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Factors associated with abstinence among older opiate users

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by

Julie Ann Snyder

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TABLE OF CONTENTS

LIST OF TABLES

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ABSTRACT

Factors associated with the achievement of abstinence were examined among

343 opiate addicted older adults (average age 56.5 years old) who were

participants in longitudinal studies conducted by Anglin and colleagues.

Participants' responses to survey questions on factors such as physical health

status, mental health status, gender, social support, and Alcoholics Anonymous

(AA) involvement were investigated to examine their association with

achievement of short-term abstinence (defined as no illicit substance use within

the past 30 days) and long-term abstinence (defined as no illicit substance use

within the past year). Logistic regression analysis was conducted to determine

the nature and strength of the relationship of these predictor variables and

abstinence. It was predicted that individuals with less reported physical health

issues will be more likely to be abstinent, while individuals with more reported

mental health issues will be less likely to be abstinent. Further, men would be

less likely to be abstinent than women; while individuals with higher reported AA

involvement will more likely to be abstinent. It was found that the current sample,

when compared to same age and gendered peers, was overall sicker that

national outpatient psychiatric norms. The results also found that higher mental

health status was able to significantly predict both higher short and long-term

abstinence. It was also found that higher AA involvement was associated with

higher abstinence in both the short and long term.

CHAPTER I: Introduction

The *Baby Boomer* generation (those born from years 1946-1964; United States Census Bureau, 2006) is a unique and well-studied generation (Beullens & Aertgeerts, 2004; Lofwall, Brooner, Bigelow, Kindbom, & Strain, 2005; Merrick, et al., 2008; Patterson & Jeste, 1999). According to U.S. Census data, individuals aged 50 and older was estimated at 83.2 million from 2002-06; this is expected to increase to 115.6 million by 2020. As Baby Boomers age and move into older adulthood, the increase in the number of older adults will have a considerable impact on the existing health care system and community resources, due to age-related health problems.

The Baby Boomer generation was not only exposed to social change, it was also characterized by a break from traditional norms, including increased drug use than their older generational counterparts (Colliver, Compton, Gfroerer, & Condon, 2006). Several studies support the continuation of substance abuse issues in older adulthood (Colliver, et al., 2006; Levy & Anderson, 2005; Duncan, Nicholson, White, Bradley, & Bonaguro, 2010; Gfroerer, Penne, Pemberton, & Folson, 2003; Han, Gfroerer, Colliver, Penne, 2009; Hser, Longshore, & Anglin, 2007).   More specifically, in a 33-year follow up study of opiate dependent individuals, Hser, Hoffman, and Grella (2001) found that over time, Baby Boomers had an increase in methadone maintenance treatment participation. The same study also found that continued substance use by older adults did appear to influence several health and quality of life factors: the individuals who were currently using heroin had higher rates of disability, mental health issues,

daily alcohol intake, cigarette smoking, other illicit drug use, criminal involvement, and lower rates of employment (Hser, et al., 2001). Further, one study of 13,749 substance use treatment facilities across the United States found that only 17.7% (2374) of these facilities reported having specialized treatment for older adults (Schultz, Arndt, & Liesveld, 2003). There is increasing evidence suggesting that addiction is a cyclical and chronic condition, where each relapse is often characterized by multi-systemic resource utilization and costly treatment episodes (Dennis, Scott, Funk, & Foss, 2005). Previous addiction treatment models operating from an acute care perspective were ill-equipped to address substance use disorders (SUDs) as a chronic condition (Grella & Hser, 1997) and a succession of acute care treatment episodes is not the same as continuing care for a chronic condition (Gossop, 2002).

Thus, as Baby Boomers age, it is projected that the number of SUDs for older adults will also increase. More concisely, substance use disorders were estimated at 2.8 million from 2002-06 among older adults (ages 50 and older). This figure is expected to double to 5.7 million in 2020 (Han, et. al., 2009). This sheer increase will present unique challenges not only in treating these individuals, but also addressing the unique issues of an aging population.

Following the shift to evidence-based practices (Broekaert, Autrique, Vanderplasschen, & Colpaert, 2010), SUD treatment is shifting to a chronic care model, providing tools to facilitate patients improving life in multiple areas (Laudet & White, 2010). In order to be utilized effectively, continuing care treatment has to be patient-driven, meeting quality of life issues to achieve recovery from SUDs

(Laudet & White, 2010) and taking a more holistic approach to treatment and recovery (De Maeyer, et. al., 2011). From this standpoint, abstinence from substance use is one component of a multifaceted recovery. Thus, investigation and identification of factors associated with abstinence among Baby Boomers will help to target treatment interventions and program resources, working to alleviate the multi-systemic strain on community, social, and fiscal resources.

A common stereotype suggests that older adults do not use substances, especially not to a level that could cause difficulties or impairment (Blow, 1998). It was often thought that older adults who may have had substance abuse issues earlier in life simply *aged out* of the problem (Blow, 1998). However, operating with this bias results in information gaps in assessment, diagnosing, and treating SUDs in older adults. For example, Molinari, Kier, & Kunik, (2002) identify a number of challenges mental health professionals have with the identification and treatment of SUDs in older adults, as follows: (a) psychological and physical health issues resulting from SUDs and the effects of aging may mistakenly be attributed to falls, memory loss, and isolating behaviors; (b) training and experience among mental health clinicians is limited, evidenced by a survey of mental health professionals, which found that 32% had no formal training in geriatrics, while 74% of the professionals stated that they wanted training; and (c) clinicians spent over half their time working with older adults.

However, as several studies suggest, older adults do continue to use drugs (Hser, Hoffman, Grella, & Anglin, 2001; Hser, Anglin, & Powers, 1993), drink alcohol (Merrick, et al., 2008), use heroin (Hser, 2007; Hser, Longshore, et

al., 2007), and abuse over-the-counter and prescription medications (Stevenson & Masters, 2005), due to the chronic nature of SUDs (Boeri, Sterk, & Elifson, 2006; Levy & Anderson, 2005). In a national study of 862 homeless and lower-income adults over age 50, it was found that 24% had a current alcohol problem and 8% had a current drug problem (Dietz, 2009). The actual prevalence may be higher due to self-reporting issues (e.g. minimizing problems or unwillingness to self-disclose problems), and difficulties with diagnosis of SUD's in older adults. It is more difficult to diagnose older adults with substance abuse issues due to an increased susceptibility to neurotoxic effects of substance abuse (Crews & Boettiger, 2009; Moore, Endo & Carter, 2003). In addition, chronic drug abuse may also exacerbate age related changes in the brain (Dowling, Weiss, & Condon, 2008).

Heroin use among an older adult population is an area with growing research, but continues to lack in-depth detail as compared to studies with other substances (Higgs & Maher, 2010). There are some preliminary findings that support continued opiate use into older adulthood. In a statistical analysis of 17 surveys conducted from 1982- 2000, Armstrong (2007) looked at a total of 452,567 participants who responded to the National Household Survey on Drug Abuse. He found that among Caucasian participants born in 1945 and later, the prevalence of intravenous drug use increased markedly when compared to other birth cohorts, concluding that those born in the late 1940s and early 1960s have a considerably higher likelihood of having ever injected drugs (Armstrong, 2007).

Assessment tools and biases may often fail to accurately account for the influence of aging on substance abuse presentation (Beullens & Aertgeerts, 2004). For example, DSM-IV-TR criterion for tolerance is inapplicable to older adults because older adults often have higher substance sensitivity, such as a higher blood alcohol level with lower consumed amounts of alcohol (Menninger, 2002). Similarly, older adults may not spend a good amount of time doing things related to substance use, have fewer regular activities and responsibilities interrupted, and often have fewer major role obligations (Menninger, 2002; Moos, Brennan, Schutte, & Moos, 2004). Modifications to substance use diagnostic criteria for older adults have been recommended for over 10 years (Patterson & Jeste, 1999), and with the increase in an older adult population, it seems fitting to develop an understanding of this population and factors related to abstinence. Updated assessment measures can help clinicians more accurately assess for SUD's (Sorocco & Ferrell, 2006). As assessment measures improve and biases are slowly lessened, it seems likely that there may be an increase in older adults who are diagnosed and enter into treatment for substance abuse issues.

Further complicating accurate assessment is that older adults may be less likely to disclose their substance use (Rockett, Putnam, Jia, & Smith, 2006) and may (incorrectly) perceive that they have control over their substance use (Boeri, et al., 2006). In a study of individuals seeking treatment in the emergency room, it was found that individuals 65 years and older were twice as likely to refuse alcohol screening as other age groups. This study also found that females who were 65 years and older were more likely to not disclose illicit use, with those

using opioids, benzodiazepines and stimulants/amphetamines being the substances that were most likely to not be disclosed to treatment providers. Research on substance use among older adults has been limited with individuals with drug use disorders, which may be related to a high mortality rate among individuals with drug use disorders. Neumark, Van Etten, & Anthony (2000) found that individuals with a drug use disorder die an average of 22.5 years earlier than individuals without drug use disorders. This leaves a smaller sample to study and from whom to develop effective treatments.

To effectively utilize resources for treatment of SUDs from a continuing care perspective, it is helpful to understand what impacts substance use among older adults and what contributes to abstinence. Identifying and developing an understanding of these issues will serve to inform and develop more specific and effective treatments, minimizing the breadth of the impact of this aging generation. Several factors that influence recovery in substance use disorders have been identified in older adults, and they include physical health issues, mental health issues, gender, social support, and 12-step/Alcoholics Anonymous group involvement (Beynon, 2009; Colliver et al, 2006; Gossop, Stewart, & Masden, 2007; Lofwall et al., 2005; Tonigan, Miller & Connors, 2000; Williamson, Darke, Ross, & Teessib, 2009). These factors are explored in more detail below.

Physical Health Issues

The aging process impacts physical health, causing deterioration in physical functioning and change in brain structures over time. Chronic drug use may exacerbate these changes, creating a discrete set of problems unique to this

group that needs further examination (Beynon, 2009). In one study of individuals with SUDs, the older patients reported the most severe physical health issues in comparison to their younger counterparts; using heroin or other opiates were found to be associated with these more severe physical health issues (Williamson, et al., 2009). In a national study of homeless and low-income individuals over age 50, Deitz (2009) found that having a current health problem doubled the odds of having a current alcohol problem.

In a comparison of younger and older adults receiving opioid-substitution treatment at Johns Hopkins Medical Center (Lofwall et al., 2005), it was found that the older adults with opioid use disorders had higher rates of cardiovascular, gastrointestinal and bone/joint problem, as compared to the younger adults in this sample, with hypertension being the most common. Further, the older adult group was taking more prescription meds daily, cited at 43.9% of the sample. However, the mean age of the older adults in this study was 53.9 years old, and this could be a very conservative estimate of the health issues that older adults face. Additionally, Colliver and colleagues (2006) found in the National Household Surveys on Drug Abuse (presently known as the National Survey on Drug Use and Health (NSDUH)) study that older adults enrolled in substance abuse treatment are more likely to present with comorbid physical problems. A 5 year follow-up study from the Drug Abuse Treatment Outcome Studies (DATOS) identified that over one-third (34.7%) of the 432 individuals enrolled in outpatient methadone treatment continued to report physical health limitations, a significant

difference when compared to 1-year follow-up data (Hubbard, Craddock, &

Anderson, 2003).

In a study of 108 older male narcotics addicts in California, Hser and

colleagues (2004) found that the participants reported worse physical functioning,

greater role limitation due to physical or health issues, and worse general health

perception overall than the general population of the same age cohort. This

suggests that the physical health issues continue to persist and be a factor in

functioning for narcotics addicts.

Physical health issues often open up a gateway for substance use

disorders, with individuals obtaining pain medication via medical providers. In a

national study of adults aged 18-80 years old who were prescribed opiate

medication, 55% of the national sample never had used an illicit drug; while 4.5%

(10 million people) have used prescription opioids in the past year for non-

medical use. Of these 10 million people who used prescription opioids in the

past year for non-medical use, 13% met criteria for opioid abuse or dependence

(Becker, Sullivan, Tetrault, Desai, & Fiellin, 2007). This is a figure that is

projected to increase with the increase of the older adult population.

Complicating these numbers is the finding that prescription and over-the-counter

medication abuse is climbing (Blazer & Wu, 2009; Lessenger & Feinberg, 2008;

McCabe, Cranford, & West, 2008). Specifically, past year prevalence of the

diagnosis of prescribed sedative abuse/dependence and opioid

abuse/dependence increased from 1991-92 to 2001-02 and the majority were not

enrolled in treatment in the last year (McCabe et al., 2008). In addition, pain

prescription medication diversion was found to be the main source of these substances, according to the work done by Lessenger and Feinberg (2008). That is, the main source of abused opioids is from medical prescribers who need to be better informed to address these issues with their patients.

Physicians have indicated discomfort in addressing substance misuse with their patients, endorsing that discussions about prescription drug abuse were more difficult than discussions regarding alcohol abuse or depression (Boddiger, 2008; McCabe, et al., 2008). Shafer (2004) also discussed in a review of the literature that the older individuals are higher utilizers of medical care than younger individuals, in part due to age-related health issues. As the medical contacts may be the only treatment contact these older individuals have, it is imperative physicians are able to screen for substance use disorders. Furthermore, Shafer argues that a "double denial" (p. 346) occurs when clinicians not trained in substance use disorders combine with caregiver's lack of training and knowledge regarding healthy behaviors of older adults, creating a treatment gap for older adults.

As clinicians often use screening questionnaires to diagnose treatment issues, a concern arises when SUD questionnaires may not accurately assess these issues in older adults. Assessment instruments, such as questionnaires, are often based on DSM-IV-TR criteria, which often are not accurate in encompassing the symptoms of SUDs in older adults (Menninger, 2002). This is a concerning finding and supports the notion that treatment providers need to have a better understanding of idiosyncratic characteristics of substance abuse

among older adults and more accurate assessment measures in order to screen for these issues.

As physical health issues increase, utilization of treatment providers, namely emergency rooms, is also likely to increase for older adults, placing a strain on treatment resources (Hampton, 2009). Baby Boomers have less hesitation than previous generations about going to the ER and admission rates are steady, so the ER visits appear to be for serious medical issues (Berger, 2008). Disturbingly, ER visits for patients 65-74 years old increased by one third from 1993-2003; by 2013, ER visits could double from 6.4 million to 11.7 million visits by patients 65-74 years old (Hampton, 2009). Understanding effective treatment interventions, as well as addressing substance use disorders from a chronic care perspective, may serve to alleviate this strain at the acute care level.

Additionally, physical health issues can be a major source of stress, impacting social and occupational roles, and psychological well-being. Folkman, Bernstein, and Lazarus (1987) found that the higher the perceived stress, the higher the likelihood of an older adult misusing substances. They also found that 48% of older adults, misused drugs and that this misuse was associated with perceived stress emotions. Specifically, the older adults who identified more negative threat emotions (such as worry and fear) with their stressful encounters were more likely to misuse substances than those who did not misuse substances. Therefore, not only do older adults present with more physical health issues, they also present with higher levels of stress related to physical health issues. Addressing physical health issues and understanding the impact

that they have on achievement of abstinence and recovery can provide more well-rounded and efficacious treatment for older adults.

Mental Health Issues

Co-morbid mental health and substance use disorders, or dual diagnosis, is another factor that is associated with difficulty in maintaining abstinence. Often a substance use disorder develops from an attempt to self-medicate an underlying mental health problem, creating two illnesses that are often intertwined and difficult to manage (Moos, Mertens, & Brennan, 1993). Among substance users over age 55 who were admitted to inpatient treatment, in a study done by Moos, Mertens, and Brennan (1993), 20% were in dual diagnosis units. Further, the adults over age 55 were more likely to have organic brain damage and paranoid psychosis, and to require longer episodes of psychiatric care and medical detox, as compared with the younger adults in this sample.

Prevalence of co-morbid mental health issues among individuals with substance use disorders is high. One study of primarily opioid users found comorbidity of substance use disorders and another mental health issue at 67% (Thomasius, Sack, & Petersen, 2010). In a national study of over 20,000 participants, (Reiger, et al., 1990) 37% of the individuals with alcohol use disorders and 53% with drug use disorders were found to have co-occurring Axis I psychiatric issues. Reiger and colleagues (1990) also found that individuals diagnosed with schizophrenia were three times as likely to have problems with alcohol and six times as likely to have problems with drugs than individuals without a schizophrenia diagnosis. Grant and colleagues (2004) found using

data from the NESARC (National Epidemiologic Survey on Alcohol and Related Conditions), a household probability sample of 43,093 individuals, that individuals diagnosed with alcohol use disorder, almost 41% had at least one co-occurring independent mood disorder. In the same study, the figures for co-morbidity were even higher for those with drug use disorders: among individuals seeking treatment for a drug use disorder, 60% had at least 1 independent mood disorder. Other studies have found the range of dually diagnosed to range from 20% (Grant, et al., 2004) to 47% (Brooner, King, Kidorf, Schmidt, & Bigelow, 1997) these estimates are dependent upon how individuals were sampled and the types of diagnostic instruments used.

Sub-diagnostic psychological distress is also highly prevalent among individuals with substance use disorders, as discussed in a study conducted by Ross and colleagues (2005). Looking at 825 current heroin users in Australia, Ross and colleagues identified that 49% reported some level of psychological distress that was significantly higher when compared with population norms. As co-occurring mental health issues present often in individuals with substance use disorders, consideration of the impact of mental health issues among those individuals being treated for substance use disorders appears imperative to achievement of abstinence and sustained recovery.

Mental health issues and substance use have been shown to be correlated, although the relationship with abstinence is not well understood. Some studies suggest that there is no relationship among psychiatric co-morbidity and relapse with substance use disorders (Di Sclafani, Finn & Fien,

2007). However, Xie, Drake, Mchugo, Xie, and Mohandas (2010) investigated the achievement of abstinence among 223 individuals dually diagnosed with mental health issues and alcohol use disorders over a 10-year period; finding that individuals with decreased psychiatric symptoms (presumably to treatment interventions to manage symptoms) were more likely to maintain abstinence. Hser, Huang, Chou, & Anglin (2007) investigated 471 incarcerated males in a 33-year follow-up study and found that individuals who quit using heroin earlier in life also had a significantly lower level of psychological problems than individuals who continued to use later in life. Maremmani and colleagues (2008) found similar results in a 6-year longitudinal study of 129 individuals on methadone maintenance, finding that concurrent psychiatric disorders were the strongest negative predictor of relapse, regardless of other clinical and socioeconomic variables. Skinner, Haggerty, Fleming, Catalano, and Gainey (2011) conducted a 12-year follow-up study with 144 opiate-dependent individuals, and found that mental health issues (namely depression) can be a significant factor in continued drug use. Further evidence to support that mental health disorders can influence treatment outcomes is Freeman, Maxwell, and Davey's (2011) study of approximately 345,000 individuals who were mandated to DUI treatment from 2005-2008. Freeman and colleagues found that individuals with a co-occurring Bipolar Disorder diagnosis were less likely to complete treatment than peers without a Bipolar Disorder diagnosis.

In Lofwall and colleagues (2005) comparison of older (ages 50-66) and younger (ages 25-36) adults in opioid maintenance programs, mood disorders

(Major Depressive Disorder, Bipolar Disorder, and Dysthymic Disorder) were the most common among the older individuals. The high prevalence of mood disorders among substance using older adults could be explained by schematic patterns that have developed over time, in addition to grief, loss of companionship, loss of social roles, and lowered standard of living. In a study of 141 older adults (ages 65-74), Folkman, et al. (1987) illustrated that older individuals who misuse drugs were more likely to have negative schemas related to stress and problem solving, than their non-using peers, which impact their mental health, specifically in presentations of depression and anxiety.

Trauma and exposure to multiple traumas is a topic that is beyond the scope of this paper. However, it is important to note the prevalence of trauma among individuals with substance use disorders. In a study of 587 individuals, Khoury, Tang, Bradley, Cubella, and Ressler (2010) found that high rates of lifetime dependence on various substances was strongly correlated with current PTSD symptoms as well as childhood physical, sexual, and emotional abuse. Identifying and treating trauma and PTSD among individuals with substance use disorders may help in the process of recovery and the achievement of abstinence.

Personality disorders are also, by definition, long-standing, and Axis II issues can further complicate achievement and maintenance of abstinence. In a study of 187 individuals with alcohol use disorders, it was found that having a co-occurring personality disorder was significantly associated with a shorter latency to relapse among outpatient individuals, especially within the first 3 months of

treatment (Verheul, van den Brink, & Hartgers, 1998). As this study was focused on individuals with alcohol use disorders, more information is needed on relapse among dually diagnosed opiate using individuals.

Individuals presenting with dual diagnosis issues may require extra help in maintaining sobriety, as they have two chronic mental health issues to manage. Due to substance use issues, dually diagnosed individuals are more susceptible to destabilization of mental health and decreased adherence to treatment (Green, Drake, Brunette, & Noorday, 2007). This leaves treatment providers often struggling with the individual to manage the co-occurring disorders, and more information on the relationship with mental health issues and relapse would begin to support a foundation for the development of treatment interventions. Further challenging treatment and the achievement of abstinence is the stigma of mental health issues and substance use disorders. The stigma has been found to have lasting effects, including contribution to continued depressive symptoms, even when the dually-diagnosed individuals are responsive to treatment interventions (Link, Struening, Rahav, Phelan, & Nuttbrock, 1997).

As Baby Boomers grow older and the number of older adults continues to increase, it seems likely that inpatient units will not be equipped to deal with an increasing amount of older individuals with dual diagnosis issues (Koenig, George, & Schneider, 1994). Inpatient treatment is used to manage medical detoxification from many substances, including opioids, and inpatient stabilization may be necessary for those who require stabilization of acute co-occurring medical or psychiatric conditions. However, it is projected that the older adults

with physical and psychological issues are more likely to be treated on an outpatient basis (Koenig, et al., 1994), as the strains on inpatient care will be significant. Also complicating this issue will be access to service delivery and the willingness of the younger generation of adult children of Baby Boomers to address dual diagnosis treatment needs, a virtually non-investigated topic (Koenig, et al., 1994).

Gender

Unique characteristics that stem from gender differences in substance abuse are well studied. Often the obstacles that women face are significantly different from the obstacles that men experience (Grella & Joshi, 1999). For example, in a study of 211 patients of primary care clinics age 55 to 91 years, men were found to report lifetime abstinence and score higher on a measure of problem substance use than did women (Satre & Arean, 2005). Understanding gender influences and aging on substance abuse will help to elucidate further understanding of this population and clarify more effective treatment targets.

Many substance use disorder studies looking at gender have focused on alcohol use, citing that men are more likely to drink than women (Chan, von Mühlen, Kritz-Silverstein, & Barrett-Connor, 2009; Crome & Crome, 2005). However, women are also socialized to avoid public intoxication (Brennan, Moos, & Kim, 1993); consequently, problems related to substance use may be more hidden. Ziegler (2008) found that older adult women are more likely to drink alone and the concept of *telescoping* is an important concern. The telescoping effect is where women start using later, but progress to later stages of addiction

earlier (in a shorter amount of time). Further, Ziegler also found in a study

conducted by the National Center on Addiction and Substance Abuse (CASA) at

Columbia University (1998), that less than 1% of the 2 million women over age

59 actually receive treatment for alcohol abuse and dependence. This same

study further suggests that women tend to use minimization, rationalization and

externalization as part of their presentation when speaking about their alcohol

use, making it challenging for treatment providers to get an accurate assessment

of the clinical picture (Ziegler, 2008). However, telescoping may not be as

applicable to individuals who are using opiates. In a study of 599 individuals

(mean age 33 years old; average age at first use was 20.9 years old) diagnosed

with opiate dependence, the telescoping effect was minimally observed in the

first 4 years of opiate dependence (Hölcher, et al., 2010). Hölscher and

colleagues (2010) explain that opiate dependence often leads to chronification,

which does not lead to significant differences across gender or length of

consumption.

Gender factors may contribute to selection of an individual's substance of

choice; with females choosing more "socially acceptable" substances, such as

prescription drugs. In a national study of 22,460 adults who used medical care

services, Simoni-Wastila (2000) found that being female increases the odds of

using any abusable prescription drug by 48% and women were more likely to use

narcotics and anxiolytics than their male counterparts. Factors associated with

nonmedical use of prescription drugs include older age, female gender, poor/fair

health status, and daily drinking (Simoni-Wastila, & Strickler, 2004). Further,

men were more likely to develop prescription drug abuse, while women were more likely to develop prescription drug dependence (McCabe, West, Morales, Cranford, & Boyd, 2007).

Further looking at gender differences in individuals with substance use disorders across several treatment modalities, Grella and Joshi (1999) found a wealth of information, including that more women (59.2%) had prior drug treatment when compared to men (53.9%). Grella and Joshi also found that when compared to men, women were younger when entering treatment, more likely to have been married, more likely to be single parents, and more likely to have exchanged drugs for sex or money. Although men have an earlier age of first drug use and have tried a greater number of drugs than women, women reported a shorter interval of time between first regular drug use and first treatment entry than men (Grella & Joshi, 1999). The authors also looked at complicating external factors, with men more likely to be involved in criminal justice system, women more likely than men to have had mental health treatment and to meet criteria for Generalized Anxiety Disorder or Major Depressive Disorder. Men also have more family support and encouragement to enter treatment, while women are less likely to be pressured by spouse to enter treatment (Grella & Joshi, 1999).

A study by Hser, Joshi, Maglione, Chou, & Anglin (2001) found that women (majority over age 30 at admission) were more likely to complete methadone maintenance treatment and outpatient drug free programs than men. The Project MATCH study found that women diagnosed with alcohol

dependence have less severe relapse patterns than men diagnosed with alcohol dependence and the women appeared more willing to seek treatment following a relapse (Project MATCH, 1997).

Therefore, previous findings suggest that gender accounts for some variability in treatment utilization and outcomes, especially as a covariate with other factors, such as mental health issues or social support. A review of the literature on substance abuse treatment entry, retention and gender by Greenfield and colleagues (2007) cited the need for further follow-up studies with older individuals and individuals with co-occurring mental health issues. The present study will help to elucidate the impact of gender on abstinence, specifically in relation to other salient treatment factors with an older population, such as social support.

Social Support and Functioning

Social support is a factor that is often lacking for individuals with substance use disorders, with females remaining more socially integrated than males (e.g. women are more likely to be living with their dependent children), as Grella and Joshi (1999) found; male substance users tend to have greater involvement in the criminal justice system (Grella & Joshi, 1999). Thus, social support may be a protective factor that results in less severe or less prevalence in alcohol-related problems for women. However, women who do have substance use disorders may be less likely to seek help and more likely to have stressful relationships with a spouse or family- particularly if their substance use is embedded within the relationship dynamics (Brennan, et al., 1993).

Bereavement, social isolation, lack of social support and financial difficulties can cause social problems and contribute to continued substance misuse (Gossop & Moos, 2008). Additionally, social stigma around substance use issues has been identified as a barrier for individuals entering into substance abuse and/or mental health treatment (Connor & Rosen, 2008), in addition to the stigma of aging and continuing to experience substance use issues. The socio-emotional career of the older substance user is marked by loneliness, stress, and fear of victimization; like many older adults, they prefer to "age in place" (p. 256) by remaining in a familiar socio-environment where they know the rules and what to expect (Levy & Anderson, 2005). This sense of isolation may be compounded by age, as older adults may perceive themselves powerless to adjust to the social norms and physical demands of the current drug world (Anderson & Levy, 2003).

Older adults who attempt to stop using heroin may have a more difficult time doing so, as the social networks to support recovery have not been established in the earlier life course (Hser, 2007). In a study of 24 older adults on methadone maintenance treatment for opiate dependence, a lack of trust was identified as the main obstacle to use and expansion of social supports (Smith & Rosen, 2009). Increasing social supports and working to overcome obstacles to social support may be helpful in treating an already isolated older adult population.

With aging also comes the loss of social supports through death of family and friends, which can be a profound loss for older adults. Multiple losses can be extremely traumatic for older adults (person, financial, home, etc.) and further

understanding is needed to assess the strength of the relationship between loss and substance use disorders. In a review by Shafer (2004), older adults often are not using substances for recreation, but for a therapeutic effect, such as relief from grief or pain. Older adults are more likely than younger adults to use/drink alone when compared to their younger counterparts (Neve, Lemmens, & Drop, 1999). Further, Sorocco and Ferrell (2006) looked at older individuals diagnosed with alcoholism, and reported that risk factors for addiction include dual diagnosis issues, isolation, stressful life events, and the environment (e.g. being homebound, lack of, or difficulty accessing, social or treatment resources in the community, and more constrictive social hours in assisted living facilities).

In a group comparison study with older adults diagnosed with alcoholism and those who did not drink, it was found that the alcohol users were more likely to be depressed, sad, isolated, and have psychiatric issues. The isolation may be due to not developing connections because of addiction, leading to a vicious cycle of continued alcohol use (Rivers, Rivers, & Newman, 1991). In a 12-year longitudinal study of 144 opiate-dependent individuals, Skinner and colleagues (2011) found that having deviant friends (friends who are using substances) and changes in marital status were more likely to be associated with continued substance use, illustrating the influence of social support factors on abstinence outcomes. In the same study, Skinner and colleagues also found that opiate users who were in recovery often cited their children or grandchildren as the important focus of their lives, illustrating how positive social support can be a factor in maintaining abstinence.

Although the literature has investigated social support and functioning as a variable that is associated with substance use disorders and abstinence, it is often focused on individuals who substance of choice is alcohol. More research is needed to address the relationship among social support and functioning and older individuals with opiate use disorders. Each substance of choice presents a unique clinical picture and subsequent treatment interventions (for example, increased discussion around safe needle use would be appropriate for intravenous heroin users, but less relevant for individuals whose substance of choice was marijuana). Focusing on how social support and functioning is associated with abstinence among older individuals with opiate dependence will help to implement effective treatment interventions.

Fellowships such as Alcoholics Anonymous (AA) and Narcotics Anonymous (NA) often serve as new support systems for individuals who are trying to cut down on their substance use. This is often because families isolate from individuals with substance use disorder issues, or the individual chooses not to be a part of an unhealthy family or social support system as they work on recovery.

Alcoholics Anonymous Involvement

Alcoholics Anonymous (AA) originated in 1935 and is a widely known and well-established support for individuals with substance use disorders (Humphreys, 2003). Better treatment outcomes have been associated with AA affiliation, including increased abstinence from alcohol (Moos, & Moos, 2004; Timko, Moos, Finney, & Moos, 2000) and sustained recovery (Fiorentine, 1999;

Morgenstern, Labouvie, McCrady, Kahler, & Frey, 1997). Additionally, treatment

costs for those who engaged in AA were shown to be 45% lower than for

individuals who engaged in outpatient treatment, with similar outcome results

after 3 years (Humphreys & Moos, 1996). However, there are unique issues in

AA for individuals with a history of methadone maintenance treatment. As

methadone was considered to be a drug, these individuals were historically

viewed by the AA community as non-abstinent. There is increasing flexibility in

this viewpoint, but there is still variability around the definition of abstinence in the

12-step community (Krentzman, et. al., 2011).

AA is one subset of a greater 12-step support community that includes

Narcotics Anonymous (NA) and Cocaine Anonymous (CA), to name a few

others. As AA was the first 12-step self-help group, it has been the most studied

(Room & Greenfield, 1993). However, studies often group NA and AA together,

as was done by Brown, O' Grady, Farrell, Flechner, & Nurco (2001), where they

found that individuals who attended AA or NA frequently (at least 3 times a week)

had more serious histories of substance use (for example, starting use at a

younger age, greater number of arrests and/or treatment episodes).

Interestingly, these investigators also found that there was no significant

difference in perceived level of social support and frequency of AA/NA

attendance. The study explains that involvement in AA/NA attract those who can

benefit from the support and continued behavioral reinforcement that 12-step

groups can provide. Considering AA and NA involvement together as 12-step

involvement could help to generalize findings and more accurately discern

treatment outcomes related to 12-step involvement, as discussed by Room and Greenfield (1993).

Originally, attendance at AA meetings was the operationalized variable in treatment studies of AA and treatment outcomes, but more recent studies have shown that greater involvement in AA (versus just simple attendance) is associated with more favorable treatment outcomes (Montgomery, Miller & Tonigan, 1995; Tonigan, Miller & Connors, 2000). An Alcoholics Anonymous Involvement (AAI) scale was developed by Tonigan, Connors, & Miller (1996) to assess AA involvement. The AAI scale has been shown to better account for explanations of variance in abstinence rates than measures of attendance alone, illustrating that the AAI exhibits greater statistical power (Cloud, Ziegler, & Blondell, 2004) versus measuring AA attendance alone.

Project MATCH (Matching Alcoholism Treatments to Client Heterogeneity) (1997) investigated efficacy of treatment options for individuals diagnosed with alcohol dependence. This study compared 12-step facilitation, cognitive-behavioral skills therapy, and motivational enhancement treatment randomly assigned 774 individuals coming from inpatient treatment and 952 individuals who had only received outpatient services (total N = 1,726). The authors found that individuals without significant mental health issues assigned to the 12-step treatment achieved significantly greater abstinence rates than those assigned to the cognitive behavioral treatment option. However, the differences in achievement of abstinence were not significant for individuals with more severe mental health issues.

AA as an effective adjunct in treatment has also been supported in the literature. For individuals with higher psychiatric severity, abstinence was more likely to be achieved when psychiatric issues are addressed concordantly (Polcin & Zemore, 2004), and that individuals with higher psychiatric severity may need more assistance than others to complete the steps of AA (Polcin & Zemore, 2004). Further, AA involvement after an inpatient treatment stay was more effective in sustaining abstinence than AA involvement alone (Walsh, et al., 1991).

Morgenstern et. al. (1997) illustrate that affiliation with AA was significantly associated with commitment to abstinence and active coping efforts to manage relapse, in addition to increased self-efficacy. Similarly, Sheeren (1987) found that AA involvement was not only correlated with lower rates of relapse for individuals with alcohol dependence, but AA involvement, specifically with reaching out to other AA members and the use of a sponsor, had the strongest correlation with maintenance of abstinence.

However, the majority of these studies investigated AA involvement with individuals who had been diagnosed with alcohol dependence, increasing the need for empirical support for AA involvement for those who have been diagnosed with SUD's with substances other than alcohol. A study by Gossop, Stewart, et al. (2007) looked at attendance at AA and NA meetings and the relationship with abstinence among individuals diagnosed with SUD's other than, or in addition to, alcohol dependence. The sample of 142 individuals in this study had been in residential treatment and longitudinal data on abstinence and AA or

NA attendance was collected. The authors found that abstinence from opiates was increased throughout the 5 year follow-up period when compared to pre-treatment levels. The study also found varying results based on the substance of choice (Gossop, Stewart, et al., 2007), with some substances, such as stimulants having only increased abstinence among those attending AA or NA at the 1-year follow-up only. As this study only looked at 12-step attendance versus involvement, further investigation into the relationship with AA involvement and abstinence achievement among individuals with a history of heroin dependence would increase understanding of what interventions may be efficacious, and cost-effective, with individuals with substances of choice other than alcohol.

Present Study

The significant increase in the number of older adults in the next decade as the Baby Boomer population ages is predicted to place a strain on treatment providers. As substance use disorders are seen as chronic conditions that require ongoing (and patient-driven) care, developing an understanding of what factors are associated with abstinence specifically for older individuals will help to effectively tailor and allocate treatment resources.

As alcohol use is well studied among older adults (Sorocco & Ferrell, 2006; Menninger, 2002; Liberto, Oslin & Ruskin, 1992), the focus of this study will be looking at older adults who have a history of heroin dependence. Looking at the current impact of physical health status, mental health status, gender, social support, and AA involvement will help to provide an understanding of how these factors are associated with abstinence in an aging population, and how this

population compares on these issues when compared with their non-using peers. These factors will be investigated using follow-up data from a longitudinal study of Baby Boomer adults. The participants were enrolled in methadone maintenance treatment for opiate dependence in the late 1970s in Central and Southern California. It is hypothesized that physical health, mental health, gender, social support, and AA involvement will be able to significantly predict the achievement of abstinence in individuals in this sample.

CHAPTER II: Methodology

Participants

The original cohort of individuals was enrolled in methadone maintenance treatment programs in six counties in California from 1976-1978 and participants in one of two separate studies conducted by Anglin & McGlothlin in the 1980's. Follow-up data collection with 343 participants was conducted from March 2005 – January 2009, which represents 37.5% of the original study sample. Of the original sample, 46.8% were identified as deceased, 3.2% were unable to be interviewed, and 12.5% were unable to be located. For the present study, three cases were dropped from analysis due to not completing survey data. The final sample was reduced from 343 participants to 340 participants (Appendix B).

Recruitment Procedures

Individuals were recruited based on their participation in one of the two previous studies conducted in the 1980s by Anglin and colleagues (Anglin, Speckart, Booth & Ryan, 1989; McGlothlin & Anglin, 1981). Study participants were selected via criterion sampling, where all participants had to meet criteria of being enrolled in methadone maintenance treatment from 1976-1978 in one of six California counties. Individuals were originally sampled from treatment program records and invited to participate in the baseline studies, in which a background and natural history assessment of their drug use, criminal behavior, and treatment participation was conducted.

Design

The non-experimental study utilized a cross-sectional design using the data collected in the follow-up study with individuals who were prior participants

in methadone maintenance treatment. Data analysis was conducted in two steps. First, independent samples comparison examined whether predictor variables can distinguish the sample from psychiatric outpatient norms; gender and age were separated as a co-variate as the measured used is normed by both age group and by gender. This served to compare the sample with a psychiatric outpatient sample. Second, logistic regression examined five predictor variables' (gender, mental health status, physical health status, social support and functioning, and AA involvement) ability to predict the outcome variable of illicit substance abstinence, both in the short- and long-term. As there were significant differences in average age across gender, age was controlled for as a co-variate.

Measures

The database includes urinalysis results and data from structured interviews conducted with participants. Data collection conducted by Grella and colleagues (Grella & Lovinger, 2011) utilized a structured interview that included a variety of standardized measures, including the RAND SF-36 item health survey and the Alcoholics Anonymous/12-step program involvement (AAI Scale). Self-report measures, such as gender, age, and past history of substance use were also contained in the interview. In the present study, self-report variables as well as the SF-36 and the AAI were used. Variable coding is listed in Appendix C.

Sociodemographics. Relevant self-reported variables for the present analysis include background characteristics, such as gender, race, and age.

Gender was based on self-report, and was the first predictor variable used in the regression analysis. Race was based on participants' answer to questions that were based on U.S. Census data questions. Individuals could choose from White, American Indian/Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, or Black or African American. Due to the small relative number of participants in each group, race was grouped as *White* and *Nonwhite*. Additionally, those individuals of Latino and Chicano descent were not separated out due to the survey following structure per United States Census data questions. This is addressed in the Limitations section of the study. Regarding age, the first part of the analysis (comparison with outpatient psychiatric norms), age was looked at as a categorical variable, as the SF-36 groups age into categories (45-54; 55-64; 65+). Therefore, mean scores were used for age groups in comparisons with SF-36 population norms. For the second part of the analysis, age was looked at as a continuous variable.

SF-36 health and functioning. The second predictor variable used is physical health status. Using the SF-36 Scale (Ware & Sherbourne, 1992), physical health status was operationalized using the Physical Health Component Summary Scale, a 35-item subscale of the SF-36 that measures overall physical health status, including self-reported functioning such as physical functioning, bodily pain, and general health. The Physical Health Component Summary Scale ranges from 0 (*poor* physical health) to 100 (*excellent* physical health) and the validity estimates usually exceed 0.90 (Ware, Kosinski, & Keller, 1994). In the present study, physical health status was looked at with means for the first

analysis (comparison to psychiatric outpatient norms). And in the second part of the analysis, the regression, the study utilized dichotomized scores grouped into high and low based on the median (Appendix C).

Mental health status is the third predictor variable. Mental health status was measured using the mental health subscale from the Rand Health Survey 36-item Short Form, abbreviated as the SF-36, (McHorney, Ware & Raczek, 1993; Ware & Sherbourne, 1992). The SF-36 mental health subscale looks at energy, emotions, social functioning, and mental health. Item scores range from 0 (*worst* possible health state) to 100 (*best* possible health state). In the present study, mental health status was looked at with means for the first analysis (comparison to psychiatric outpatient norms). And in the second part of the analysis, the regression, the study utilized dichotomized scores grouped into high and low based on the median.

Social support and functioning, the fourth predictor variable, was operationalized using the Social Functioning Subscale from the SF-36 (Ware & Sherbourne, 1992). This subscale includes measures of social involvement and social scope. In the present study, social support and functioning was looked at with means for the first analysis (comparison to psychiatric outpatient norms). And in the second part of the analysis, the regression, the study utilized dichotomized scores grouped into high and low based on the median.

AA involvement. AA involvement is the fifth predictor variable used in the regression analysis.   AA involvement is derived from the Alcoholics Anonymous Involvement (AAI) scale (Tonigan, et al., 1996), which is a 13-item

self-report inventory that measures both lifetime and recent involvement in AA

programs. The inventory is designed to look at several factors of AA

involvement, including the degree that the individual is "working" the program

(e.g. recent involvement) as well as commitment to AA fellowship. The AAI scale

(Tonigan, et. al., 1996) has good internal item consistency (Cronbach's α = .85;

N = 1625) and test-retest results indicated the scores were replicable (r =0.76; N

=76), as found by Tonigan and colleagues (1996). For the present study, AA

involvement was only used in the regression analysis, as this scale is not present

on the SF-36. For the AA involvement variable, a composite variable was

created from items from the AA involvement scale. Sample participants were

dichotomously grouped as no involvement (indicating no involvement in working

the steps, attending meetings, etc.) and any involvement (Appendix C).

   Abstinence outcomes. Two measures of abstinence were looked at in

the present study, the first being short-term abstinence, defined as no substance

use for the past 30 days, consistent with the research done by Zhang and

colleagues (2011). Long-term abstinence, as defined by several studies (Becker,

et. al., 2001; McCabe, et. al., 2008; McCabe, West, Morales, Cranford, & Boyd,

2007), and DSM-IV-TR criteria for "sustained full remission" (American

Psychiatric Association, [*DSM-IV-TR*], 2000, p. 196) was defined as no illicit

substance use for at least one year. Abstinence was based on self-report of

substance use and cross-verified with a urinalysis sample collected at the time of

the survey. Individuals testing positive for methadone were considered an illicit-

drug free screen, as methadone was considered a therapeutic intervention. All

other substances, including alcohol, were considered illicit. Further, individuals who refused to provide a urine specimen were considered illicit; individuals who were unable were considered non-illicit.

Procedures

Recruitment procedures. The current study was a secondary analysis of the data collection conducted by Grella and colleagues (Grella & Lovinger, 2011) from March 2005 – January 2009. Participants for the study were selected based on their involvement in previous studies conducted in the 1980s by Anglin and colleagues (Anglin, Speckart, Booth & Ryan, 1989; McGlothlin & Anglin, 1981). Participants and collateral contacts were contact via phone and/or letter and initially told that the study was concerning a public health issue. Once the participant was verified as being a part of the original study via their date of birth, county residence during the original study, and social security number, informed consent was obtained. Grella and colleagues (Grella & Lovinger, 2011) conducted this procedure in the follow-up data collection and the present study will be a secondary analysis of that data collection.

Data collection. Individuals in the initial study were asked to voluntarily participate in a structured face-to-face interview. Interviewers who were research staff at UCLA conducted these interviews (most had Bachelor's level degrees and several years of experience conducting research interviews). The majority of these interviews took place at the individual's home or another location of their choosing (e.g. a restaurant or another public setting). Each interview took approximately 2-3 hours to administer, and at the end of the interview,

participants gave a urine sample (if they were not incarcerated), which measured the presence of heroin, methadone, cocaine/crack, THC, phencyclidine, barbiturates, benzodiazepines, amphetamines, and methamphetamines. As individuals could refuse to give a specimen for urinalysis, only those participants who consented to give a sample will be included in the present study. Participants received $100 for completion of the follow-up interview. UCLA IRB approved all procedures and all participants gave informed consent and were debriefed and referred as necessary. A federal Certificate of Confidentiality was obtained to protect the data. Data sharing and IRB exemption approval were sought for the study through Pepperdine's IRB and approved on March 22, 2011. All data analyzed in this study was deidentified.

Data Analysis

Descriptive analysis. Descriptive statistics have been collected on the population via UCLA researchers/statisticians as part of the original study. However, as part of the current study, descriptive analysis was run again for mean and standard deviation for age, breakdown of race, gender, participation rate from previous study. This serves to contextualize the sample. A basic correlational analysis was conducted on both the predictor and outcome variables to determine co-variation among variables and possible multicollinearity among variables, which could have resulted in possible suppression across measures.

Comparison to SF-36 norms. For the current study, a two-part analysis was conducted. In the first analysis, three predictor variables (physical health,

mental health, and social functioning) were examined with an independent samples t-test to see how well these variables help distinguish between the sample population and population norms for psychiatric outpatient individuals. Additionally, the psychometric properties (e.g. reliability coefficients, distributions) of the predictor variables in the study sample were examined to assess the reliability of the scales in this study.

Factors related to abstinence. The second part of the analysis utilized logistic regression to examine how well five independent variables (gender, physical health status, mental health status, social support and AA involvement) predict the outcome variable of abstinence (both short and long-term). As there were significant differences in average age across gender, age was controlled for as a co-variate. Odds ratios and 95% confidence intervals are reported for independent variables entered into the logistic regression models.

Research Hypothesis

The primary research questions and associated hypotheses are delineated as follows.

Question 1. How well do predictor variables distinguish the current sample from a psychiatric outpatient normative sample, using age- and gender-specific norms?

Hypothesis 1a. Reported physical health will not significantly distinguish between participants and psychiatric outpatient population norms.

Hypothesis 1b. Mental health indicators will not significantly distinguish between participants and psychiatric outpatient population norms.

Hypothesis 1c. Reported social functioning will not significantly distinguish between participants and psychiatric outpatient population norms.

Question 2. When age is controlled for, how well do independent variables (gender, physical health, mental health, social support, and AA involvement) predict the outcome of short-term and long-term abstinence?

Hypothesis 2a. Being a male will have a significant (at the $p > 0.5$ level), negative correlation with abstinence. Subsequently, being a female will have a significant (at the $p > 0.5$ level), positive correlation with both short-term and long-term abstinence.

Hypothesis 2b. Physical health status will have a significant (at the $p > 0.5$ level), correlation with both short-term and long-term abstinence, in that better physical health will be associated with higher odds of abstinence outcomes, controlling for other variables.

Hypothesis 2c. Mental health status will have a significant (at the $p > 0.5$ level), correlation with both short-term and long-term abstinence, in that better mental health status will be associated with higher odds of abstinence outcomes, controlling for other variables.

Hypothesis 2d. Social functioning will have a significant (at the $p > 0.5$ level), positive correlation with both short-term and long-term abstinence, controlling for other variables.

Hypothesis 2e. Involvement in Alcoholics Anonymous will have a significant (at the $p > 0.5$ level), positive correlation with both short-term and long-term abstinence, controlling for other variables.

CHAPTER III: Results

Sociodemographics

Table 1 provides descriptive information for the total sample of 340

participants. This sample represents a 37.2% of the original sample of

participants from previous studies conducted in the 1980s by Anglin and

colleagues (Anglin, et al., 1989; McGlothlin & Anglin, 1981).   Mean age for the

340 participants at the time of the survey was 57.3 years (standard deviation of

4.7 years) with a minimum age of 47.7 years and a maximum age of 75.9 years.

The mean age for females was 55.4 years (standard deviation 3.7 years) and the

mean age for males was 58.8 years (standard deviation 4.9 years), and there

was a significant difference at the p >.01 level between age across gender as

indicated by a one-way ANOVA [F (1, 338) = 50.190, p = 0.000].

Of the 340 participants, 191 identified as male (56.2%) and 149 identified

as female (43.8%). The majority (93.8%) of the sample identified as White, at

319 participants, and 6.2% of the sample identified as American Indian/Alaska

Native, Asian, Native Hawaiian or Other Pacific Islander, or Black or African

American, which was grouped into the Non-White category. This grouping will be

addressed in the discussion as limitations of the study.

Abstinence Rates

Table 2 provides breakdowns for abstinence by gender. Among the total

sample, a majority (56.8%) had used illicit substances in the last 30 days, and

43.2% of the total sample remained abstinent in the last 30 days. Trends were

similar for long-term abstinence. A majority (63.2%) had used illicit substances in

the last year, whereas a little over one-third of the total sample (36.8%) achieved abstinence in the last year.

Among men, 44.5% achieved short-term abstinence; 55.5% used within the last 30 days. In the longer term, 37.7% of men were able to achieve long-term abstinence; 62.3% used within the last year. Among women, 41.6% achieved short-term abstinence; 58.4% used within the last 30 days. In the longer term, 35.6% of women were able to achieve long-term abstinence; 64.4% used within the last year. Using a one-way ANOVA, there was no significant difference determined in either short-term [$F_{(1, 338)} = 0.162$, $p = 0.688$] or long-term [$F_{(1, 338)} = 0.284$, $p = 0.595$] abstinence rates across gender.

A basic correlational analysis was conducted on both the predictor and outcome variables to determine co-variation among variables and possible multicollinearity among variables. Short-term abstinence was found to be strongly correlated with long-term abstinence ($r(340) = .874$, $p < 0.01$). Short-term abstinence was found to be correlated with almost all of the predictor variables, namely physical health ($r(340) = .143$, $p < 0.01$); mental health ($r(340) = .191$, $p < 0.01$); social functioning ($r(340) = .114$, $p < 0.05$); and AA involvement ($r(340) = .190$, $p < 0.01$). Similarly, long-term abstinence was correlated with physical health ($r(340) = .160$, $p < 0.01$); mental health ($r(340) = .216$, $p < 0.01$); social functioning ($r(340) = .127$, $p < 0.05$); and AA involvement ($r(340) = .164$, $p < 0.01$). Although not correlated with either short-term or long-term abstinence, gender was found to be mildly correlated with several of the predictor variables, mental health functioning ($r(340) = .153$, $p < 0.01$); social functioning ($r(340) = $

.207, $p < 0.01$); and physical health functioning ($r(340) = .130$, $p < 0.05$). Age was found to be correlated with gender ($r(340) = .360$, $p < 0.01$) and will be controlled for as a covariate in the rest of the analysis.

SF-36 Norms Comparison with Opiate-Dependent Males

The present sample's scores on the three SF-36 scales (*General Health*, *Mental Health*, and *Social Functioning*) were compared to general outpatient psychiatric population norms by age and gender to contextualize the sample. Table 3 illustrates the mean scores on the three SF-36 scales, by gender and age group. Among men 45-54 years old, the study sample was significantly different from men of the same age group in the general population on *General Health (t*(38) = 13.899, *p* < .001), *Mental Health (t*(38) = 20.436, *p* < .001), and *Social Functioning (t*(38) = 15.773, *p* < .001). On all scales, the present study sample scored significantly lower, indicating poorer functioning in all three domains when compared to the general population sample. Results were similar among men ages 55-64 years old; the present study sample was significantly different from men of the same age group in the general population on *General Health (t*(128) = 24.691, *p* < .001), *Mental Health (t*(128) = 39.130 , *p* < .001), and *Social Functioning (t*(128) = 29.909, *p* < .001). In the eldest group, results were similar to the first two age groups. Among men 65 years and older, the present study sample was significantly different from men of the same age group on measures of *General Health (t*(22) = 14.752, *p* < .001), *Mental Health (t*(22) = 28.702, *p* < .001), and *Social Functioning (t*(22) = 13.469, *p* < .001).

SF-36 Norms Comparison with Opiate-Dependent Females

Similar trends were found among the women when compared in the same way with outpatient psychiatric general population norms. Among women 45-54 years old, the study sample was significantly different from women of the same age group in the general population on *General Health (t*(72) = 14.146, *p* < .001*), Mental Health (t*(72) = 20.987 , *p* < .001), and *Social Functioning (t*(72) = 12.555, *p* < .001)*. Results were similar among women ages 55-64 years old; the present study sample was significantly different from women of the same age group in the general population on *General Health (t*(73) = 14.949, *p* < .001), *Mental Health (t*(73) = 21.423, *p* < .001), and *Social Functioning (t*(73) = 16.588, *p* < .001)*. Among women 65 years and older, there was a very small subgroup (n = 2), and the results of the norms comparison were not conducted due to the limited statistical power.

Factors Associated with Short-Term Abstinence

A logistic regression analysis was preformed with gender, physical health, mental health, social support, and AA involvement as predictor variables for short-term abstinence (Table 4). Age was controlled for as a co-variate due to the significant difference across age among gender. A total of 340 cases were analyzed and the full model significantly predicted abstinence (omnibus chi-square = 34.462, df = 6, p < 0.0005). The model accounted for between 9.6% and 12.9% of the variance in short-term abstinence, with 78.8% of those who were non-abstinent in the short-term successfully predicted. However, only 45.6% of predictions for the short-term abstinent group were accurate. Table 4

provides coefficients and the Wald statistic and associated degrees of freedom and the probability values for each of the predictor variables. This shows that high mental health functioning and any AA involvement reliably positively predicted short-term abstinence. The values of the coefficients reveal that each year increase in age increases the odds of short-term abstinence by a factor of 1.063 (95% CI 1.009 and 1.120) and that high mental health increased the odds of short-term abstinence by a factor of 2.145 (95% CI 1.247 and 3.692). Any involvement in AA increased the odds of short-term abstinence by a factor of 2.641 (95% CI 1.652 and 4.222). Post-hoc analysis did not indicate any significant interaction effects with mental health and gender or AA involvement and gender.

Factors Associated with Long-Term Abstinence

A similar logistic regression analysis was preformed with gender, physical health, mental health, social support, and AA involvement as predictor variables for long-term abstinence (Table 5). Age was controlled for as a co-variate due to the significant difference across age among gender. A total of 340 cases were analyzed and the full model significantly predicted long-term abstinence (omnibus chi-square = 36.667, df = 6, p < 0.0005). The model accounted for between 10.2% and 14.0% of the variance in long-term abstinence, with 87.0% of those who were non-abstinent in the long-term successfully predicted. However, only 34.4% of predictions for the long-term abstinent group were accurate. Table 5 provides coefficients and the Wald statistic and associated degrees of freedom and the probability values for each of the predictor variables.

This shows that high mental health functioning and any AA involvement reliably positively predicted long-term abstinence. The values of the coefficients reveal that each year increase in age increases the odds of long-term abstinence by a factor of 1.073 (95% CI 1.018 and 1.132) and that high mental health increased the odds of long-term abstinence by a factor of 2.394 (95% CI 1.366 and 4.196). Any involvement in AA increased the odds of long-term abstinence by a factor of 2.487 (95% CI 1.533 and 4.033). Post-hoc analysis did not indicate any significant interaction effects with mental health and gender or AA involvement and gender.

CHAPTER IV: Discussion

The present study focused on factors related to both short-term and long-term abstinence among opiate-dependent older adults. The participants were part of an original longitudinal study conducted in the 1980s by Anglin and colleagues. The current impact of physical health status, mental health status, social support and AA involvement on the achievement of both short-term and long-term abstinence and how this population compares on these issues when compared with their non-using peers.

Comparison to Norms: Research Question 1 and Hypothesis

The first research question in the present study was: how well do predictor variables distinguish the current sample from a psychiatric outpatient normative sample, using age- and gender-specific norms? This study question will be addressed hypothesis by hypothesis.

The first hypothesis, 1a, hypothesized that reported physical health will not significantly distinguish between participants and psychiatric outpatient population norms. This hypothesis was not supported. The present analysis found that both men (in all age groups) and women (ages 45-54 and 55-64) in the current sample had lower rates of physical health when compared to their same-age peers.

The second hypothesis, 1b, hypothesized that mental health indicators will not significantly distinguish between participants and psychiatric outpatient population norms. This hypothesis was also not supported. It was found that both men (in all age groups) and women (ages 45-54 and 55-64) in present

sample had lower rates of mental health when compared to their same-age peers.

The third hypothesis, 1c, hypothesized that reported social functioning will not significantly distinguish between participants and psychiatric outpatient population norms. Similarly, this hypothesis was not supported. It was found that both men (in all age groups) and women (ages 45-54 and 55-64) in the current study had lower rates of social support than their same age peers in the normed group.

The group of women ages 65 and older were not compared to the normed sample due to the small sample size and limited statistical power. When compared to psychiatric outpatient general population norms, using the SF-36, both men (in all age groups) and women (ages 45-54 and 55-64) had poorer physical and mental health and lower levels of social support than their same age peers in the general population. This contextualizes the present sample to have lower physical and mental health levels, and lower social support, illustrating the need of this population for multi-faceted care and intervention. This is consistent with previous research (Grella & Lovinger, 2012).

Factors Related to Abstinence: Research Question 2 and Hypothesis

The second research question in the present study was: when age is controlled for, how well do independent variables (gender, physical health, mental health, social support, and AA involvement) predict the outcome of short-term and long-term abstinence? This study question will be addressed hypothesis by hypothesis. The first hypothesis, 2a, hypothesized that being a

male will have a significant (at the p > 0.5 level), negative correlation with abstinence. Subsequently, being a female will have a significant (at the p > 0.5 level), positive correlation with both short-term and long-term abstinence. This hypothesis was not supported as there was no significant correlation found for gender with short-term nor long-term abstinence.

The second hypothesis, 2b, hypothesized that physical health status will have a significant (at the p > 0.5 level), correlation with both short-term and long-term abstinence, in that better physical health will be associated with higher odds of abstinence outcomes, controlling for other variables. This also was not supported in the analysis, as there was no significant correlation found for physical health for either short-term or long-term abstinence.

The third hypothesis, 2c, hypothesized that mental health status will have a significant (at the p > 0.5 level), correlation with both short-term and long-term abstinence, in that better mental health status will be associated with higher odds of abstinence outcomes, controlling for other variables. This hypothesis was supported. High mental health status was significantly correlated with both short-term and long-term abstinence. High mental health was associated with increased odds of short-term abstinence and long-term abstinence. This suggests that higher mental health has a significant, positive relationship with both short- and long-term abstinence, in that, better mental health may lead to abstinence.

The fourth hypothesis, 2d, hypothesized that social functioning will have a significant (at the p > 0.5 level), positive correlation with both short- and long-

term abstinence, controlling for other variables. This also was not supported in the analysis, as there was no significant correlation found for social support for either short-term or long-term abstinence.

The last hypothesis, 2e, hypothesized that involvement in Alcoholics Anonymous will have a significant (at the $p > 0.5$ level), positive correlation with both short-term and long-term abstinence, controlling for other variables. This hypothesis was supported. Any involvement in AA was found to be significantly correlated with both short- and long-term abstinence. Any involvement in AA was associated with higher odds of short- and long-term abstinence by a factor of This suggests that any involvement in AA has a significant, positive relationship with both short- and long-term abstinence, in that, as AA involvement increases, abstinence increases.

As higher mental health and any AA involvement is associated with higher rates of both short- and long-term abstinence, it may be prudent for treatment providers to tailor interventions accordingly. Treatment providers can address substance use with interventions such as motivational interviewing or from a harm-reduction standpoint. In addition, treatment providers can also address mental health issues, such as depression, anxiety, and trauma, with empirically-supported treatment methods. Treatment providers may benefit from becoming more familiar with AA and encouraging patients to increase involvement in AA, through attending meetings, working the steps, and/or working with a sponsor.

Limitations

Several limitations of the study should be noted. First, the study sample is limited to participants who were on methadone maintenance in the 1970s in Central and Southern California. These findings may have limited generalizability to samples that use other substances or who live in other geographic areas.

Another limitation is regarding survivor bias in the present sample, as approximately 46.8% of participants in the original studies conducted in the 1980s had died. Those participants in the present study are those individuals who survived and they represent a more robust sample of individuals (as indicated in Grella & Lovinger, 2011), creating a survivor bias in the data, which may limit the generalizability of the data to a broader population. Additionally, there was further attrition from the original sample, with some individuals unable to be located or opting to not participate, and this may also create a bias in the sample surveyed. These individuals may have cut off connection with their former drug-using lifestyle as the entered the next phase of their lives, or they may have experienced similar or worse outcomes as the present sample.

Limitation with sample size across racial and ethnic groups rendered analyzing differences by race and ethnicity not possible in the present study. How race and ethnicity were categorized on the data collection forms was in conjunction with United States Census standards at the time of the study. However, as there is an evolving conception of ethnic identity, looking at potential differences between racial and ethnic groups may be a direction for further

research. In addition, looking at treatment needs across varying racial and ethnic groups may also serve to highlight various treatment factors that could help benefit various communities. For example, Rosen, Goodkind, and Smith (2011) investigated treatment needs among an older African-American population who utilized methadone services. Continued work on discerning specific treatment needs will better help individuals engage in treatment and recovery.

The definition of abstinence is another possible limitation in the present analysis. Although methadone positive urinalysis results were considered to be illicit-drug free, individuals could be using methadone in an illicit fashion.   The possibility of error in urinalysis should also be considered as potential limitation in analyzing urinalysis data. Additionally, the possibility of underreporting of previous substance use should be considered in the individuals self-report of past substance use. Although individuals had little reason to provide inaccurate information, the stigma around substance use or difficulty remembering past history could possibly influence the accuracy of self-report.

Further, another limitation of the nature of the analysis in the regression model is that it does not predict causality or the direction of the relationship. The nature of the relationship or causality between abstinence and mental health or AA involvement can only be interpreted by association. The present model uses data collected at one point in time, and the model is testing the associations at the same time frame. Further, logistic regression is a correlational analysis that only allows interpretation of the association between certain variables, which limits the nature of data interpretation.

Implications and Conclusions

Despite these limitations, the study findings have important implications for future research and treatment of older adults who have been diagnosed as opiate-dependent. There will be a significant increase in the number of older adults in the next 10 years as the Baby Boomer population ages. This significant increase will undoubtedly place a strain on treatment providers. As substance use disorders are seen as chronic conditions that require ongoing (and patient-driven) care, continuing to understand what factors are associated with abstinence specifically for older individuals will help to effectively tailor and allocate treatment resources, which is consistent with ongoing research (Rosen, Morse, & Reynolds, 2010; Wu & Blazer, 2011). Additionally, as alcohol use is well studied among older adults (Liberto, et al.,1992; Menninger, 2002; Sorocco & Ferrell, 2006), continued research with opiate users may serve to address physical and mental health, social support, and 12-step involvement in middle age and older adults and tailor treatment interventions to best address the needs of older opiate-dependent adults.

The present analysis suggests that higher mental health status is positively associated with abstinence. Treatment providers may consider encouraging continued work on addressing mental health issues, including assessing for possible dual-diagnosis and treating any co-occurring mental health issues with evidence-based practices, such as cognitive-behavioral therapy. Additionally, as AA involvement was significantly associated with abstinence, treatment providers may also consider encouraging involvement in

AA or other 12-step groups, working with a sponsor, or reading materials associated with 12-step groups and working the steps.

In conclusion, individuals with a history of opiate dependence may benefit from multi-faceted treatment with various treatment interventions, including managing mental health issues and getting involved in AA. Providing tailored treatment and educating treatment providers how to screen and treat for these needs will help best address the growing need of our community.

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APPENDIX A

Accompanying Tables

Table A1

Socio-demographics by Gender

	Men (n=191)		Women (n=149)		Total (N=340)	
	N	*%*	*N*	*%*	*N*	*%*
45-54 years	22	11.5	62	41.6	84	24.7
55-64 years	140	73.3	85	57.1	225	66.2
65 + years	29	15.2	2	1.3	31	9.1
Race						
White	182	95.3	137	91.9	319	93.8
Non-white	9	4.7	12	8.1	21	6.2

* Significant difference between age across gender (p = 0.05)

Table A2

Short-term and Long-term Abstinence by Gender

	Men (N=191)		Women (N=149)		Total (N=340)	
	N	*%*	*N*	*%*	*N*	*%*
Short-Term (30 Days) Abstinence						
Abstinent	85	44.5	62	41.6	147	43.2
Not-Abstinent	106	55.5	87	58.4	193	56.8
Long-Term (at least 1 year) Abstinence						
Abstinent	72	37.7	53	35.6	125	36.8
Not-Abstinent	119	62.3	96	64.4	215	63.2

Table A3

Mean Scores and Standard Deviations on SF-36 Scales by Age and Gender

| | Age Group | | | | | |
| | 45-54 Years | | 55-64 Years | | 65 + Years | |
	Men (N=39)	Women (N=73)	Men (N=129)	Women (N=74)	Men (N=23)	Women (N=2)
General Health	51.1* sd=22.9	41.3* sd=24.9	50.3* sd=23.2	45.4* sd=26.1	58.7* sd=19.1	60.0¶ sd=35.4
Mental Health	67.4* sd=20.6	56.8* sd=23.1	68.2* sd=19.8	60.1* sd=24.1	78.6* sd=13.1	50.0¶ sd=53.7
Social Support and Functioning	68.3* sd=27.0	51.4* sd=34.9	71.0* sd=26.9	60.8* sd=31.5	74.5* sd=26.5	43.8¶ sd=26.5

SF-36 Scales: Scores range from lowest (0) to highest (100) level of functioning

* Significant difference from SF-36 Norm (at the p < 0.01 level)

¶ Comparison to norm not conducted due to small sample size

Table A4

Logistic Regression Analysis for Short-Term Abstinence

Predictor Variable	B	S.E.	Wald	p	Odds Ratio	95% C.I.	
						Lower	Upper
Age	.061	.027	5.328	.021	1.063	1.009	1.120
Gender	-.290	.256	1.282	.258	.749	.453	1.236
Physical Health	.171	.266	.416	.519	1.187	.705	1.998
Mental Health	.763	.277	7.594	.006	2.145	1.247	3.692
Social Support	.118	.278	.181	.670	1.125	.653	1.939
AA Involvement	.971	.239	16.474	.000	2.641	1.652	4.222

Note. Age is entered as a continuous variable

Table A5

Logistic Regression Analysis for Long-Term Abstinence

Predictor Variable	B	S.E.	Wald	p	Odds Ratio	95% C.I.	
						Lower	Upper
Age	.071	.027	6.767	.009	1.073	1.018	1.132
Gender	-.383	.265	2.081	.149	.682	.405	1.147
Physical Health	.217	.274	.627	.429	1.242	.726	2.124
Mental Health	.873	.286	9.290	.002	2.394	1.366	4.196
Social Support	.126	.290	.189	.663	1.134	.643	2.003
AA Involvement	.911	.247	13.634	.000	2.487	1.533	4.033

Note. Age is entered as a continuous variable

APPENDIX B

Breakdown of Original Sample Collected by Anglin & McGlothlin in the 1980s.
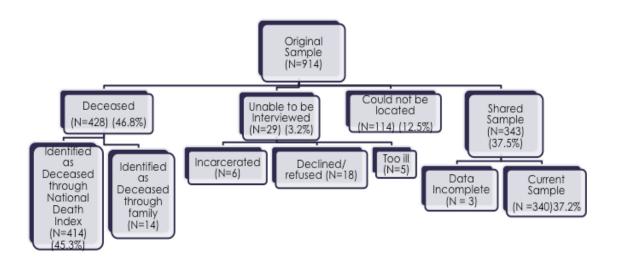
APPENDIX C

Table C1

Variables Used in Analysis, Coding, and Sample Distribution

Variable	Coding	Sample Distribution
Sociodemographics		
Age	45-54	24.7%
	55-64	66.2%
	65+	9.1%
	Continuous	$M = 57.3$ ($sd = 4.7$)
Race	White = 0	93.8%
	Non-White = 1	6.2%
Gender	Female = 0	43.8%
	Male= 1	56.2%
Predictor Variables		
SF-36 Physical Health	Low = 0	49.7%
	High = 1	50.5%
SF-36 Mental Health	Low = 0	51.9%
	High = 1	48.1%
SF-36 Social Support and	Low = 0	37.6%
Functioning	High = 1	62.4%
AA Involvement	None = 0	57.1%
	Any = 1	42.9%
Outcomes		
Short-Term Abstinence	Non-Abstinent = 0	56.8%
	Abstinent = 1	43.2%
Long-Term Abstinence	Non-Abstinent = 0	63.2%
	Abstinent = 1	36.8%