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A RETROSPECTIVE DESCRIPTIVE STUDY OF
CHEMICALLY IMPAIRED NURSES
IN TEXAS

by

MERCY NGOSA MUMBA

Presented to the Faculty of the Graduate School of
The University of Texas at Arlington in Partial Fulfillment
of the Requirements
for the Degree of

DOCTOR OF PHILOSOPHY

The University of Texas at Arlington

December 2016

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Acknowledgements

First, praise and honor to my Heavenly Father, my Lord and Savior Jesus Christ, and my strength and comfort, the Holy Spirit. My Christian faith has been the cornerstone and anchor, providing a sure and steady promise that all things are possible to them that believe and that I can do all things through Christ who strengthens me. My husband Vituli, you are the best. I could have never asked for a more kind, supportive, and all around wonderful husband. The sacrifices you have made just for me to finish this program of study are remarkable. I am forever grateful for you and I love you.

I would also like to thank my dissertation committee: Dr. Susan Baxley, Dr. Daisha Cipher, and Dr. Diane Snow. You have been more than supportive of my journey since I met each of you. Your experience and knowledge have been instrumental in allowing me to design a study that is strong and relevant for our times. Dr. Snow, you are the reason that I have remained interested in studying nurses with impaired practice. Your passion for mental health and psychosocial wellbeing of individuals has fueled my desire to study this population for years now. I appreciate your expertise in this field and all the wealth of knowledge you have shared with me over the last seven years. I know I can always count on you and that is a blessing. I would also like to thank Dr. Cipher whose statistical prowess I have greatly benefited from. Thank you for pointing me in the right direction and for always challenging my thinking. You have been available to

answer questions and to make what seemed to be complicated processes easier to understand.

To my dissertation chair, Dr. Susan Baxley, I could not have done this without you, literally. Thank you first for believing that I could do it. You poured your heart and energy into this process, and at every turn, you reassured me that it was possible if I was willing to work hard. You advocated for me when I could not do it for myself. For all the long nights and short turn-around times you committed to; I could have never asked for a better chair. I appreciate your calm demeanor even when I was panicking about something and for just being you, for the feedback, and for pointing me in the right direction, time and time again. You have been my mentor throughout the program and I want you to know that I appreciate all the checking-in over the last four years.

A special acknowledgement goes to the Texas Peer Assistance Program for Nurses (TPAPN) for all the assistance rendered throughout my dissertation process. I would like to thank them for allowing me to use their de-identified database to answer my research questions. I would also like to thank their staff who worked tirelessly to de-identify the database, and to ensure that I had all the necessary information to conduct the study. Thank you to the staff who further answered all my questions as I was trying to make sense of the data.

My sincere gratitude goes to Vivian Lail-Davis. You always had the answers to my questions and took the time to explain processes and procedures

for what needed to be done at what time. Your expertise and warm smile have always been greatly appreciated. To Dr. Jennifer Gray- you were the first person to convince me that I was the right candidate for the BSN-PhD program and that I could make it through. Your unwavering support throughout this process has been invaluable. Even after leaving, you have continued checking on me and that means a lot. Dr. Lauri John- you have seen me at some of my lowest points in my life, but you gently held my hand and provided guidance in those moments when I could not even think. I could not express in words everything your support has meant especially in the last two years. Thank you.

To my big brother Joshua Makungu Mumba, you are more than a brother. You are my confidant and so much more. Thank you for never doubting me, and for the wise counsel you have provided over the years. I owe much of my success to you for helping me navigate life. Lastly, but certainly not least, my Pastor and first lady, Dr. Sultan H. Cole Snr, and Mrs. Kandice R. Cole. I thank God for sending me to Revealed Word Ministries. I have a great church family. You have stood with me and cheered me on every step of the way. You have prayed for me and encouraged me. You have become my family and I am grateful to God.

Dedication

This dissertation is dedicated to my parents, Pastor Ramson Mumba Snr, and Mrs. Mercy Ngosa Mumba Snr. Mom and Dad; you have been my greatest supporters since I can remember having memories of you. You have loved me, encouraged me, prayed for me, and simply been there for me. Thank you for always believing that I could be anything I wanted to be and that it did not matter where I came from, what I looked like, how I sounded like, I could still be great. When many people thought I should simply quit, you told me I could do it. Above all else, I thank you for introducing me to my Lord and Savior, Jesus Christ.

This dissertation is also dedicated to my unborn children. When you get here, I want you to know that there is nothing impossible to them that believe. You can fly and you can soar, just never give up.

Abstract

A RETROSPECTIVE DESCRIPTIVE STUDY OF CHEMICALLY IMPAIRED NURSES IN TEXAS

Mercy Ngosa Mumba, PhD

The University of Texas at Arlington, 2016

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Dissertation Committee: Susan M. Baxley, Daisha Cipher and Diane Snow

There are approximately 3.1 million nurses in the United States (US Census Bureau, 2016) and approximately 8% of them suffer from chemical dependency and substance use disorders (Kunyk, 2015). In Texas, nurses with impaired practice are referred to peer assistance programs such as the Texas Peer Assistance Program for nurses (TPAPN), a monitoring program for nurses as they seek rehabilitation and recovery. Nurses are referred for various reasons including diversion of medications from patients and impairment at work. Currently, 348 nurses in TPAPN are actively participating in the program for substance abuse related offenses. Many nurses are also referred to the program for dual diagnoses. Of all the nurses that were referred to TPAPN over the last six years,

1553 were specifically for substance abuse related problems. These represent two percent of the population of nurses in Texas. The average age of participants in this study was 40.1 years, and approximately half of them were under the age of 40. Females represented 75% of participants and 76% were registered nurses. About 32% relapsed while they were in the program, and about 41% successfully completed the program. Nurses with impaired practice abuse variety of substances including prescription drugs and illegal drugs. Opioids were the most frequently abuse class of drugs, followed by alcohol, and then stimulants. The majority of nurses obtained their drugs by diverting from patients. Contrary to what is in the literature, nurses working in long-term care, medical-surgical units, and home health care had the highest prevalence of impaired practice. In this study, psychiatric comorbidity was not significantly associated with relapse. Self-report status was significantly associated with gender, age category, license type, relapse, and drug of choice. There was a significant inverse relationship between time it takes to enroll and number of days abstinent. Men were also more likely to be employed while in the program compared to their female counterparts. Of the twelve-predictor variables used in Cox Regression analysis, only two were significant predictors of relapse among nurses with impaired practice in TPAPN. These two predictors were (a) having substance use disorder as the referral type and (b) having alcohol as the primary drug of choice. The findings of this will

help develop interventions that promote recovery, reduce relapse rates, and ultimately protect the public from impaired practice.

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Chapter 1

Introduction

A Study of Chemically Impaired Nurses in Texas

Chemical dependency is a chronic disease process that causes compulsive drug seeking behaviors in spite of harmful consequences (National Institute on Drug Abuse [NIDA], 2016). Chemical dependency affects a significant number of people in the United States. It is estimated that 24.6 million Americans use illicit drugs every year (United States Department of Health and Human Services [USDHHS], 2014). This is approximately 10% of the US population.

According to the Texas Board of Nursing (TBON, 2016), there are approximately 83 thousand nurses in the state of Texas; almost 45 thousand Registered Nurses (RNs), approximately 22 thousand Advanced Practice Registered Nurses (APRN), and close to 17 thousand Licensed Vocational Nurses (LVNs). Unfortunately, a significant number of nurses suffer from substance use disorders (Darbro, 2011). Although the prevalence of substance use disorders among nurses in Texas is unknown, it is estimated that nationally, approximately 8% of nurses suffer from substance use disorders (Kunyk, 2015). In 2012 alone, approximately 6,500 nurses received some form of disciplinary action, such as license probation, revocation, or suspension, and about 68% to 90% of these disciplinary actions were related to substance abuse (National Council of State Boards of Nursing [NCSBN], 2013).

This chapter includes a discussion on the significance, background, and factors associated with substance use disorders among nurses. It also includes a discussion on Engel's biopsychosocial model, the main concepts in the model, and the relevant assumptions pertaining to the study of nurses with impaired practice. Furthermore, this chapter will discuss Lazarus' theory of stress and coping, the main concepts of that theory, including the important relational statements of the theory as relates to nurses suffering from substance use disorders. A discussion on the interaction of the two theories that provides the framework for this study of nurses with chemical impairment follows.

Significance of Substance Use Disorders Among Nurses

Nursing is known to be one of the most stressful professions (American Nurses Association [ANA], 2016). Some of the stressors in nursing include excessive workloads, shift work, role ambiguity, conflict on the job, and lack of support (Epstein, Burns, & Conlon, 2010; Lim, Bogossian, & Ahern, 2010). When nurses fail to cope adequately with this stress, many resort to substance abuse (Dittman, 2012; Malliarakis, Smith, & Darbro, 2012). Sadly, a significant number of nurses with impaired practice obtain drugs by diverting medications from patients (Cares, Pace, Denious, & Crane, 2015; Dittman 2012). This is unacceptable in the nursing profession because nurses have an ethical responsibility to protect the health and wellbeing of patients who are entrusted in

their care (Monroe, Pearson, & Kenaga, 2008). Failure to uphold these standards can and has often resulted in nurses facing disciplinary actions (Darbro, 2011).

The typical nurse with impaired practice is female, young, and new to nursing (Darbro & Malliarakis, 2012; Tipton, 2006). Chemical dependency and substance abuse among nurses also varies by specialty (Young, 2008) with nurse anesthetists having the highest reported prevalence at 15% (American Association of Nurse Anesthetist [AANA], 2016). Although these phenomena have not been specifically studied among nurses with impaired practice, we know that substance abuse disrupts family relations, often affecting significant others and children alike (Feingold, Washburn, Tiberio, & Capaldi, 2015; Ritter, Kivisto, Handsel, & Moore, 2014). Substance use disorders among nurses further affect the individual nurse as evidenced by legal problems, financial problems, and professional problems (Dittman, 2012).

Patients are another group of people that is affected by chemical dependency among nurses (Cares et al., 2015; ANA, 2016). This is because substance use disorders among nurses expose patients to unsafe practice, increased likelihood of poor outcomes, and decreased quality of care (Cares et al., 2015). This is noteworthy because the majority of nurses with impaired practice continue to practice impaired if they are not discovered or reported to the board of nursing (Cares et al., 2015; Kunyk, 2015). Lastly, society as a whole suffers when nurses practice impaired because this problem contributes to turnover, conflict

with co-workers and managers, higher healthcare costs and benefit utilization, and a concomitant loss in productivity (Jordan, Grissom, Alonzo, Dietzen, & Sansland, 2008; Roche, Duffield, Homer, Buchan, & Dimitrelis, 2014), costing approximately \$600 billion annually (NIDA, 2016).

Background on Substance Use Disorders Among Nurses

Risk factors for chemical dependency and substance abuse in nurses include access to drugs, attitude such as denial and stigma, stressful work environments, and lack of education on substance use disorders for both nurses and the public (Darbro & Malliarakis, 2012). Access to drugs is one of the most cited risk factors for nurses with impaired practice (Cares et al., 2015; Dittman, 2008). This is worse in less supervised areas in which nurses have more autonomy in their practice such as the emergency department, (Young, 2008). Similarly, the presence of psychiatric comorbidities such as depression and anxiety increase chances about two fold of both relapse and substance abusers (NIDA, 2015; Schellekens, de Jong, Buitelaar, & Verkes, 2015).

Alcohol is the most abused substance in the general population (Substance Abuse and Mental Health Services Administration [SAMHSA], 2016); narcotics however are the drug of choice for many nurses with impaired practice (Bettinardi-Angres, Pickett, & Patrick, 2012). This has been associated with the access nurses have to narcotics in the work place (Cares et al., 2015; Darbro, 2011; Dittman, 2012). Additionally, many nurses abuse more than a one

substance at any given time, further increasing their chances of relapse and substance abuse than if they used alcohol alone (Davis, Powers, Vuk, & Kennedy, 2014). The problem of substance use disorders among nurses is exacerbated by many negative attitudes such as stigma associated with mental health disorders (Evans-Locko, Brohan, Motjabai, & Thornicroft 2012). This has resulted in underreporting and undertreatment of substance abuse in the general population and in nurses alike (Cares et al., 2015; SAMHSA, 2015). Furthermore, many nurses fear losing their licenses because of impaired practice (Cares et al., 2015).

Treatment of Substance Abuse

Many interventions such as mindful meditation (Murphy & MacKillop, 2014; Witkiewitz et al., 2014), interpersonal psychotherapy (Frank, Ritchey, & Levenson, 2014), cognitive behavioral therapy (Hunter, Paddock, Zhou, Watkins, & Hepner, 2013), family therapy (Knight, 2014; Nelson & Sullivan, 2011), and motivational interviewing (Mujika et al., 2014; Chang, Compton, Almeter, & Fox, 2015) have been found to be effective in decreasing substance abuse. No specific data however, exists among nurses who are chemically impaired supporting these interventions. Nurses with impaired practice however have the opportunity to participate in peer assistance programs (Darbro, 2011). Peer assistance programs are monitoring programs developed for nurses with impaired practice intended to foster recovery and at the same time helping nurses maintain their licenses as they go through these programs (Texas Peer Assistance Program for Nurses [TPAPN],

2016). The Texas Peer Assistance Program for Nurses is an example of such a program. In addition, nurses who wish to seek the treatment modalities alluded to earlier have to pursue treatment by themselves because they are traditionally not incorporated into monitoring program for nurses with impaired practice (TPAPN, 2016).

Although there is a plethora of general information about nurses with impaired practice, few studies have aimed at comprehensively describing this population, including their recent prevalence, demographic characteristics, and interventions specific to nurses. The existence of such studies would help clinicians to understand this population and to implement interventions to reduce relapse rates. Further exploration of this topic might assist in developing teaching plans on how to identify nurses with impaired practice. This promises to help with early identification of those who are practicing impaired and consequently, protecting the public. In Texas, no recent studies were found that addressed the aforementioned concerns. This study was a retrospective analysis of secondary data of nurses with impaired practice collected by TPAPN between 2013 and 2016. The theories of Engle (1977) and Lazarus (1976) provided the framework for the study of this population. This study included an analysis of variables present in the TPAPN database.

Development of Study Framework

The Biopsychosocial Model of Health and Illness

George Engel first proposed the biopsychosocial model of health and illness in 1977 (Engel, 1977). This model has since undergone various revisions, but the fundamental concepts remain the same (Engel, 2012). Engel proposed that health and illness are a result of complex interactions among biological, psychological, and sociological factors (Engel, 1977; Epstein, 2014). This was a significant shift from the prevailing biomedical model at that time, which ascribed biological factors as the only cause for disease and illness (Engle, 1980).

Engel (1977) believed that in addition to the biological composition, human beings exist in a psychological and sociological milieu; intangible, as it may be yet relevant to the study of health and illness. His model was largely inspired by Von Bertalanffy's General Systems Theory (McLaren, 1998). Proponents of the biomedical model view molecular biology as the basis for scientific research (Suls, Luger, & Martin, 2010). The problem with the biomedical model however, is the emphasis that diseases develop independent of psychosocial factors that might contribute to illness (Engel, 1977). This reductionist and exclusionist approach leads to an ineffective way of treating disease because it requires diseases to be explained in physical-chemical terms before they can be accepted (Engel, 1980).

Major concepts in the model. The three main concepts in the biopsychosocial model include biological factors, psychological factors, and sociological factors (Engel, 1977). Biological factors are determinants of health and illness that pertain to bodily systems (Engel, 1979). In this model, biological factors include factors such as the genetic makeup, the immune system, and the nervous system (Engel, 1980). Psychological factors are defined as psychological conditions and stressors that have an impact on bodily systems and help determine individual reactions to health and illness (Engel, 1979). The psychological factors that might affect health or illness include emotional turmoil, negative thinking, and low self-worth (Engel, 1980; Suls et al., 2010). Psychological factors also include mental health disorders, health beliefs, and psychological stressors (Engel, 1977). Lastly, sociological factors are factors that exist in a person's physical environment that either foster or hinder health (Engel, 1977). An individual's religion, socioeconomic status, culture, technology, and interpersonal relationships all fall under sociological factors in the biopsychosocial model of health and illness. The dynamic interactions among these factors all play a role in an individual's health or illness (Engel, 1980).

Engel's biopsychosocial model of health and illness lends itself well to the study of substance use disorders among nurses in that it provides a holistic lens through which to view these individuals (Smith, Fortin, Dwamena, & Frankel, 2013). One however, could ask how it is that two people with the same risk

factors may not necessarily end up with the same fate. Despite this, the model can explain the interplay of biological, psychological, and sociological factors as described above. It is hypothesized that the difference between two people with similar factors becoming chemically impaired or addicted may lie in how well they cope with stressors. To this end, Lazarus' theory of stress and coping (1976) is employed to shed more light on this phenomenon.

Lazarus Theory of Stress and Coping

Lazarus' theory of stress and coping was first developed in 1976 (Lazarus, 1976). The three main concepts in this theory are stress, cognitive appraisal, and coping (Folkman & Lazarus, 1988; Baldwin, 2005). These processes are believed to happen in succession, from the introduction of the stressor, to cognitively appraising it, and finally eliciting the right coping response (Lazarus & Folkman, 1987; Baldwin, 2005). Lazarus (1992) asserts that coping is neither negative nor positive, but that the outcome determines the inherent success of the coping effort. Lazarus' theory was greatly influenced by Selye's theory of stress (Lazarus, 1998).

Major concepts of the theory. Stress is defined as the appraisal of the relationship between the person and the environment as either taxing or exceeding the individuals' resources, thereby threatening that individual's wellbeing (Lazarus & Folkman, 1984). Stress is believed to be a result of the interaction between individuals' personal characteristics and their environment (Baldwin, 2005). A stressor therefore, is any event that causes a stress response (Lazarus & Folkman, 1987). The second concept, cognitive appraisal, is the evaluation process people go through to determine whether a particular encounter is relevant to their general wellbeing (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). Of particular concern to our study of nurses with impaired practice is the concept of coping. Coping is considered a crucial aspect of adapting to stressors in the environment (Folkman et al., 1986). Coping also determines adaptation outcomes such as depression, anxiety, and other somatic illnesses (Folkman et al., 1986) including substance use disorders.

Bringing It Together

Several factors interact in nurses who are susceptible to substance use disorders to produce the dependence. For example, a nurse who may have a genetic predisposition to substance abuse, working in a stressful unit with access to habit-forming medications, and a poor support system may cognitively appraise this situation as stress producing. This cognitive appraisal in conjunction with the determination of the nurse's coping constraints may lead to chemical dependency.

This is why the view that coping is both a process-oriented and context-focused endeavor is particularly important for nurses with impaired practice. This is because depending on the interplay of various factors and the contexts in which these factors occur, outcomes may be different.

The biopsychosocial model lends itself well to understanding nurses with impaired practice, their challenges, and the contexts in which these stressors occur. It promotes an individualistic approach to health and illness. This individualized holistic care model increases the understanding of nurses with impaired practice, their decision-making processes, and coping mechanism that can promote full recovery and reincorporation into the profession. Understanding the interactions of these factors further informs practitioners with knowledge about what factors can contribute to relapse of nurses with impaired practice participating in peer assistance programs for substance abuse. Furthermore, understanding the time when these nurses are most vulnerable to relapse while participating in peer assistance programs may assist clinicians to employ specific interventions to deter the occurrence of relapse in that time frame.

Stressors for nurses with impaired practice can present in the form of biological, psychological, or sociological factors. The impaired nurses' coping is primarily related to the cognitive appraisal of each perceived factor in each domain of the biopsychosocial model. Below is the proposed framework for studying chemically impaired nurses that is based on the integration of the

biopsychosocial model of health and illness and Lazarus' coping theory. Although there are many factors that can be incorporated in the proposed framework, only those presenting variables in the TPAPN database and were available for analysis were used.

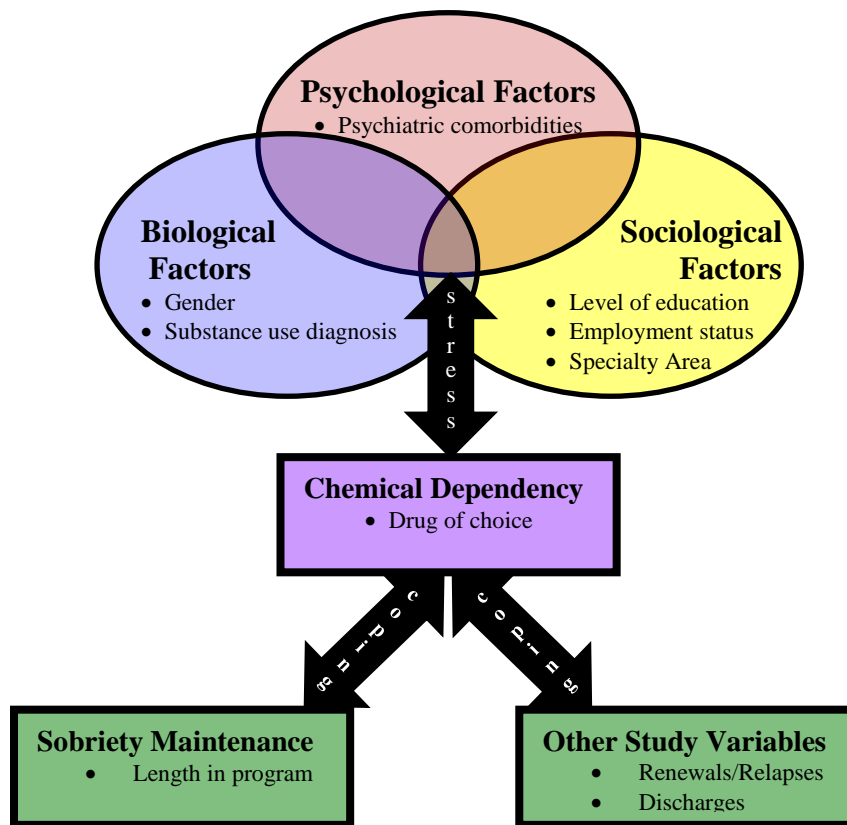


Figure 1-1 Mumba Framework for Chemical Dependency among Nurses: Study Variables Only

Many other factors in the literature are associated with chemical dependency among nurses. Analysis of those variables was limited because of the use of a secondary database. Other variables of interest to study include self-

efficacy, spirituality, cravings for drugs, family history, and age at first onset of abuse. Because these variables were not in the database, it was not possible to analyze them. For the purpose of this study, gender and substance use disorder represented biological factors. Psychological factors were represented by the following variables: psychiatric comorbidities and drug of choice. Sociological factors were represented by level of education, employment status, and specialty area.

Problem and Statement of Purpose

For a long time, very little was known about the characteristics of nurses with impaired practice, who they are, and what challenges they face (Epstein, Burns, and Conlon, 2010). Due to confidentiality problems, studying this population has proved difficult (Bettinardi-Angres, Pickett, & Patrick 2012). Problems related to standardization of procedures across states, including reporting procedures and length of probationary periods, have all contributed to the inconsistencies which plague many peer assistance programs for nurses with impaired practice (Darbro, 2011). Stipulations may therefore vary from state to state.

The lack of education and screening for substance abuse, negative attitudes towards substance abuse, and the stigma associated with mental illness have further exacerbated this problem (Darbro & Malliarakis, 2012). Furthermore, very few interventional studies have been conducted on nurses with impaired

practice. This is partly due to the complexities involved with studying nurses with impaired practice, specifically when considering confidentiality problems and maintaining anonymity of these nurses.

Consequently, very little is known concerning the characteristics of nurses with impaired practice, especially those going through peer assistance programs. Few recent studies have aimed at comprehensively describing this population, including their recent prevalence, demographic characteristics, and interventions specific to nurses in order to promote recovery and reduce relapse rates. In Texas, no studies were found in the literature that addressed the aforementioned concerns. Before any specific interventions can be recommended, a clear picture of who these nurses with impaired practice are is needed. The purpose of this study was to describe the population of nurses with impaired practice in the state of Texas going through a peer assistance program between 2013 and 2016.

Statement of Questions

1. What is the demographic composition of nurses with impaired practice in Texas going through TPAPN?
2. Is there a relationship between the presence of psychiatric comorbidities and relapse after controlling for age and gender for nurses in TPAPN?
3. Are there any differences between those who self-report and who are reported/referred to TPAPN in relation to demographic characteristics, employment status, license type, and drug of choice?

4. Is there an association between age and gender with the following after controlling for psychiatric comorbidities in nurses participating in TPAPN?
 - a. employment status,
 - b. length in program,
 - c. license type,
 - d. Number of days abstinent?
5. What factors are associated with relapse among nurses with impaired practice going through a peer assistance program, and at what stage are they most susceptible to relapse?

Assumptions of the Framework

1. Female nurses with impaired practice relapse faster than male nurses do.
2. Female nurses with impaired practice remain in the program longer than male nurses do.
3. Younger nurses have more renewals and relapses than older nurses do.
4. Nurses with impaired practice who have psychiatric comorbidity relapse sooner than those who do not.
5. Nurses with impaired practice from high-stress specialty areas such as the emergency department relapse more than other specialties.
6. The higher the educational level, the less likely the nurse is to relapse.

7. A higher percentage of male nurses with impaired practice are employed while enrolled in the monitoring program compared to their female counterparts.

Propositions of the Framework

1. A combination of factors from the biological, sociological, and psychological domains all interact to produce relapse
2. The presence of psychiatric co-morbidities increases the chances of relapse.
3. Chemically impaired nurses abusing opiates relapse more frequently compared to those abusing other substances.
4. Drug of choice is closely related to area of practice

Summary

There are approximately three million nurses in the United States and an additional 700,000 LVNs (U.S Census Bureau, 2016) and of these, about eight percent are chemically impaired (Kunyk, 2015). Many of them are referred to peer assistance programs especially in Texas, which is an alternative-to-disciplinary state (TPAPN, 2016). Nurses with impaired practice possess many traits that can be subdivided into biological, psychological, and sociological factors that contribute to their tendencies toward substance abuse. The interactions of these factors determine the expression of health and illness (Engel, 1980), in this case substance abuse and chemical dependency. Although

understanding the interactions of these factors can be used to inform diagnostic and treatment procedures, in and of themselves they may not adequately explain why some nurses become chemically dependent and others do not. Lazarus' theory of stress and coping (1977) helps in clarifying this phenomenon. In this theory, Lazarus (1977) emphasizes that the cognitive appraisal of various stressors determine the outcomes of person-environment interactions. The result is the development of a framework that combines concepts from both theories that can be used to study nurses with impaired practice who are participating in peer assistance programs for substance abuse.

Chapter 2

Review of Relevant Literature

Chemical dependency is a disease process in which individuals are unable to control the use of substances such as alcohol and other drugs, frequently occurring in those with a family history, and in which the process of recovery becomes more difficult as the disease progresses (Substance Abuse and Mental Health Services Administration [SAMHSA], 2016). Approximately 10% of the United States population report abusing substances, whether prescribed, illicit, or otherwise (National Institute on Drug Abuse [NIDA], 2015). This estimate is an increase from 2002 when only 8.3% of Americans reported use of illicit drugs in the past year (NIDA, 2015). Substance use disorders can present an enormous economic burden on society, and health care costs related to substance abuse and addictions run upwards of \$600 billion annually (NIDA, 2016). In the literature, the terms chemical dependency and substance use disorder are used interchangeably (SAMHSA, 2016).

This paper includes a discussion of the definition, prevalence, and effects of chemical dependency. This chapter also includes a discussion of signs of chemical dependency and the intrinsic and extrinsic factors associated with it. Assistance and monitoring programs specific to nurses with impaired practice is discussed. Lastly, this chapter includes a discussion of the limited research that

has focused on descriptions of the population of nurses with impaired practice, and the need for further research.

The Neurobiological Basis of Chemical Dependence and Addiction

According to NIDA (2016), about 40% to 60% of the risk for substance abuse is associated with genetic influences. Early research such as the human genome project revealed underlying differences in the brain's response to alcohol (Treutlein et al., 2009), which make substance-abusing individuals more susceptible to intoxication, tolerance, withdrawal, and a higher propensity for organ damage (Gianoulakis, Krishnan, & Thavundayil, 1996). More recently, brain-imaging techniques have shown that in addition to their genetic predisposition, substance-abusing individuals have neurotransmitter imbalances such as dopamine (Leroy et al, 2011). These neurotransmitter differences are associated with increased addiction severity and impulsivity (Volkow et al., 2014). Additionally, substance abusers have significantly less gray matter volume in the cortical and cerebellar regions of the brain (Rando, Hong, & Bhagwagar, 2011). These findings all provide support for genetic and neurophysiologic mechanisms influencing tendencies toward substance abuse and addiction.

Addiction is a disease that affects the reward circuitry of the brain (Stamatakis et al., 2014). The amygdala, a portion of the brain whose primary functions include memory formation, emotional learning and regulation, and reward processing, together with the nucleus accumbens (NAc), have shown

potent neural activation in the presence of drug associated cues (Chase, Eickhoff, Laird, & Hogarth, 2011). Excitation of the basolateral amygdala (BLA) and its concomitant transmission to the NAc is necessary for reward-seeking behaviors (Chase et al., 2011; Stuber et al., 2011). In addition, stimulation of the BLA is responsible for regulating dopamine release into the NAc, which is important for encoding memory cues that act as reinforcement for addictive behaviors (Jones et al., 2010). This is achieved through the projection of neurons that create a feedback loop to the ventral midbrain (Xia et al., 2011).

The deregulation of the reward circuitry system leads to the reactive reward system hijacking the reflective reward system (Stahl, 2013; Xia et al., 2011; Watabe-Uchida, Zhu, Ogawa, Vamanrao, & Uchida, 2012). An overactive reactive reward system is responsible for the irrational drug seeking behaviors inherent in addiction disorders (Stahl, 2013). Over time, the brain produces less dopamine, which decreases the ability of the abusing individual to experience pleasure (Stahl, 2013; Watabe-Uchida et al., 2013). This decreased ability to experience pleasure leads to increasing the quantity of drugs needed to obtain the same effect, a phenomenon called tolerance (Stahl, 2013; Watabe-Uchida et al., 2013). The reactive reward system, which is connected to the amygdala, is regulated by the ventral tegmental area (VTA) (Stahl, 2013). This connection elicits emotional memories and more dopamine release, and is responsible for a conditioned response to drug use (Stahl, 2013).

The NAc is also connected to the prefrontal cortex, a region of the brain that is responsible for executive function and judgment. Because the NAc is connected to the prefrontal cortex through the thalamus, drug addiction is further characterized by impulsivity resulting from synaptic plasticity that is a consequence of overvaluing of rewards associated with abuse (Goto, Yang, & Otani, 2010). The functional severance of the BLA- prefrontal cortex is further associated with significantly increased risky behavior stemming from an inflexible and exaggerated response to emotionally pertinent environmental cues (St Onge, Stopper, Zahm, & Floresco, 2012). This signifies an improper processing of emotional learning cues inherent in addiction (Stamatakis et al., 2014). Other neurotransmitters have been associated with addiction including serotonin, Gamma-amino butyric acid (GABA), and glutamate (Stamatakis et al., 2014). The drug that is being abused however, largely determines the type of neurotransmitter affected (Neisewander, Cheung, & Pentkowski, 2014).

Description of Population of Nurses in the United States

There are approximately three million Registered Nurses (RNs) and approximately 700 thousand Licensed Vocational Nurses (LVNs) in the United States (US Census Bureau, 2016), of which an estimated 8% are chemically impaired (Kunyk, 2015). The American Nurses Association (ANA, 2016) has estimated that 62% of RNs work in a hospital setting, and the average age of RNs is 45.5 years old. Conversely, almost 80% of LVNs work in skilled nursing

facilities, home health, and other outpatient service areas (US Census Bureau, 2016). Approximately 90% of nurses are women, and only 10% of all nurses are younger than 30 years of age (ANA, 2016). An estimated 17% of all nurses identify themselves with minority groups, such as African American (5.4%), Asian (5.5%), Hispanic or Latino (3.6%), and American Indian or Alaska Native (0.3%; ANA, 2013).

Prevalence of Substance Use Disorders in Nurses

The prevalence of chemical dependency among nurses is thought to be the same as that in the general population (Fogger & McGuinness, 2009). The literature notes, in the United States, it is unclear how the rates of chemical dependency in nurses have been estimated, and most of these estimates are older than 10 years (Fogger & McGuinness, 2009; Monroe & Pearson, 2009). Another problem that has contributed to the difficulties in arriving at consistent estimates for chemical dependency among nurses is that numbers vary depending on what method of estimation is utilized (Bozimowski, Groh, Rouen, & Dosch, 2014).

In Canada, the prevalence of chemical dependency among nurses is 8% (Kunyk, 2015). This estimate was from a study of nurses in Canada who filled out an internet survey. This study included 4,187 nurses who responded to the online survey with 32 of these being hard-copy questionnaires (Kunyk, 2015). Even though this rate is not specific to the United States, it is the latest available prevalence rate of chemical dependency among nurses, and the two countries

have similar training and work environments for nurses. Cares, Pace, Denious, and Crane (2015) concluded that the rate of chemical dependency among nurses is higher than what is traditionally reported because many nurses consider reporting such information or seeking help detrimental to their role in the profession. Denial of the problem of chemical dependency and substance abuse among nurses has further contributed to the underreporting of the problem (Cares et al., 2015).

The prevalence of chemical dependency also varies by specialty area, with other specialties being more susceptible to substance abuse than others (Young, 2008). For example, it is estimated that 15% of nurse anesthetists suffer from substance use disorders (American Association of Nurse Anesthetist [AANA], 2016) and emergency room nurses are 3.5 times more likely to abuse substances than others (Young, 2008). There is also a stigma attached to mental health disorders, including substance use disorders; therefore many people who have mental health disorders are reluctant to disclose these diagnoses (Evans-Locko, Brohan, Motjabai, & Thornicroft, 2012). The fear nurses have of reporting impaired practice results in underreporting of the rates of chemical dependency (Kunyk, 2015). The typical impaired nurse is female, young, and new to nursing (Darbro & Malliarakis, 2012; Tipton, 2006).

Stress and Substance Abuse in High Risk Professions

Many professions are considered high-risk for substance use disorders. These professions include nurses, physicians, law enforcement officers, and fire

fighters. This is largely related to the enormous amounts of stress that these professionals deal with because of their jobs (Deklava, Millere, & Circenis, 2011). For instance, law enforcement officers have three times higher chances of alcohol abuse and report engaging in high risk alcohol abuse behaviors in the previous week (Ballenger et al., 2011).

Alcohol abuse affects police performance with almost 50% of the lowest performing officers reporting alcohol issues (Gray, 2011). In fact, approximately 95% of police suicides involved alcohol (Larned, 2010). In addition, every 17 hours a peace officer commits suicide (Larned, 2010) associated with presence of alcohol use. Similar results have been found among firefighters (Jahnke, Carlos-Poston, & Haddock, 2014; United States Firefighters Association [USFA], 2016).

Another group of high-risk professionals is physicians (Dumitrascu, Mannes, Gamble, & Selzer, 2014). The rate of substance abuse among physicians is estimated to range between 10% and 12%, with anesthesiologist substance abuse rates projected to be higher than this (Physician Health Program [PHP], 2016). Although the majority of physicians with impaired practice abuse alcohol, anesthesiologists usually abuse potent intravenous opioids instead (Berge, Seppala, & Schipper, 2009). An estimated 9000 physicians are actively participating in physician health programs in the United States (PHP, 2016).

Physician Health Programs are required monitoring programs that physicians with impaired practice have to participate in that allow them to

maintain their licenses as they undergo rehabilitation for their substance use disorders (PHP, 2016). Physicians participating in these monitoring programs seemingly have better outcomes compared to their nurse counterparts in similar programs. For example, physicians have a 20% five-year relapse rate (Carini & Christo, 2009) compared to nurses at 40% five-year relapse rate (Zhong, Kenward, Sheets, Doherty, & Gross, 2009).

Stress and Other Risk Factors in the Nursing Profession

Nursing is one of the most stressful professions (ANA, 2016). With the dynamic medical, economic, social, and emotional problems patients face daily, nurses who take care of these patients consequently often experience tremendous psychological and physical stress (Deklava et al., 2011). Epstein, Burns, and Conlon (2010) concluded from their literature review that stress at work can further result from excessive workload, floating to other units, and working overtime to cover shifts due to the nursing shortage. Other stressors in nursing include shift work, role ambiguity, and lack of support both from peers and from management (Lim, Bogossian, & Ahern, 2010). Conflict with physicians and dealing with death and dying can further exacerbate an already stressful work situation (Xianyu & Lambert, 2006). Working long hours and the concomitant disruption of the circadian rhythm compound psychophysiological problems that many nurses may experience, and this may further increase susceptibility to substance abuse (Geiger-Brown & Trinkoff, 2010).

Factors present in the nurses' work environment can also increase the likelihood for substance abuse (Dittman, 2012). Workplace risk factors for substance use disorders in nurses include access to drugs, attitude, and lack of education (Darbro & Malliarakis, 2012). Access to drugs is one of the most cited risk factors for nurses who are chemically impaired (Cares et al., 2015; Dittman, 2008). This is worse in less supervised areas such as the emergency department; emergency room nurses are 3.5 times more likely to abuse drugs compared to nurses in other specialties (Young, 2008). The AANA (2016) estimates that 15% of nurse anesthetists are chemically impaired, making this specialty a high-risk specialty in nursing. Approximately 25% of nurses in drug and alcohol programs indicate that they obtained their drug of choice from work or through forged prescriptions, and nearly half of them reported using alcohol or drugs while at work (Cares et al., 2015).

Coping with Stress in Nursing

People cope with stress using two main approaches: problem focused coping and emotion focused coping (Lazarus & Folkman, 1987; Folkman & Lazarus, 1988). Problem focused coping is concerned with altering and removing the stressor whereas emotion focused coping is concerned with regulating an individual's emotional responses to the stressor (Folkman & Lazarus, 1988). There seems to be conflicting evidence on which coping mechanisms nurses prefer (Deklava et al., 2011; Lim et al., 2010). Although most situations in

nursing are not amenable to immediate change, nurses who use problem focused coping demonstrate better mental health and well-being (Lim et al., 2010). Either way, frequent stress over extended periods regardless of the coping strategy utilized is associated with poor physical and mental health (Chang et al., 2007).

The American Nurses Association (2016) recommends employing several strategies to cope with stress on the job. These include creating a culture of purposeful communication, getting more organized at work to reduce unnecessary stress, and adopting a mentor as an accountability partner to assist with both professional and personal development. Mental Health America (MHA, 2016) suggests more ways to reduce and control stress such as meditating, being realistic, exercising, and sharing feelings. A meditation modality called mindfulness, for example, has been shown to be effective in decreasing stress, depressive symptomology, and anxiety (Murphy & MacKillop, 2014; Witkiewitz et al., 2014). Nurses are encouraged to practice self-care through practices such as yoga, tai chi, massage, music therapy and guided imagery, among others (Blum, 2014).

When nurses cannot cope adequately with these stressors, they may resort to self-medicating (Dittman, 2012). Self-medicating leads to a kind of denial called professional invincibility, a phenomenon in which nurses feel that they can self-medicate without becoming addicted (Dittman, 2008; Dittman, 2012). This phenomenon is usually the beginning of a downward spiral into substance abuse

and chemical dependency (Malliarakis, Smith, & Darbro, 2012). This is especially true when nurses already have prescribed medications for another disorder that have high abuse potential (Malliarakis et al., 2012). For instance, in a study by Tipton (2006), approximately 37% of participants in TPAPN were legally prescribed habit-forming medications to treat other medical and psychiatric disorders. The same is true for physicians as well (PHP, 2016). Because of their unprecedented access to drugs, surgeons and anesthesiologist abuse more substances especially intravenous medications than other specialties (Berge et al., 2009; PHP, 2016).

A study by Bowen, Taylor, Marcus-Aiyeku, and Krause-Parello (2012) examined the relationships among stress, coping, and adaptation in nurses with impaired practice in recovery and monitoring programs. These researchers found that stress was inversely related to social support ($r = -0.43$; $p = .00$). They also found that social support was significantly related to general wellbeing ($r = 0.40$; $p = .00$). Lastly, Bowen et al. (2012) found that stress was negatively related to general wellbeing ($r = -0.72$; $p = .00$). Nurses with impaired practice participating in recovery and monitoring programs for substance abuse should be encouraged to find effective ways to cope with stress to mitigate its negative effects on recovery, including relapse (Bowen et al., 2012).

Nurses and the public need more education on chemical impairment and substance abuse (Darbro & Malliarakis, 2012). Lack of education for both nurses

and the public is associated with negative stereotypes about impaired individuals, contributing to stigma, and consequently the lack of access to mental health services that are essential to recovery (Evans-Locko et al., 2012). Stigmatization, which partly results from lack of education, contributes to chemically impaired individuals' reluctance to disclose the presence of mental illness and addictions (Rusch, Evans-Locko, Henderson, Flack, & Thornicroft, 2011). Lack of education on substance abuse, especially the recognition of signs and symptoms, as well as procedures for reporting colleagues with impaired practice have often been cited as reasons this problem continues to affect many high-risk professionals, including nurses (Ballenger et al., 2011; Cares et al., 2015; Janke et al., 2014; PHP, 2016).

In a study by Cares et al. (2015), almost half of nurses with impaired practice indicated that stigma, denial, and fear of embarrassment deterred them from seeking the help they needed. Furthermore, nurses with impaired practice do not disclose their problems for fear of losing their licenses and other disciplinary action (Dittman, 2012). Negative attitudes toward chemical dependency and substance abuse in the profession have led to denial of this problem and the concomitant underreporting of impaired practice (Horton-Deutsch, McNelis, & Day, 2011).

Understanding Substance Abuse from a Historical Perspective

From a historical perspective, nursing as a profession has had several forces that have shaped the trajectory of how to deal with substance abuse and impaired practice in the profession (Heise, 2003). The focus of substance abuse and addictions in nurses from 1850 to 1982 was on the medicalization and criminalization of this problem (Heise, 2003). In this era, many nurses with addictive disorders were viewed negatively. The late 19th century perspective of habituation followed this era, which was the notion that those individuals who suffered from substance use disorders were merely weak-willed moral failures who were generally harmless (Heise, 2003).

In the early 20th century however, the shift was toward a temperance movement in which all of society's ills were blamed on substance abuse and addictions (Heise, 2003). This consequently led to legislation restricting access of many habit-forming substances, including the prohibition of opium for medicinal use (Heise, 2003). From the late 1960s, more research was conducted that led to the shift into considering substance abuse as a mental health problem that required deliberate efforts to decriminalize and humanize individuals who were suffering at the hands of this mental health problem (Heise, 2003). This is what led to the birth of the disease concept of addiction (Heise, 2003).

As the rest of the public encountered these changes in attitudes toward substance abuse and addiction, nursing as a profession was also experiencing

similar trends. With position statements on this problem by nursing leaders as early as 1900, the problem of impaired practice among nurses has elicited varied responses over the years (Heise, 2003). As knowledge of addictions and substance use disorders has increased, nursing began to implement policies that encouraged studying this phenomenon and interventions to decrease its negative effects among individual nurses (Heise, 2003).

In 1980, the first taskforces on impaired practice among nurses were convened (Heise, 2003). The purpose of these taskforces was to construct position statements on substance abuse in nursing (Heise, 2003). These taskforces further recommended ways to effectively rehabilitate nurses, including how to support them through their recovery (Heise, 2003). These efforts consequently led to the development of peer assistance programs for nurses and by 1983, 25 states had some form of assistance program for their nurses with impaired practice (Heise, 2003). Today, 44 states have alternative programs with the remaining six in the process of transitioning to alternative programs (National Council for State Boards of Nursing [NCSBN], 2013)

Although nursing as a profession has come a long way in dealing with the issue of impaired practice among nurses, much still remains to be done to promote research that helps understand this population even more (Heise, 2003). Others may argue that substance abuse among nurses is no different from substance abuse in the general population; however, nurses are held to a higher standard by

society, and this has compounded the problem of denial of this issue (Heise, 2003). Additionally, nurses stand to lose their professional license when they have substance abuse problems (Heise, 2003). This compounds an already stressful situation and thus motivating factors for recovery may be different from other people who simply want to get better (Darbro & Malliarakis, 2012). Unfortunately, there is still stigma associated with substance abuse among nurses, but the focus for the future should be on improving outcomes for nurses in assistance programs, educating the nursing community on how to recognize substance abuse among colleagues, supporting impaired nurses in recovery, and reducing the impact on patient safety (Heise, 2003; Mallia, 2015).

Patterns and Risk Factors for Substance Abuse

Drug abuse is most common among young adults, with prevalence rates estimated at upwards of 22% in this age group (NIDA, 2015). The high prevalence rates are largely attributed to the rise in marijuana use in this age group (NIDA, 2015). Younger nurses have a higher risk of chemical dependency than older nurses do, and most nurses with impaired practice going through rehabilitation programs for substance abuse admit to having some form of chemical dependency prior to becoming licensed professionals (Merlo, Trejo-Lopez, Conwell, & Rivenbark, 2013). For example, almost 70% of healthcare professionals with chemical dependency problems report abusing drugs prior to entering their profession (Merlo et al., 2013).

In addition, there has been an increase in the prevalence of drug abuse among individuals aged 50 and older (NIDA, 2015). For example, in 2003, approximately one percent of older adults reported using illicit drugs within the past month, compared to about eight percent in 2013 (NIDA, 2015). The increase in the prevalence rates of substance abuse among older adults is theorized to partly arise from the aging of the baby boomers (NIDA, 2016). This is important to nursing because the population of nurses who qualify as older adults is increasing, with the average age of RNs being 45.5 years old (U.S. Census Bureau, 2016).

Signs and Symptoms of Substance Use Disorders

Signs of substance use disorders can be varied and need to be considered in context (Monroe & Kenaga, 2010). Nurses with impaired practice often make excessive sick calls, request assignments in less supervised areas, and are usually tardy (Cares et al., 2015). Other signs of impaired practice include frequent accidents on the job, difficulty meeting deadlines, decreased reliability, decreased dependability, working extra hours, and irrational mood swings (Cares et al., 2015; Dittman, 2008). In addition, nurses with impaired practice may exhibit tendencies toward social isolation, discrepancies between patients' charts and narcotic records, and defensiveness when questioned about medication errors (Cares et al., 2015). This usually stems from the fact that a significant number of

nurses with impaired practice divert medications from patients for their own personal use (Cares et al., 2015).

Physical signs of chemical impairment include irrational behavior, physical roughness (unkempt appearance), smell of alcohol, tremors, verbal abuse of other people, and a change in physical and emotional behaviors (Cares et al., 2015). Individuals suffering from substance use disorders further experience intense and often uncontrollable cravings that lead to an irrational focus on obtaining the drug of choice (Moore, et al., 2014), sometimes to the extent of risking their lives and the safety of their patients (Dittman, 2012). People with substance use disorders are often unable to stop the use of mood-altering and addictive substances despite a resulting failure to perform professional duties (Bettinardi-Angres & Angres, 2010).

The Effects of Substance Use Disorders

Effects on the Individual

Individuals suffering from substance use disorders, including nurses, are more susceptible to comorbid psychiatric disorders such as depression and anxiety (NIDA, 2015; Schellekens, de Jong, Buitellaar, & Verkes, 2015). The presence of comorbid psychiatric disorders makes the treatment of substance use disorders in nurses challenging (Malliarakis et al., 2012). Finding a balance between treating comorbid psychiatric disorders, which often require other habit-forming medications and helping nurses recover from impaired practice can be difficult

(Malliarakis et al., 2012). Nurses with impaired practice consequently score lower on mental and physical health assessments compared to nonusers (Kunyk, 2015). These nurses further experience extreme shame and guilt (Dittman, 2012). This is mostly related to the fact that nursing is considered one of the most trusted professions and associating substance abuse with it is unacceptable as it threatens the public's trust (ANA, 2016; Dittman, 2012).

Women with substance use disorders also have higher hazard ratios for completed suicide (Chapman & Wu, 2014). Women have also had significantly higher prevalence rates of comorbid psychiatric disorders, and this is postulated to contribute to this disparity (Chapman & Wu, 2014). Although men complete suicides at higher rates than women do, women attempt suicide more than men (NIDA, 2015). Another consequence of substance abuse is malnutrition in the substance abuser. Malnutrition is common in people with substance use disorders because their primary concern is to obtain the drug of choice (Neale, Nettleton, Pickering, & Fischer, 2012; Piran & Robinson, 2011). Malnutrition can develop secondary to an irrational focus on obtaining the substance of choice even when substance abusers know their nutritional deficits (Dittman, 2008; Wall-Bassett, Robinson, & Knight, 2014).

Individual nurses who participate in monitoring programs for chemical dependency have to bear the cost going through these programs (Texas Peer Assistance Program for Nurses [TPAPN], 2016). This can be expensive especially

because most insurance companies minimally cover the cost of rehabilitation for substance use disorders (SAMHSA, 2015). Most nurses who are beginning to participate in these peer assistance programs are usually unemployed (Darbro & Malliarakis, 2012). Unemployment leads to a lack of income, and adding the cost of going through the monitoring programs in order to maintain their licenses can be an added stressor (Darbro & Malliarakis, 2012). Because some nurses are not employed at the time of enrollment into the monitoring program (Tipton, 2006), they may not be able to afford the cost of participating in the monitoring programs. This may result in limited access to mental health services, which increases the likelihood of poor outcomes (NIDA, 2016).

Additional challenges such as stigmatization of mental health disorders, including substance use disorders prevent people from getting the help they need (Evans-Locko et al., 2012; Yadav, Arya, Kataria, & Balhara, 2012). Consumers of mental health services therefore are less trusting of the system and are usually discriminated against (Evans-Locko et al., 2012; Yadav et al., 2012). This may further lead individuals with substance use disorders to refrain from engaging in their recovery process (Evans-Locko et al., 2012; Yadav et al., 2012). Consequently, nurses continue to practice while impaired thereby placing patients and themselves at risk (Talbert, 2009).

Effects on Families

Substance abuse can lead to disruption of family dynamics. Intimate partner violence is associated with substance abuse (Feingold, Washburn, Tiberio, & Capaldi, 2015; Ritter, Kivisto, Handsel, & Moore, 2014). Approximately 55% of all incidents of intimate partner violence involve alcohol consumption (Feingold et al., 2015; Ritter et al., 2014). No studies however, were found that investigated this phenomenon specifically among nurses with impaired practice. Intimate partner violence costs society upwards of \$2 billion related to health care costs, lost productivity, and lost wages (NIDA, 2016). Substance abuse further leads to deterioration of relationships and increasing social isolation (Dittman, 2012; Ritter et al., 2014).

Children of substance abusers report more dysfunction and psychosocial distress that predisposes them to poor outcomes such as substance abuse and disruptive behaviors (Herrenkohl, Hong, Klika, Herrenkohl, & Russo, 2013; Moe, Johnson, & Wade, 2008). In a study that provided children of substance abusers enrolled in rehabilitation programs social, environmental, and psychological support, the children reported significantly lower anxiety, depression, aggression, and somatic complaints at posttest (Lewis, Holmes, Watkins, & Mathers, 2015). These children further reported increased family support and attention (Lewis et al., 2015). Substance use Disorders have negative effects on family members of abusers and if these problems are not addressed, they can impede the recovery of

nurses with substance use disorders going through peer assistance programs (Horton-Deutsch et al., 2011).

Effects on Patients

Almost a third of nurses with impaired practice have admitted to repeatedly placing patients at risk for adverse outcomes due to impaired practice (Cares et al., 2015; Talbert, 2009). A significant number of nurses with impaired practice also obtain drugs by diverting medications from patients (Cares, et al., 2015; Dittman 2012). Diverting drugs provides the easiest access for nurses with impaired practice and leads to compromised patient safety, comfort, and recovery (Dittman, 2012). Monroe, Pearson, and Kenaga (2008) concluded that, nurses have an ethical responsibility to protect vulnerable individuals entrusted in their care; therefore, when they divert medications from their patients, disciplinary actions can be undertaken for falsifying medical records, pharmaceutical theft, and patient neglect. These disciplinary actions may range from license suspension to revocation (Darbro, 2011).

Chemical dependency among nurses is consistently linked to decreased quality of care, which may negatively affect patient outcomes (Cares et al., 2015; Dittman, 2008; Talbert, 2009). Although it is difficult to quantify the negative effects of impaired practice on patient safety, they are undeniable because the majority of impaired nurses continue to practice impaired until they are caught and reported, or otherwise choose to self-report later in the course of their

addiction (Cares et al., 2015; Kynyk, 2015). Nurses are also expected to practice the ethical principles of beneficence, non-maleficence, and truthfulness, and when they fail to uphold these principles, they should be held accountable (ANA, 2016).

Effects on Society and Healthcare Organizations

Substance use disorders can have a negative impact on society. Over 10 million Americans report that in the past year, they drove immediately following drug abuse either alcohol or other mind-altering substances (SAMHSA, 2015). Driving under the influence is the leading cause of motor vehicle accidents in the United States (SAMHSA, 2015). It is assumed that if nurses with substance use disorders can risk coming to work impaired, it is possible that they are also driving under the influence. Chemical dependency in the workplace can result in conflict with managers and colleagues (Jordan, Grissom, Alonzo, Dietzen, & Sansland, 2008), which can contribute to turnover. Turnover leads to loss of productivity and the need to replace nurses (Roche, Duffield, Homer, Buchan, & Dimitrelis, 2014). The costs related to replacing nurses are exorbitant, with overall organizational costs running upwards of \$728 million (Brewer, Kovner, Greene, Tukov-Shuser, & Djukic, 2011). Estimates of health care costs related to chemical dependency in the United States run upwards of \$600 billion annually (NIDA, 2016). These costs are related to turnover, health care costs, and use of government assistance programs (NIDA, 2015).

Factors Associated with Substance Use Disorders

Age and Gender

Younger age is associated with adverse outcomes for nurses with impaired practice (Davis, Powers, Vuk, & Kennedy, 2014). Over 50% of nurses in peer assistance programs are under the age of 40 (Tipton, 2006). Nurses who are relatively young at the time of first infraction are also 96% more likely to report other subsequent violations (Davis et al., 2014). Initiation of substance abuse at an early age is further associated with increased severity of substance abuse later in life (Arteaga, Chen, & Reynold, 2010; Stahl, 2013). Additionally, nurses who receive initial disciplinary action later in life are less likely to relapse (Davis et al., 2014).

Though the majority of nurses in chemical dependency monitoring programs are female, male nurses with impaired practice have a 24% higher chance of relapse compared to their female counterparts (Davis et al., 2014). Male nurses are also overrepresented in peer assistance programs when compared to their composition in nursing as a profession (Dittman, 2008; Tipton 2006). For example, male nurses constitute approximately nine percent of the total nursing population; however, they make up anywhere from a quarter to a third of nurses participating in peer assistance programs for substance abuse (Dittman, 2008; Dittman, 2012, Tipton, 2006). Furthermore, approximately 60% of nurses in peer assistance programs are new nurses with less than 10 years of experience (Tipton,

2006). This may suggest that male nurses who are young and new to the profession are not only at increased risk for chemical dependency but also relapse once they are admitted into peer assistance programs for substance abuse.

Prior Disciplinary Actions

Prior criminal history is a significant predictor of relapse among nurses with impaired practice (Zhong et al., 2009). Individuals with prior criminal history have a 30% higher rate of relapse in chemical dependency rehabilitation compared to those without prior convictions (Zhong et al., 2009). Furthermore, changing employers during probation and having previous disciplinary actions by the Board of Nursing increases the risk of relapse among nurses with impaired practice (Waneka, Spetz, & Keane, 2011).

Nurses with impaired practice who receive pre-licensure education in the United States are also at significantly higher risk of relapse compared to those who did not receive their pre-licensure education in the United States (Waneka et al., 2011). More research is needed to understand what factors contribute to U.S trained nurses being more susceptible to substance abuse and addiction compared to foreign-trained nurses. Except for prior criminal convictions, not many of these factors can be controlled. Davis et al. (2014) suggested that because of this, Boards of Nursing should consider not issuing licenses to people with prior criminal convictions. This conclusion, however, is not free of controversy. The

feasibility and the implications of excluding a certain population of people from obtaining nursing licenses can be considered as discriminatory.

Drug of Choice

Although alcohol is the most abused substance in the general population (SAMHSA, 2016), narcotics are the drug of choice for many nurses with impaired practice (Bettinardi-Angres, Pickett, & Patrick, 2012; Tipton, 2006). Providers in anesthesia specialties such as anesthesiologist and nurse anesthetists tend to abuse intravenous opioids more frequently compared to other specialty areas (Berge et al., 2009). The choice of which drugs nurses with impaired practice abuse more frequently may be related to the access nurses have to narcotics in the work place (Cares et al., 2015; Darbro, 2011; Dittman, 2012). Some nurses however, abuse multiple drugs at once (Davis et al., 2014; SAHMSA, 2016). Nurses who abuse more than one substance have six times higher risk of relapse than if they used alcohol alone (Davis et al., 2014).

Cravings and Negative Affect in Chemical Dependency

Cravings for drugs and alcohol are significant predictors of relapse (Moore et al., 2014). Individuals who report sudden increase in cravings are approximately 14 times more likely to relapse than individuals who have a gradual increase (Moore et al., 2014). This is significantly accurate in the first two weeks of follow-up after rehabilitation (Berlin, Singleton, & Heishman, 2013). Nurses in monitoring programs should therefore, be screened for cravings on a

regular basis. This may give indications on when relapse prevention interventions should be implemented or if a referral is needed in order to thwart a possible relapse episode.

Negative affect, which includes a person's negative emotions and poor self-concept, is also a significant predictor of relapse, increasing chances by approximately 13%, but not when controlling for cravings (Moore et al., 2014). This may indicate that sudden increase in cravings may have a mediating effect on increasing the likelihood of relapse in substance abusing individuals presenting with negative affect. Assessing for cravings at follow-up is essential in mitigating some of the negative effects of unaddressed cravings (Berlin et al., 2013). Substance abusing individuals can further benefit from medication-assisted treatment that decreases cravings, thereby reducing the chances of relapse (Braquehais et al., 2015; Lee, Kresina, Campopiano, Lubran, & Clark, 2015). Although this study does not address cravings, it is still important to note that cravings are significant predictors of relapse in individuals with SUD.

The Role of Comorbid Psychiatric Disorders

Psychiatric comorbidities not only increase risk of substance abuse but they also increase the risk of relapse in individuals suffering from substance use disorders (NIDA, 2015; Schellekens et al., 2015; Tipton, 2006). This is of concern because in a study of medical-surgical nurses working in a hospital 35% of medical-surgical nurses showed significant depressive symptomology (Welsh,

2010) and about 18% of the nursing workforce exhibited symptoms of major depressive disorder (Letvak, Ruhm, & Gupta, 2012). These statistics are concerning because the risk of relapse doubles in people with comorbid psychiatric disorders such as depression and anxiety (Schellekens, et al., 2015). Additionally, about 50% of nurses in TPAPN reported the presence of a psychiatric comorbidity (Tipton, 2006). Other psychiatric comorbidities other than mood disorders also affect relapse among individuals with substance use disorders. For example, antisocial personality disorder, another comorbid psychiatric disorder was a significant predictor of relapse two years following treatment of substance abuse, with a mean difference score of 9.88 between the relapse and non-relapse groups (Angres, Bologeorges, & Chou, 2013).

Childhood Factors Affecting Chemical Dependency

Substance abuse disorders have been associated with childhood traumatic experiences, and about 30% of mental health disorders diagnosed in adulthood can be linked to these childhood experiences (Green et al., 2010). Substance abusers with a history of child abuse initiate substance abuse at a younger age, have greater functional impairments, and have higher odds of dependency (Banducci, Hoffman, Lejuez, & Koenen, 2014; Nomura, Hurd, & Pilowsky, 2012). Other childhood environmental risk factors such as deviant peer affiliations, school mobility in adolescence, and parental substance abuse can

collectively predict adult substance abuse about 80% of the time (Arteaga et al., 2010).

Giordano et al. (2015) found that family attachment and respect for authority are protective factors against relapse and chemical dependency (OR = .97). Green et al. (2010) concluded that growing up in an environment that promotes alcohol abuse, whether through parents, siblings, other family members, or friends, increases the likelihood of addiction in individuals. The interplay of nature and nurture is well documented, and the consensus is that having both risk factors significantly increases the chances of addiction (Darbro & Malliarakis, 2012; Green et al., 2010).

Spirituality and its Effects of Chemical Dependency

Spirituality and religiosity are two important factors related to chemical dependency. The use of these terminologies can be a matter of preference for researchers; spirituality is an all-encompassing term, but religiosity is mostly associated with Judeo-Christian beliefs (Zwingmann, Klein, & Bussing, 2011). Individuals who score low on religiosity have an 85% higher rate of substance abuse (Allen & Lo, 2010). Spirituality can provide a sense of meaning to life, ability to cope with stressful situations, intrapersonal connectedness, and integration (Monod et al, 2011), all of which are important to successful recovery from chemical dependency. Individuals who score high on spirituality are four times less likely to be depressed compared to those who score low (Diaz, Horton,

McIlveen, Weiner, & Williams, 2011; Giordano et al., 2015). This is of particular relevance because depression is a predictor of relapse in chemical dependency treatment (Schellekens et al., 2015).

Self-efficacy

Self-efficacy is the perception of one's own ability to achieve a set goal (Bandura, 1977; McKiernan, Cloud, Patterson, Golder, & Besel, 2011). According to Bandura (1986), self-efficacy is a better predictor of subsequent behavior than past performance alone, and it can be taught. Self-efficacy is further associated with decreased relapse in smoking cessation ($r = 0.6$) (Alessi & Petry, 2014; McKiernan et al., 2011). Self-efficacy mediates treatment efficacy and increases abstinence, accounting for approximately 83% of the variance in treatment outcomes (Hendricks, Delucchi, & Hall, 2010; LaChance, Ewing, Bryan, & Hutchison, 2009; McCarthy et al., 2010). Self-efficacy also increases over time in treatment programs ($F = 5.70, p = 0.02$), especially when incentivized (Alessi & Petry, 2014), and is a consistent predictor of outcomes in substance abuse treatment (Adamson, Sellman, & Frampton, 2009). Of note, self-efficacy is also significantly associated with decreased depressive symptomology ($r = 0.43$; Chang, Wang, Li, & Liu, 2011; Greenfield, Venner, Kelly, Slaymaker, & Bryan, 2012). Having both low self-efficacy and depression can intensify subjective stress (Scott & Dearing, 2012), putting substance-abusing individuals at greater risk for relapse. Self-efficacy also significantly predicts anxiety, with

every one-point increase being associated with a 0.2 decrease in anxiety (May, Hunter, Ferrari, Noel, & Jason, 2015).

Treatment for Substance Use Disorders

Substance abuse and addictive disorders are treatable, but early identification and a multifaceted long-term approach are foundational (NIDA, 2016). Treatment options for substance abuse include pharmacotherapies (Braquehais et al., 2015; Lee et al., 2015; Wilkes, 2008), motivational interviewing (Chang, Compton, Almeter, & Fox, 2015; Mujika et al., 2014; Rohsenow et al., 2015), and mindfulness meditation (Murphy & MacKillop, 2014; Witkiewitz et al., 2014). Interpersonal psychotherapy (Barry & Wheeler, 2014; Frank, Ritchey, & Levenson, 2014; Gamble et al., 2013), cognitive behavioral therapy (Gouzoulis-Mayfrank et al., 2015; Hunter, Paddock, Zhou, Watkins, & Hepner, 2013; Zhuang, An, & Zhao, 2013), and family therapy (Dutcher et al., 2009; Roozen, de Waart, & van der Kroft, 2010) have also been shown to be effective in treating substance use disorders.

Even though many treatment programs are available to individuals suffering from substance use disorders, many of them still do not pursue treatment (Cares et al., 2015; SAMHSA, 2015). In spite of the prevalence of substance use disorders in our society today, of the 22.7 million people who need specialty treatments, only 2.5 million receive it (NIDA, 2015), and about 1.5 million young

adults who recognize that they need substance abuse treatment do not pursue any treatment options (SAMHSA, 2015).

Assistance Programs Specific to Nursing

Nurses with impaired practice can participate in two types of monitoring programs, either disciplinary programs or alternative-to-disciplinary programs, otherwise known as alternative programs (Monroe et al., 2008). It is estimated that nationally over 17, 000 nurses who are chemically impaired are enrolled in either a disciplinary or alternative assistance program (Monroe, Kenaga, Carter, Dietrich, & Cowan, 2013). Texas is one of the alternative-to-discipline states (TPAPN, 2016). Although there has been a push by the American Nurses Association for all states to adopt alternative programs, currently, six state boards of nursing are still using the disciplinary programs (NCSBN, 2013).

Disciplinary programs are monitoring programs that concentrate on removing impaired nurses from practice and whose main concern is protecting the public (Darbro, 2011; Monroe et al., 2008). Federal law requires nurses in disciplinary programs be reported to publicly available databanks such as the Healthcare Integrity and Protection Data Bank (Bettinardi-Angres et al., 2012). Nurses participating in these programs therefore receive some form of disciplinary action on their licenses ranging from probation to revocation of licenses (Bettinardi-Angres et al., 2012; Darbro, 2011).

Alternative programs are based on the philosophy that protecting the public from nurses with impaired practice is as important as making sure that these nurses are not simply left to their vices; nurses can be rehabilitated and reincorporated into the workforce (Darbro, 2011; Monroe et al., 2008).

Alternative programs include reporting nurses with impaired practice to the state's peer assistance program for nurses but at the same time allowing them to maintain their licenses, provided they comply with the terms of their monitoring programs (Bettinardi-Angres et al., 2012; Monroe et al., 2008). Nurses with impaired practice participating in these monitoring programs are responsible for the cost of treatment (TPAPN, 2016). These costs are usually related to the random urine drug screens, going to required meetings, and personal upkeep (TPAPN, 2016). This is especially noteworthy because most newly admitted nurses with impaired practice might not be employed (TPAPN, 2016).

Terms of compliance may vary from individual to individual depending on severity of impairment, available resources, and state requirements (TPAPN, 2016). Terms of participation in monitoring programs may include random urine drug screens, participation in a 12-step program such as Alcoholics Anonymous, restrictions on nursing license including what area of practice and shift the nurse with impaired practice is allowed to work (Bettinardi-Angres et al., 2012; Monroe et al., 2008). Nurses with impaired practice who are compliant with the terms of their contracts may be allowed to continue working and maintain their licenses

with fewer restrictions while participating in the monitoring programs (Fogger & McGuinness, 2009; Kunyk, 2015). This may enhance their financial status, consequently having a positive effect on their recovery (Fogger & McGuinness, 2009; Kunyk, 2015).

Measures of success in monitoring programs specific to nurses are related to the benefits of the alternative programs. Benefits of alternative programs include early admission into treatment, case management, and aftercare (Clark & Farnsworth, 2006; Monroe et al., 2008; TPAPN, 2016). For example, alternative programs admit three times as many nurses who are chemically impaired compared to disciplinary programs (Monroe et al., 2013). This protects the public from impaired practice while at the same time offering nurses with impaired practice opportunities to get treatment for their substance use disorder. The possibility of maintaining one's license while participating in alternative programs provides an incentive for nurses with impaired practice who would otherwise not seek help for fear of losing their licenses, as is the case for disciplinary programs (Monroe et al., 2013).

Alternative programs additionally have higher retention rates (68%) compared to 37% in disciplinary programs (Roche, 2007). This has been associated with greater support that nurses with impaired practice receive in alternative programs, especially in the form of case management (TPAPN, 2016). Furthermore, nurses with impaired practice participating in alternative monitoring

programs are paired with an advocate who can help them navigate their recovery process (TPAPN, 2016). Alternative programs also offer support groups located in different parts of the state. These support groups are led by peer volunteers and provide a platform for nurses with impaired practice going through the program to interact with others in similar situations (TPAPN, 2016). Longer time spent in alternative monitoring alternative programs by impaired nurses is also associated with higher chances of recovery (Clark & Farnsworth, 2006; Darbro, 2011).

In a qualitative study aimed at describing recovering nurses' experiences, nurses with impaired practice recognized that the stipulations of their contracts, such as attending 12-step programs and providing random urine samples, fostered a sense of accountability that would otherwise not be present (Horton-Deutsch et al., 2011). These nurses also explained that accountability provided motivation for sobriety. They also recognized that if these stipulations were not present in their contracts to participate in the monitoring programs, they would be less likely to maintain sobriety. The recovering nurses also identified the need for individualized treatment programs that include support for psychosocial problems such as depression and anger as means to improve the chances for recovery (Horton-Deutsch et al., 2011). Because these programs are not the typical rehabilitation program, and their primary concern is monitoring impaired nurses as they strive to get rehabilitated and reincorporated into the workforce, many

nurses who require additional support such as counseling and therapy have to seek out these treatment options by themselves (Horton-Deutsch et al., 2011).

The problem for years regarding alternative programs was that there was no consistency across states on the stipulation of requirements, specifically on the length of rehabilitation before nurses can be reincorporated into the workforce. The NCSBN responded to this need, appointed a nine-member committee, and tasked it with constructing model guidelines for alternative and disciplinary programs (Darbro, 2011). The purpose of the model guidelines was to promote consistency among states in the treatment of nurses with impaired practice (Darbro, 2011). The recommendations offered by the committee have since been published, and states are now in various phases of implementation (Darbro, 2011). There is no stated deadline for completing the implementation of these guidelines (Darbro, 2011), and no progress report was found in the literature concerning the implementation of these recommendations.

Peer assistance programs for nurses can be generalized or specific to nursing specialty. Most states with peer assistance programs provide monitoring to all nurses with impaired practice regardless of specialty area of practice. Massachusetts and Texas are examples of such states. The Massachusetts Nurses Association's peer assistance program for nurses is the oldest peer assistance program in the United States (Mallia, 2015). The Massachusetts peer assistance program for nurses is the only peer assistance program in the United States that

operates completely independent of the State's Board of Nursing (Mallia, 2015). They believe that being completely independent of the state's Board of Nursing encourages nurses with impaired practice to seek assistance for their problem without fear of being disciplined and losing their licenses (Mallia, 2015). This in turn reduces the likelihood of negative patient outcomes, but also promotes access to care in a timely manner (Mallia, 2015).

An example of a peer assistance program that is specific to an area of practice is the AANA's peer assistance network for nurse anesthetists (Stone, Quinlan, Rice, & Wright, 2016). The AANA's Peer Assistance Advisory Council was created to address specific issues facing nurse anesthetists with impaired practice, especially that as a specialty, they have the highest prevalence rates of substance abuse in nurses (AANA, 2016). The peer assistance network focuses on advocacy and support by providing education, championing outreaches, conducting research, and disseminating online resources specific to nurse anesthetists (Stone et al., 2016). Another hallmark of the peer assistance network is providing State Peer Advisor (SPA) volunteers who are trained professionals assigned with the task of helping nurse anesthetists with impaired practice navigate their recovery process (Stone et al., 2016).

Relapse in Chemical Dependency and Addiction Treatment

Relapse is the unauthorized use of any mind-altering substance, including alcohol and other medications, prescribed or not, after an individual has entered

treatment for substance abuse (Darbro, 2011). According to SAMHSA (2016), annually 93% to 97% of people who try to quit abusing drugs fail. Nurses with impaired practice have a 40% five-year relapse rate (Zhong et al., 2009). Risk of relapse is highest in the first year of recovery (Clark & Farnsworth, 2006) because most nurses find themselves needing to go back to work due to the financial and economic burden of going through alternative programs (Fogger & McGuinness, 2009).

Relapse rates among nurses with impaired practice can be decreased further. We know that this is possible because physicians have shown better outcomes when going through chemical dependency monitoring programs (Carinci & Christo, 2009). Physicians have a 20% five-year recidivism rates (Carinci & Christo, 2009) as opposed to the 40% for nurses (Zhong et al., 2009). In addition, physicians return to work sooner than nurses do and have fewer work-related sanctions on their licenses upon return to work (Shaw, McGovern, Angres, & Rawal, 2004). When considering psychological health and relational functioning, physicians in monitoring programs also report less psychosocial dysfunction compared to nurses (Shaw et al., 2004).

All factors that promote compliance in substance abuse treatment programs, such as random drug screens, restrictions placed on licenses, and attendance at 12-step programs, are considered protective factors (Darbro & Malliarakis, 2012). Nurses with impaired practice understand that violation of

these factors can be detrimental, resulting in loss of licensure as well as problems with the criminal justice system (Darbro & Malliarakis, 2012). Some experts have recommended that actively participating in the actual monitoring programs such as TPAPN for extended periods improves chances of recovery because of the continued support and monitoring available in these programs (Clark & Farnsworth, 2006; Darbro, 2011).

In a study by Tipton (2006) that examined predictors of relapse among nurses with impaired practice in TPAPN, several factors were identified. Participants in inpatient treatments for substance abuse were at four times higher risk of relapse compared to those in outpatient treatment. Those participants who did not comply with self-help programs were at significantly higher risk of relapse than those who complied. Additionally, being assigned an advocate within the first two months of admission into the peer assistance program significantly reduces the odds of relapse. Tipton (2006) however found no significant difference in the odds for relapse between those participants who live in rural versus urban settings.

Among the studies that have been conducted to test the efficacy of clinical interventions to reduce substance abuse and relapse, the results have been mixed, making confident recommendation of any interventions difficult (Kadden & Litt, 2011). Although there is a plethora of information about nurses with impaired practice, few studies have aimed at comprehensively describing this population,

including their recent prevalence, demographic characteristics, and interventions specific to nurses in order to reduce relapse rates. In Texas, no studies were found that addressed the aforementioned concerns.

Conclusion

When approximately 3.1 million nurses in the United States are affected by chemical dependency (Monroe & Pearson, 2009) and relapse rates as high as 40% (Zhong et al, 2009), gaining a better understanding of who nurses with impaired practice in Texas are is imperative. Chemical dependency affects the individual, family, patients, and society as a whole. Annual health care costs related to substance abuse in the United States run upwards of \$600 billion (NIDA, 2016). Factors that have been associated with chemical dependency include genetic and physiologic changes (Rando et al., 2011), psychiatric comorbidities (Schellekens et al., 2015), spiritual factors (Giordano et al., 2015), and self-efficacy (Alessi & Petry, 2014; May et al., 2015), and all are significant predictors of relapse as well. The typical nurse with impaired practice is female, young, and new to the profession (Darbro & Malliarakis, 2012). Male nurses however, have higher rates of relapse and are overrepresented in chemical dependency treatment compared to the general nursing population (Davis et al., 2014; Dittman, 2008). Extrinsic factors associated with chemical dependency include family history (Banducci et al., 2014), childhood traumatic experiences (Arteaga et al., 2010), and work related factors, such as access to drugs, stress,

and lack of education on chemical dependency (Cares et al., 2015). Treatment options such as pharmacotherapy, behavioral therapy, and psychotherapy are available to substance abusers, however they are seldom utilized (SAHMSA, 2016). Specifically for nurses, alternative programs have more benefits compared to disciplinary programs (Darbro, 2011). Even with all this information, we do not really know the characteristics of nurses who are chemically impaired in Texas, and further exploration into this is warranted.

Chapter 3

Methods and Procedures

This chapter includes a discussion on the research methodology used in this study and the rationale for choosing the design. The chapter also includes a discussion of the sample to be used and how this sample size was determined. A description of the database containing the variables analyzed is provided. The chapter further includes a discussion on the definitions of the variables that were analyzed. Lastly, data analysis procedures, ethical considerations, and delimitations of the study are discussed.

Research Design

This study was a retrospective analysis of secondary data of nurses who are chemically impaired collected by TPAPN between January 2010 and October 2016. It included both associational and comparative designs. Associational design was used to examine the strengths of relationships among variables, as well as to predict the behavior of one variable based on how another variable is acting (Grove, Burns, & Gray, 2013). A comparative design was also used to answer research questions that examined differences between groups but lacked an active independent variable (Gliner, Morgan, & Leech, 2009). In this study, there was no randomization to groups (Grove, et al., 2013) as this was a secondary analysis of already collected data. When data are analyzed from secondary sources, randomization of research subject to groups and manipulation

of variables is not possible, hence necessitating the use of a comparative design (Grove & CIPHER, 2016). Because of the research designs utilized in this study, no inferences to cause and effect can be made (Gliner, et al., 2009; Grove & CIPHER, 2016).

Sample

The inclusion criteria for this study were all cases in the TPAPN database for which the research variables discussed were present or could be created from the information available. This included both RNs and LVNs. All cases that had the identified research variables were included in the sample that was analyzed. The information in the databases was only used for research purposes. All case entries between 2010 and the date when the database was shared with the researcher that met the inclusion criteria were included in the data analysis. The researcher received prior permission from TPAPN to analyze these data after receiving Institutional Review Board (IRB) review from the University of Texas at Arlington (Appendix A). The data that were analyzed did not contain any identifying information that could potentially result in breach of confidentiality. All personal identifiers were removed from the dataset that was shared with the researcher.

Sample Size: Power Analysis

The corresponding effect size for the Pearson's Product Moment Correlation is the r , the Cohen's d for the t -test for independent samples, and the

Cohen's f for Analysis of Variance (Grove and CIPHER, 2016). A small effect size of 0.1 was used to conduct a-priori power analysis. A small effect size was used because no similar previous studies were found that reported a larger effect size. Additionally, most nursing interventions generally have small effect sizes (Grove et al., 2013). The power for this study was set at 0.8 and the alpha level was set at 0.05. Using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) to estimate a-priori sample size with the following parameters: estimated small effect sizes of $d = 0.1$, $r = 0.1$, alpha = 0.05, and power of 0.8, the required sample size of 614 and 616 for the t-test and Pearson's correlation respectively were derived. To satisfy the requirements of both statistical procedures, the larger sample size requirement of 616 was used.

For this study, a 95% confidence interval was used. At the time the database was shared, there were 1952 participants; however, some of these were duplicates. After data cleaning procedures were completed, the final sample size was 1553. This far exceeded a-priori sample size requirements. This study therefore has sufficient power to either correctly reject the null hypotheses or to accept the null hypotheses.

Description of Database

In recent years, Texas Peer Assistance Program for Nurses (TPAPN) recognized that there was little information known about nurses with impaired practice in Texas. Although TPAPN had been monitoring nurses with impaired

practice in the program for many years, there was a lack of measurable and objective information gathered about who nurses with impaired practice were and how they were represented. To this end, in 2013 TPAPN started building a large database containing all pertinent descriptive information related to demographics, diagnosis, and treatment efficacy of the program. Information collected for this database included age, gender, drug of choice, any additional drugs, referral reason, referral type, license type, area of practice, substance use diagnosis, participation type, relapses, renewals, and discharges (TPAPN, 2016).

This study proposal was submitted to the University of Texas at Arlington Institutional Review Board (UTA IRB). Upon review, it was determined that because this study was only dealing with de-identified data and did not need a full review, the researcher received permission from TPAPN to use the database. The researcher was required to present a proposal for the research to be conducted and a letter from the UTA IRB stating no review was necessary. This was a written proposal and had to be approved by the Program Director and all concerned parties (Appendix C). The Texas Peer Assistance Program for Nurses was responsible for de-identification process of the database and all related procedures. The de-identified database was shared with the researcher through an encrypted email. This database was stored on encrypted and password protected computers in the Center for Research and Scholarship at the University of Texas at Arlington. All data cleaning, managing, and statistical analyses were performed

using these computers in the College of Nursing and Health Innovation (CONHI) Center for Research and Scholarship at UTA.

The information in the TPAPN database was collected from participants upon admission into the program and was updated as needed to reflect the status of nurses in the program. The information contained in this database was analyzed to better understand the population of nurses in Texas with impaired practice. The database that was analyzed contained information collected from 2013 up to the date when the database was shared with the researcher. However, the earliest participation date was January 2010. Currently, 348 total participants in TPAPN are participating strictly because of referrals related to substance use disorders. It is important to note that TPAPN, in addition to nurses with impaired practice monitors other nurses who are referred to the program for mental health problems. The data obtained from TPAPN included both Licensed Vocational Nurses (LVNs) and Registered Nurses (RNs).

Since TPAPN also provides monitoring for nurses with mental health problems alone, this study only focused on those nurses with substance abuse problems. All data entries from 2010 to present were included in this study. At the time the researcher received the database, it contained 1952 participants. However, some of these were duplicate entries. After identifying and removing 178 duplicate entries, 1743 participants remained. Of these, 190 were strictly for

mental health disorders, and they were excluded from the analysis. This brought the final sample size for this study to 1553.

Research Variables

The research variables that were analyzed in this study included those variables that were available in the TPAPN database. These variables were age, gender, drug of choice, any additional drugs, referral reason, referral type, and license type, area of practice, substance use diagnosis, participation type, relapses, renewals, and discharges from the program. The researcher also extrapolated the information from the database to create new variables such as length in program, number of days abstinent, time to enroll, number of relapses, and all nominal variables that had to be dummy coded in order to perform the survival analysis. These variables are displayed in Table 3.1.

For the purposes of this study, age was defined as the chronological age of the substance-abusing nurse at the time of participation in the program. It was reported to the nearest whole number. A new variable, age category, was created. It was a categorical variable divided into 10-year intervals. The database did not contain any information on race or ethnicity. Therefore race/ethnicity was not available for analysis. Gender was represented by male and female. Gender however has the most number of missing values in the database (n = 288). Drug of choice was defined as the primary substance(s) that the nurse with impaired

practice abuses. A variable called additional drugs was created for nurses who abused more than one substance.

In the database, every nurse with impaired practice who is admitted to the program is assigned a referral type. This specifies the main reason for which the nurse is participating in the program. This may include categories such as substance use disorders or dual diagnosis. A new variable called psychiatric comorbidity was created from those individuals with a referral type called dual, mental illness with urine drug screen, and mental health support program with urine drug screen.

The length in program was defined as how long a nurse with impaired practice was active in the program, from the date of admission to the date of discharge. For those participants who were still actively participating in the program at the time the database was shared with the researcher, the date that the database was shared was used as placeholder to calculate length in program. Number of days abstinent was created by subtracting the admission date from the date of discharge for those participants who had relapsed as reason for discharge. Nurses who were also discharged for non-adherence and declining renewal were added to the group that was considered to have relapsed. A combination of those groups was used to create a variable called relapse, which was dichotomous.

The database also specified how many times a person relapsed under reason for discharge. This information was used to create a new variable called

number of relapses. Those who were specified as first relapse were assigned the number one; those who were specified as second relapse were assigned the number two; those who were not specified as such were assigned the number zero. It is important to note however that 311 participants had start dates later than their discharge dates. These were considered to have relapsed and came back to the program as renewal candidates if the reason they were discharged from the program was that they self-withdrew without a relapse. Another new variable was created called time to enroll. This was extrapolated from the difference between the referral date and the start date provided in the database.

Referral reason was defined as the behavior for which the nurse was referred to the peer assistance program. This included categories such as diversion, impairment at work, forgery, etc. A new variable called referral broad category was then created using information from this variable. This was because some categories were mixed together and delineation of precise reason was difficult. Broader, fewer categories were created to assist with analysis of data. A variable called primary drug of choice was present, and it was defined as the primary drug which the impaired nurse abused. These were nonetheless many, and thus were categorized under drug classes such as opioids, benzodiazepines, and alcohol, among others. The name of the new variable was primary drug of choice class.

License type was defined as the type of license held by the nurse. This ranged from LVN to APRN. In the database, there was a distinction between CRNAs and APRNs. Area of practice included the different practice settings that nurses with impaired practice primarily practice in, such as emergency departments, critical care, medical-surgical care, women's services, and other delineations such as long-term care facility and outpatient services. A new variable was created called broad area of practice. This variable grouped similar practice areas into broad categories. Employment status was categorized as either employed or unemployed. Successful completion was defined as achieving remission, satisfying the terms of the contract for monitoring, and being discharged from the program. Successful completion was a dichotomous variable. Number of successful completions was the total number of people who successfully completed the program. No data was available on marital status or specific psychiatric comorbidity.

Nurses with impaired practice are termed "renewal" candidates when they are readmitted into the assistance program after having a relapse episode. They are also termed "renewal" candidate if after withdrawing from the program they decide to come back and re-enroll. Nurses who are discharged from the program are also assigned a discharge reason. These may range anywhere from successful completion of the program to withdrawal from the program.

Table 3.1: Study Variables

Name of Variable	Level of Measurement	Variable Coding
Age	Interval/Ratio	Continuous variable
Age Category	Ordinal	1 = 20-29 2 = 30-39 3 = 40-49 4 = 50-59 5 = >59
Gender	Nominal	0 = Male 1 = Female
Participant Type	Nominal	1= SUD 2 = DUAL 3 = EEP 4 = Interim Monitoring 5 = MI w/ UDS 6 = MHSP w/ UDS
Psychiatric Comorbidities	Nominal	0 = No 1 = Yes
Drug of Choice	Nominal	1 = Alcohol 2 = Opioids 3 = Cocaine 4 = Amphetamines 5 = Cannabinoids 6 = Heroin 7 = Benzodiazepines 8 = Hypnotics 9 = Anesthetics 10 = General Analgesics 11 = Methadone 12 = Stimulants 13 = Other
Additional Drugs	Nominal	0= No 1 = Yes
Time to Enroll	Interval/Ratio	Continuous variable
Number of Months Abstinent	Interval/Ratio	Continuous variable
Length in program (months)	Interval/Ratio	Continuous variable

Table 3.1—Continued

License type	Nominal	1 = APRN 2 = CRNA 3 = RN 4 = LVN 5 = RN/LVN
Employment Status	Nominal	0= No 1 = Yes
Self-Report	Nominal	0= No 1 = Yes
Number of Relapses	Interval/Ratio	0= 0 1 = 1 2 = 2
Relapse (yes/no)	Nominal	0= No 1 = Yes
Renewal (yes/no)	Nominal	0= No 1 = Yes
Referral Broad Reason	Nominal	1 = Arrest/Criminal History 2 = Diversion 3 = Impaired at work 4 = SUD 5 = mental health disorder primary 6 = forgery 7 = positive UDS 8 = alcohol 9 = Other

Data Collection and Cleaning Procedures

The dataset containing variables that were analyzed was obtained from TPAPN. The researcher personally verified all data points in the database that was shared. The researcher also conducted data cleaning procedures. This process involved making sure that all desired variables were present and they fit within the specified categories. If any data points were found to be out of order or not

appropriate for a particular variable, the researcher excluded them from the analysis. The database was also checked for duplicates and all duplicate data points were excluded from analysis. The database was further checked for outliers and missing data.

The researcher maintained a codebook for the duration of the study in which she kept all pertinent information for the study such as new variables that were created to aid with data analysis, the already present variables in the data set and their respective operational definitions. All manipulations of the data points that were done to aid with data analysis such as recoding of variables and creation of dummy variables were also entered in the codebook. An example of variables that were created included length of time in program, which was derived from admission date into the program and the date of discharge or date of data analysis. Another variable that was created was number of months abstinent. This was derived by calculating the number of months either from admission date to relapse date, or from renewal date to another relapse date. The dataset was stored on a password protected and encrypted computer in the CRS at the University of Texas at Arlington College of Nursing and Health Innovation.

Ethical Considerations and Human Subjects Protection

This study was submitted for reviewed to the Institutional Review Board at the University of Texas Arlington. Upon Institutional Review Board review, it was determined that the study did not need to go through a full IRB review. This

was because only de-identified information was being shared with the researcher and there was no need to obtain informed consent since participants give consent for their de-identified information to be used for research purposes upon admission into the program (TPAPN Handbook, 2016). Since this study was a retrospective secondary analysis of de-identified data, there was no risk of breach of confidentiality, or the information being linked to a particular nurse with impaired practice. The data received from TPAPN did not include names, places of employment, addresses, ethnicity, or marital status.

The researcher worked closely with personnel at TPAPN to ensure that the information that was shared in the database was de-identified to minimize the risk of breach of confidentiality. In fact, the researcher did not have access to the database until all de-identifying procedures were complete. Informed consent was further waived because trying to obtain informed consent from all nurses who were actively participating, or might have participated in the peer assistance program between 2010 and 2016 would have increase the chances of breach of confidentiality and anonymity.

Additionally, analyzing these data was done for the sole purpose of research and with the intent to inform practice and contribute to the body of knowledge on nurses with impaired practice going through assistance programs in Texas. Lastly, there were no physical or emotional risks associated with this study since there was no physical contact with any nurses with impaired practice. The

researchers also made sure that her Human Subjects training certification was up to date for duration of the study.

Data Analysis

The data received from TPAPN was in Microsoft Excel. The data were then entered into the statistical software called SPSS version 22 (University of Chicago, IL), which was also used for all statistical analyses. The data were sorted and cleaned in preparation for data analysis as stated above. All cases were evaluated for missing data. The researcher made distinction between data that were missing at random and those that were not missing at random. For example, gender has the most number of missing data points, but they were missing at random. It was determined that data that were missing at random would likely not affect the validity of the statistical analyses. For example, if data points were completely missing for a particular variable for all cases, that variable was simply excluded from the analysis. This distinction was particularly imperative because this was a secondary data analysis and only the de-identified data that was shared with the researcher could be analyzed. Depending on what the missing data were that were not missing at random, the researcher made the following decisions: excluding the variables from analysis, used replacement values and treated them as if they were observed, or used statistical models and analyses that accommodate for missing data. The researcher also made sure that all

assumptions about missing data were clearly articulated and reported in the discussion section of the study.

The researcher also made sure that all variables fell within the defined limits. For example, the researcher checked for outliers and evaluated the validity of the entries. It was not expected for instance that someone's age would be 500. The researcher double-checked all entries into the statistical software. Prior to running any associational or differential statistics, frequencies were run on all variables to make sure they were within defined limits. Those variables that did not fall within defined limits were further examined to make sure that the problem was not going to affect the validity of the analyses. Continuous variables were analyzed for normality using the Shapiro-Wilk test of normality, which aided in the determination of appropriate statistical analyses to conduct. All demographic variables were analyzed using descriptive statistics such as mean, mode, median, percentage, range, and standard deviation (Grove & Ciper, 2016).

The first research question, demographics, was answered by analyzing the data using measures of central tendency such as means, medians, modes, percentages, and frequencies, and measures of dispersion such as range, variance, and standard deviation. Associational research questions were answered using Pearson's chi square and the non-parametric equivalent of the Pearson's product moment correlation, the Spearman Rho (Grove & Ciper, 2016). The Pearson's chi square is computed when examining relations between dichotomous or

nominal level variables, which only have a few non-ordered categories (Grove & CIPHER, 2016). See Table 3.2 for a comprehensive list of analyses by question.

The Spearman Rho correlation is computed to ascertain the strength and direction of the linear relationship between two continuous variables whose distribution do not approximate normality (Grove & CIPHER, 2016). Assumptions of the Pearson's correlation are that both the independent and dependent variable are normally distributed, and that there is equal variance for each value of the independent and dependent variables (Grove & CIPHER, 2016). The Spearman Rho, a non-parametric equivalent of the Pearson's product moment correlation was utilized because the assumptions of the Pearson's product moment correlation were violated. The Shapiro-Wilk test of normality was significant, which meant that the distribution of the dataset did not approximate normality.

To answer comparative research questions, the Mann Whitney U was computed. The Mann Whitney U is the nonparametric equivalent of the *t*-test for independent samples and it is utilized when the data computed in the analysis were obtained from the different subjects, as is the case with this retrospective secondary analysis (Grove & CIPHER, 2016). It is also computed in place of the *t*-test whenever the sample scores do not approximate normality as was the case in this study. The purpose is to examine between-subject differences (Grove & CIPHER, 2016). The *t*-test for independent samples requires that the scores

approximate normality, the population variance is equal, and samples are independent (Grove & Ciper, 2016).

In this study, survival analysis was utilized to predict the time it took for a relapse event to happen in nurses with impaired practice participating in this program and to identify which predictor variables significantly predicted the likelihood of relapse in nurses with impaired practice. It was also utilized to create a model of variables that significantly contributed to relapse in this population. Survival analysis was computed for this purpose as opposed to a regression model such as logistic regression because survival analysis is able to account for censored cases (Harrell, 2015). Censored cases are those cases that do not experience the event in the time frame in which the study was conducted (Harrell, 2015). This is the case with some nurses with impaired practice. Some nurses with impaired practice many not have experienced a relapse in the years of data entry that were analyzed in this study.

Table 3.2 Research Questions and Statistical Analyses

Research Question	Descriptive Statistics	Independent Variable	Dependent Variable	Associations	Differences
Question 1	mean, mode, range, SD, frequency, percentage				
Question 2				Pearson's chi square	
Question 3				Pearson's chi square	

Table 3.2 – Continued

Question 4	Age	Employment Status	Pearson's chi square	Pearson's chi square Mann Whitney U
		Length in program	Spearman Rho	
		License type	Pearson's chi square, Spearman Rank Order	Mann Whitney
		Number of months Abstinent	Spearman's Rho	
Question 4	Gender	Employment Status		Pearson's chi square, Mann Whitney U
		Length in program		Mann Whitney U
		License type	Pearson's chi square	Pearson's chi square,
		Number of months Abstinent		Mann Whitney U
Question 5			Cox Regression Analysis; Kaplan- Meier Function	

Kaplan-Meier survival function was further computed to estimate the accelerated risk of relapse at any given time. This type of survival analysis can be computed because it assumes that events happen independent of each other (Clark, Bradburn, Love, & Altman, 2003), as is the case with relapse in nurses

with impaired practice. The Kaplan-Meier survival function was computed to estimate mean and median time to relapse for various groups.

Delimitations of the Study

A delimitation of this study was the decision to use a preexisting database to conduct a retrospective study. This is also because the data that TPAPN has been collecting over the last few years has never been extensively analyzed and published, thus findings from this study provide greater insight into the problem of chemical dependency among nurses who are going through peer assistance programs in Texas. Several research variables had to be extrapolated from the data that was provided in order to provide greater insight into the phenomenon of substance use disorders among nurses. As the researcher, I had to trust that the data provided was collected and entered with utmost accuracy. This is something that was out of my control. Among the variables of interest, gender had the most number of missing data (n = 288). All other research variables had fewer than 10 missing data points in a sample of 1553.

Conclusion

This study was a retrospective descriptive associational and comparative analysis of nurses who are chemically impaired and participating in a peer assistance program in Texas. Demographic variables included age, gender, drug of choice, length in program, license type, substance abuse diagnosis, other psychiatric diagnoses, area of practice, employment status, the number of

successful completions, relapses, renewals, and discharges. These variables were analyzed using descriptive statistics. Correlational research variables were analyzed using the Pearson's chi square or the Spearman Rho. This depended on what assumptions for statistical analysis were met and the level of measurement involved. Comparative research variables were analyzed using the Mann Whitney U. The statistical software package SPSS version 22 was used for all statistical analysis procedures. The researcher was involved in all the aspects of the research study from data cleaning and analysis to reporting of findings. The researcher did everything possible to ensure confidentiality of subject was maintained. This was achieved by waiting for TPAPN to complete all their de-identifying procedures. The dataset was stored on a secure computer that is password protected in the Center for Research and Scholarship at the University of Texas at Arlington College of Nursing and Health Innovation.

Chapter 4

Results

This chapter includes a presentation of the findings of all statistical analyses performed in order to answer the five research questions. After the data were cleaned as described in Chapter 3, the final sample of 1,553 participants met the inclusion criteria for the study. The results of the analysis are divided into sections that correspond with the research questions. The first research question addressed the demographic characteristics of nurses with impaired practice participating in the TPAPN program. The remaining of the research questions analyzed the statistical significance of association between variables of interests. The Shapiro-Wilk test of normality was computed to determine distribution of variable, and it was determined that the data did not approximate.

Research Question 1: Demographic Characteristics

Age

Age was defined as the number of years of the participant at the time of enrollment in the assistance program (Table 4.1). This was reported to the nearest whole number in years. The age of participants in this study ranged from 22 to 66. The mean age was 40.1 ($SD = 9.7$). Age was further grouped into five categories as shown in Table 4.2. The categories included 20-29, 30-39, 40-49, 50-59, and >59. The age group 30-39 years had the highest number of participants at 33.7% ($n = 508$) followed by those between the ages of 40 and 49 at 30.2% ($n = 455$).

Table 4.1 Table of Continuous Variables

Variable	Total Number	Mean	Standard Deviation
Age	1506	40.12	9.9
Length in Program	1553	21.28	11.45
Number of days abstinent	1080	640.92	365.02
Time to enroll	1194	138.97	256.17

Gender

Gender also had the most number of missing cases in this sample accounting for 18.5% of the total sample. Out of the people who identified themselves as either male or female (n = 1270), 75% were female and 25% were male. It is not clear whether individual participants simply did not choose one option provided or the people entering the information forgot to include the information (Table 4.2).

License Type

License type for participants ranged from LVN to Advanced Practice Registered Nurses (APRNs). Although both APRNs and CRNAs are considered advanced practitioners, in this sample they were separated out. A summary of the participants' license type shows Registered Nurses represented the majority of the sample at 76.3% (n = 1185) and LVNs at 23.2%. There was a category called "other", however only one person was part of that category. Additionally, there was a category called RN/LVN. There was no explanation of what made a participant to be assigned both license types (Table 4.2).

Table 4.2 Description of Sample

Variable	Frequency	%
Age		
20-29	247	16.4
30-39	508	33.7
40-49	455	30.2
50-59	257	17.1
<59	39	2.6
Gender		
Male	319	25.1
Female	951	74.9
License Type		
RN	1108	71.3
LVN	360	23.2
APRN	46	3.0
CRNA	30	1.9
RN/LVN	7	.5
Mid-Wife	1	.1
Other	1	.1
Participation Type		
SUD	1017	65.5
Dual	352	22.7
EEP	162	10.4
Interim	12	.8
Monitoring		
MI w/ UDS	9	.6
MHSP w UDS	1	.1
Psychiatric Comorbidity		
Yes	362	23.3
No	1191	76.7
Relapse		
Yes	498	32.1
No	1055	67.9
Number of Relapses		
0	1056	68.0
1	435	28.0
2	62	4.1

Table 4.2 – Continued

Employment Status		
Yes	483	31.1
No	1070	68.9
Self-Referral		
Yes	198	12.7
No	1355	87.3

Participation Type

Nurses with impaired practice are referred to the peer assistance programs for various reasons. This is because peer assistance programs not only monitor nurses with Substance Use Disorder (SUD), but also those with mental illness. This study concentrated only on those referred to the program for SUD and related conditions. Some nurses participate because they have a dual diagnosis of mental illness and SUD. Nurses with SUD alone make up the majority of the participants in this program at 65.5% (n = 1017). Nurses with dual diagnoses make up the next highest category of participation type, accounting for 22.7% of participants. Table 4.2 gives a breakdown of participation type for nurses with impaired practice participating in peer assistance programs.

When considering those participants whose participation type also included positive urine drug screen test but were not recorded as a dual diagnosis, the total percentage of participants who would be considered as dual diagnosis increases to 23.3%. All participants in the program who were admitted with a dual

diagnosis and those admitted with mental illness but had positive urine drug screens were considered to have a psychiatric comorbidity (Table 4.2).

Status in the Program

Status in the program was divided into active and discharged. There are several reasons that participants are discharged from the peer assistance program. Table 4.3 summarizes all the various reasons. Those who are currently active in the program made up 22.4% of participants from the years 2010 to 2016. It is important to note that although some participants had discharge dates recorded in their charts, they also had another start date in after their indicated discharge date. These were 116 participants. These participants were also considered among those who relapsed as they returned to the program after a discharge date was recorded.

Of note, out of all the participants in the study, 37 (2.4%) declined participation the first time, 26 (1.7%), did not even respond at first attempt, 31 (2.1%) did not enroll, and 77 (4.9%) withdrew from the program of their own volition, without completing the program. These nurses account for approximately 11% of nurses with impaired practice who are referred to the program initially but do not take advantage of the resources that the peer assistance program offers. Of the 171 participants who either did not start the program when they were first referred to the monitoring program or withdraw themselves after briefly participating in the program approximately 68% (n = 116)

returned to the program and enrolled. The average length in program for those who withdrew themselves from the program was 9.44 months. The average length in program for all program participants was 21.3 months (Table 4.1). Additionally, the average number of months it days it took a participant to enroll in the peer assistance program from the time they are referred was four months (139 days; Table 4.1).

Table 4.3 Reasons for Discharge from Program

Reason for Discharge	Frequency	%
Completed	638	41.1
Active	348	22.4
Nonadherence	138	11.8
Withdrew from program	77	5.0
1 st relapse	62	4.0
2 nd relapse	62	4.0
BON Related	55	3.6
Declined participation	37	2.4
Did not enroll	31	2.1
Did not respond	26	1.7
Declined renewal- relapse	9	.6
Declined renewal- nonadherence	5	.3
Not appropriate	5	.3
Cannot locate	4	.3
Unable to meet work requirements	4	.3
Deceased	4	.3
Not eligible	2	.1
Self-pending-inactive	1	.1

Approximately 41% of participants completed the program without any identifiable relapse. Of those who were discharged from program for whatever reason, approximately 15.8% relapsed. As mentioned earlier, about 311 participants were discharged from program but had start dates later than their

discharge dated. These were considered to have relapsed and came back to the program as renewal candidates. When these were added to the number of nurses who were designated as relapses, the total number of nurses who relapsed was increased to 498 (32.1%). Participants who relapsed were further categorized into those who relapsed just once, twice, or had no recorded relapse at all. The majority of people who relapsed had one relapse (87%, n = 435).

Referral to Peer Assistance Program

There are several ways nurses with impaired practice can be referred to a peer assistance program. The majority of nurses with impaired practice however are ordered by the BON to enroll in the program otherwise they would risk losing their licenses. These constitute approximately 79% of all referrals. Nurses with impaired practice can also report themselves to the peer assistance program and enroll in the program without third party involvement. These are called self-referrals and constitute 12.7% of nurses who are referred to the assistance program. Colleagues, friends, and family combined report less than 1% of nurses with impaired practice to the peer assistance program.

When nurses with impaired practice are referred to a peer assistance program, a referral reason is required. Reasons for referral range from impaired on the job, to diversion, and even criminal offenses related to the substance abuse. The top four reasons nurses with impaired practice are referred to the peer assistance program are diversion (25.6%), impairment at work (20.0%), arrest and

criminal history (19.7%), and SUD diagnosis (13.2%). Of note, 44 nurses (2.8%) had positive pre-employment UDS, and another 43 (2.8%) were referred for forging a record related to their SUD (Table 4.4).

Table 4.4 Referral Reasons to Peer Assistance Program

Referral Reason	Frequency	%
Diversion	450	29
Impairment at work	311	20.0
Arrest/ criminal history	307	19.8
SUD diagnosis	206	13.3
Alcohol	96	6.2
Positive UDS pre-employment	44	2.8
Forgery	43	2.8
Illegal Drugs	11	.7
Mental health primary	34	2.2
Other	26	1.7
Prescription drug abuse	18	1.2

Drug of Choice

Primary drug of choice is the drug or substance on which the nurse is dependent on or to which the nurse is addicted. Nurses with impaired practice abuse a myriad of substances whether prescribed or not. About 1.2% of nurses in the study abused prescription drugs. Approximately 7% of nurses in the study abused illegal drugs, but the vast majority of nurses abuse substances that can be obtained legally. It is important to note that when analyzing drug of choice, the largest category was “other” and 32% of the sample were classified as such. Other can include a lot of different substances and no assumptions can be made as to what type of drugs might have been included in this category.

Table 4.5: Primary Drug of Choice Class

Drug of Choice	Frequency	%
Opioids	451	29.0
Alcohol	396	25.5
Stimulants	87	5.6
Amphetamines	54	3.5
Cannabinoids	52	3.3
Benzodiazepines	37	2.4
Cocaine	33	2.1
Hypnotics	10	.6
Heroin	7	.5
Anesthetics	4	.3
General Analgesics	4	.3
Methadone	3	.2
Other	499	32.1

Notwithstanding, among those with identifiable drugs of choice, opioid/narcotics (29%) and alcohol (25.5%) represented the most frequently abused drugs. These were followed by stimulants (5.6%) and marijuana (3.3%). Additionally, about four people (0.3%) in the study used general anesthetics such as propofol as their drug of choice. The least abused substance in this sample of nurses with impaired practice was Methadone. Only three nurses (0.2%) were referred for abusing it. Additionally, about 36.6% of nurses indicated that they abused other substances in addition to other primary drug of abuse (Table 4.5).

Area of Practice

Table 4.6 summarizes the top 10 areas of practice in which nurses with impaired practice generally practice. The top five areas of practice were long-term

care and geriatrics (12.7%), medical-surgical and telemetry areas (10.3%), home health and hospice care (8.8%), Psychiatric Mental Health areas (4.6%), and Dialysis (4.9%). There were two (0.1%) nursing students who were referred to the peer assistance program and five nursing faculty (0.3%). Employee health, risk management, and radiology had the least number of nurses, all with only one (0.1%) participant.

Table 4.6 Top Ten Areas of Practice

Area of Practice	Frequency	Percent
Long Term Care and Geriatrics	198	12.7
Medical/Surgical/Telemetry	160	10.3
Home Health and Hospice Care	137	8.8
Psychiatric Mental Health	76	4.9
Dialysis	76	4.9
Emergency Care and Triage	72	4.6
Intensive Care	60	3.9
Administrative	49	3.1
L&D and Women's Services	44	2.8
Anesthesia and Operating Room	41	2.4

Employment Status

At the time of referral to the assistance program, about 31.1% of nurses with impaired practice indicated that they were employed and were assumed to remain employed if an end date for employment was not provided (Table 4.2).

Research Question 2: Psychiatric Comorbidities and Relapse

Research question 2 focused on the relationship between psychiatric comorbidities and relapse after controlling for age and gender. A 2 x 2 Pearson's

chi square test was performed and it revealed no significant difference in relapse between nurses with (18%) and without (14.9%) psychiatric comorbidities ($\chi^2=2.759$, $df, =1$, $p 0.097$; Table 4.7).

Table 4.7 Associations for Research Question 2 and 3

		n (%)	<i>p</i>
Psychiatric comorbidity	Relapse	129(18)	0.097
Self-report	Employment status	58(29.3)	0.056
	License type	APRN: 15(32.6) CRNA: 8(27.7) RN: 153(13.3)	<0.010
	Drug of choice	Alcohol: 43(21.7) Amphetamines: 9(4.5)	0.002
	Age category	30-39: 71(37.2) 40-49: 54(28.3) >59: 1(0.5)	0.011
	Gender	Male: 109(55.1%) Female: 36(18.2%)	0.004
	Relapse	Relapse: 69(34.8%) Did not relapse: 129(62.5%)	<0.01

Research Question 3: Self-Report Status

The third research question aimed to examine any relationships among license type, drug of choice, employment status, gender, and age category. To answer this question, the likelihood ratio was calculated whenever there were

more than 20% of cells with expected count less than five. This was a violation of one of the major assumptions of the Pearson's chi square, thus it could not be calculated. In all other cases where this assumption was not violated, the Pearson's chi square was computed to report the findings of the analyses.

Although those who did not self-report are more likely to be employed (31.4%) compared to those who report themselves (29.3%), this difference was not statistically significant at the 0.05 alpha level set for this study ($p = 0.556$; Table 4.7). Mann Whitney U test revealed that self-report status is not significantly associated with time to enroll ($p = .453$). There was a significant relationship between self-report and license type, with APRNs being most likely to self-report (32.6%) followed by CRNAs (26.7%), RNs (13.8%), and LVNs at 6.1%, (likelihood ratio = 37.081, $df, = 6$, $p < .001$; Table 4.7). Self-report was also significantly associated with primary drug of choice. The Pearson's chi square indicated that those who abused alcohol (21.7%) and amphetamines (4.5) being significantly more likely to report themselves than nurses who abused other all other identified drugs (likelihood ratio = 30.894, $df, = 14$, $p = 0.002$; Table 4.7).

Self-report status was further significantly associated with age category ($\chi^2 = 13.115$, $df, = 4$, $p = 0.011$). Among those aged between 30 and 39, 37.2% reported themselves compared to 28.3% among those aged 40-49, 23% among those aged 50-59, 11% for those aged 20-29, and only 0.5% among those 60 years and older. Among those who reported themselves to the peer assistance program,

females were more likely to report themselves compared to their male counterpart at 55.1 % and 18.2% respectively ($\chi^2 = 11.054$, $df = 2$, $p = 0.004$). Additionally, those who reported themselves had fewer relapses when compared to those who do not self-report at 5.6% versus 17.3% respectively ($\chi^2 = 18.006$, $df = 1$, $p < .001$; Table 4.7).

Research Question 4: Age and Gender as Relates to Other Variables

To answer the first part of the fourth research question, Spearman's Rho, Pearson's chi square, and Mann Whitney U were calculated to examine associations and differences among the variables of choice. Both employment status and license type approached significance at $p = 0.062$ and $p = 0.056$, nonetheless the differences in the groups were not distinct enough to constitute statistical significance. Length in program and number of days abstinent were also not significantly associated with age of the participant, $p = .718$ and $.377$ respectively.

Of note, the time it takes participants to enroll in a peer assistance program from the time they are referred and the number of days abstinent are negatively associated with length in program ($p < .001$). The strength of these relationships though small, they are significant. Also noteworthy is the strong positive significant relationship between number of days abstinent and the length in program ($r_s = .992$, $p < .001$; Table 4.8).

Table 4.8 Correlations for Times Related to Participation in Program

	Age	Length in program	Number of days abstinent	Time to enroll
Age	1.00	.009 (.718)	.028 (.377)	-.014 (.641)
Length in program	.009 (.718)	1.00	.992 (<0.001)	-.164 (<0.001)
Number of days abstinent	.028 (.377)	.992 (<0.001)	1.00	-.169 (<0.001)
Time to enroll	-.014 (.641)	-.164 (<0.001)		1.00

The second portion of the fourth research question was also answered using the Pearson’s chi square of independence and the Mann Whitney U, a nonparametric equivalent of the *t*-test for independent samples (Grove & Ciper, 2016). There was no significant relation between gender and number of days abstinent ($p = 0.826$) and between gender and length in program ($p = 0.155$). Pearson’s chi square was computed and revealed that there was no statistically significant relationship between gender and license type ($p = .237$). Nonetheless, there was a significant association between gender and employment status, with more men (34.5%) being employed compared to only 28.7% of women ($\chi^2 = 6.615$, $df = 2$, $p = .037$; Table 4.9).

Table 4.9 Associations for Research 4

		n (%)	<i>p</i>
Gender	License type		.709
	Employment Status	Male: 110(34.5) Female: 273(28.7)	0.037

Research Question 5: Relapse Risk

Twelve variables were chosen to be included in the survival analysis model. These twelve variables were chosen on the basis of evidence found in the literature associating them with the risk of relapse in individuals with substance use disorder. Cox proportional hazard analysis was computed to answer this research question. The nominal predictor variables to be included in the model were recoded to binary as dictated by the process of dummy coding (Grove & Ciper, 2016). This dummy coding decreases the multicollinearity, which is a phenomenon whereby two or more predictor variables in a regression model are highly correlated (Grove & Ciper, 2016).

Of the twelve-predictor variables that were part of the Cox regression model, only two were statistically significant. These were having a SUD referral type ($p < 0.001$) and using alcohol as the primary drug of choice ($p = 0.004$). Participants who were referred for SUD alone had 55% less risk of relapse when participating in the monitoring program and those who abused alcohol as their primary drug of choice had 1.7 times higher risk of relapse (Table 4.10). Although other predictor variables can be used to help understand the nature of the associations with relapse, they were not statistically significant and no concrete accurate conclusions can be drawn from studying them.

Table 4.10 Cox PH Regression Model of Program Relapse

Predictor	<i>p</i>	Adjusted HR	95% CI	
			Lower	Upper
Participation Type- Substance Use Disorder	<0.001	.453	.292	.701
Drug of choice- Alcohol	0.004	1.690	1.178	2.423
Participation Type- DUAL	.616	1.671	.224	12.463
Age at program enrollment	.252	.991	.977	1.006
Drug of choice- Opioids	.200	1.300	.871	1.006
Criminal History	.868	.964	.626	1.484
Diversion/Impaired Practice	.250	1.226	.866	1.736
RN License	.387	.864	.621	1.203
Male	.521	.893	.632	1.262
Psychiatric Comorbidity	.446	.457	.061	3.431
Self-Report	.133	1.385	.905	2.121
Additional Drugs	.272	.825	.586	1.163

Kaplan-Meier survival function indicated that median time to relapse was 68 months and mean time to relapse being 56 months. Participants who were referred to the program with substance use disorder had a median time of 72 months to relapse and an average of 62 months. Median time to relapse for those who abused alcohol alone was 71 months with a mean time of 57 months. Although not a statistically significant predictor of relapse, those who were referred for dual diagnosis had the shortest time to relapse with median score of 68 months and average of 55 months (Table 4.11; Figure 4-1).

Table 4.11 Mean and Median Time to Relapse (Months)

Predictor	Mean	Median
Overall	56	68
SUD	62	72
Alcohol	57	71
Opioids	61	71
Dual	55	68
Diversion/impaired practice	60	68

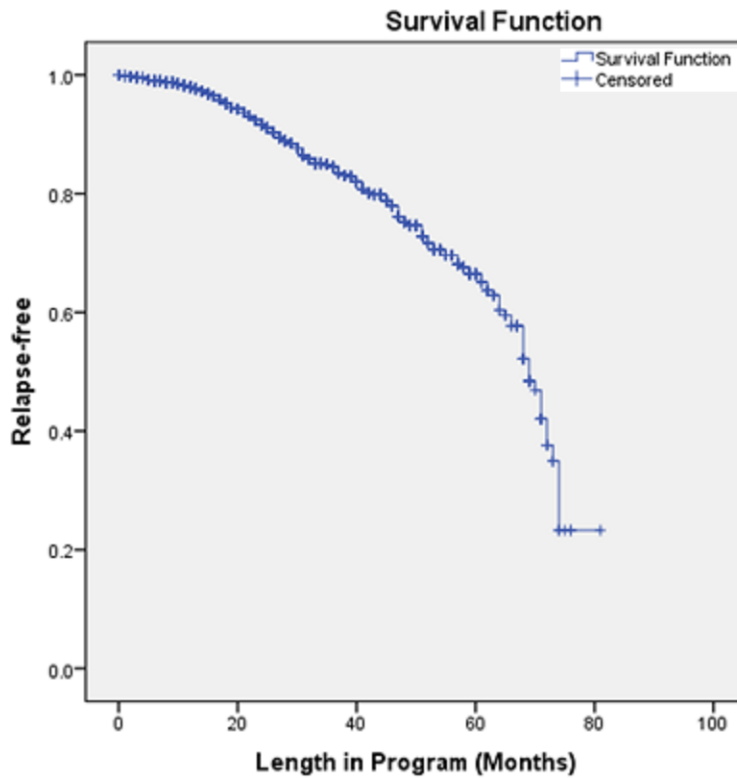


Figure 4-1 Kaplan Survival Function – Time to Relapse in Months

Conclusion

This chapter included the findings from the statistical analyses conducted in order to answer the research questions presented. Demographic characteristics

of the entire sample were provided. All the associations of interest were also presented, both statistically significant ones and those that were not. Cox regression analysis was computed to determine which of the twelve selected predictor variables significantly predicted accelerated risk of relapse. A Kaplan-Meier survival function was estimated to determine mean and median time to relapse for the entire sample and for other variables of interest. Substance use disorder and alcohol as a drug of choice were significant predictors of accelerated risk of relapse. The median time to relapse for the sample was 68 months. Other significant associations were found such as between self-report status and relapse.

Chapter 5

Discussion of Findings

The purpose of this retrospective study was to describe the population of nurses with impaired practice in the state of Texas going through a peer assistance program between 2010 and 2016. This chapter includes an overview of the study, including the discussion of research findings and the implications for nursing practice. It also includes a discussion on the conclusions of the findings, recommendations for future research, and the limitations of this study.

There are close to 3.1 million nurses in the United States, including RNs and LVNs (US Census Bureau, 2016). Of these, approximately 83 thousand live in the state of Texas (TBON, 2016). Between January 2010 and October 2016, approximately 1,553 nurses were referred to TPAPN for substance use disorders. This six-year prevalence represents approximately two percent of the nurses in Texas. This however is only the number of the number of identifiable nurses with SUD and impaired practice over the last six years, and TPAPN has been in existence for almost twenty years. According to Cares et al. (2015), the majority of nurses with impaired practice will continue to practice impaired if not reported or caught. It is therefore important to note that the actual prevalence of impaired practice, including those nurses who have not been reported and those from prior years would be higher than the two percent represented in this study.

Nurses are referred to peer assistance programs for various reasons. Some are referred strictly for SUD, some for dual diagnoses, and other strictly for mental health disorders (TPAPN, 2016). Between January 2010 and October 2016, 1,743 nurses were referred to TPAPN however, 190 of these referrals were strictly for mental health disorders. Nurses who were referred strictly for mental health disorders were excluded from this study because the focus of the study was nurses with SUD and impaired practice.

Interpretation of the Findings

Demographic Composition

Of the 1,553 study participants, 61% were female and 20% were male. As reported in chapter 4, a significant number of participants (18.5%) did not select either gender. Of those participants with an identifiable gender, 25% were male. According to ANA (2016), only 10% of nurses in the United States are male. There has been concern that there is overrepresentation of male nurses in substance abuse monitoring programs (Dittman, 2012) with prevalence running upwards of 20% (Cares et al., 2015; Kunyk, 2015). In the State of Florida, it is estimated that about 38% of participants in their peer assistance programs are male (State of Florida, 2008).

In a study of male nurses in substance abuse monitoring programs, Dittman (2012) found that male nurses might be overrepresented in substance abuse treatment programs because they had a significant family history of

substance abuse that predisposed them to chemical dependency. They also reported sensation-seeking behaviors that preceded their professional careers. These sensation-seeking behaviors were exacerbated while in nursing, which contributed to a distorted view of the world.

The average age of nurses who participated in this study was 40.1 ($SD = 9.7$). In contrast, the average age of nurses in the United States is about 45.5 years old (ANA, 2016). Tipton (2006) however found that the average age of nurses in substance abuse monitoring programs was 39.37, which is similar to what this study revealed. The highest number of participants (33.7%) came from the age group 30 - 39 years of age. Those between the age of 40 and 49 with 30.2% followed these. About 70% of the nurses in the peer assistance program were therefore younger than 50 years of age and about 50% were younger than 40 years of age. Being relatively young has been associated with adverse outcomes in substance abuse monitoring programs (Davis et al., 2014). More research is warranted to understand what factors influence substance use disorders among younger nurses.

Registered Nurses constituted over three quarters of participants in the monitoring programs. This is consistent with the proportions of RNs to LVNs in the nursing population (US Census Bureau, 2016). Nurses with advanced degrees made up only 5% of the participants in the study. In addition, CRNAs only made up 1.9% of the sample. This is in contrast to what is reported in the literature, with

CRNAs estimated to have prevalence rates as high as 15% (AANA, 2016). Consistent with this finding, CRNAs also had a self-report prevalence of 26.7%, the second highest in this study. It is therefore possible that they have the highest prevalence of substance abuse among nurses, as they are more likely to be identified because of the higher rates of self-report status.

Dual diagnosis and the presence of psychiatric comorbidities have long been identified as predictors of relapse among nurses with impaired practice and individuals with SUD in general (Schellekens et al., 2015; Tipton, 2006). Approximately 23% of nurses in this study were identified as having a psychiatric comorbidity. Other studies have found prevalence of psychiatric comorbidities as high as 58% (Shaw et al., 2004) and others as low as 18% (Clark & Farnsworth, 2006). This is especially important when 35% of medical-surgical nurses and 18% of the nursing workforce report significant depressive symptomology (Letvak et al., 2012; Welsh, 2010). In this study, almost 11% of all nurses who were referred to the peer assistance programs were strictly referred for mental health disorder. When added to those nurses with dual diagnoses, nurses struggling with mental health disorders made up over a third (34.2%) of all participants in this peer assistance program.

Tipton (2006) found that psychiatric comorbidities were significant predictors of relapse and explained about 6.4% of the variance in relapse among nurses participating in peer assistance programs. This however was not true for

nurses in this study. Psychiatric comorbidity was not significantly associated with relapse and when included in the survival analysis model, the hazard of relapse was not significantly different between the two groups. Even though the proportion of nurses with psychiatric comorbidity (25.9%) who relapsed was higher than those who did not (22.1%), this difference was not statistically significant. In the regression model, although not statistically significant it is noteworthy that nurses with dual diagnosis were 67% higher risk of relapse than those who did not. In fact, in this study a diagnosis of SUD alone was significantly associated with 55% less likelihood of relapse.

At the time the study was conducted, about 348 nurses were actively participating in the peer assistance program for substance use and impaired practice. However, about 11% of nurses with impaired practice who were referred to the program for the first time either did not respond and enroll in the program or they enrolled in the program for a short period and then withdrew of their own volition. Of those nurses who exhibit this behavior, 68% returned to enroll into the program later and participated fully. It is unclear what factors are associated with this phenomenon and further research is needed to explore these possibilities. It is hypothesized that maybe these nurses are still in denial about their substance use disorder when they are first referred to the program and need other motivating factors in order to come back and participate in the peer assistance programs. This conclusion is based on the literature supporting the existence of denial and

embarrassment among nurses with impaired practice (Cares et al., 2015; Horton-Deutsch et al., 2011; Kunyk, 2015).

For nurses who participate in the peer assistance program for nurses, the average length in program was 21 months. In a study by Cares et al. (2015), nurses participated in the assistance program anywhere from zero months to over 25 months. Over 80% of participants completed the program in less than 25 months (Cares et al., 2015). Most peer assistance programs require nurses to participate for about 24 months (TPAPN, 2016). Clark and Farnsworth (2006) also found that longer time spent in recovery was associated with higher chances of recovery among nurses with impaired practice who participate in peer assistance programs.

The number of days abstinent, which is the time it took nurses who have a relapse from the time of enrollment ranged from two days to over 5 years. Among those nurses who relapsed (n = 498), 35% relapsed within the first six months. Zhong et al. (2009) estimated that the five-year prevalence rate of relapse among nurses going through peer assistance programs was 40%. Approximately 28% of nurses in this study relapsed at least once. This is very close to what Zhong et al. (2006) found in their study. If almost a third of nurses are relapsing in monitoring programs, it is important to find out when exactly they are most susceptible to relapse and what factors are associated with relapse.

One of the advantages of participating in an alternative peer assistance program for substance abuse such as TPAPN is that they usually have shorter time between referral and actual start of the program (Monroe et al., 2008). This is also another reason more nurses enroll in alternative programs compared to disciplinary programs (Monroe et al., 2013). In other studies, nurses who enrolled in alternative peer assistance programs did not wait more than two weeks to start the program from the time of referral. In this study, time to enroll in the program, from initial referral date ranged from zero to 2,067 days. The mean time it took for nurses to enroll in the program was 138.97days (4.6 months). Nonetheless, approximately 50% (n = 770) of participants were enrolled in the program within two months of being referred to the program. Forty-one percent of nurses participating in the peer assistance program successfully completed the program without any identifiable relapses.

According to SAMHSA (2016), alcohol is the most abused substance in the general population; nurses with SUD abuse narcotics/opioids more than any other drug class (Bettinardi-Angres et al., 2012). The findings of this study were consistent with previous studies (Dittman, 2012; Tipton, 2006). Twenty nine percent of participants abused narcotics followed by 25.5% with alcohol as the drug of choice. The type of drugs that nurses with impaired practice abuse is largely associated with what they have access to in the work place (Darbro, 2011). This is because a significant number of nurses obtain their drug of choice by

diverting drugs from patients in the workplace (Cares et al., 2015; Dittman, 2012). In this study, approximately 30% of nurses diverted drugs from patients. An additional 20% went to work impaired. This is a patient safety concern because nurses with impaired practice put both themselves and patients at risk for injury (Talbert, 2009).

Although the majority of nurses with SUD abuse narcotics, in this study use of narcotics alone did not significantly increase the risk of relapse. Alcohol however, which was the second highest abused drug was a significant predictor of relapse in nurses with impaired practice participating in peer assistance programs. In fact, nurses who abused alcohol were 69% more likely to relapse than if they did not abuse alcohol. Many nurses do not abuse only one substance at any given time (Davis et al., 2014), and these nurses are more likely to relapse compared to those who do not use multiple drugs. In this study however, no significant difference in the risk for relapse was found between those who abused additional drugs (36%) and those who did not.

Of note, 1.2% of nurses were referred for abusing prescription drugs. Other studies have found higher prevalence rates of prescription drug abuse among nurses (Cares et al., 2015; Clark & Farnsworth, 2006; Tipton, 2006). Snow (2015) explains the challenges providers face when treating patients with mental health disorders who also have co-occurring SUD. Finding the right balance is

never easy, but failure to treat the mental health condition could also prove detrimental (Snow, 2015).

Nurses with impaired practice often find themselves in some legal problems that consequently lead to arrest and criminal history (Zhong et al., 2009). Approximately 20% of nurses in this study reported being arrested and having a criminal history directly related to their substance use disorder. A significant number of nurses who are referred to a peer assistance program may have lost their jobs (TPAPN, 2016), and adding criminal history and arrests to those problems only exacerbate an already stressful situation. For example, in this study about 68% of participants were unemployed.

Getting a criminal history may impede future opportunities to obtain a good job and this may contribute to stressors that predispose these nurses to relapse. Zhong et al. (2009) found that history of criminal convictions was a significant predictor of relapse even though this was not true for this study. It is not clear however how many of these criminal convictions affect the public and the magnitude of effects of the behaviors leading to the arrest. The database did not specify what these criminal convictions and arrest were related to other than they were a direct consequence of their substance abuse. No studies were found that examined death from substance abuse among nurses with impaired practice. In this study, three nurses died while participating in the monitoring problem but it is not clear if their deaths were directly linked to their substance use disorder.

Although representing only 0.1% of the entire sample, two nursing student were referred to the peer assistance program for substance abuse. According to Merlo et al. (2013), about 70% of health care professionals with SUD report abusing drugs prior to entering the profession. Monroe and Pearson (2009) concluded that substance use disorders among nursing students often starts as a means to cope with stress while in nursing school, but is exacerbated when they enter the profession. They assert that Colleges of Nursing have the ethical responsibility to graduate nurses who are safe to practice and includes them not abusing drugs. Nursing schools therefore need to implement policies that address substance abuse among student nurses and faculty. Five faculty members were reported to the peer assistance program. It is important to remember that substance abuse can affect anyone, not only nurses in clinical settings but also those in academia, and there needs to be an emphasis on educating faculty as well as students on the signs and symptoms of chemical dependency.

In the literature, intensive care nurses, emergency room nurses, and CRNAs have been found to have higher prevalence rates of substance abuse (AANA, 2016; Young, 2008). This has been postulated to be related to the increased autonomy and access nurses in these specialty areas have (AANA, 2016; Young, 2008). In this study, nurses in long-term and geriatric care had the highest prevalence and then followed by medical surgical nurses. This is contrary

to what most studies have found. Nonetheless, Tipton (2006) found similar results with medical-surgical nurses having the highest prevalence rates.

It is possible that nurses practicing in long-term care and geriatrics specialty areas have the highest prevalence because of reduced accountability in these areas, especially that most long-term care residents are incapacitated in some fashion or form. It is also possible that these specialty environments are less controlled and their patient population is less likely to complain about the quality of care being provided. Furthermore, about 60% of nurses in long-term care, home health, geriatric care were LVNs, and in this study, LVNs were the least likely to self-report. The above reasons provide insight into why it may be much easier to divert medications in such practice settings compared to in-patient settings in which audits and stringent regulations on handling of medications are in place. This could also be true for home health and hospice nurses. It is not clear what factors make medical-surgical nurses more susceptible to substance abuse. Surprisingly, emergency room and ICU nurses combined made up less than 10% of the nurses in the program.

Research Question 2 and 3

The second research question examined the association between presence of psychiatric comorbidity and relapse. The third research question examined some associations between self-report status and several variable of interest. There was no significant association between psychiatric comorbidity and relapse.

Even though there were more nurses with comorbid disorders who relapsed than those who did not, the difference was not statistically significant. This was surprising because of the abundance of research examining comorbid psychiatric disorders as predictors of relapse (NIDA, 2015; Schellekens, et al., 2015; Tipton, 2006).

Employment status was not significantly associated with self-report status ($p = .556$). Conversely, self-report status in nurses with impaired practice was significantly associated with license type ($p < 0.001$), primary drug of choice ($p = 0.002$), age category ($p = 0.011$), gender ($p = 0.004$), and relapse ($p < 0.001$). Nurses who self-report are more likely to be female, RNs who abuse opioid/narcotics, between the ages of 30 and 39, and are likely to have higher rates of relapse. No studies in the literature were found that examined what makes this group of nurses with impaired practice different. In this study, they made up about 12% of participants, but in the literature, rates of self-report range from as low as 6% to as high as 34% (Cares et al., 2015; Clark & Farnsworth, 2006).

More research is needed to understand the motivating factors of nurses who self-report, especially if self-report status is associated with decreased likelihood of relapse. Of interest is the fact that LVNs has the lowest rates (6.1%) of self-report status. This is concerning especially because there is limited research that has focused on LVNs and trends of abuse in this population. Nurses aged 60 and over had the lowest rates of self-report status (2.9%).

It is argued that the prevalence of chemical dependency might be on the rise among older adults (NIDA, 2015) specifically with the aging of the baby boomers. If nurses in this age group could be encouraged to self-report at higher rates, they may experience less susceptibility to poor outcomes, thus protecting both them and the public. In a study by Dittman (2012), none of the male participants in that study self-reported. This is consistent with the findings of this study that male nurses are less likely to report themselves compared to their female counterparts. Notwithstanding, there was no difference between those who self-reported on time to enroll in the program.

Research Question 4

The fourth research question examined associations between age and gender in relation to employment status, length in program, license type, and number of days abstinent. In this study, age was not significantly associated with employment status, license type, length in program, or number of days abstinent. These results are in contrast to the findings of Davis et al. (2014) who found that younger nurses have poorer outcomes than older nurses. Arteaga et al. (2010) also found that individuals who initiate substance abuse at an early age were more likely to have increased severity of substance abuse later in life.

Although only with a small correlation coefficient, number of days abstinent was inversely associated with time it took to enroll. Nurses who enroll in the program faster are therefore more likely to relapse at a later stage if they do

at all. Deliberate efforts should be made to encourage nurses with impaired practice to enroll into the assistance programs as soon as possible. The longer nurses participate in the monitoring program, the higher the number of days they are abstinent ($p < 0.001$). Participating in the peer assistance program for extended periods has further been viewed as a protective factor against relapse among individuals recovering from substance use disorders (Horton-Deutsch et al., 2011) and should be encouraged whenever possible.

The findings of this study reveal that gender is not associated with license type, length in program, or number of days abstinent. In the literature, there is conflicting evidence on who has poorer outcomes. For example, Davis et al. (2014) found that men tend to have higher rates of relapse in comparison to women, but Chapman and Wu (2014) found that they have higher hazard ratios for completed suicide and psychiatric comorbidity. Gender is however associated with employment status with more men (34.5%) being employed compared to their female counterparts (28.7%) while participating in monitoring programs. This was echoed by Dittman (2012) and Dittman (2008) who found that men with impaired practice are treated much differently than women, and thus contributed to their overrepresentation in substance abuse monitoring programs.

Research Question 5

Research question 5 aimed at examining predictors of relapse and identifying at what periods they were most susceptible for relapse. Twelve

variables were chosen to be included in the survival analysis model. The basis for choosing these predictor variables was the literature supporting their association with relapse among nurses with SUD. Table 5.1 gives a list of all the predictor variables entered in the model. Cox regression analysis revealed that only two of the 12 predictor variables significantly affected the risk of relapse. The two significant predictors were alcohol as primary drug of choice ($p = 0.004$) and substance use disorder as referral type ($p < 0.001$).

The rest of the predictor variables may not have been statistically significant but it is important to note some relationships that may have been supported by other studies. For example, though not a statistically significant prediction, nurses with dual diagnosis may have a 67% higher likelihood relapse. This is consistent with what other researchers have found (Schellekens et al., 2015; Tipton, 2006). Additionally, the risk of relapse may be increased by 30% in individuals who abuse narcotic/opioids as their drug of choice. This is important to know because the majority of nurses with substance abuse use narcotics. Lastly, in this study, nurses who divert drugs from patients may very well have a 20% higher probability of accelerated relapse. Close attention therefore needs to be paid to nurses with impaired practice who are referred to the program with alcohol as their primary drug of choice, have a dual diagnosis, and with a history of diversion and impairment at work.

Table 5.1 Predictor Variables for Cox Regression Analysis

Name of Predictor	Level of Measurement
Referral Type: Substance Use Disorder	Nominal
Referral Type: Dual Diagnosis	Nominal
License type: RN	Nominal
Drug of choice: Alcohol	Nominal
Drug of choice: Narcotics/opioids	Nominal
Criminal backgrounds and arrests	Nominal
Diversion and impairment at work	Nominal
Psychiatric comorbidity	Nominal
Self-report status	Nominal
Additional drugs	Nominal
Gender	Nominal
Age	Continuous

Limitations of the Study

The main limitation for this study was the use of a preexisting dataset (Grove et al., 2013). Only variables that were already present in the database could be analyzed. The quest to de-identify the data, though necessary, led to deletion of information that could have been used to inform other research questions (Cheng & Phillips, 2014). This was considered a constraint to a comprehensive data analysis plan, thereby limiting the conclusions that could be drawn for this particular population (Cheng & Phillips, 2014; Grove et al., 2013).

Another limitation of this study was that the TPAPN database represented only a portion of nurses with impaired practice. This is because some impaired nurses refuse treatment for various reasons, others are reported directly to the board of nursing and may not have the chance to be enrolled in a peer assistance

program, and not all nurses with impaired practice have been identified. It is also possible that other nurses with impaired practice will seek help elsewhere however, these may not be monitored, and these findings may not be applicable to them either. Generalization of study findings is therefore limited to nurses with impaired practice who are actively enrolled in peer assistance programs in Texas (TPAPN). This is because it would not be prudent to say that the findings of this research study are true for all nurses with impaired practice regardless of the setting or state. It is important to note that threats to internal validity such as maturation, carry-over effect, attrition, and history are not inherent in secondary data analyses (Grove et al., 2013).

Prospective studies in this population are very difficult to conduct, especially considering the difficulties associated with recruitment and the increased risk of breaching confidentiality. The database that was shared with the researcher had no personal identifiers that could be used to link any study participants. Careful attention was paid to the cleaning, management, and analysis processes to ensure accuracy of results obtained from the database. It is also important to note that the researcher depended extensively on TPAPN staff for the integrity and the veracity of the data that was shared.

Implications for Nursing

With approximately 8% of nurses chemically impaired in the United States, much research is needed to understand who they are, what can be done to

support them and, and how to improve outcomes of those participating in peer assistance programs. The advantages of participating in peer assistance programs have long been identified (Darbro, 2011; Monroe et al., 2008; Monroe et al., 2013), however a significant number of nurses (11%) who are referred to these programs do not want to participate initially. Determinants and motivational factors that influence decisions to participate upon first referral need to be explored.

Approximately 79% of people who are referred to the peer assistance program are referred by the BON. Only about 12.7% self-report. Even more concerning, is the fact that less than a percent of those participating in a monitoring program are referred by colleagues, family, and friends combined. These people however are usually the first to notice patterns of substance use disorders before the problems are exacerbated. Concerted efforts are required to diminish the denial that is associated with substance use disorders not only among the substance users themselves, but also among colleagues, friends, and family (Darbro, 2011; Malliarakis et al., 2012).

Relapse is also lower among those nurses who self-report. Policy makers and administrators need to develop and implement policies that incentivize individuals who report themselves to the peer assistance programs. Mallia (2015) argued that the best way to do this is to create peer assistance programs that are completely independent of state BONs. When this is the case, nurses with

impaired practice are more likely to come out and seek help without fear or repercussions (Mallia, 2015). When nurses are encouraged to self-report, there is a chance that there will be fewer negative patient outcomes, but also the nurses will get the help they need before it is too late and end up with criminal histories or even death. In addition, nurses with impaired practice who have been reported to the board and peer assistance program should be encouraged to enroll as soon as possible. As shown in this study, a negative relationship exists between the time it takes to enroll in the program and the time it takes to relapse. Those nurses who are not enrolling soon enough should be followed up to better understand the barriers and challenges they may be facing.

The literature has long pointed to a few select specialty areas as having higher prevalence rates of substance use disorders (AANA, 2016; Young, 2008). The trend however is shifting to specialty areas that have traditionally gone unnoticed such as medical-surgical areas and long-term care. It is possible that those areas previously known for higher rates of substance abuse have been subjected to much more stringent monitoring, but to the neglect of all others. Those areas that have not received the untoward attention have consequently seen a rise in the rate of substance use disorders.

Another explanation could be that with the aging of the population, there are more people now living in long-term care facilities, many of them with multiple medical conditions and possibly incapacitated in many ways. Nurses

working in these areas have greater autonomy, access, and less regulation and oversight, thus providing an environment that is conducive for diversion.

Kennedy (2005) found that among staff in long-term care facilities, nurses have the highest burn out rates. This is especially important with the aging population as these nurses may feel inadequate in their skills and knowledge to care for this population (Kennedy, 2005). This additional stress that nurses in long-term and geriatric care experience may compound substance use problems and chemical dependency. No other studies were found that examined the regulation of medications in long-term care facilities and how this might affect substance abuse in nurses.

Overrepresentation of men in substance abuse monitoring programs is still a major concern in nursing. Despite what we know, they are still experiencing poor outcomes (Dittman, 2008; Dittman, 2012). More research is needed to examine other factors affecting their susceptibility and how to encourage self-report in this population. Of all the participants in her study, Dittman (2012) found that not even one of them self-reported. Addressing the attitude of professional invincibility might prove helpful in improving these efforts. Additionally, diversion and impairment at work remain among the top reasons nurses are referred to peer assistance programs. Specifically for long-term care and home health specialties, better ways to counteract diversion should be

considered with the intent to protect both nurses and patients entrusted in their care.

Recommendations for Future Studies

Specific recommendations for future studies include studies that focus on understanding nurses with impaired practice who self-report. Research is needed to examine what motivated them to come out by themselves and seek help. These factors should be examined for their usefulness and applicability to larger populations to see if that would produce better outcomes for nurses with impaired practice. Another recommendation for future research is to study nurses with impaired practice who do not take advantage of the services and resources provided by peer assistance programs. Are they seeking help elsewhere, and if not, what are the follow-up mechanisms in place to monitor such nurses?

In addition, more research is needed to understand the factors that are leading to rising prevalence of substance abuse and chemical dependency among nurses in long-term care, medical-surgical units, and home health settings. Furthermore, more research is needed to understand barriers and challenges to enrolling in peer assistance programs as soon as referrals are made. Some nurses with impaired practice do not enroll in these programs immediately when they are referred, but there is nothing in the literature that speaks to what happens to them between referral and enrollment. Lastly, it would be interesting to find out if differences in outcomes exist between those nurses with impaired practice who

are strictly adhering to the program and those who use external resources such as counseling from other sources.

Summary of Study Conclusions

1. There are more females than males participating in peer assistance programs even though men are still overrepresented.
2. The average age of nurses with impaired practice in Texas is 40 years old, with the highest prevalence among those aged between 30 and 39 years old.
3. Registered Nurses make up over three quarters of nurses participating in monitoring programs
4. Sixty five percent of nurses are referred for SUD alone, however about 23.3% of participants have a psychiatric comorbidity.
5. The average time spent in the program was 21 months; average time it took to enroll in the program was 4.6 months; and some participants relapsed as early as 2 days after starting the program.
6. Approximately 32% of participants relapsed; 41% completed the program without a relapse episode; and 348 are currently participating in the program specifically for substance use disorders.
7. The majority of nurses are referred to the program by the BON; the majority is referred for diversion; most of them use narcotic/opioids as the drug of choice.

8. Long-term care and medical-surgical areas have the highest prevalence and over two thirds of the participants are unemployed.
9. There is no significant association between relapse and psychiatric comorbidity.
10. Self-report was not significantly associated with employment status; however, it was significantly associated with gender, age category, drug of choice, licensure type, and relapse.
11. Age was not significantly associated with license type, employment status, length in program or number of days abstinent; gender was not significantly associated with length in program, number of days abstinent, and license type but was significantly associated with employment status.
12. Out of twelve predictor variables of relapse in the Cox regression model, only two were statistically significant: having a SUD participation type and using alcohol as the primary drug of choice.

Summary

The estimated six-year prevalence rate of substance abuse and chemical dependency in Texas is about 2%. This prevalence however is only for nurses who are participating in the peer assistance program. It is therefore expected that the actual prevalence for the state of Texas is higher than was found in the study. Nurses with impaired practice in Texas are more likely to be female, between the ages of 30 and 39, abusing narcotics, and having a RN license. A significant

number of these nurses continue to practice impaired and are diverting medications from patients. Very few nurses with impaired practice self-report and almost one third relapse while going through the monitoring program. Denial of the problem of substance abuse is still apparent among nurses as evidenced by over one in 10 refusing to participate in the program when they are first referred or withdrawing from the program prior to completion. The plight of nurses with impaired practice still needs to be understood, especially with new trends being noticed in the literature and recommendations for future studies have been made.

Appendix A

IRB Letter

September 23, 2016

Mercy Mumba, Dr. Susan Baxley
College of Nursing and Health
Innovations University of Texas
at Arlington
Box 19407

IRB Approval Inquiry

Mercy Mumba:

Thank you for contacting the Office of Research Administration; Regulatory Services regarding a retrospective analysis of secondary data contained in the Texas Peer Assistance Program for Nurses (TPAPN) database. This project will receive data from TPAPN in order to describe the population of chemically impaired nurses in the state of Texas who are going through the TPAPN program. Upon reviewing the procedures involved with the study, it appears they would not meet the definition of, “research with human subjects” as defined by the Office for Human Research Protections (OHRP) and would therefore not be subject to review or approval by the Institutional Review Board (IRB) at UT Arlington. OHRP defines research as:

- A systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge. A human subject in research is defined as, “A living individual about whom an investigator conducting research obtains data through intervention or interaction with the individual, or identifiable private information.”

From the description of procedures provided, it appears that the proposed research study is not collecting information that is individually identifiable. The data you will receive will not be individually identifiable through direct or indirect labels, and you and the research team do not have access to the key to the codes. You are unable to readily ascertain the identities of the individuals in the dataset. If your research progresses to a stage where you may receive individually identifiable information, then you would need to submit a protocol for IRB review and approval at that time.

I have included the link for decision charts provided from OHRP from which this determination is made for your reference. If the procedures that have been outlined and provided to our office change such that IRB approval might be necessary or you have any questions regarding this determination please do not hesitate to contact me at regulatoryservices@uta.edu.

Thank You,



Mary-
Colette
Lybrand
Regulatory
Services
Manager
Office of Research
Administration;
Regulatory Services
OHRP reference: <http://www.hhs.gov/ohrp/policy/checklists/decisioncharts.htm>

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Appendix B
Humana Subjects Training Certificate



Human Subjects Protection Training (HSP) Training Complete

This document certifies that Mercy Ngosa Mumba completed the training entitled “Human Subjects Protection Training (HSP)” in its entirety on March 4th, 2016.

Certificate ID 25ab8eca4b10afcbbd94c3eb718f7e12 was generated by Electronic Research Administration on behalf of The University of Texas at Arlington.

Appendix C
TPAPN Approval Letter



November 29, 2016

Mercy Mumba
University of Texas Arlington
P. O. Box
Arlington, Texas

Re: Access to the Texas Peer Assistance Program for Nurses (TPAPN) de-identified data

Dear Ms Mumba:

Please be advised that you hereby have permission to utilize de-identified TPAPN data for dissertation research purposes, a retrospective descriptive study of chemically impaired nurses in Texas, using the TPAPN data that has been de-identified by TPAPN staff.

I understand that you are conducting this research as a PhD student of the University of Texas at Arlington. Your committee members are Susan Baxley, PhD, RN (chair), Diane Elizabeth Morrison Snow, Ph.D., RN, PMHNP-BC, CARN, FAANP, FIAAN, and Daisha CIPHER, PhD. They may also have access to the data.

Sincerely,

A handwritten signature in black ink, appearing to read "Jonathan Wolfarth", is written over a light blue circular stamp.

Jonathan Wolfarth, MS, RN-BC
Program Director
Texas Peer Assistance Program for Nurses
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