.

Data Collection

Initial data collection for this study began on August 6, 2014, and extended

through August 22, 2014. This period of time was required to achieve the required

sample size of 34, identified by conducting an *a priori* power analysis using PASS-13

Sample Size Software obtained from the NCCS Statistical Software website found at

www.ncss.com. To ensure that an adequate sample size was achieved, considering some

individuals may have needed to be excluded due to the possibility of them not fully

completing study instruments, eleven additional individuals were involved in the study,

for a total of 45 individuals. However, the data file provided to this researcher, included

results on all study instrumentation, from all 45 individuals, thus all were viable for

inclusion in the study. Therefore, all 45 individuals were included in the data analysis.

Instrumentation included a standardized screening instrument (MMS), a brief

depression assessment (PHQ-9), and a test that identifies Axis I & Axis II disorders

(MCMI-III). Participants completed the instruments after they had detoxified from

alcohol, and before they were discharged. This time frame was identified to ensure that

intoxication was not a confounding factor in the study. All three instruments are self-

report measures. Scoring of completed instruments was performed by facility staff.

If a positive score, identified by a score of; 10 or greater on the PHQ-9, 6 or greater on the MMS, and 75 or greater on the MCMI, for any of the predictor variables, occurred, the following information was provided to me, the researcher, by facility staff; patient identification number, age, gender, positive or negative status for previous alcohol detoxification episodes, and positive or negative status for each of the three test instruments. The next step involved monitoring the daily census of the detoxification services to identify readmissions of the study population for a period of 90 days following each participant's initial admission for detoxification. The actual number of days between discharge from detoxification services to relapse resulting in readmission for detoxification services was collected by monitoring the daily census. Data collection was completed 90 days following the final participants' admission for detoxification and concluded on November 22, 2014.

Setting

The site for the study was a public behavioral health facility, located in central Wisconsin. Participants were drawn from the detoxification units located within this facility. The instruments used in the study were adopted by the facility as standard practice, prior to the study beginning. The substance abuse counselors' employed at the setting facilitated the completion of the instruments. Test instruments included; MMS, MCMI-III, and PHQ-9.

Demographic Characteristics of the Sample

The current study included data from 45 individuals from a public behavioral

health facility, located in central Wisconsin. Following appropriate approval to conduct research from the Institutional Review Board (IRB) of Walden University, the participants were identified based upon the following criteria; admission for alcohol detoxification services, successful completion of all three test instruments, and attaining a positive score for a least one of the predictor variables; depression, anxiety, psychosis, or personality disorder, on at least one of the test instruments. Requiring a positive score for at least one of the predictor variables was required, as the purpose of the study was to identify predictors of relapse in patients detoxified from alcohol. Only those individuals that met all of the criteria were included in the study.

Of the 45 participants, 12 were female (26.7%) and 33 (73.3%) were male. The facility the study was conducted at indicated the typical population admitted for detoxification is approximately 25% female and 75% male. Therefore, it was anticipated that the study population would be closely aligned with this assumption. Table 2 provides a summary of the study samples gender, which supports the assumption regarding gender mix.

Table 2

Gender Frequency and Percent of Study Population (N = 45)

Gender	Frequency	Percent
Male	33	73.3
Female	12	26.7
Total	45	100.0

The mean age of the study sample was 44.42 (*SD* = 11.13), and participants ranged in age from 21 to 65 years. Table 3 presents the age break out, by gender, of the study population. Typical census data is presented in 10 year increments, which is how the data is broken down. The youngest subject was 21 and the oldest was 65, therefore the data starts and stops at these points.

Table 3

Age and Gender of Study Population (N = 45)

Age	Males	Females	Total
21-29	2	3	5
30-39	6	1	7
40-49	16	3	19
50-59	5	4	9
60-65	4	1	5

Only two participants were of an ethnicity other than Caucasian. One individual was Asian and the other Hispanic. Neither of the non-Caucasian participants were readmitted for alcohol detoxification services during the research time parameter of 90 days. Ethnic characteristics of the study sample are presented in Table 4.

Table 4

Ethnic Characteristics of Study Sample (N = 45)

Characteristics	Number	Percentage
Caucasian/White	43	95.56%
Hispanic/Latino	1	2.22%
Asian	1	2.22%

Twenty-seven of the 45 participants involved in this study, had been provided detoxification services, at least one time, prior to this study beginning. Of the 27 individuals that had received previous detoxification services, 20 of these individuals (74.07%) were readmitted within 90 days from their initial detoxification admission for the present study, which means that this was at least the third time they had been provided detoxification services. This indicates a recurrent pattern for this sub-population group (44.44% of total study population).

Twenty four of the 45 individuals (53.33%) involved in this study relapsed ($M = 6.49$, $SD = 12.11$) within the identified 90 day time frame, thus were readmitted for subsequent detoxification services. This suggests that the study population is a very chronic population that may benefit from intensive aftercare services. Of clinical importance, all individuals admitted for detoxification services are screened for suicide risk and immediate intervention occurs if a positive screening occurs. Psychiatry and social work services are available and utilized when moderate to high suicide risk is identified.

Results

Data Analytic Strategy

Data analyses for this study were conducted using SPSS 21 software (IBM, 2012).

This researcher conducted an analysis of data, collected at the request of this researcher,

by staff from the facility the study was conducted in. Eight simple bivariate regression

analyses were conducted, one for each selected predictor variable, to explore whether or

not each predictor variable was able to adequately predict the criterion variable, relapse,

among patients previously detoxified from alcohol.

Data Preparation Prior to Analyses

All data elements, including results from three test instruments, demographic

information, and relapse information, were combined into a single dataset using an Excel

spreadsheet. No data was excluded from analyses as all data provided to this researcher

was complete, therefore all data provided by the facility was viable for the study.

Analyses

Eight bivariate linear regressions were conducted using the linear regression

function in SPSS. Each predictor variable, identified as independent variables in SPSS,

was correlated with the criterion variable, identified as the dependent variable in SPSS, to

run the analyses. The purpose of running the bivariate linear regressions was to determine

if any of the predictor variables; depression, anxiety, psychosis, and personality

disorders, as identified by the three instruments used: PHQ-9, MMS, and MCMI-III, were

able to significantly predict the criterion variable, number of days to relapse, within the

first 90 days following initial detoxification, resulting in readmission for alcohol

detoxification.

      Alpha level applied in the study. An alpha of 0.05 was selected for the study

based on Field (2000) and Gravetter and Wallnau (2007), who suggest that 0.05 is the

acceptable probability value in the social sciences. An alpha level of 0.05 is conventional

practice that has become the accepted standard in the social sciences (Gravetter &

Wallnau, 2007).

Regression Models

      Bivariate Linear Regression. This subsection deals with the contribution of each

of the predictor variables to the prediction of the criterion variable. The criterion variable,

number of days to relapse within the first 90 days following initial detoxification,

resulting in readmission for alcohol detoxification was correlated with each of the four

predictor variables based on each of the three test instruments, resulting in eight bivariate

linear regressions being conducted. These eight regressions were needed to answer the

eight research questions. The eight linear regressions used the following predictor

variables: a) depression as measured by the PHQ-9, b) depression as measured by the

MMS, c) depression as measured by the MCMI-III, d) anxiety as measured by the MMS,

e) anxiety as measured by the MCMI-III, f) psychosis as measured by the MMS, g)

psychosis as measured by the MCMI-III, and h) personality disorders as measured by the

MCMI-III. The results from each of these regression analyses follow.

      Evaluating the model. The 'model' refers to the specific variable that was used

as a predictor of the criterion variable. In this study the predictor variables refers to

depression as measured by the PHQ-9; depression as measured by the MMS; depression as identified by the MCMI-III; anxiety as measured by the MMS; anxiety as measured by the MCMI-III; psychosis as measured be the MMS; psychosis as measured by the MCMI-III; and personality disorders as measured by the MCMI-III.

Model evaluation refers to an analysis of the amount of variance in the criterion variable that can be explained by the predictor variable (Pallant, 2007). Typically, the 'adjusted R^2', which is found in the analysis, is multiplied by 100, which then provides the value as a percentage, indicating the extent to which the model explains the criterion variable. Each model summary and ANOVA, to test for significance, will be reviewed in reference to each research question. Following this, a review of the relationship between the predictor variable and criterion variable, as identified in the tables labeled as coefficients, will be reviewed.

Research question 1: Does depression, as measured by the PHQ-9, significantly predict relapse among individuals, within 90 days following alcohol detoxification? Tables 5 and 6 below show the results for model evaluation, inclusive of the predictor variable, depression as identified by the PHQ-9, and the criterion variable, number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification. In this instance, the model explains 7.6% of the variance in number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification, the criterion variable. Table 5 shows that this result is statistically significant ($R = .311$, $R^2 = .097$, Adjusted $R^2 = .076$, $p = .037$).

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Table 5

Model Summary[b]/Depression-PHQ-9

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics				
					R^2 Change	F Change	df1	df2	Sig. F Change
1	.311[a]	.097	.076	11.640	.097	4.613	1	43	.037

Criterion Variable: Relapse

Table 6

ANOVA/Depression-PHQ-9

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	625.036	1	625.036	4.613	.037[b]
Residual	5826.208	43	135.493		
Total	6451.244	44			

Criterion Variable: Relapse

As illustrated in Tables 6 above and 7 below, depression, as indicated by the PHQ-9 is statistically significant, however the percentage of variance accounted for is very low, suggesting a very weak ability to consider this variable a viable predictor of relapse [$F(1, 43) = 4.613$, $p = .037$]. This result means that the presence of depression, as indicated by the PHQ-9, does potentially make a contribution to the prediction of the criterion variable, number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification (Relapse = 7.687 x Depression + 1.706). However, as evidenced by the low R^2 value (.097), depression as

measured by the PHQ-9 is a weak predictor of relapse in individuals that have previously

been detoxified from alcohol.

According to Field (2005), any field that attempts to predict human behavior, such

as psychology, typically has R^2 values lower than .50, as humans are hard to predict.

However, an R^2 value of .097, as in this case, is extremely low, thus the likelihood of

producing predictions that are reasonably precise are questionable.

Table 7

Coefficients/Depression - PHQ-9

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for β	
	β	Std. Error	Beta			Lower Bound	Upper Bound
Constant	1.706	2.823		.604	.549	-3.988	7.399
Depression PHQ-9	7.687	3.579	.311	2.148	.037	.469	14.905

Criterion Variable: Relapse

Research question 2: Does depression, as measured by the MMS, significantly

predict relapse among individuals, within 90 days following alcohol detoxification?

Tables 8 and 9 below show the results for model evaluation, inclusive of the predictor

variable, depression as identified by the MMS, and the criterion variable, number of days

to relapse, within the first 90 days following initial detoxification, resulting in

readmission for alcohol detoxification. In this instance, the model explains 6.3% of the

variance in relapse, the criterion variable. Table 8 shows that this result is not statistically significant as $p > 0.05$ ($R = .291$, $R^2 = .084$, Adjusted $R^2 = .063$, $p = .053$).

Table 8

Model Summary[b]/Depression-MMS

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics				
					R^2 Change	F Change	df1	df2	Sig. F Change
1	.291[a]	.084	.063	11.720	.084	3.963	1	43	.053

Criterion Variable: Relapse

Table 9

ANOVA/Depression-MMS

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	544.444	1	544.444	3.963	.053[b]
Residual	5906.800	43	137.367		
Total	6451.244	44			

Criterion Variable: Relapse

As illustrated in Tables 9 above and 10 below, depression, as indicated by the MMS is not statistically significant [$F(1, 43) = 3.963$, $p = .053$]. This result means that the presence of depression, as indicated by the MMS, does not make a statistically significant contribution to the prediction of the criterion variable, number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission

for alcohol detoxification, therefore is not a predictor of relapse in individuals that have

previously been detoxified from alcohol (Relapse = 7.000 x Depression + 2.600).

Table 10

Coefficients/Depression – MMS

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for β	
	β	Std. Error	Beta			Lower Bound	Upper Bound
Constant	2.600	2.621		.992	.327	-2.685	7.885
Depression MMS	7.000	3.516	.291	1.991	.053	-.091	14.091

Criterion Variable: Relapse

Research question 3: Does depression, as measured by the MCMI-III,

significantly predict relapse among individuals within 90 days following alcohol

detoxification? Tables 11 and 12 below show the results for model evaluation, inclusive

of the predictor variable, depression as identified by the MCMI-III, and the criterion

variable, number of days to relapse, within the first 90 days following initial

detoxification, resulting in readmission for alcohol detoxification. In this instance, the

model explains 13.3% of the variance in number of days to relapse, the criterion variable.

Table 11 shows that this result is statistically significant as $p < 0.05$ ($R = .364$, $R^2 = .133$,

Adjusted $R^2 = .112$, $p = .014$).

Table 11

Model Summary[b]/Depression-MCMI-III

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics				
					R^2 Change	F Change	df1	df2	Sig. F Change
1	.364[a]	.133	.112	11.407	.133	6.576	1	43	.014

Criterion Variable: Relapse

Table 12

ANOVA/Depression-MCMI-III

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	555.696	1	555.697	6.576	.014[b]
Residual	5595.548	43	130.129		
Total	6451.244	44			

Criterion Variable: Relapse

As illustrated in Tables 12 above and 13 below, depression, as indicated by the
MCMI-III is statistically significant, however the percentage of variance accounted for is
very low, suggesting a very weak ability to consider this variable a viable predictor of
relapse [$F(1, 43) = 6.576$, $p = .014$]. This result means that the presence of depression, as
indicated by the MCMI-III, does potentially make a contribution to the prediction of the
criterion variable, number of days to relapse, within the first 90 days following initial
detoxification, resulting in readmission for alcohol detoxification (Relapse = 9.419 x

Depression + 1.017). However, as evidenced by the low R^2 value (.133), depression as measured by the MCMI-III is a weak predictor of relapse in individuals that have previously been detoxified from alcohol.

Table 13

Coefficients/Depression-MCMI-III

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for β	
	β	Std. Error	Beta			Lower Bound	Upper Bound
Constant	1.017E-013	3.049		.000	1.000	-6.148	6.148
Depression MCMI-III	9.419	3.673	.364	2.564	.014	2.012	16.827

Criterion Variable: Relapse

Research question 4: Does anxiety, as measured by the MMS, significantly predict relapse among individuals, within 90 days following alcohol detoxification? Tables 14 and 15 below show the results for model evaluation, inclusive of the predictor variable, anxiety as identified by the MMS, and the criterion variable, number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification. In this instance, the model explains 3.8% of the variance in relapse, the criterion variable. Table 14 shows that this result is, however, not statistically significant as $p > 0.05$ ($R = .194$, $R^2 = .038$, Adjusted $R^2 = .015$, $p = .201$).

Table 14

Model Summary[b]/Anxiety-MMS

| Model | R | R^2 | Adjusted R^2 | Std. Error of the Estimate | Change Statistics | | | | |
					R^2 Change	F Change	df1	df2	Sig. F Change
1	.194[a]	.038	.015	12.015	.038	1.687	1	43	.201

Criterion Variable: Relapse

Table 15

ANOVA/Anxiety-MMS

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	243.587	1	243.587	1.687	.201
Residual	6207.658	43	144.364		
Total	6451.244	44			

Criterion Variable: Relapse

As illustrated in Tables 15 above and 16 below, anxiety, as indicated by the MMS is not statistically significant [$F(1, 43) = 1.687$, $p = 0.201$]. This result means that the presence of anxiety, as indicated by the MMS, does not make a statistically significant contribution to the prediction of the criterion variable, number of days relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification, therefore is not a predictor of relapse in individuals that have previously been detoxified from alcohol (Relapse = 4.711 x Anxiety + 4.500).

Table 16

Coefficients/Anxiety – MMS

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for β	
	β	Std. Error	Beta			Lower Bound	Upper Bound
Constant	4.500	2.356		1.910	.063	-.252	9.252
Anxiety MMS	4.711	3.626	.194	1.299	.201	-2.603	12.024

Criterion Variable: Relapse

Research question 5: Does anxiety, as measured by the MCMI-III, significantly predict relapse among individuals, within 90 days following alcohol detoxification? Tables 17 and 18 below show the results for model evaluation, inclusive of the predictor variable, anxiety as identified by the MCMI-III, and the criterion variable, number of days to relapse resulting in readmission for alcohol detoxification. In this instance, the model explains 2.4% of the variance in number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification, the criterion variable. Table 17 shows that this result is, however, not statistically significant as $p > 0.05$ ($R = .155$, $R^2 = .024$, Adjusted $R^2 = .001$, $p = .308$).

Table 17

Model Summary[b]/Anxiety-MCMI-III

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics				
					R^2 Change	F Change	df1	df2	Sig. F Change
1	.155[a]	.024	.001	12.100	.024	1.062	1	43	.308

Criterion Variable: Relapse

Table 18

ANOVA/Anxiety-MCMI-III

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	155.506	1	155.506	1.062	.308
Residual	6295.738	43	146.413		
Total	6451.244	44			

Criterion Variable: Relapse

As illustrated in Tables 18 above and 19 below, anxiety, as indicated by the MCMI-III is not statistically significant [$F(1, 43) = 1.062$, $p = 0.308$]. This result means that the presence of anxiety, as indicated by the MCMI-III, does not make a statistically significant contribution to the prediction of the criterion variable, relapse, therefore is not a predictor of relapse in individuals that have previously been detoxified from alcohol (Relapse = 3.726 x Anxiety + 4.750).

Table 19

Coefficients/Anxiety - MCMI-III

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for β	
	β	Std. Error	Beta			Lower Bound	Upper Bound
Constant	4.750	2.470		1.923	.061	-.231	9.731
Anxiety MCMI-III	3.726	3.616	.155	1.031	.308	-3.565	11.018

Criterion Variable: Relapse

Research question 6: Does psychosis, as measured by the MMS, significantly predict relapse among individuals, within 90 days following alcohol detoxification? Tables 20 and 21 below show the results for model evaluation, inclusive of the predictor variable, psychosis as identified by the MMS, and the criterion variable, number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification. In this instance, the model explains 3.0% of the variance in number of days to relapse, resulting in readmission for alcohol detoxification, the criterion variable. Table 20 shows that this result is, however, not statistically significant as $p > 0.05$ ($R = .175$, $R^2 = .030$, Adjusted $R^2 = .008$, $p = .251$).

Table 20

Model Summary[b]/Psychosis-MMS

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics				
					R^2 Change	F Change	df1	df2	Sig. F Change
1	.175[a]	.030	.008	12.061	.030	1.351	1	43	.251

Criterion Variable: Relapse

Table 21

ANOVA/Psychosis-MMS

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	196.544	1	196.544	1.351	.251
Residual	6254.700	43	145.458		
Total	6451.244	44			

Criterion Variable: Relapse

As illustrated in Tables 21 above and 22 below, psychosis, as indicated by the MMS is not statistically significant [$F(1, 43 = 1.351, p = 0.251$]. This result means that the presence of psychosis, as indicated by the MMS, does not make a statistically significant contribution to the prediction of the criterion variable, number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification, therefore is not a predictor of relapse in individuals that have previously been detoxified from alcohol (Relapse = 6.650 x Psychosis + 5.750).

Table 22

Coefficients/Psychosis – MMS

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for β	
	β	Std. Error	Beta			Lower Bound	Upper Bound
Constant	5.750	1.907		3.015	.004	1.904	9.596
Psychosis MMS	6.650	5.721	.175	1.162	.251	-4.887	18.187

Criterion Variable: Relapse

Research question 7: Does psychosis, as measured by the MCMI-III, significantly predict relapse among individuals, within 90 days following alcohol detoxification? Tables 23 and 24 below show the results for model evaluation, inclusive of the predictor variable, psychosis as identified by the MCMI-III, and the criterion variable, number of days to relapse, resulting in readmission for alcohol detoxification. In this instance, the model explains 3.0% of the variance in number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification services, the criterion variable. Table 23 shows that this result is, however, not statistically significant as $p > 0.05$ ($R = .175$, $R^2 = .030$, Adjusted $R^2 = .008$, $p = .251$). In this case the results using the MMS and the MCMI-III are identical as both instruments consistently identified the same individuals as positive for psychosis.

Table 23

Model Summary[b]/Psychosis-MCMI-III

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics				
					R^2 Change	F Change	df1	df2	Sig. F Change
1	.175a	.030	.008	12.061	.030	1.351	1	43	.251

Criterion Variable: Relapse

Table 24

ANOVA/Psychosis-MCMI-III

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	196.544	1	196.544	1.351	.251
Residual	6254.700	43	145.458		
Total	6451.244	44			

Criterion Variable: Relapse

As illustrated in Table 25 below, psychosis, as indicated by the MCMI-III is not statistically significant [$F(1, 43 = 1.351, p = .251$]. This result means that the presence of psychosis, as indicated by the MMS, does not make a statistically significant contribution to the prediction of the criterion variable, number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification, therefore is not a predictor of relapse in individuals that have previously been detoxified from alcohol (Relapse = 6.650 x psychosis + 5.750).

Table 25

Coefficients/Psychosis - MCMI-III

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for β	
	β	Std. Error	Beta			Lower Bound	Upper Bound
Constant	5.750	1.907		3.015	.004	1.904	9.596
Psychosis MMS	6.650	5.721	.175	1.162	.251	-4.887	18.187

Criterion Variable: Relapse

Research question 8: Do personality disorders, as measured by the MCMI-III, significantly predict relapse among individuals, within 90 days following alcohol detoxification? Tables 26 and 27 below show the results for model evaluation, inclusive of the predictor variable, personality disorders as identified by the MCMI-III, and the criterion variable, number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification. In this instance, the model explains 2.9% of the variance in relapse, the criterion variable. Table 26 shows that this result is, however, not statistically significant as $p > 0.05$ ($R = .171$, $R^2 = .029$, Adjusted $R^2 = .007$, $p = .261$).

Table 26

Model Summary[b]/Personality Disorders-MCMI-III

					Change Statistics				
Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	R^2 Change	F Change	df1	df2	Sig. F Change
1	.171[a]	.029	.007	12.068	.029	1.295	1	43	.261

Criterion Variable: Relapse

Table 27

ANOVA/Personality Disorders-MCMI-III

Model	Sum of Squares	*df*	Mean Square	F	Sig.
Regression	188.604	1	188.604	1.295	.261
Residual	6262.640	43	145.643		
Total	6451.244	44			

Criterion Variable: Relapse

As illustrated in Table 28 below, personality disorders, as indicated by the

MCMI-III is not statistically significant [F(1, 43 = 1.295, p = .261]. This result means

that the presence of a personality disorder, as indicated by the MCMI-III, does not make

a statistically significant contribution to the prediction of the criterion variable, number of

days to relapse, within the first 90 days following initial detoxification, resulting in

readmission for alcohol detoxification, therefore is not a predictor of relapse in

individuals that have previously been detoxified from alcohol (Relapse = 4.120 x

Personality Disorders + 4.200).

Table 28

Coefficients/Personality Disorder - MCMI-III

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for β	
	β	Std. Error	Beta			Lower Bound	Upper Bound
Constant	4.200	2.699		1.556	.127	-1.242	9.642
Personality Disorder MCMI-III	4.120	3.620	.171	1.138	.261	-3.181	11.421

Criterion Variable: Relapse

Of additional interest in relation to the predictor variable, personality disorders, is

that 15 of 25 individuals (60%) that were identified as having a personality disorder

relapsed, resulting of readmission for alcohol detoxification services. All 15 of those that

relapsed were positive for depression in addition to a personality disorder, and 13 of the

15 had both depression and anxiety, in addition to a personality disorder. Therefore, in

the study population, personality disorders do not appear to stand in isolation from other

mental health disorders.

Summary

Eight bivariate linear regressions, involving all 45 study participants, were

conducted to examine the eight research questions:

1. Does depression, as measured by the PHQ-9, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

2. Does depression, as measured by the MMS, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

3. Does depression, as measured by the MCMI-III, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

4. Does anxiety, as measured by the MMS, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

5. Does anxiety, as measured by the MCMI-III, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

6. Does psychosis, as measured by the MMS, significantly predict relapse among, individuals within 90 days following alcohol detoxification?

7. Does psychosis, as measured by the MCMI-III, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

8. Do personality disorders, as measured by the MCMI-III, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

Each research question examined whether the predictor variables, as measured by results from the three instruments used, were able to predict relapse resulting in alcohol detoxification within 90 days from the previously detoxification episode.

Support was found for the alternative hypothesis in research questions 1 and 3, related to depression and relapse. Thus depression as identified by the PHQ-9 and MCMI-III was able to predict, however not very precisely, the criterion variable, number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification services. Therefore, in the population studied, the presence of depression, as measured by the PHQ-9 and the MCMI-III are weak predictors of relapse resulting in readmission for alcohol detoxification. Even though these predictors were statistically significant, they are very weak because they are not able to produce predictions that are reasonably precise as evidenced by the low R^2 values associated with them ($R^2 = .097$, Adjusted $R^2 = .076$ for depression as measured by the PHQ-9; and $R^2 = .133$, Adjusted $R^2 = .112$ for depression as measured by the MCMI-III).

The predictor variables of; depression as identified by the MMS, anxiety as identified by the MMS; anxiety as identified by the MCMI-III, psychosis as identified by the MMS; psychosis as identified by the MCMI-III, and personality disorders as identified by the MCMI-III were not able to predict the criterion variable, number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification. Therefore the null hypotheses, as stated in research questions 2, 4, 5, 6, 7, and 8 was supported. The predictor variables did not significantly predict relapse in previously detoxified individuals.

As noted earlier, a key element of this study design was the use of multiple instruments that measure similar clinical issues. This strategy was used to determine if a simpler instrument, rather than a more exhaustive instrument, was able to produce

equitable results. Instrumentation included a standardized screening instrument (MMS), a brief depression assessment (PHQ-9), and a test that identifies Axis I & Axis II disorders (MCMI-III). In the study conducted, one of the simpler instruments, the PHQ-9 produced results very similar to the more complex tool, the MCMI-III when applying the predictor variable of depression. Although the MCMI-III demonstrated more sensitivity, by identifying 4 more individuals with depression than the MMS and 3 more than the PHQ-9, the time required for testing and scoring is substantially increased with the MCMI-III.

The MMS and the MCMI-III were used to identify anxiety in the study population. Again, the MCMI-III demonstrated more sensitivity and was able to identify 2 individuals with anxiety that were missed by the MMS. Psychosis was identified equally by both the MMS and MCMI-III. The MCMI-III was the only instrument utilized to identify personality disorders; therefore a comparison is not able to be made. Chapter 5 will provide interpretation of the findings, discuss limitations of the study, describe recommendations for further research, and discuss implications for social change.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

This chapter provides a discussion and summary of the statistical analyses and findings for each of the study's research questions, along with the assimilation of previous research and the self-medication hypothesis. Additionally, an explanation of the limitations of the study and suggestions for future research will be addressed.

The purpose of this study was to identify predictors of relapse in patients detoxified from alcohol. Predictor variables of this study included depression, anxiety, psychosis, and personality disorders as measured by three different instruments (PHQ-9; MMS; and MCMI-III). The criterion variable involved in this study was number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification. In addition, this researcher sought to contribute to the existing research about the relationship between mental health disorders and relapse in patients previously detoxified from alcohol.

Data for this study were collected by staff from a public behavioral health facility, located in central Wisconsin, and provided to this researcher for analyses. The statistical approach of bivariate linear regression was applied to analyze the data utilizing SPSS software. Data was analyzed to determine whether the selected predictor variables, depression, anxiety, psychosis, and personality disorders, were able to significantly predict the criterion variable, number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification.

The research questions presented in this study were as follows:

1. Does depression, as measured by the PHQ-9, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

2. Does depression, as measured by the MMS, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

3. Does depression, as measured by the MCMI-III, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

4. Does anxiety, as measured by the MMS, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

5. Does anxiety, as measured by the MCMI-III, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

6. Does psychosis, as measured by the MMS, significantly predict relapse among, individuals within 90 days following alcohol detoxification?

7. Does psychosis, as measured by the MCMI-III, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

8. Do personality disorders, as measured by the MCMI-III, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

Based on the results of analysis presented in Chapter 4, the null hypotheses were rejected for research questions 1 and 3, thus the research (alternate) hypotheses were supported. The presence of depression, as identified by the PHQ-9 and MCMI-III, were

able to statistically predict the criterion variable, number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification services. However, the actual predictive ability was very low, thus these predictor variables did not demonstrate the ability to produce predictions that can be considered reasonably precise

Of primary significance, 100% ($N = 24$) of the individuals that relapsed within 90 days, requiring subsequent alcohol detoxification, were positive for depression. This means that all individuals that relapsed, who were positive for any disorder, also had depression. Therefore, the presence of a negative affective state was present in all individuals that relapsed.

The research conducted for this dissertation, supports the findings of Cacciola et al. (2001), as the presence of depression was found to be prevalent in the population of individuals that relapsed to alcohol use after previously being detoxified. Cacciola et al. conducted an extensive literature review examining prevalence rates of mental health disorders in addiction treatment settings. These authors reported a consistent pattern emerged, indicating that people with alcohol use disorders are likely to suffer from mood and anxiety disorders.

The null hypotheses were supported for research questions 2, 4, 5, 6, 7, and 8, thus the research hypotheses must be set aside. The predictor variables; depression as identified by the MMS, anxiety as identified by the MMS, anxiety as identified by the MCMI-III, psychosis as identified by the MMS, psychosis as identified by the MCMI-III, and personality disorders as identified by the MCMI-III, were not able to predict the

criterion variable, number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification. However, the small sample size of the study population may have produced results that are not an accurate reflection of the prediction capacity that anxiety, psychosis, and personality disorders have on relapse.

Interpretation of Findings

The literature presented in this study supported the significance of mental health disorders as they relate to the issue of relapse to alcohol use in previously detoxified individuals. Identifying mental health disorders in individuals who present for alcohol detoxification, and subsequently referring these individuals to the appropriate treatment services, provides the opportunity to address the source of the issue, thus enhancing the potential for recovery and reduce the risk of relapse (Bradizza, et al., 2009). If such individuals are not identified, appropriate referrals may not occur.

This research added to the literature base related to the co-occurrence of mental health disorders and substance use disorders. Predicting relapse after alcohol detoxification is important to ensure that people are directed to the most appropriate aftercare services (Pederson & Hesse, 2009). Pederson and Hesse also stated that a valid and practical instrument for predicting risk for relapse does not exist; therefore individuals may not be correctly targeted for aftercare services. Even though the sample size for the research conducted for this dissertation was small, results do suggest that existing instruments may be very useful for identifying individuals with co-occurring disorders, including the prediction of relapse to alcohol use in those with depression.

If individuals are not provided with the appropriate aftercare services, the likelihood of relapse increases (Nakajima & al'Absi, 2012). Lagoni et al. (2011) reported that individuals with mental health disorders are significantly more likely to have alcohol use disorders as compared to the general population, are less likely to be successful in treatment, and are more likely to relapse following treatment.

Self-Medication Hypothesis

The findings from this research add to the literature base related to the theoretical framework of the study used as a model, that being, the self-medication hypothesis. From the earliest studies, reviewed in Chapter 2 of this dissertation, to present day, the self-medication hypothesis has been supported by evidence substantiating the link between using substances and negative affective states.

Primary theoretical propositions of the self-medication hypothesis include: some individuals have an inability to tolerate strong negative affect; the inability to tolerate strong affect is a primary motivator for substance use in these individuals; and mental health conditions are the causal agent in substance use. Chakroun, Johnson, and Swendsen (2010) provided support for these propositions by reporting certain individuals use substances in an attempt to self-medicate intolerable affective states.

According to this hypothesis, an individual's use of alcohol or other substances is not accidental, but chosen for its ability to relieve distressing symptoms or feelings (McDonald & Meyer, 2011). Considering these propositions, the results of the research conducted for this dissertation do provide some reinforcement for the validity of the self-medication hypothesis, as 100% of study participants that did relapse within the first 90

days following initial detoxification, resulting in readmission for alcohol detoxification, were identified by the instruments used, as having depression.

Early research conducted by Khantzian (1985), Bibb and Chambless (1986), Heinz et al. (1999), Franken and Hendriks (1999), Strowing (2000), and Driessen et al. (2001) through more current research as conducted by Chakroun et al. (2010), Littlefield and Sher (2010), and Dick et al. (2010) was supported by the current research, as all have indicated the presence of depression increases the risk of relapse in individuals who have stopped using alcohol. Thus all the aforementioned studies support the self-medication hypothesis.

The National Institute of Mental Health Epidemiologic Catchment Area study was one of the earliest studies conducted and included 9,543 individuals aged 18 to 30 years. This study was designed to explore the sequence of mental health disorders and substance abuse. The results of this study supported the self-medication hypothesis as it found 75% of individuals reported the development of their affective disorder prior to the onset of their substance abuse disorder (Christie et al., 1988). In spite of the small sample size of the study conducted for this dissertation, it is imperative to recognize that 100% of the individuals that relapsed were positive for depression. The current results support and align with the large scale research conducted by Christie et al. in 1988.

Research Question 1

Does depression, as measured by the PHQ-9, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

The current study found that depression, as indicated by the PHQ-9, was able to predict relapse, however at a very low level, in individuals that had previously been detoxified from alcohol. Depression, as indicated by the PHQ-9 was statistically significant ($R = .311$, $R^2 = .097$, Adjusted $R^2 = .076$, $p = .037$). The PHQ-9 was not as sensitive as the MCMI-III, however did produce results that were statistically significant. The PHQ-9 tool is a simple to use instrument and takes only a few minutes for individuals to complete. Scoring of the PHQ-9 is also simple, which makes it an attractive tool for clinical staff to use. The PHQ-9 is also used universally, across care systems and therefore requires little interpretation between providers.

Research Question 2

Does depression, as measured by the MMS, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

The current study found that depression, as indicated by the MMS, was not able to significantly predict relapse in individuals that had previously been detoxified from alcohol. Depression, as indicated by the MMS was not statistically significant ($R = .291$, $R^2 = .084$, Adjusted $R^2 = .063$, $p = .053$). The MMS is a simple to use instrument that screens for depression, anxiety, and psychosis. The MMS was not as sensitive as the PHQ-9 or MCMI-III and did not produce results that were statistically significant. A benefit of the MMS is that is screens for multiple disorders, rather than just one disorder.

Research Question 3

Does depression, as measured by the MCMI-III, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

The current study found that depression, as indicated by the MCMI-III, was able to predict relapse, however at a very low level, in individuals that had previously been detoxified from alcohol. Depression, as indicated by the MCMI-III was statistically significant ($R = .364$, $R^2 = .133$, Adjusted $R^2 = .112$, $p = .014$). The MCMI-III is a test that screens for mental health disorders and personality disorders. The MCMI-III was the most sensitive instrument used in that it identified more individuals with depression than any of the instruments used. Use of the MCMI-III required a significant time commitment from both the study participants and the facility staff.

Research Question 4

Does anxiety, as measured by the MMS, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

The current study found that anxiety, as indicated by the MMS, is not able to predict relapse in individuals that have previously been detoxified from alcohol. Anxiety, as indicated by the MMS was not statistically significant ($R = .194$, $R^2 = .038$, Adjusted $R^2 = .015$, $p = .201$). As mentioned in the information presented above on Research Question 2, the MMS is a simple to use instrument that screens for depression, anxiety, and psychosis. The MMS was not as sensitive as the MCMI-III, however neither the MMS nor the MCMI-III produced results that were statistically significant in regard to the variable of anxiety.

Research Question 5

Does anxiety, as measured by the MCMI-III, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

The current study found that anxiety, as indicated by the MCMI-III, is not able to predict relapse in individuals that have previously been detoxified from alcohol. Anxiety, as indicated by the MCMI-III was not statistically significant ($R = .155$, $R^2 = .024$, Adjusted $R^2 = .001$, $p = .308$). The MCMI-III was the most sensitive instrument used in that it identified more individuals with anxiety than any of the instruments used, however was not able to predict the criterion variable, relapse. Again, this may due to the small sample size of the study.

Research Question 6

Does psychosis, as measured by the MMS, significantly predict relapse among, individuals within 90 days following alcohol detoxification?

The current study found that psychosis, as indicated by the MMS, was not able to predict relapse in individuals that have previously been detoxified from alcohol. Psychosis, as indicated by the MMS was not statistically significant ($R = .175$, $R^2 = .030$, Adjusted $R^2 = .008$, $p = .251$). As mentioned in the information presented above on Research Questions 2 and 4, the MMS is a simple to use instrument that screens for depression, anxiety, and psychosis.

The MMS was equally as sensitive as the MCMI-III, identifying the same number of individuals with psychosis, however did not produce results that were statistically significant. In the population studied, only 5 individuals scored positive for psychosis.

This small study sample size makes it difficult to provide any meaningful interpretations about the findings.

Research Question 7

Does psychosis, as measured by the MCMI-III, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

The current study found that psychosis, as indicated by the MCMI-III, was not able to predict of relapse in individuals that have previously been detoxified from alcohol. Psychosis, as indicated by the MCMI-III was not statistically significant ($R = .175$, $R^2 = .030$, Adjusted $R^2 = .008$, $p = .251$). As mentioned in the information presented above regarding Research Question 7, the MMS was equally as sensitive as the MCMI-III, identifying the same number of individuals with psychosis. However, only 5 individuals scored positive for psychosis of the study population of 45. Again, this small sample of individuals with psychosis makes it difficult to provide any meaningful interpretations about the findings.

Research Question 8

Do personality disorders, as measured by the MCMI-III, significantly predict relapse among individuals, within 90 days following alcohol detoxification?

The current study found that personality disorders, as indicated by the MCMI-III, were not able to predict relapse in individuals that had previously been detoxified from alcohol. Personality disorders, as indicated by the MCMI-III were not statistically significant ($R = .171$, $R^2 = .029$, Adjusted $R^2 = .007$, $p = .261$). Fifteen, of the 25 individuals, who were identified as having a personality disorder relapsed (60%). Of

particular interest is that all 15 had another mental health disorder in addition to the personality disorder. All 15 individuals that relapsed had depression in addition to a personality disorder, and 13 of the 15 had both depression and anxiety in addition to a personality disorder.

Therefore, in the study population, personality disorders do not appear to stand in isolation from other mental health disorders. This information suggests the presence of personality disorders is common in the population of people that receive detoxification services and have depression and anxiety.

While the results of this study do not support the predictive capability of personality disorders, research conducted with larger samples have supported this. Chávez, Dinsmore, and Hof conducted research in 2010 and found that being diagnosed with a personality disorder is a strong predictor of alcohol use disorders. Therefore, results from this study need to be considered within the appropriate context.

Limitations of the Study

A limitation of this study involves the internal validity of the data from the instrumentation used. All instruments completed by individuals were self-report measures. Although, each of the instruments used in this study have been thoroughly researched and tested, and have been determined to be valid and reliable, studies that use self-report measures have potential validity and reliability concerns (Kroenke & Spitzer, 2002). Individuals may over-report or under-report the severity or frequency of symptoms in order to maximize or minimize their problems which presents the potential of inaccuracy and trustworthiness of the data obtained.

In general, screening tools have inherent limitations related to the potential of either under-identify or over-identify the conditions they are designed to detect. In the present study a screening tool, the MMS, was used. The MMS identified 6 fewer individuals with depression than the MCMI-III and 3 fewer than the PHQ-9. Additionally, the MMS identified 2 fewer individuals with anxiety than the MCMI-III. This screening tool identified the same number of individuals with psychosis as the MCMI-III. The MMS produced significant results in the present study, however was not as sensitive as the MCMI-III and PHQ-9. Given that 3 different instruments were utilized for this study, limitations regarding instrumentation were minimized.

The PHQ-9 was developed and normed on patients presenting in primary care and has not been thoroughly examined for administration to patients with mental health disorders (Inoue et al., 2012). The present study occurred within a behavioral health facility and the study population was specific to individuals that had been provided alcohol detoxification services. Even though detoxification is a medical intervention, the study population was drawn from a behavioral health setting, rather than a primary care setting. The strategy of using multiple instruments was selected to minimize the limitations each instrument has independently.

The primary limitation of the MCMI-III is the potential for occasional misidentification of personality disorders due to the lack of a distinct division between Axis I (major mental health disorders) and Axis II (personality disorders) phenomena. In this study, the MCMI-III demonstrated the greatest ability to identify any disorder in the study population. However, considering this was the only instrument used to identify

personality disorders it is not possible to determine if misidentification occurred. This is a limitation of this study.

An additional limitation of this study was the homogeneity of the population. Forty-three of the 45 (95.56%) of the population was Caucasian/White, therefore, this research cannot be generalized to non-Caucasian/non-White populations. Additionally, 33 of the 45 (73.3%) individuals were male, resulting in additional caution being required when considering applying the results of this research to other populations. Readers of this research must keep these limitations in mind to ensure that results are not generalized or interpreted beyond the scope intended.

Using a convenience sample is another limitation that needs to be acknowledged. This study population may not be representative of the entire population, therefore limiting the generalizability of the study results.

Although no significant findings related to relapse in the study population with personality disorders were identified, earlier studies have reported such a connection. Therefore, the small sample size may have been a limiting factor in assessing this variable.

Recommendations for Future Research

The findings in this study do contribute to an area of study in which information is lacking in regards to mental health disorders and relapse in individuals previously detoxified from alcohol. Future studies should focus on the actual scores from the instruments used to determine if a relationship between the severity of the mental health disorder and relapse exists.

Considering this study utilized bivariate linear regression, this resulted in very little predictability. Research utilizing multiple linear regression would provide future researchers the ability to examine the potential increase in R^2 if all of the potential predictor variables used in this study were in linear combination.

Future studies should also examine the relationship between aftercare services and relapse to alcohol use requiring subsequent detoxification services. Again, this will assist behavioral health providers to apply scarce resources to the population that will likely have the most significant benefit.

The study sample for this research was taken from a public behavioral health facility located in central Wisconsin with a large Caucasian population. Applying such a study, using a diverse population, is recommended to improve the generalization of findings.

Implications for Positive Social Change

The current study has important implications for positive social change. The results may encourage behavioral health providers to recognize the importance of identifying mental health disorders, particularly depression, in the population of people that present for alcohol abuse services.

The literature review presented in this study supported the need for identifying mental health disorders in individuals that present for alcohol detoxification services, however the results from the present study did not provide a significant contribution to supporting this need. Predicting relapse after alcohol detoxification is important to ensure that people are directed to the most appropriate aftercare services (Pederson & Hesse,

2009). These authors shared that a valid and practical instrument for predicting risk for relapse does not exist; therefore may not be correctly targeted for aftercare services.

If individuals are not provided with the appropriate aftercare services, the likelihood of relapse increases (Nakajima & al'Absi, 2012). The current research demonstrated the use of existing instruments, that are simple to use, do yield useful information and are able to identifying those individuals that are most likely to relapse. The PHQ-9 demonstrated the ability to identify depression and yield significant results related to predicting the criterion variable number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification. Correctly identifying individuals and providing them with the appropriate aftercare services; has the potential of improving their lives, decreasing repetitive use of detoxification services, and improving overall social conditions

Conclusion

This study focused on the relationship between mental health disorders and relapse in individuals that had previously been detoxified from alcohol. The study examined the ability of depression as identified by the PHQ-9, depression as identified by the MMS, depression as identified by the MCMI-III, anxiety as identified by the MMS, anxiety as identified by the MCMI-III, psychosis as identified by the MMS, psychosis as identified by the MCMI-III, and personality disorders as identified by the MCMI-III, to predict the criterion variable, number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification services.

The study utilized 3 different tools, of varying complexity, to identify mental health disorders, a standardized screening instrument (MMS), a brief depression assessment (PHQ-9), and a test that identified Axis I & Axis II disorders (MCMI-III). One of the simpler tools, the PHQ-9, yielded results comparable to the more complex tool, the MCMI-III for the predictor variable, depression. Depression as indicated by the MMS did not demonstrate the ability to predict the criterion variable, number of days to relapse, within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification services.

Anxiety as identified by the MMS and MCMI-III, psychosis as identified by the MMS and MCMI-II, and personality disorders as identified by the MCMI-III did not demonstrate the ability to predict the criterion variable, number of days to relapse, was within the first 90 days following initial detoxification, resulting in readmission for alcohol detoxification services. However, as mentioned earlier, the sample size was very small, which may have skewed the results of this study.

Considering all individuals that relapsed scored positive for depression, this should be a primary focus for identification by behavioral health providers providing substance abuse services. The PHQ-9 is a very simple to use tool and is designed specifically to identify depression. In the current study, the PHQ-9 was able to identify slightly more individuals with depression as compared to the MMS. The findings from the current study support findings of the study conducted by Weiss, et al. (1992) as reviewed in Chapter 2. The Weiss, et al. study found that 100% of men and 81% of women that were diagnosed with depression reported abusing substances for self-

medicative purposes. These results suggest that a primary component of the self-medication hypothesis, the desire to reduce depressive symptoms, was acknowledged in the majority of those who abuse substances.

The purpose of this study was to identify predictors of relapse among individuals detoxified from alcohol. The research presented in this study supports the self-medication hypothesis and demonstrates the importance of identifying mental health disorders, specifically depression, in individuals that present for alcohol detoxification services. Identification of mental health disorders provides behavioral health professionals the ability to provide individuals with the appropriate treatment, which includes referral to aftercare services. The ability to predict relapse after treatment for detoxification from alcohol may be useful to ensure that individuals who have the highest need for aftercare services are identified and to make the best use of the limited resources that are available (Pedersen & Hesse, 2009). Providing detoxification services in isolation from mental health services, for individuals that have a co-occurring mental health disorder, is simply treating the symptom, rather than the cause.

References

Abraham, H., & Fava, M. (1999). Order of onset of substance abuse and depression in a

    sample of depressed outpatients. *Comprehensive Psychiatry, 40*(1), 44-50.

Alexander, M., Haugland, G., Lin, S., Bertollo, D., & McCorry, F. (2018). Mental health

    screening in addiction, corrections and social service settings: Validating the

    MMS. *International Journal of Mental Health and Addiction, 6*(1), 105-119.

Alexander, M., Layman, D., Haugland, G., & Tang, D. (2013). *Validating the Modified*

    Mini Screen (MMS) as a mental health referral screen for public assistance

    recipients in New York state: final report. Orangeburg, New York.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of*

    mental disorders (5th ed.). Washington, DC: Author.

Aneshensel, C., & Huba, G. (1983). Depression, alcohol use, and smoking over one year:

    A four-wave longitudinal causal model. *Journal of Abnormal Psychology, 92*(2),

    134-150.

Bibb, J., & Chambless, D. (1986). Alcohol use and abuse among diagnosed

    agoraphobics. *Behavior Research and Therapy, 24*(1), 49-58.

Bradizza, C., Maisto, S., Vincent, P., Stasiewicz, P., Connors, G., & Mercer, N. (2009).

    Predicting post treatment-initiated alcohol use among patients with severe mental

    illness and alcohol use disorders. *Journal of Consulting and Clinical Psychology,*

    77(6), 1147-1158.

Breslau, N., Andreski, P., & Kilbey, M. (1991). Nicotine dependence in an urban

    population of young adults: Prevalence and comorbidity with depression, anxiety

and other substance dependencies. *NIDI Research Monograph, 105,* 458-459.

Brown, S., Indaba, R., Gillian, J., Shucked, M., Stewart, M., & Irwin, M. (1995). Alcoholism and affective disorder: Clinical course of depressive symptoms. *American Journal of Psychiatry, 152*(1), 45-52.

Brown, S., & Schuckit, M. (1988). Changes in depression among abstinent alcoholics. *Journal of Studies on Alcohol, 49*(5), 412-417.

Cacciola, J., Alterman, A., Rutherford, M., McKay, J., & Mulvaney, F. (2001). The relationship of psychiatric comorbidity to treatment outcomes in methadone maintained patients. *Drug and Alcohol Dependence, 61*(3), 271-280.

Cadoret, R., Winokur, G., Langbehn, D., Troughton, E., Yates, W., & Stewart, M. (1996). Depression spectrum disease, I: the role of gene-environment interaction. *American Journal of Psychiatry, 153*(7), 892-899.

Castaneda, R., Galanter, M., & Franco, H. (1989). Self-medication among addicts with primary psychiatric disorders. *Comprehensive Psychiatry, 30*(1), 80-83.

Chakroun, N., Johnson, E., & Swendsen, J. (2010). Mood and personality-based models of Substance use. *Psychology of Addictive Behaviors, 24*(1), 129-136.

Chávez, J., Dinsmore, & Hof (2010). Assessing the incidence rates of substance use disorders among those with antisocial and borderline personality disorders in rural settings. *International Journal of Psychology, 6,* 57-66.

Christie, K., Burke, J., Regier, D., Rae, D., Boyd, J. & Loke, B. (1988). Epidemiologic evidence for early onset of mental disorders and higher risk of drug abuse in young adults. *American Journal of Psychiatry, 145,* 971-975.

Conger, J. (1951). The effect of alcohol on conflict behavior in the albino rat. *Quarterly Journal of Studies on Alcohol, 12,* 1-49.

Cornelius, J., Salloum, I., Ehler, J., Jarret, P., Cornelius, M., Perel, J., Thase, M., & Black, A. (1997). Fluoxetine in depressed alcoholics. *Archives in General Psychiatry, 54*(8) 700-705.

Corrigall, W., Franklin, K., Coen, K., & Clark, P. (1992). The mesolimbic dopaminergic system is implicated in reinforcing effects of nicotine. *Psychopharmacology, 107*(2-3), 285-289.

Cresswell, J. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches.* (3ʳᵈ ed.). Los Angeles, CA: Sage Publications, Inc.

Curran, G., Flynn, H., Kirchner, J., & Booth, B. (2000). Depression after alcohol treatment as a risk factor for relapse among male veterans. *Journal of Substance Abuse Treatment, 19*(3), 259-265.

Daley, M., Argerious, M., & McCarty, D. (1998). Substance abuse treatment for pregnant women: A window of opportunity. *Addictive Behaviors, 23*(2), 239-249.

Dattalo, P. (2008). *Determining sample size: Balancing power, precision & practicality.* New York: Oxford University Press.

Deykin, E., Levy, J., & Wells, V. (1987). Adolescent depression, alcohol, and drug abuse. *American Journal of Public Health, 77*(2)*,* 394-404.

Dick, D., Smith, G., Olausson, P., Mitchell, S., Leeman, R., O'Malley, S., & Sher, K. (2010). Understanding the construct of impulsivity and its relation to alcohol use disorder. *Addiction Biology, 15*(2), 217-226.

Drake, R., Mueser, K., & Brunette, M. (2007). Management of persons with co-occurring severe mental illness and substance use disorder: program implications. *World Psychiatry, 6,* 131-136.

Drake, R., O'Neal, E., & Wallach, M. (2008). A systemic review of psychosocial research on psychosocial interventions for people with co-occurring severe mental and substance use disorders. *Journal of Substance Abuse Treatment, 34*, 123-138.

Driessen, M., Meier, S., Hill, A., Wetterling, T., Lange, W., & Junghanns, K. (2001). The course of anxiety, depression and drinking behaviors after completed detoxification in alcoholics with and without comorbid anxiety and depressive disorders. *Alcohol and Alcoholism, 36*(3), 249-255.

Field, A. (2000). Discovering statistics using SPSS for Windows: Advanced techniques for the beginner. London, United Kingdom: Sage Publications.

Franken, I., & Hendriks, V. (1999). Predicting outcome of inpatient detoxification of substance abusers. *Psychiatric Services, 50*(6), 813-817.

Grant, B. (1995). Comorbidity between DSM-IV drug use disorders and major depression: Results of a national survey of adults. *Journal of Substance Abuse, 7*(4)*,* 481-497.

Grant, B., Stinson, F., Dawson, D., Chou, P., Dufour, M., Compton, W., Pickering, R., & Kaplan, K. (2004). Prevalence and co-occurrence of substance use disorders and Independent mood and anxiety disorders. *Archives of General Psychiatry, 61*(8), 807-816.

Gravetter, F., & Wallnau, L. (2007). *Statistics for the behavioral sciences* (7th ed.).

Belmont, CA: Thomson Wadsworth.

Green-Hennessy, S. (2002). Factors associated with receipt of behavioral health services among persons with substance dependence. *Psychiatric Services, 53,* 1592-1598.

Greenfield, S., Weiss, R., Muenz, L., Vagge, L., Kelly, J., Bello, J., & Michael, J. (1998). The effect of depression on return to drinking: a prospective study. *Archives of General Psychiatry, 55*(3), 259-265.

Hall, D. & Queener, J. (2007). Self-Medication Hypothesis of substance abuse: Testing Khantzian's updated theory. *Journal of Psychoactive Drugs, 39,* 151-158.

Harris, K., & Edlund, M. (2005). Use of mental health and substance abuse treatment among adults with co-occurring disorders. *Psychiatric Services, 56*(8), 954-959.

Hasin, D., & Grant, B. (2002). Major depression in 6050 former drinkers: Association with past alcohol dependence. *Archives of General Psychiatry, 59*(9), 794-800.

Heinz, A., Weingartner, H., George, D., Hommer, D., Wolkowitz, O., & Linnoila, M. (1999). Severity of depression in abstinent alcoholics is associated with monoamine metabolites and dehydroepiandrosterone-sulfate concentrations. *Psychiatry Research, 89*, 97-106.

Henwood, B., & Padgett, D. (2007). Reevaluating the Self-Medication Hypothesis among the dually diagnosed. *The American Journal on Addictions, 16,* 160-165.

Howell, D. (1992). *Statistical methods for psychology* (3rd.ed). Belmont, CA: Duxbury Press.

Hughs, J. (1993). Possible effects of smoke-free inpatient units on psychiatric diagnosis and treatment. *Journal of Clinical Psychiatry, 54*(3), 109-114.

IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk,

    NY: IBM Corp.

Inoue, T., Tanaka, T., Nakagawa, S., Nakato, Y., Kameyama, R., Boku, S., Toda, H.,

    Kurita, T., Koyama, T. (2012). Utility and limitations of PHQ-9 in a clinic

    specializing in psychiatric care. *Biomedcentral Psychiatry, 12*(73), 1-6.

Jahng, S., Trull, T., Wood, P., Tragesser, S., Tomko, R., Grant, J., Bucholz, K., & Sher,

    K. (2011). Distinguishing general and specific personality disorder features and

    implications for substance dependence comorbidity. *Journal of Abnormal*

    Psychology, 120(3), 656-669.

Keeler, M., Taylor, C. & Miller, W. (1979). Are all recently detoxified alcoholics

    depressed? *American Journal of Psychiatry, 136*(4B), 586-588.

Kessler, R., Crum, R., Warner, L., Nelson, C., Schulenberg, J., & Anthony, J. (1997).

    Lifetime co-occurrence of DSM-III-R alcohol abuse and dependence with other

    psychiatric disorders in the National Comorbidity Survey. *Archives of General*

    Psychiatry, 54(4), 313-321.

Kessler, R., Chiu, O., Demler, & Walters, E. (2005). Prevalence, severity, and

    comorbidity of 12-month DSM-IV disorders in the national comorbidity survey

    replication. *Archives of General Psychiatry, 62*(6), 617-627.

Kessler, R., McGonagle, K., Zhao, S., Nelson, C., Hughes, M., Eshleman, S., Wittchen,

    H., & Kendler, K. (1994). Lifetime and 12-month prevalence of DSM-III-R

    psychiatric disorders in the United States: Results from the National Comorbidity

    Survey. *Archives of General Psychiatry, 51*(1), 8-19.

Khantzian, E. (1985). The Self-Medication Hypothesis of affective disorders: Focus on heroin and cocaine dependence. *American Journal of Psychiatry, 142*(11), 1259-1264.

Kimonis, E., Tatar, J., & Cauffman, E. (2012). Substance-related disorders among juvenile offenders: What role do psychopathic traits play? *Psychology of Addictive Behaviors, 26*(2), 212-225.

Kinnunen, T., Doherty, K., Militello, F., & Garvey, A. (1996). Depression and smoking cessation: Characteristics of depressed smokers and effects of nicotine replacement. *Journal of Consulting and Clinical Psychology, 64*(4), 791-798.

Koob, G. (2006). Alcoholism: Allostasis and beyond. *Alcoholism: Clinical and Experimental Research, 27*(5), 232-243.

Kranzler, H., Del Boca, F., & Rounsaville, B. (1996). Comorbid psychiatric diagnosis predicts three-year outcomes in alcoholics. *Journal of Studies on Alcohol, 57*(6), 619-626.

Kroenke, K., & Spitzer, R. (2002). The PHQ-9: A new depression diagnostic and severity measure. *Psychiatric Annals, 32*(9), 1-7.

Kroneke, K., Spritzer, R., & Williams, J. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine, 16*, 606-613.

Kumari, V., & Postma, P. (2005). Nicotine use in schizophrenia: The Self-Medication Hypothesis. *Neuroscience and Biobehavioral Reviews, 29*, 1021-1034.

Kushner, M., Abrams, & Borchardt. (2000). The relationship between anxiety disorders and alcohol use disorders: A review of major perspectives and findings. *Clinical*

Psychology Review, 20(2), 149-71.Lagoni, L., Crawford, E., & Huss, M. (2011).
An examination of the Self-Medication Hypothesis via treatment completion.
Addiction Research and Theory, 19(5), 416-426.

Lerman, C., Caporaso, N., Main, D. Audrain, J., & Boyd, N. (1998). Depression and self-
medication with nicotine: The modifying influence of the dopamine D4 receptor
gene. *Health Psychology, 17*(1), 56-62.

Lewis, B., & Vogeltanz-Holm, N. (2002). The effects of alcohol and anxiousness on
physiological and subjective responses to a social stressor in women. *Addictive
Behaviors, 27*(4), 529-545.

Littlefield, A., & Sher K. (2010). The multiple, distinct ways that personality contributes
to alcohol use disorders. *Social and Personality Psychology Compass, 4*(9), 767-
782.

Maier, W., & Merikangas, K. (1996). Co-occurrence and co transmission of affective
disorders and alcoholism in families. *British Journal of Psychiatry, 30*(6), 93-100.

Maisto, S., Carey, K., & Bradizza, C. (1999). In K.E. Leonard, & D.H. Niles (Eds.),
Psychological theories of drinking and alcoholism (2nd ed.) (106-163). New York:
Guilford Press.

Markou, A., Kosten, T., & Koob, G. (1998). Neurobiological similarities in depression
and drug dependence: A Self-Medication Hypothesis.
Neuropsychopharmacology, 18(3), 135-174.

Martin, A., Rief, W., Klaiberg, A., & Braehler, E. (2006). Validity of the brief patient
health questionnaire mood scale (PHQ-9) in the general population. *General*

Hospital Psychiatry, 28(1), 71-77.

Martin, W. (1980). Emerging concepts concerning drug abuse. In D. Lettieri, M. Sauers, & H. Pearson (Eds.), *NIDA Research Monograph, 30.* Rockville, Maryland: National Institute on Drug Abuse.

McDonald, J., & Meyer, T. (2011). Self-report reasons for alcohol use in bipolar disorders: why drink despite the potential risks? *Clinical Psychology and Psychotherapy, 18,* 418-425.

McGovern, M., Wrisley, B., & Drake, R. (2005). Relapse of substance use disorder and its prevention among persons with co-occurring disorders. *Psychiatric Services, 56*(10). 1270-1273.

McGovern, M., Xie, H., Segal, S., Siembab, L., & Drake, R. (2006). Addiction treatment services and co-occurring disorders: Prevalence estimates, treatment practices, and barriers. *Journal of Substance Abuse Treatment, 31*(3), 267-75.

McKim, W. (2003). *Drugs and Behavior: An Introduction to Behavioral Pharmacology* (5th Ed.). Prentice Hall: Upper Saddle River, New Jersey.

Meehan, W., O'Connor, L., Berry, J., Weiss, J., Morrison, A., & Acampora, A. (1996). Guilt, shame, and depression in client's recovery from addiction. *Journal of Psychoactive Drugs, 28*(2), 125-134.

Milkman, H., & Frosch, W. (1973). On the preferential abuse of heroin and amphetamine. *Journal of Nervous Mental Disorders, 156*(4), 242-248.

Millon, T., Davis, R., Millon, C., & Grossman, S. (2009). *The Millon clinical multiaxial inventory-III, Third Edition (MCMI-III) (2009) with new norms and updated*

scoring (3rd ed.). San Antonio, TX: Author.

Mueser, K., Drake, R., & Wallach, M. (1998). Dual diagnosis: a review of etiological theories. *Psychology of Addictive Behaviors, 23*(6), 717-734.

Myers, J. (1984). Six-month prevalence of psychiatric disorders in three communities 1980 to 1982. *Archives of General Psychiatry, 41*(10), 959-967.

Nakajima, M., & al'Absi, M. (2012). Predictors of risk for smoking relapse in men and women: a prospective examination. *Psychology of Addictive Behaviors, 26*(3), 633-637.

New York State Office of Alcoholism & Substance Abuse Services. (2001). Treating co-occurring mental health and addictive disorders in New York state: A comprehensive view. Albany, NY: Author.

Pallant, J. (2007). *SPSS Survival Manual*. New York, NY: Open University Press.

Pedersen, M., & Hesse, M. (2009). A simple risk scoring system for prediction of relapse after inpatient alcohol treatment. *The American Journal on Addictions, 18,* 488-493.

Pomerleau, O., Collins, A., Shiffman, S., & Pomerleau, C. (1993). Why some people smoke and others do not: New perspectives. *Journal of Counseling and Clinical Psychology, 61*(5), 723-731.

Potvin, S., Stip, E., & Roy, J. (2003). Schizophrenia and addiction: An evaluation of the Self-Medication Hypothesis. *Encephale, 29*(3), 193-203.

Potvin, S., Stip, E., Lipp, O., Roy, M., Demers, M., Bouchard, R., & Gendron, A. (2008). Anhedonia and social adaptation predict substance ause evolution in dual

diagnosis schizophrenia. *The American Journal of Drug and Alcohol Abuse, 34,* 75-82.

Regier, D., Farmer, M., Rae, D., Locke, B., Keith, B., Judd, L., & Godwin, F. (1990). Comorbidity of mental health disorders with alcohol and other drug abuse. *Journal of the American Medical Association 264*(19), 2511-2518.

Robins, L., & Regier, D. (Eds.). (1991). *Psychiatric disorders in America: The epidemiologic catchment area study.* New York, NY: Free Press.

Rounsaville, B., Anton, S., Carroll, K., Budde, D., Prusoff, B., & Gawin, F. (1991). Psychiatric disorders of treatment-seeking cocaine abusers. *Archives of General Psychiatry, 48*(1), 43-51.

Rounsaville, B., Dolinsky, Z., Babor, T., & Meyer, R. (1987). Psychopathology as a predictor of treatment outcome in alcoholics. *Archives of General Psychiatry, 44*(6), 505-513.

Rounsaville, B., Wiessman, M., & Crits-Cristoph, K. (1982). Diagnosis and symptoms of depression in opiate addicts. *Archives of General Psychiatry, 39*(2), 161-168.

Rounsaville, B., Weissman, M., Kleber, H., & Wilber, C. (1982). Heterogeneity of psychiatric diagnosis in treated opiate addicts. *Archives of General Psychiatry, 39*(2), 161-168.

Schaub, M., Fanghaenel, K., & Stohler, R. (2008). Reasons for cannabis use: patients with schizophrenia versus matched healthy controls. *Australian and New Zealand Journal of Psychiatry, 42,* 1060-1065.

Schuckit, M. (1985). Clinical implications of primary diagnostic groups among

alcoholics. *Archives of General Psychiatry, 42*(11), 1043-1049.

Simon, E. (1981). Recent developments in the biology of opiates: Possible relevance to addiction. In J. H. Lowinson & P. Ruiz (Eds.), *Substance abuse: Clinical problems and perspectives.* Baltimore: Williams and Wilkins.

Strahan, E., Panayiotou, G., Clements, R., & Scott, J. (2011). Beer, wine, and social anxiety: Testing the "Self-Medication Hypothesis" in US and Cyprus. *Addiction Research and Theory, 19*(4), 302-311.

Strowing, A. (2000). Relapse determinants reported by men treated for alcohol addiction: the prominence of depressed mood. *Journal of Substance Abuse Treatment, 19*(4), 469-474.

Suh, J., Robins, E., Ruffins, S., Albanese, M., & Khantzian, E. (2008). Self-medication hypothesis: Connecting affective experience and drug choice. *Psychoanalytic Psychology, 25*(3), 518-532.

Swendsen, J., & Merikangas, K. (2000). The comorbidity of depression and substance use disorders. *Clinical Psychology Review, 20*(2), 173-189.

Thyer, B., Parrish, R., Himle, J., Cameron, O., Curtis, G., & Nesse, R. (1985). Case Histories and shorter communications. *Behavior Research and Therapy, 24*(3), 357-359.

Weiss, R., Griffin, M., & Mirin, S. (1992). Drug abuse as self-medication for depression: an empirical study. *American Journal of Drug & Alcohol Abuse, 18*(2), 121-129.

Willinger, U., Lenzinger, E., Hornik, K., Fischer, G., Schonbeck, G., Aschauer, H., & Meszaros, K. (2002). Anxiety as a predictor of relapse in detoxified alcohol-

dependent patients. *Alcohol & Alcoholism, 37*(6), 609-612.

Wisconsin Administrative Code. (2011). Department of Health Services, Chapter 75,

Community substance abuse service standards, No. 671.

Wisconsin Administrative Code. (2014). Department of Health Services, Chapter 55,

Protective services system.

Witkiewitz, K. (2011). Predictors of heavy drinking during and following treatment.

Psychology of Addictive Behaviors, 25(3), 426-438.

Witkiewitz, K., & Villarroel, N. (2009). Dynamic association between negative affect

affect and alcohol lapses following alcohol treatment. *Journal of Consulting and*

Clinical Psychology, 77(4), 633-644.

Woody, G., O'Brien, C., & Rickels, K. (1975). Depression and anxiety in heroin addicts:

A placebo-controlled study of doxepin in combination with methadone. *American*

Journal of Psychiatry, 132(4), 447-450.

Young, R., Oei, T., & Knight, R. (1990). The tension reduction hypothesis revisited: an

alcohol expectancy perspective. *British Journal of Addiction, 85,* 31-40.