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Walden University

College of Health Sciences

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Mabel Gonzalez

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Walden University
2016

Abstract

Factors Related to Prescription Drug Abuse Among Young Adults in Florida

by

Mabel Gonzalez

Master of Health Services Administration, Strayer University, 2007

Doctor of Medicine, Havana University, 1994

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health-Community Health Education

Walden University

September 2016

Abstract

A lack of available data exists regarding environmental factors related to prescription drug abuse (PDA), which could explain the ineffectiveness of efforts to reduce PDA in Florida. Prescription drug abuse among adults older than age 18 varies with the level of education achieved, and these metrics potentially reflect socioeconomic differences. The purpose of this quantitative study was to examine the connections between contextual aspects of prescription opioid abuse among Florida's middle and high school students to understand youth PDA in relation to their environments. This study consisted of a secondary analysis of existing PDA data (dependent variable) in relation to a number of independent variables, including the incidence of female-headed households, the nature of residential environment, adherence to religious precepts, and students' ability to achieve educational goals. Incidence of female-headed households, the nature of residential environment, and adherence to religious precepts were not found to predict youth PDA. The only finding of significance was that PDA predicted lowered students' ability to achieve educational goals ($p = .015$). Data collected from this study might be used by school counselors and administrators when developing drug abuse prevention, intervention, and educational programs, thereby leading to positive social change in helping to reduce PDA among youth.

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Dedication

For my mother who never gave up on me.

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Chapter 1: Introduction

Introduction

Prescription drug abuse (PDA)—most notably, the abuse of opioids—is one of the fastest growing threats to American public health (Centers for Disease Control and Prevention [CDC], 2011). According to the Centers for Disease Control and Prevention (2011), on average, approximately 100 Americans died every day from overdoses in 2010. Of the more than 38,300 deaths, opioid pain relievers were involved in more than 16,000, whereas heroin was involved in approximately 3,000 instances (CDC, 2011). Putting this effect into perspective, in 2012 almost 5 million Americans older than age 12 reported nonmedical use of prescription opioids during the preceding 30 days (CDC, 2011). In that same year, more than 2 million individuals were considered to be abusing or dependent on prescription pain relievers (Botticelli, 2014). However, as dangerous as prescription opioids may be when used improperly, opioids provide superior remedies for people suffering from chronic pain, recovering from surgery, or undergoing therapy after accidents or illness (Botticelli, 2014). For the estimated more than 100 million people who suffer from chronic pain in the United States, opioid therapy may be the most appropriate treatment (Botticelli, 2014). Patients who need relief from persistent, moderate-to-severe noncancer pain include those with back conditions (approximately 38 million) and osteoarthritis (approximately 17 million; Thomas et al., 2015).

Florida has been particularly affected by prescription opioid use. Florida has been described as the epicenter of unlawful prescription drug distribution (Bondi, 2014). For example, dispensing doctors in Florida purchased more oxycodone than doctors in all other states combined (Surratt et al., 2014). In addition, fatal overdoses associated with

oxycodone in Florida increased 86% between 2003 to 2009 (Surratt et al., 2014). In testimony given before the House Energy and Commerce Committee, Florida Attorney General, Pamela Bondi (2012) described that recent state efforts to address PDA included strengthening pain management oversight regulations, better monitoring of physician dispensing habits, and developing a statewide Prescription Drug Monitoring Program.

The Florida approach to PDA limitation is both immediate and long-term. Regional strike forces, supplemented by local authorities, conduct criminal investigations of and raids upon suspected pill mills (Bondi, 2014). However, long-term prevention efforts fall within the civil rather than criminal sphere. Educational programs, such as the Narcotics Overdose Prevention Education (2012) task forces, can be effective in distributing prevention messages at middle and high schools and generally educating young people regarding the dangers of PDA. In this chapter, I review background information on PDA in the United States and detail the problem statement, purpose of the study, nature of the study, research questions, and theoretical framework.

Background

In the most recent annual survey of controlled substance use and abuse, the Substance Abuse and Mental Health Services Administration (SAMHSA; 2014) reported that approximately 9% of the American population older than age 12 used an illicit drug during the month prior to being surveyed. For the purposes of this survey, an *illicit drug* includes those on the federal government's controlled substance list and prescription medications that are used recreationally, illegally, or nonmedically (SAMHSA, 2014). The 2013 SAMHSA survey further established that 2.6% of the 12 years or older

population had used psychoactive prescription drugs nonmedically during the month preceding the survey (SAMHSA, 2014).

The SAMHSA has identified annual PDA stabilization among adults aged 40–44 at approximately 6% (SAMHSA, 2014). This statistic stands in marked contrast to the significant annual decline in PDA among older cohorts (SAMHSA, 2014). This development has prospective long-term implications, which stem from current PDA levels among young adults. Metrics describing university-level students support this prospective outcome. The illicit drug consumption rates for university graduates, for example, have increased from 5.4% in 2011 to 6.6% in 2013 (SAMHSA, 2014). As such, the current university graduate drug abuse rate corresponds with the established aged 40–44 cohort PDA rate. One explanation for this correlation is that maturing university graduates abandon the spectrum of controlled substances in favor of prescription drugs (Taylor, 2015). Further research into this pattern is needed to draw definitive conclusions as to the causes of these trends. In terms of racial demographics, PDA is an almost exclusively a Caucasian problem. In 2013, nearly 87% of hospital admissions for prescription drug overdoses were Caucasian, though Caucasian admissions for all drug overdoses comprised approximately 60% of all cases (SAMHSA, 2014).

In testimony given at a hearing of the Senate Judiciary Committee, Richard Kerlikowske (2011), the Director of the Office of National Drug Control Policy described PDA as one of the fastest growing public health epidemics. Kerlikowske noted a four-fold increase in addiction treatment admissions from 1998 to 2008 for the abuse of prescription painkillers. Reducing abuse is particularly difficult because of the easy access to prescription drugs combined with a low-risk perception (Kerlikowske, 2011).

In addition, Thomas et al. (2015) reported that the total number of annual prescriptions have increased more than 100% (to 207 million) since 1991, leading to an increased availability of prescription drugs, which may be bolstering PDA numbers. For example, in 2012, 54% of prescription drug users received prescription medication for free from relatives and friends (Thomas et al., 2015). Relatives and friends provided prescription drugs to another 11% of drug abusers for a price (Thomas et al., 2015). Almost 20% of prescription drug abusers reported receiving medications from physicians after the abusers convinced the doctors to write them a prescription (Thomas et al., 2015). The national economic effect of PDA is extensive. Hansen (2011) described the overall nationwide costs attributable to such abuse in 2006 as amounting to $53.4 billion. As of 2013, health insurance reimbursable costs for PDA treatment have amounted to $72 billion (Thomas et al., 2015).

Problem Statement

One problem uncovered in this study was the structural shortcoming of available data regarding PDA in Florida, particularly the biennial Florida Youth Substance Abuse Survey (FYSAS). A lack of available data on social and environmental factors related to PDA could explain the ineffectiveness of state and federal efforts to reduce PDA (Taylor, 2015). Evidence shows that young adult PDA levels are replicated among adults (Taylor, 2015). The previously described PDA stabilization rate among the aged 40–44 cohort is troubling, not only because of its implications for the long-term health of the population, but also because of the implication that youth PDA may be a significant contributing factor. If this proves to be true, the control and reduction of youth PDA may positively result in an overall reduction in PDA among the older cohort in years to come.

A number of researchers have addressed the extent of PDA in the United States. A moderate, though significant, body of literature exists regarding the investigation of the methods used by public authorities and private groups to address the problem (Clark, 2008; Rannazzisi, 2007). However, a gap exists in the research literature to address the efficacy of these efforts. For example, the FYSAS provides detailed statistical data on youth PDA in each of Florida's counties (State of Florida, 2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i, 2013j, 2013k). Although the FYSAS compares each county's results with statewide metrics, it does not address comparisons between counties with comparable socioeconomic status (SES) with different PDA outcomes. According to the SAMHSA (2014), illicit drug abuse among adults older than age 18 varies with the level of education achieved. It is lower among university graduates (6.6%) than those with some college education (10.2%), high school graduates who do not attend college (9.8%), and those who have not graduated from high school (11.1%; SAMHSA, 2014). These metrics potentially reflect SES differences. With this study, I addressed the structural shortcomings of the FYSAS data to suggest beneficial approaches that state and local governments and nonpublic citizens' groups can adopt to address the current PDA level.

Purpose of the Study

The primary purpose of this quantitative study was to examine the connections between contextual aspects of prescription opioid abuse among Florida's middle and high school students to understand youth PDA in relation to their environments. To establish context and to highlight elements that may reduce PDA in the subject population, I focused on secondary analysis of existing data, particularly the FYSAS. I also addressed

the structural deficiency in this data to establish comparable PDA patterns between demographic variables among youth. Establishing such correlations helped me identify the proactive measures that have proven successful in addressing youthful PDA.

In the study, I analyzed nonmedical prescription opioid use in 11 selected Florida counties. Florida's principal formal information vector for matters relating to PDA is the Narcotics Overdose Prevention Education task forces. Because Narcotics Overdose Prevention Education reaches its target audience through schools, examining state-sponsored improvements leading to reductions in PDA in the age cohort in question must rely on that medium.

Research Questions

Through this study, I examined the relationship between a number of variables and PDA among students aged 12–17. The dependent variable was PDA. Independent variables included: the incidence of female-headed households, the nature of the residential environment, adherence to religious precepts, and the students' capability to achieve educational goals.

Research Question 1

What is the relationship between the incidence of female-headed households, the nature of the residential environment (urban vs. rural), and PDA?

$H_0$1: There is no relationship between the incidence of female-headed households, the nature of residential environment, and PDA.

H_a1: There is a relationship between the incidence of female-headed households, the nature of residential environment, and PDA.

Research Question 2

What is the relationship between the social factors adherence to religious precepts and PDA?

$H_0$2: There is no a relationship between adherence to religious precepts and PDA.

H_a2: There is a relationship between adherence to religious precepts and PDA.

Research Question 3

What is the relationship between PDA and students' capability to achieve educational goals?

$H_0$3: There is no relationship between PDA and students' capability to achieve educational goals.

H_a3: There is a relationship between PDA and students' capability to achieve educational goals.

Theoretical Framework

Evidence suggests that a successful, comprehensive public program with the objective of significantly reducing PDA among the age 12–17 cohort must take into account the social contexts of the members of that cohort (Taylor, 2015). It is an accepted maxim that adolescents are influenced by their peers and adopt behavior patterns that increase their social acceptance. This holds true for youth PDA as 54% of PDA initiation results from prescription opioids being made available by peers (SAMHSA, 2014). However, research also shows that the reasons for youth PDA are multiple and include sociodemographic factors, such as family structure, the nature of residential environments, and religion (Taylor, 2015). Consequently, I used a theoretical framework that allowed for consideration of contextual factors (e.g., familial, cultural, and

socioeconomic) in better understanding youth PDA. Bronfenbrenner (1992) developed the ecological systems theory to explain how individuals develop in relation to their social environments and how behavior is influenced by the interactions between individuals and their social, cultural, economic, and familial contexts. I used Bronfenbrenner's ecological systems theory as the theoretical foundation for this study to help explain the connections between youth PDA and social factors, including family structure, the nature of residential environments, and the influence of religion.

Because Bronfenbrenner's (1992) theory allows for the influence of multiple environmental factors, it was appropriate for understanding PDA among adolescents. Ecological systems theory allows researchers to examine how sociodemographic factors and individuals interact within a given context or environment (Bronfenbrenner, 1992). The theory was also appropriate for explaining how the incidence of female-headed households, the nature of residential environments, and adherence to religious precepts are connected to youth PDA (Taylor, 2015). Ecological systems theory holds that contextual factors, such as the family and socioeconomic environment, can be integrated into one explanatory framework for a more complete understanding of how families and environments can influence the behavior of individuals. I used ecological systems theory in this study to examine how youth PDA is connected to the SES factors of the incidence of female-headed households, the nature of residential environments, and adherence to religious precepts.

Nature of the Study

In this study I used a quantitative cross-sectional correlational design. This was the appropriate design because the goal of this study was to test whether or not the

independent variables of being from a female-headed household, the residential environment, and adherence to religious precepts have a relationship with PDA. In the study, I also tested the relationship that PDA has with the student's ability to achieve educational goals. A cross-sectional correlational design was appropriate because I assessed the relationship of the variables and the participants at one point in time.

This study consisted of a secondary analysis of existing PDA data (dependent variable) in relation to a number of independent variables, including: the incidence of female-headed households, the nature of residential environment, adherence to religious precepts, and students' capability to achieve educational goals. The data collection method allowed me to cross-reference the independent variables with data metrics provided by county middle and high school students, as presented in the most recent FYSAS (State of Florida, 2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i, 2013j, 2013k). The FYSAS are the documents prepared by each of Florida's county governments biennially in even numbered years. Although researchers are finding the secondary analysis of existing data increasingly useful in health-related research, such research depends on agencies, governments, and researchers making the primary data available to researchers who were not involved in the original research (Cheng & Phillips, 2014). To isolate factors at work in youth PDA in Florida, those prospective impediments have been removed through the biennial publication of the FYSAS.

Assumptions and Limitations of the Study

In this study, I treated all data on Caucasian persons in the age 12–17 cohort as similar, except for differences in SES. This approach was built on the assumption that cohort behavior patterns within SES groups are either uniform or, alternatively, that any

potential effect of evident differences is diminished through the workings of compensating variables. Although this assumption is speculative, researchers should acknowledge that certain socially defining differences within SES strata might have an effect on youth PDA (Taylor, 2015). For example, youth growing up in devout Catholic families have a different PDA pattern compared to similar youth with different family surroundings. It may be useful to eliminate such ancillary information from the datasets in the FYSAS, especially when combined with other available information regarding social patterns in Florida counties. Ascertaining the prospective effect of such social differences extends beyond the purview of this study. Furthermore, because of the specifics of state regulations and how other states collect data for youth substance abuse reports, the findings of this study may not generalize to the populations of other states. Because data was self-reported, it was also assumed that participants in the original survey were honest about their drug use.

Scope and Delimitations

For this study, I focused on the various socioeconomic factors that might be connected to PDA in Florida youth because a lack of available data exists regarding the social and environmental factors related to PDA, which could explain the ineffectiveness of efforts to reduce PDA in Florida. The study included Florida's middle school and high school students because youth PDA may be a significant contributing factor to the PDA stabilization rate among the 40–44 year old cohort. Consequently, I excluded children outside the range of middle and high school ages from this study. In addition, because age was an important factor of PDA onset and stabilization, findings may not generalize

to other age cohorts. I focused on the specifics of Florida regulations and data collection for youth PDA and not on those of other states.

Definition of Terms

Adherence to religious precepts: Adherence to religious precepts are used interchangeably with *religiosity*, and, for the purposes of this study, is defined as the degree to which an individual is committed to his or her religious beliefs and values and practices them in daily life (Shukor & Jamal, 2013). Adherence to religious precepts involves the observance of conventions and outward forms of a religious tradition (Shukor & Jamal, 2013).

Female-headed household: For the purposes of this study, female-headed household refers to a household managed primarily by a woman and in which a woman is the primary provider for their family as well; a majority of female-headed households are single-parent households (Madyun & Lee, 2010).

Opioid: The category of drugs that includes heroin and prescription pain relievers, such as oxycodone and hydrocodone (CDC, 2010).

Prescription drug abuse (PDA): PDA is the illicit use of controlled substances by individuals other than those for whom the substances were prescribed or the excessive or recreational use of controlled substances by prescription holders (U.S. Department of Health and Human Services [DHHS], 2013). Prescription drug abusers without prescriptions often obtain controlled substances at no charge from friends and relatives (DHHS, 2013).

Pill mill: Pill mill refers to an interrelated system of doctors' offices, clinics, and health care facilities that regularly prescribe and dispense controlled medications outside

the scope of prevailing standards of the medical practice and laws regarding the prescription and management of prescription drugs (Bondi, 2012).

Significance of the Study

To date, few researchers have focused on teenage PDA outcome disparities among otherwise similar cohort populations (DHHS, 2013). With this study, I aimed to help generate more comprehensive metrics for future FYSAS reports and to address the gap in the literature relating to PDA prevention efforts among youth. Insights gained from this study may aid in highlighting teenagers' misperceptions that prescription medication is inherently harmless (Thomas et al., 2015). Study results may also facilitate improvement in coordinated parent-student efforts in addressing PDA (State of Kentucky, 2010, 2014). Some parents may consider abandoning questionable personal behaviors to better serve as examples to their children (State of Kentucky, 2013).

From the perspective of the educational establishment, this study may help teachers and administrators to better identify those students at risk of PDA. This study could help teachers create new educational strategies aimed at reducing PDA among students aged 12–17. Such programs would allow more students to focus on their education to obtain better opportunities as professionals in the future and increasing their value in society. This study may also aid in the development of interventions to reduce the early initiation of opioid abuse (State of Florida, 2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i, 2013j, and 2013k). Because PDA affects the psychological and social aspects of adolescents' lives, targeting predictors of PDA for leaders and administrators of drug abuse prevention, intervention, and educational programs may lead

to positive social change at the community level by helping to reduce PDA among youth (National Institutes of Health, 2010).

Summary

PDA is one of the gravest and fastest growing threats to American public health. Of the 38,000 overdose deaths in the United States in 2010, 16,000 were attributed to PDA (Botticelli, 2014). Adult PDA, which previously decreased as users aged, has now stabilized at approximately 6% of total substance abuse (Botticelli, 2014). In this study, I focused on PDA among the aged 12–17 cohort in Florida. Analysis of biennial FYSAS, in conjunction with other demographic datasets, helped me to ascertain the characteristics of youth PDA (conditions of drug initiation, effect of peer pressure, and prospective social discouragement). I selected ecological systems theory (Bronfenbrenner, 1992) as the theoretical framework for this study because of its relevance in explaining connections between external social factors and youth PDA.

In this chapter, I discussed the background, purpose, research questions, methodology, theoretical framework, and significance of the study. In sum, in this study, I conducted a secondary analysis of existing data to evaluate PDA in relation to variables, including the incidence of female-headed households, the nature of residential environment, adherence to religious precepts, and students' capability to achieve educational goals. In Chapter 2, I provide the literature review, which details the scope of the problem and federal and state (Florida) PDA prevention efforts. In Chapter 3, I detail the study's methodology, including the sample, methods of data collection and analysis, threats to validity, and ethical issues. In Chapter 4, I present the study's findings in

relation to the research questions. Finally, I discuss the study's findings, limitations, recommendations for further research, and implications in Chapter 5.

Chapter 2: Literature Review

Introduction

There is extensive literature relating regarding the methods and approaches for combating the social pathology of PDA. Prescription drug abusers have a range of challenges and intents, as do those in positions of authority working to reduce the incidence of PDA. However, these spectra are asymmetric. If the drug abuser is primarily driven by self-gratification, those tasked with limiting illegal drug access and conducting intervention programs must function within a number of officially mandated restrictions. These restrictions include legislated public policy; administrative efforts legitimated by such legislation; budgetary constraints; and, in numerous instances, court decisions that limit (or conversely empower) public authorities in their effort to further the public well-being.

Literature Search Approach

I found the research used in this literature review in the following data sources: peer-reviewed articles available through EBSCOHost, congressional hearings, reports and analyses of prescription drug monitoring programs (PDMPs), and other sources available through the Library of Congress and PubMed. I used the following terms to search for relevant articles: *economic costs of nonmedical use of prescription opioids*; *national drug control policy* and *prescription drug abuse*; *opioids*, *chronic pain*, and *the law*; *OxyContin*, *opioids*, and *the law*; *prescription drug* and *heroin abuse*; *prescription drug monitoring programs*; and *State of Florida Youth Substance Abuse Survey.* I used these search terms to extract literature related to the FYSAS, and this search yielded 13 results. I used the same terms to search for sources in relation to prepared statements in

the U.S. Congress, House of Representatives, and the Committee on Energy and Commerce regarding the federal government's Response to the Prescription Drug Abuse Crisis Hearing. This search yielded 12 sources. I applied a search of the same terms to hearings before the U.S. Congress, House of Representatives, and the Committee on Energy and Commerce, which generated 15 results. In addition, these terms were also searched as they applied to the SAMHSA survey, and this search resulted in eight sources.

The inclusion criteria for articles in this literature review were English language articles published within the last 5 years, and those older than 5 years that provided historical background. I excluded articles published more than 5 years before this study took place that did not provide background and articles that were not related to the specific focus of this study, such as those focusing on other illicit drug use (e.g., marijuana and inhalants). The search resulted in the literature used for this study, as it related to the sociology of PDA, PDA at the federal level, PDA at the state and local levels, and selected state PDA prevention programs.

Prescription Drug Abuse: Scope of the Problem

In their most recent annual survey of controlled substance use and abuse, the SAMHSA (2014) reported that approximately 9% of the American population older than age 12 had used an illicit drug during the month prior to being surveyed. The SAMHSA also established that 2.6% of the older than 12 population had used psychoactive prescription drugs nonmedically during the month preceding the survey—a proportion that maintains earlier trends established through their surveys from 2002–2010. Prescription drug sources for nonmedical users were substantially different from those

associated with illicit drugs (e.g., heroin, cocaine). During 2012, more than half (54%) of prescription drug abusers obtained such drugs, at no charge, from friends and relatives (SAMHSA, 2014). Another 11% obtained such drugs from the same sources for a price (SAMHSA, 2014). Almost 20% reported that they had found a pliable physician and persuaded him or her to write a prescription (SAMHSA, 2014). Less than 5% purchased such drugs from a drug dealer or purchased them on the Internet (SAMHSA, 2014).

Drug abuse, including PDA, does not occur in a social or psychological vacuum. Rather, it functions in the various contexts of peer pressure (particularly among adolescents), ignorance of long-term effect, and emerging or manifesting mental and physical illness (Clark, 2013). The extent to which these associated factors interact with one another has not been determined, but given the available data, a number of differing interpretations can be made (Clark, 2013).

The national economic effect of PDA is extensive. Hansen (2011) described the overall nationwide costs attributable to such abuse in 2006 as amounting to $53.4 billion. Of that, $42 billion was attributed to lost productivity, $8.2 billion to criminal justice costs, $2.2 billion to drug abuse treatment, and almost $1 billion to associated medical complications (Hansen, 2011). Other metrics have also been suggested. Thomas et al. (2015) identified an overall health insurance industry annual outlay of $72 billion attributable to PDA.

These metrics do not capture such nonquantifiable costs as abusers' diminished life prospects and lost educational and employment opportunities. Likewise, these metrics do not reflect the effect on family members who have lost loved ones to PDA or other social effects. According to the CDC (2012), more than 38,000 people died from drug

overdoses in 2010. Opioid analgesics (e.g., hydrocodone, oxycodone, and methadone) were responsible for about three out of four pharmaceutical overdose deaths (Rannazzisi, 2014).

Sociology of Prescription Drug Abuse

In keeping with other socioeconomic issues, prescription drug abusers exhibit certain class characteristics. These characteristics include age, ethnicity, education, employment, and criminal behavior. The following subsections address these considerations.

Age Characteristics

For young abusers (aged 12–17 years old), the most popular drugs used during the previous decade have been illicit drugs (i.e., federally controlled substances), marijuana, and prescription psychotherapeutics (Taylor, 2015). A modest overall secular decline existed in self-reported use of these drugs during the previous decade (SAMHSA, 2014). According to the SAMHSA (2014), the ratio of drug use between those same drug categories has remained remarkably stable. Concerning PDA within this age group, it appears that—at least in terms of percentage—abuse rises quickly at age 16 (SAMHSA, 2014).

Ethnicity

The SAMHSA (2014) described overall substance abuse in terms of ethnicity but did not break down the data by specific types of abuse (e.g., heroin vs. prescription drugs). African-American substance abuse patterns during the 2002–2012 decade were consistently higher than those of Caucasians (SAMHSA, 2014). The differential averaged 1% of the total national cohort population in the early years of the decade has risen to 2%

(SAMHSA, 2014). According to the report, the Hispanic and Latino trendline was anomalous, although the SAMHSA did not suggest possible contributing factors. Finally, the SAMHSA noted abnormal abuse levels among Native Americans (12.7%) and persons of two or more races/ethnicities (14.8%).

Controlled substance abuse differentiates by ethnicity. However, collected treatment episode data sets compiled by the SAMHSA (2014) indicated that the majority of prescription drug abusers are Caucasian. Consequently, those states most adversely affected by PDA are likewise largely Caucasian (Taylor, 2015). From 2010–2011, the SAMHSA (2013) listed the states in descending order of such abuse, in terms of percentage of total population older than age 12. Oregon led the list (6.37%), with Colorado (6%), Washington (5.7%), Idaho (5.7%), Indiana (5.67%), and Florida (4 %) following (SAMHSA, 2013).

Education

According to the SAMHSA (2014), illicit drug abuse among adults older than age 18 metrics vary inversely with the level of education achieved. This includes PDA. PDA is lower among university graduates (6.6%) than among those with some college education (10.2%), high school graduates who did not attend college (9.8%), and those who have not graduated from high school (11.1%; SAMHSA, 2014).

Employment Status

The percentage rate of illicit drug use among adults aged 18 and older varies with employment status (SAMHSA, 2014). Almost half of all illicit drug abusers are full-time employees (SAMHSA, 2014). However, concerning the measurement of use, unemployed persons predominate (SAMHSA, 2014).

Geographic Area of Residence

Researchers agree that drug abuse and other antisocial behavior is more prevalent in urban areas than in their rural counterparts. According to the SAMHSA (2014), PDA in large metropolitan and nonmetropolitan urbanized areas tracks with the metrics for African-American and Caucasian drug abusers, respectively. Residential patterns nationwide show higher percentages of African Americans in large metropolitan areas (relative to the overall national population fraction), whereas Caucasians dominate in nonmetropolitan urbanized environments (Taylor, 2015). Sosin (2014), Acting Director for the National Center for Injury Prevention and Control, suggested that the recent rise in PDA has been especially significant among poor rural Caucasians, despite statistical data describing the larger national picture. Although deaths from drug overdose are prevalent throughout the country, some states, such as New Mexico, West Virginia, and Kentucky, have been hit harder than others (Sosin, 2014). Treatment admissions for PDA for rural Caucasians accounted for 77% of total admissions, even in areas where Caucasians comprised a considerably smaller fraction of the total population (SAMHSA, 2014). However, rural African American and Hispanic population subsets exhibited substantially lower levels of admissions in comparison with their urban counterparts (SAMHSA, 2014).

Criminal Justice Populations

A substantial gap separates the abuse cohort consisting of adult drug abusers on parole or some other form of supervised release and the overall adult population. That abuse cohort numbered approximately 1.5 million in 2012 (SAMHSA, 2014). According to the SAMHSA (2014), 7% of the parolee-supervised release population reported

abusing controlled substance prescription drugs during the year in question, compared to 2.6% for the overall adult population. Of the estimated 5 million adults on probation in 2012, 10.1% reported current nonmedical use of psychotherapeutic drugs, including within prescription analgesics, compared to a nonprobationary population sector abuse rate of 2.4 % for such drugs (SAMHSA, 2014).

Summary

The five important aspects of the data presented (age, ethnicity, education, employment, and criminal behavior) provide necessary context for further inquiry into PDA prevention programming. Prescription drug abuse most commonly begins in a noncriminal environment (Taylor, 2015). Unlike other types of substance abuse, PDA has its beginnings in household and peer group environments, especially among youth in the age 12–17 cohort (SAMHSA, 2014). Ethnic characteristics of PDA suggest a need for specialized change prevention strategies (Taylor, 2015). As data has shown, unemployed persons are particularly susceptible to PDA (SAMHSA, 2014). Maintaining a lifestyle in which constructive daily routines are normative will make PDA less pronounced (Taylor, 2015). Local communities should encourage volunteer work by unemployed persons.

Addressing Prescription Drug Abuse at the Federal Level

According to Barnes (2013), efforts to reduce PDA must be enacted at both state and interstate (i.e., federal) levels. In 1973, Congress established the Drug Enforcement Administration (DEA) as the enforcement interface between the federal government and the several states (Barnes, 2013). Despite court challenges to the authority of the DEA regarding intrastate drug distribution cases, based on the 10th Amendment, courts have granted the federal government substantial freedom (Barnes, 2013). Other government

agencies, such as the SAMHSA, CDC, National Institute of Health, and the National Institute on Drug Abuse, support state and local PDA prevention efforts without intruding on the states' plenary police powers (Kerlikowske, 2011). For example, in testimony given before the Energy and Commerce Committee, Kerlikowske (2011) emphasized that President Obama's administration recognizes PDA as a disease significantly affecting the American population. Kerlikowske described the administration's comprehensive Prescription Drug Abuse Prevention Plan (the Plan), developed and circulated in 2011. According to Kerlikowske, the Plan concentrates on four important sections: (a) education for prescribers, (b) prescription drug manufacturing programs, (c) proper medication disposal, and (d) effective enforcement. The following subsections further detail the four supportive pillars.

Education for Prescribers

Although a general understanding of the dangers of PDA exists, a low level of appreciation exists for the particular aspects of the problem. In 2011, the U.S. Government Accountability Office (2011) found that some prescribers received little formal education on dispensing prescription pain relievers, or training on recognizing substance abuse in their patients. The Plan promotes mandatory education on proper prescribing and encourages several states to enact legislation to that end (Kerlikowske, 2011). At the time of giving testimony, Kerlikowske (2011) noted that Iowa, Massachusetts, and Utah had taken that legislative step. Federal support for the implementation of state-sponsored education efforts includes online continuing education training tools developed by the National Institute on Drug Abuse for health care professionals who prescribe opioid painkillers (U.S. Government Accountability Office,

2011). Additionally, the establishment of health care provider electronic prescribing and the implementation of the 2008 Ryan Haight Online Pharmacy Consumer Protection Act are part of this subsection.

Health care provider electronic prescribing. Electronic prescribing includes the private and secure electronic delivery of prescriptions and other health care information from a prescriber's computer to the computer of the pharmacy, and back again. Electronic prescribing does not include using a computer-generated fax, sending a prescription in an insecure manner through the Internet; or using unlicensed or rogue Internet pharmacies (Hutchinson, 2007). Hutchinson (2007) estimated that electronically delivered prescriptions for 8 million patients are written every year. This figure has risen in recent years, because the increasing reliance on electronic prescribing is unavoidable. Traditional prescribing—a paper prescription with the issuer's signature delivered to a pharmacy—is inadequate to the needs of health care consumers. Equally as important, traditional prescribing has its own spectrum of shortcomings.

2008 Ryan Haight Online Pharmacy Consumer Protection Act. This act helped to decrease the distribution of prescriptions drugs through the Internet. The exponential growth of Internet-based prescription drug marketing has facilitated the distribution of such drugs for diversion to nonmedical use. In an in-depth study of such Internet sales, Goldman (2011) provided sales metrics highlighting the overall problem. From 1999–2003, prescription drug online sales rose from $160 million to $3.2 billion. Through 1997–2007, substance abuse treatment center admissions rose five-fold, of which at least a fraction was attributed to abuse of drugs accessed through the Internet (Goldman, 2011). Prior to enactment of the 2008 Ryan Haight Online Pharmacy

Consumer Protection Act, an estimated 85% of online pharmacies did not require a prescription and, of the remainder, more than half prescribed on the basis of a faxed (and therefore easily forged) prescription (Goldman, 2011). Further analysis of the data revealed a nexus between Internet availability growth and increased levels of PDA. From 2000–2007, oxycodone abuse treatment facility admissions rose 374% (Goldman, 2011). Nearly all of this increase occurred during the period in which the majority of online products and services consumers switched from dial-up to high-speed Internet access (Goldman, 2011).

Prescription Drug Monitoring Programs (PDMPs)

PDMPs maintained statewide electronic databases of prescriptions dispensed from controlled substances. Information collected by PDMPs may be used to support access and legitimate medical use of controlled substances, and to identify and prevent drug abuse and diversion. The PDMPs are state-based, electronically stored information for gathering, collating, evaluating, and distributing operations. The financing for a PDMP is a state responsibility, although they receive substantial financial support from the federal government. The following subsections detail the various components of PDMPs.

Information collection. Each state determines which categories of data are subject to collection and which dispensing authorities are subject to reporting requirements; some organizations are regularly exempt. For example, hospital-based pharmacies are not usually required to submit prescription data to PDMPs when they are filling prescriptions written by hospital-based physicians or other health care providers. Some states (e.g., Alabama) require out-of-state, mail order, and Internet pharmacies to submit data to the state PDMP regarding prescriptions filled in the state.

Information access. Information availability in PDMP databases is determined by state law and varies from state to state. Most states allow access to practitioners and pharmacists, though they restrict access to patients and customers. Some states grant law enforcement agencies, state medical examiners, and state licensing boards access under limited conditions (Finklea, 2014). At present, 45 states allow for information sharing, either through reciprocity agreements or in support of specific investigations. Individual reciprocity agreements between states take the form of a memorandum of understanding. Each memorandum of understanding addresses issues, such as information reporting formats, the manner of information use, guidelines on data retention, state responsibilities in the event of data breach, and consequences of data misuse.

Compliance. Assuring PDMP reporting compliance by affected parties is a function of prospective state-level punitive response for noncompliance. Penalties vary from state to state and can extend from licensing board censure to criminal indictment, in extreme cases. This raises a fundamental issue: noncompliance by criminally motivated actors. The PDMP system functioning is predicated on conscientious compliance and smooth operation by all components of the prescription writing/filling chain: physician or clinician prescription, to electronic delivery system, to pharmacist. Detection of PDA though analysis of PDMP data presupposes that at least one element in that chain has not been compromised (e.g., conscientious PDMP reporting at the pharmacy dispensing end will point to prospective improper prescription writing by a health care provider). If both prescription writer and pharmacy dispenser are corrupted, neither have motivation to file a report with the PDMP that would highlight the unprofessional behavior. The existence of a PDMP reporting requirement may also discourage practitioners from writing

legitimate prescriptions, as doing so may bring them under the scrutiny of law enforcement or licensing boards (Perrone, 2012).

Proper medication disposal. The safe disposal of unused or expired prescriptions drugs occurs through partnership efforts between the DEA and state authorities. Rennzazzisi (2012) addressed the temptation that medicine cabinet drugs pose for teenagers. According to Rennzazzisi, to respond to this prospective source for wrongful diversion, Congress enacted the Secure and Responsible Drug Disposal Act of 2010. Under the terms of the act, the DEA has held national Take-Back Days, where household members may deliver outdated or otherwise unwanted prescription drugs to accepted receivers (Rennzazzisi, 2012). These events have resulted in the recovery and appropriate disposal of more than 2.8 million pounds of unneeded or expired medications (Kerlikowske, 2011).

Effective enforcement. Federal law enforcement agencies, such as the DEA, are collaborating with state and local agencies nationwide through the National Methamphetamine and Pharmaceuticals Initiative program, which trains state and local law enforcement in pharmaceutical crime investigations (Kerlikowske, 2011). The following subsections further outline the workings of the two major federal agencies responsible for addressing issues relating to the prevention and treatment of PDA: the DEA and the SAMHSA.

Drug Enforcement Administration. In 2013, the DEA, a subordinate administration of the Department of Justice, reported that the abuse of controlled prescription drugs is a major threat to the United States and requires a significant law enforcement and public health effort (Kerlikowske, 2011). The DEA further identified

those regions of the nation in which such abuse posed the most illegal drug threat: Florida/Caribbean (60.4%), New York/New Jersey, (47.1%) and New England (41.1%; Kerlikowske, 2011). Particularly troubling in this context was the reported increase in prescription writing for hydrocodone (14.1%) and oxycodone (26.6%) from 2008–2012 (Kerlikowske, 2011). These two medications have molecular formats similar to heroin; abuse results in neurological outcomes virtually indistinguishable from heroin. The DEA has conducted a number of long-term programs to suppress illegal controlled prescription drug distribution. Investigations into suspected pill mill operations (rogue pain management clinics) have enjoyed a number of successes. In June 2012, at the conclusion of a 2-year investigation named Operation Pill Nation in Florida, DEA operatives working in conjunction with local police made numerous arrests statewide of clinic owners and operators reportedly writing and filling CPD prescriptions in the tens of thousands per year.

Substance Abuse and Mental Health Services Administration. The SAMHSA compiles data on drug abuse in its annual National Survey on Drug Use and Health. A major component of the National Survey on Drug Use and Health is information on the extent and specifics of PDA. A primary SAMHSA support function is improving information transfer between the federal government and state counterparts and, equally importantly, assisting the several states in maximizing the information value of data already assembled at the state level. For example, the SAMHSA project, Enhancing Access to PDMPs, through health information technology has resulted in improved information flow at the interface between state PDMP custodians and medical professionals.

The SAMHSA also functions in the role of educating prescription drug providers. This effort is accomplished at both the individual health care provider level and at the larger community level (Clark, 2013). Additionally, the SAMHSA has executive responsibility for maintaining the National Registry of Evidence-Based Programs and Practices, a searchable electronic depository for evidence-based interventions available for implementation by local governments and interest groups. As of May 2014, the National Registry of Evidence-Based Programs and Practices contained only one prescription drug avoidance program directed at teenagers: the Refuse, Remove, Reasons high school education program. This substance abuse prevention program was designed to reduce high school students' favorable attitudes toward the use of alcohol, tobacco, and other drugs (ATOD); decrease their misperception of normative peer use; and increase their refusal skills. This program was based on the premise that students' behavior can be positively modified by increasing their knowledge of the risks of substance use, and by modeling appropriate behavior within a social context. One day of the 4-day indoctrination cycle is dedicated to PDA avoidance. As welcomed as the availability of this model approach may be, only one such education model exists in the National Registry of Evidence-Based Programs and Practices. Whether this highlights an inadequacy in the SAMHSA's data collection (at least in this area) or an actual dearth of such intervention models exists is unknown. However, preliminary available evidence points to the former, as two of the most popular intervention models, Too Good for Drugs and Teen Intervene, are omitted from the database (Clark, 2013).

Summary

The federal role in PDA prevention, despite appearances, is not strictly defined. The DEA enforcement efforts described above are, for practical purposes, exercises of what is properly understood as the state's inherent plenary police powers, albeit legitimated by applicable federal criminal statutes. Although DEA enforcement efforts are welcome by state and local law enforcement agencies, such federal activities have the possibility of infringing on state autonomy, especially in the case of local efforts to increase reliance on nonpunitive drug abuse deterrent strategies. For example, a state program for improved health care provider prescription behavior could be undermined by a particularly aggressive DEA enforcement program directed at that same cohort (Hoffman, 2008).

Government programs, such as the SAMHSA, are predicated on a limited approach to PDA containment. However, prevention efforts that combine formal educative approaches and family and community reinforcement can encourage responsible behavior in the 12–17 age cohort, and can significantly reduce future abuse. To address this discrepancy, the SAMHSA should adopt a more flexible approach regarding funding distribution.

Finally, prescription drug websites are a significant problem that requires action at the federal level. The effect of online pharmacies is felt at the state and local level, although law enforcement authorities at those levels face issues because of their geographic and legal limitations. As such, because of the interstate character of such entities, preventing and constraining such activities must be accomplished at the national level. However, federal action faces inherent challenges. For example, websites offering

controlled prescription drugs are usually located offshore, and mail delivery can be accomplished from almost any location in the nation.

Addressing Prescription Drug Abuse at State and Local Government Level

Long-term efforts at PDA control and reduction fall within the province of the several states. With the exception of Missouri and the District of Columbia, every state has enacted legislation establishing a PDMP, or is in the process of such activation and implementation (as of April 2014; Rannazzisi, 2014). Some state programs, such as in Kentucky, are singularly comprehensive, in that they require pharmacies to file an electronic report to the applicable state agency on every controlled prescription filled. Most state and local law enforcement agencies, in conjunction with the courts, address the immediate problem of PDA through punitive measures. Combined with punishment (e.g., confinement, periods of probation, and fines), courts are empowered to require medical treatment or participation in controlled substance avoidance programs as an alternative to punishment.

Prescription drug abuse does not function completely independently of the misuse of other controlled substances. This is especially true in efforts to prevent diversion of those prescription painkillers (e.g., oxycodone) that replicate the neurological effects of heroin. Rannazzisi (2014) described an unwanted outcome of concerted state efforts at oxycodone diversion prevention. According to Rannazzisi, the sale prices of prescription drugs on the black market are usually five to 10 times higher than their retail value. In addition, the potency of the medication in question raises its street price (Rannazzisi, 2014). Prices per tablet range from a low of $5 to as much as $40 for the 30mg oxycodone immediate release formulation. Immediate release tablets are those that allow

the opioid to become fully available to the patient upon ingestion, usually as a means for addressing acute pain (e.g., gunshot wounds or severe injuries), to facilitate other medical treatment. Most prescription opioids, however, are designed for extended release to reduce or prevent chronic pain (e.g., severe arthritis). Although high street prices may restrict teens' and young adults' access to prescription medications, some are able to obtain prescription drugs for free from family members or friends (Rannazzisi, 2014). Additionally, some youth may turn to heroin, which is a cheaper opioid that is easier sometimes easier to obtain than prescription drugs purchased illegally (Van Ingram, 2014).

Selected State Prescription Drug Abuse Prevention Programs

The SAMHSA (2013) published the rankings of PDA in several states by percentage of total state population older than age 12. The following subsections present different programs from two of the states experiencing the highest level of abuse (Oregon and Colorado), two of the states experiencing an intermediate level of abuse (Indiana and Kentucky), and two of the least affected states (New York and Iowa; SAMHSA, 2013). Absolute percentage differences fall within a narrow range: the most affected state, Oregon, reported a PDA level during 2010–2011 of 6.37%, and Iowa, the least affected state, reported an abuse level of 3.62% for the same period (SAMHSA, 2013). Although the SAMHSA includes a condition statistical differences between the states are not necessarily significant, the data show that some states are doing a better job of preventing prescription drug diversion to nonmedical use than other states.

Oregon. A review of the literature pertaining to Oregon indicated that much of the effort at controlled substance abuse is predicated on punitive response. For example,

in the Oregon Department of Justice 2013 annual report on drug abuse prevention, the department described a number of investigative procedures, applications of new technology to law enforcement efforts, and multilevel law enforcement agency coordination. The only reference to abuse prevention was to "promote the creation and support of existing community-based drug prevention and recovery initiatives whose missions are to significantly reduce the impacts of illegal drug use in Oregon" (Oregon Department of Justice, 2013, p. 45). Although the report highlighted the negative effect of PDA, it did so in terms of the recent growth of heroin consumption. Because heroin is more accessible, often less expensive, and can provide a high more intense than prescription opiates, prescription drug abusers are increasingly switching to heroin (Oregon Department of Justice, 2013).

One must acknowledge that Oregon state policy concerning drug abuse prevention education directs the matter to county and local community governments and agencies. However, in keeping with state movements, a review of such designated agencies indicated that the specific identification of PDA among teenagers and young adults is not high on the agenda. A program, such as that in Clackamas County, is an example of community-based drug prevention and recovery initiatives in Oregon.

Clackamas County (population = 390,000) is a predominately Caucasian, middle-class, urbanized polity southeast of Portland. The county's designated drug abuse prevention agency, the Clackamas County Prevention Coalition, conducts the Positive Youth Development program, which is an effort that emphasizes youth involvement in the community and supportive relationships with adult role models and peers as keys to substance abuse prevention. This approach is not without its merits. A recent county

profile (Clackamas County, 2012) indicated that upwards of 85% of resident females aged 40–55—those most likely to be mothers of teenagers and young adults—were married and living with spouses. The female divorced/separated/never married/widowed cohort never exceeded 15%. Therefore, most county teenagers grow up in stable home environments. Nonetheless, Clackamas County appears to have an ongoing PDA problem, especially in the teenage and young adult population.

Colorado. In September 2013, Colorado's special team to address misuse of prescription opioids promulgated the Colorado Plan to Reduce Prescription Drug Abuse. The document outlined the state's plan to reduce such abuse from its current level (6% of Coloradans aged older than 12) to 3.5% by 2016. In terms of the actual population, this effort, if successful, would reduce the prescription drug-abusing cohort from 255,000 to 163,000 during a period of 3 years (SAMHSA, 2013). The state plan emphasized coordination between law enforcement, public health, health care providers, and pharmacists. The sole component involving intended beneficiaries was the development of a campaign targeting PDA among youth and young adults from 12 to 25 years of age (SAMHSA, 2013).

Indiana. In Wright's (2009) report on PDA in Indiana, Indiana University researchers reported that although lifetime statewide abuse experience was virtually identical with that of the entire United States (20.5%), oxycodone abuse in Indiana exceeded the national level by almost 40% (2.5% vs. 1.8%, respectively). In-state nonmedical use of prescription drugs was almost 8% in the age 12–17 cohort and rose to 15.5% in the age 18–25 cohort (Wright, 2009).

Hamilton County in Indiana implemented a community comprehensive plan to address substance abuse (State of Indiana, 2014). This plan included information on PDA derived from anonymous data collection in the county's high schools (State of Indiana, 2014). This data indicated prescription drug initiation beginning in the eighth grade (State of Indiana, 2014). Such abuse becomes more prevalent in the ninth grade, which may be a reflection of expanded access from peers (State of Indiana, 2014). This supposition was reasonably inferred from the report that abusers obtained many prescription drugs from friends and family members (State of Indiana, 2014). The data further indicated that by the 12th grade, PDA stabilized at 6% to 8% of that cohort (State of Indiana, 2014). Hamilton County's PDA prevention program, directed at adults, middle school students, and high school students, is instructional and has a lecture format (State of Indiana, 2014). Lecture attendees learn about the risks of overdosing on prescription medications and the signs of overdosing, as well as how to respond to it (Health Education Handbook, 2012).

Kentucky. Kentucky's Office of Drug Control Policy was established in 2000 to reduce tobacco, alcohol, and other drug use among youth and adult populations in the state (State of Kentucky, Office of Drug Control Policy, 2014). Responsibility for achieving statewide objectives falls to local boards, organizations composed of locally-elected and appointed officials, community leaders, and significant stakeholders (e.g., teachers and physicians). Local boards are either regional or county-specific, and are the institutions through which the state government dispenses substance abuse prevention funding (State of Kentucky, Office of Drug Control Policy, 2014). Each local board identifies specific substance abuse problems within its area and is tasked with developing

a plan to address those issues. One example is Fayette County, with a population that is 73% Caucasian and 15% African American (State of Kentucky, 2010). Median household income is $47,000, 17% higher than the statewide average (State of Kentucky, 2010). Female-headed households in the age 35–55 cohort account for 30% of the total (State of Kentucky, 2010). The 30% for the age 35–55 cohort is an average, although actual fluctuation is modest. However, a noticeable rise in percentage occurs as age within the cohort increases, alluding to the possibility that secular teenage PDA increases from Grades 8 through 12 (State of Kentucky, 2010).

The Fayette County Agency for Substance Abuse Policy provides online advice and suggested PDA avoidance strategies for youth, parents, and educators. Although the youth avoidance approach is largely instructive, it also provides information on nonpunitive options, including seeking counseling and treatment for existing abuse conditions. Another particularly convincing suggestion—and one applicable to many other aspects of parenting—was, "Let your child see you saying 'no' to things in your life as well as saying 'no' to them as discipline" (State of Kentucky, 2013, p. 1).

New York. The New York State Department of Public Health (CITE) does not conduct or coordinate a statewide PDA prevention program. Rather, such efforts fall within the purview of county governments. However, the New York Department of Health provides extensive guidance on abuse and misuse to educators, health care professionals, and parents (Dutchess County, 2012).

Iowa. In the report, *Reducing Prescription Drug Abuse in Iowa: A State Strategy* (2012), the authors described the current conditions of prescription drug use in the state and its related trends. Iowa has been fortunate in that PDA has been historically low, at

least in comparison with other states. Annual nonheroin opiate treatment admissions (a proxy for actual PDA) followed a modestly rising slope during 2002–2007, increasing from 359 admissions to 502 (State of Iowa, 2012). That metric increased to 878 in 2009. Despite the recent asymptotic rise in the treatment curve, the authors (2012) argued that this development should be placed in context: "The most recent National Survey on Drug Use and Health found Iowa and Nebraska tied for the lowest rate (3.6%) on nonmedical use of pain relievers in 2008-2009" (p. 4).

The Office of Drug Control Policy developed a statewide plan to reduce the prospect of continued exponential growth in PDA. Although much of the plan rests on security aspects of controlled prescription drugs (e.g., PDMP, safe storage and disposal, and law enforcement), the authors emphasized the importance of education and the role that parents play in that effort. The Office of Drug Control Policy researchers found that only 22% of parents discussed the dangers of PDA with their children. For example, Dubuque County has a population of 95,000 and is 93% Caucasian. Median family income is $47,000, only a few percentage points lower than the Iowa state average (Dubuque County, 2012). Female-headed households in the age 35–55 cohort account for 75% of total households, a metric comparable to that found in most of the county profiles previously discussed (Dubuque County, 2012). In 2010, Dubuque County published a comprehensive report on community health needs and planned improvements for 2011–2016. As extensive as the report was, the authors barely touched on teenage substance abuse, only discussing the percentage of marijuana use and binge drinking by 11th graders. The report did not address opiate abuse in any age group.

Florida. Until a number of rigorous reforms were legislated in 2009 and 2010, and then implemented in 2011, Florida had the distinction of being the most prominent state tolerating PDA. According to the CDC (2011), in 2010 more than 900 registered pain management clinics existed in the state. By January 2014, the numbers had decreased to 367 (State of Florida, 2014). Health care provider negligence in prescribing controlled substances has been significantly reduced. For example, in 2010, 98 of the top oxycodone dispensing physicians in the nation resided in Florida, while as of 2014, none of the top 100 dispensing physicians were located in the state (State of Florida, 2014). Two statewide initiatives are associated with these signal improvements: (a) the 2009 legislation and implementation of the state's PDMP and (b) the 2011 legislation restricting the activities of pill mills.

Electronic-Florida Online Reporting of Controlled Substance Evaluation Program. The statute establishing Electronic-Florida Online Reporting of Controlled Substance Evaluation Program (E-FORCSE) requires health care practitioners to report electronically to the PDMP each time a controlled substance is dispensed to an individual (State of Florida, 2011). This must occur as soon as possible, but no more than 7 days after dispensing. The underlying purpose of the program is to provide guidance to practitioners in their prescribing activities (State of Florida, 2011). According to E-FORCSE managers, the PDMP "complies with the Health Insurance Portability and Accountability Act as it relates to protected health information, electronic protected health information, and all other relevant state and federal privacy and security laws and regulations" (State of Florida, 2011, p. 1).

Pill Mill Initiative. The Pill Mill initiative (HB 7095) was enacted in 2011 and implemented a year later. The initiative has two basic elements: (a) short-term strategies, including enhanced criminal penalties, more stringent administrative penalties for insufficiently complying practitioners, and more aggressive prosecution efforts; and (b) long-term strategies, including support for and reliance on E-FORCSE and prevention strategies (Bondi, 2011). Prevention strategies may include school-based instruction, drug *give-back* recovery, and substance abuse treatment conducted through the state's drug courts (Bondi, 2011).

Summary

No uniformity exists in state reporting regarding efforts to prevent or contain PDA. A few states (e.g., Kentucky) prepare annual reports on PDA. In some states, such as New York, when state health departments prepare obligatory annual reports, county public health departments also publish detailed annual reports on PDA. In Kentucky, Fayette County periodically publishes detailed reports describing prescription and other substance abuse, which include extensive information regarding age, ethnicity, education, family structure, substance abuse history, and employment status of its residents. Fayette County is an outlier in this regard. Some states, such as Iowa, require county public health departments to publish annual reports on comprehensive health care plans, usually covering 5-year periods.

County government websites sometimes provide detailed information on PDA prevention. However, it is a more common practice to include that effort under the general rubric of substance abuse challenges and interventions. As an alternative to the lack of coherent state data comparing county efforts, City-Data, a real estate-oriented

collection of websites detailing social and economic data uniformly, may be helpful for intra- and interstate comparison.

The SAMHSA (2013) data concerning PDA levels may be misleading. These rankings are based on state-assembled data, and though the data may be accurate, the data identify drug abuse conditions at a particular moment. The data do not to illustrate how actual abuse trends reflect a dynamic process at work. For example, state data may indicate a secular decline in PDA accurate in absolute terms, but fail to take into account a corresponding, or even larger, increase in heroin use. Several authors have noted the shift from prescription opioid abuse to heroin use (Ingram, 2014; Rannazzisi, 2014). This development is often attributed to the increase in the street cost of oxycodone.

This development, however, does not influence PDA prevention programs. Prescription drug diversion to nonmedical use is inherently dangerous. The pharmacological toxic screen data from largely Caucasian counties indicates that more than 50% of drug-associated mortalities are caused by oxycodone or hydrocodone abuse (Dutchess County, 2012). Equally important, the Kentucky data indicates that four-fifths of heroin initiates were previous oxycodone abusers (State of Kentucky, 2014). Had oxycodone pills not been so easily obtained, the heroin addict population would have been reduced, at least to some extent.

Classroom education efforts function best in the context of associated reinforcement from parents and peers. Lecture-style instructions on the dangers of PDA are likely most effective with those in the age 12–17 cohort who enjoy a stable family life, one with both biological parents present, both of whom encourage responsible

behavior in their children through example. However, for those students in that age cohort not so fortunate, it appears that reinforcement of classroom instruction is a must.

Finally, the influence of family structure affects the levels of PDA, although the full extent of this is unknown. Chapter 3 contains information regarding the methodology and research design of this study. Chapter 3 contains sections on the rationale for the designed used, the population, sampling, instrumentation, and data analysis. The chapter will also provide information on reliability, threats to validity, and ethical concerns.

Chapter 3: Research Methodology

Introduction

In this study, I addressed aspects and factors relating to PDA among youth, age 12–17. In its most recent annual survey of controlled substance use and abuse, the SAMHSA (2014) reported that more than 9% of the American population older than age 12 had used an illicit drug during the month prior to being surveyed. The 2014 SAMHSA survey established that 2.5% of the older than age 12 population used psychoactive prescription drugs nonmedically during the month preceding the survey, a proportion close to the 2011 and 2012 figures and for all years 2002 through 2010.

Drug abuse does not occur in a social or psychological vacuum. It functions in the context of peer pressure (among adolescents), ignorance of long-term effect, and mental illness (Clark, 2013). The extent to which these associated factors interact with one another is an open question. Given the complexities inherent in available data, a number of differing interpretations could fit the available data (Clark, 2013).

The purpose of this study was to ascertain the extent of PDA in Florida communities as defined by SES and ethnicity and, as a result, to determine the efficacy of state and local efforts to address the problem. To establish context in this chapter, I first address PDA as a national problem and then describe PDA challenges in selected states. The metrics and specific stratagems public authorities have employed to address them provided a basis for assessment of the efficacy of official Florida policy in this area.

Research Design and Rationale

The design of this study was a quantitative cross-sectional correlational design. This was the appropriate design because the goal of this study was to test whether or not

the independent variables of being from a female-headed household, the residential environment, and adherence to religious precepts have a relationship with PDA. In the study, I also tested the relationship that PDA has with the student's ability to achieve educational goals. A cross-sectional design was appropriate because I aimed to capture information about multiple age groups at one point in time, rather than assessing information about the participants over time (Busk, 2005). A correlational design was appropriate because the purpose of the study was to test the relationship between the variables. This design was also appropriate because it saves time and resources as compared to an experimental design, which requires the collection of participants. A correlational design is appropriate to assess both risk factors and protective influences present in the students' surroundings (Howell, 2013). A longitudinal design would not be appropriate because I am not looking to analyze people and variables over a long period of time. An experimental design would not be appropriate because I am not able to assign participants into controlled groups. A quasi-experimental design would not be appropriate because I do not plan to compare differences between groups (Howell, 2013). The elements I studied include peer and individual settings, family and community environs, and the school environment. These factors have been shown to be reliable predictors with regard to drug use and other antisocial behaviors (Howell, 2013).

Methodology

Population

According to Trochim (2006), the audience for a research study consists of those who will benefit from the knowledge gained through the research. In this case, the FYSAS was intended to inform educators, planners, parents, and the general public about

the current state of students' risks for ATOD behaviors and their participation in those behaviors within the state of Florida. The objective of the FYSAS was to benefit young people, families, and society by providing programs designed to help young people avoid the negative effects of substance abuse and related delinquent behaviors. Although the resulting information is intended to inform several audiences, the population under question is a particular segment of the audience: Florida's middle school and high school students. Therefore, the students eligible to participate in the survey were drawn from this population. A representative sample was taken from the population, in which 96 middle schools and 79 high schools in Florida were selected based on their enrollment numbers. Out of the 175 schools, 172 elected to administer the FYSAS to students (with parental consent).

Sampling and Sampling Procedures

All participation in the survey was voluntary on the part of both schools and students (Florida Department of Children and Families [FDCF], 2013). The FDCF selected participating students in a multistep procedure to identify the sample who would fill out the survey. First, the FDCF stratified students by grade levels, with Grades 6 through 8 in the middle school stratum, and Grades 9 through 12 in the high school stratum. Next, the FDCF randomly selected groups of schools from each stratum. The size of a school's enrollment influenced its chance of being selected, with preference given to schools with higher enrollment numbers. In this step, the FDCF chose 96 middle schools and 79 high schools for consideration. From these schools, "survey coordinators were instructed on how to randomly select classrooms to fulfill the survey quota for each school" (FDCF, 2013, p. 2).

Participation levels of the selected schools and classrooms were high, with 172 out of 175 schools electing to administer the survey to volunteering students (with parental consent; FDCF, 2013). All of the 96 middle schools invited to participate chose to do so, and 76 of the 79 high schools participated (96.2%; FDCF, 2013). Student participation within these schools was also high. In the middle school stratum, 6,231 out of a possible 7,252 students volunteered to take the survey (85.9%), and 6,402 out of 7,725 students in participating high schools volunteered (82.9%; FDCF, 2013). The participation rates were obtained by calculating "a ratio of the number [of schools or students] participating divided by the number selected" to take the survey (FDCF, 2013, p. 3).

I also considered demographics in targeting the data to be analyzed. The gender demographics consisted of 49.8% female and 48.3% male participants (FDCF, 2013). Only the top three racial groups were included: 36.1% non-Hispanic (Caucasian), 24.8% Hispanic, and 16.6% African American (FDCF, 2013). Other ethnic categories had too few participants to allow for reliability of results and were not included.

Sampling Frame

Trochim (2006) described a sampling frame as "the listing of the accessible population from which [a] sample" is drawn (p. 16). The FYSAS sampling frame included all public middle and high schools in Florida, "with the exception of adult education, correctional or special education schools" (FDCF, 2013, p. 2). In addition, special education students and students who spoke English as a second language were excluded from participation (FDCF, 2013). Private schools were also excluded because they would not be participating in programs developed from the survey's information

(FDCF, 2013). Because of these exclusions, the sampling frame was broad enough to allow an accurate representation of middle and high school students in all parts of the state, although excluding students whose data were likely to skew the outcome (FDCF, 2013).

After applying the sampling frame, the FDCF identified the schools chosen to participate in the survey using the methods described above. Of the 175 schools, 172 schools agreed to participate and constituted the study sample. The students from these 172 schools formed the subsample and completed the survey (FDCF, 2013).

Sample Size

I calculated the sample size for this study by using the power calculator, G*Power 3.1.9.2. I based the parameters for calculating sample size on the multiple regression analysis because it has the most conditions of the analyses in this study. I chose a medium effect size because setting the *a priori* effect size level too high or too low can increase the risk for error (Cohen, 1988). Considering the medium effect size (f^2) of .15, a generally accepted power of .80 and an alpha (α) significance level of .05, the desired sample size to achieve empirical validity for a multiple regression with four predictors was 85 participants (Faul, Erdfelder, Buchner, & Lang, 2013).

Procedures for Recruitment, Participation, and Data Collection

The sample design in the 2013 FYSAS—which was the survey accessed in order to carry out the current study—was similar to the design used in the 2001, 2003, 2005, 2007, 2009, and 2011 surveys (FDCF, 2013). The FYSAS used in odd-numbered years represents state-level data (FDCF, 2013). Those administered in even-numbered years represent countywide as well as statewide figures and cover a much larger sample size

than those used in odd-numbered years (FDCF, 2013). For a survey to have sufficient reliability, a sample must have adequate size to merit statistical analysis (Population Sampling Techniques, 2015). Sampling allows researchers to obtain reliable information while minimizing the amount of effort, money, and time involved in administering the survey (Population Sampling Techniques, 2015). Surveying each student in the Florida public school system would be logistically impossible, but the evidence garnered from a population sample can be sufficiently representative to make survey results reliable. The sampling procedures described in the previous section with regard to school selection, student participation, demographics, and sample size ensured that the results were representative of the Florida Public Schools' middle and high schools.

Instrumentation

The FYSAS (2013) assessed participants' ethnicity, age, gender, and grade level. An example query is: "What is your age?" (FYSAS, 2013). The survey identifies protective factor prevalence rate trends among middle and high school students, respectively (FDCF, 2013). Protective factors include school and family rewards for prosocial involvement, as well as religiosity at the individual level (FYSAS, 2013). Similarly, the survey identifies risk factor prevalence rates among those respective cohorts and factors at work (e.g., perceived availability of drugs, family conflict, and lack of commitment to school; FYSAS, 2013). The survey also identifies income distribution levels, degree of urbanization, and female-headed households (as a fraction of all households; FYSAS, 2013). The factors are inferentially cross-tabulated with county FYSAS datasets to determine prospective factors at work in teenage PDA propensity.

The FDCF administered in a standardized manner that created consistency in each location that participated (FYSAS, 2013). The teacher in each classroom received the correct number of surveys and collection envelopes for every student who volunteered to take the survey and who had received parental permission to participate (FDCF, 2013). The teachers had not seen the instructions beforehand, to eliminate any type of bias or preconceived opinions on their part (FDCF, 2013). After the teacher gave the instructions to the students, the students were allowed a period of 50 minutes to complete the survey (FYSAS, 2013).

Students were encouraged to complete the survey but were also told that they could skip any question that they were uncomfortable answering (FYSAS, 2013). The survey assured students that their participation was purely voluntary, that they would remain anonymous, and that their answers would be treated confidentially (FYSAS, 2013). The FDCF implemented all of these measures were appropriately, with no irregularities recorded (FDCF, 2013). Only a slight anomaly occurred: because of statewide standardized testing across Florida, the survey was administered in February and March of 2013, as it had been in 2011 and 2012 (FYSAS, 2013). Previously, in 2002–2010, the survey was administered in March and April (FDCF, 2013). As the FYSAS (2013) report states, "student behaviors and attitudes that are positively correlated with age, such as ATOD use, are likely to have slightly lower prevalence rates" in younger students, meaning that administering the test 1 month earlier might influence the prevalence of the ATODs indicated by students on their surveys (p. 5). Therefore, planners should be cognizant of the possible differences between surveys of the last 3 years and those from earlier dates.

Description of Variables

In this study, I conducted a secondary analysis of existing PDA data (dependent variable) in relation to a number of independent variables assessed, including the incidence of female-headed households, the nature of residential environment, adherence to religious precepts, and students' capability to achieve educational goals. The data collection method cross-referenced the independent variables with data obtained from the 11 selected Florida counties. The following sections describe the data from each county.

Brevard County

Brevard County is a heavily urbanized polity fronting on the Atlantic and east of the Orlando metropolitan area (CITE). The county population is 550,000, an increase of 75,000 more than the 2000 census figure (CITE). Brevard is 78% Caucasian, with the remainder almost equally divided between African-American and Hispanic minorities (Brevard County, 2012). The median household income of Brevard County is $45,400, 1% above the Florida statewide average (Brevard County, 2012).

Lifetime prescription opioid abuse experienced among Brevard County middle school students is similar to that of the statewide average; both at 3.8% (State of Florida, 2013a). However, the high school age cohort's lifetime experience is markedly different, where the nonmedical use of prescription opioids is 10.6%, compared with 8.7% statewide (CITE). This represents a differential of 22% (State of Florida, 2013a). Recent (past 30 days) prescription opioid abuse among the 12–17 age cohort has fluctuated during the past decade with little apparent trend consistency (CITE). For example, between the years 2002–2012, the percentages of recent nonmedical prescription opioid use among high school students (taken every 2 years) were 4.7%, 5.1%, 3.7%, 5.6%,

2.3%, 4.3%, and 1.7%, respectively (State of Florida, 2013a). A significant drop occurred in such abuse during the 2011–2012 timeframe, although the available data does not identify causality (CITE). A contributing and possibly major factor has been the success of Florida's PDMP in reducing overall prescription opioid availability for diversion to nonmedical use (State of Florida, 2013a).

Calhoun County

Calhoun County is located in the Florida panhandle, inland from the Gulf of Mexico (Calhoun County, 2012). It is 32% urban and 68% rural (Calhoun County, 2012). The population is 78% Caucasian, with African American representing the majority of the remainder (Calhoun County, 2012). The county population was 14,700 in 2012, a metric that had increased slightly during the past decade (Calhoun County, 2012). The median family income in 2012 was $30,600, 68% of the state average (Calhoun County, 2012). Female-headed households account for 28% of total households (Calhoun County, 2012).

The 2012 FYSAS Calhoun County report (State of Florida, 2013b) described middle and high school student lifetime prescription opioid abuse at 2.4% and 11.2%, respectively. These metrics compare with statewide fractions of 3.6% and 8.5% for the same cohorts (State of Florida, 2013b). The Calhoun County metrics are abnormal (State of Florida, 2013b). Nonmedical use of prescription opioids is relatively lower than the statewide average, and the age 15–17 cohort reports abuse substantially higher than the Florida average, 3.6% and 8.5% respectively (State of Florida, 2013b).

Unlike metrics from other counties assessed in the data analysis, middle school students in Calhoun County identified religiosity as a significant protective factor (State

of Florida, 2013b). For other counties, students regularly rated this factor at less than 50% (State of Florida, 2013b). High school students identified family opportunities as drug abuse risk prevention at 51% (State of Florida, 2013b). The increased effect of religiosity reflects a trend found in all of the counties under assessment. Aside from religious objections to substance abuse, it is possible that religiously observant—or at least influenced—high school students are more attuned to shared community interests, and accommodating such interests advocates substance abuse avoidance (State of Florida, 2013b).

Calhoun County middle school students identified low school commitment (54%) as a significant risk factor (State of Florida, 2013b). That cohort likewise identified early drug use initiation as a significant factor at 38% (State of Florida, 2013b). Given the relatively low levels of substance abuse found among middle school students, county education efforts have a favorable effect, at least in the middle school cohort (State of Florida, 2013b). Compared to their middle school counterparts, high school students reported a somewhat lower percentage for low school commitment risk factor at 41% (State of Florida, 2013b). Early drug initiation as a risk factor among the 15–17 age cohort (33%) was lower than that of county middle school counterparts, but much the same as comparable metrics found in the 2012 reports from other counties assessed in this data analysis (State of Florida, 2013b).

Citrus County

Citrus County is located on the Florida peninsula, southwest of Ocala, and inland from the Gulf of Mexico. The county population is 140,000, 65% of which is urban and the remainder rural (Citrus County, 2012). The county is 90% Caucasian, with the

remaining residents mostly of Hispanic ethnicity (Citrus County, 2012). Median household income in 2012 was $38,100, 85% of the Florida statewide average (Citrus County, 2012). Female-headed households (age 35–55 cohort) account for 40% of total households (Citrus County, 2012).

Data metrics in the 2012 Citrus County FYSAS point to higher levels of lifetime prescription opioid abuse among members of the high school county cohort, as compared to the statewide Florida average (14.6% vs. 8.7%; State of Florida, 2013c). Self-reported male and female nonmedical prescription opioid use levels are virtually identical (State of Florida, 2013c). The 2012 county middle school PDA level was identical to the statewide average of 3.6% (State of Florida, 2013c).

Although county and statewide middle school percentages were virtually identical, the county and statewide high school cohorts were substantially different—5.1% compared to 2.8% statewide, which was a 55% higher relative abuse rate among county vs. statewide high school students (State of Florida, 2013c). Middle school students in 2012 identified family opportunities and religiosity at rates of 57% and 49%, respectively (State of Florida, 2013c). That same cohort identified the major risk factor as the lack of commitment to school, at a rate of 48% (State of Florida, 2013c). Among the high school cohort, the protective factors were 52% and 56%, respectively, and the above described risk factor was 54% (State of Florida, 2013c).

Franklin County

Franklin County is a largely rural polity located in Florida's panhandle and on the Gulf of Mexico. The county has had a population of slightly fewer than 12,000 for more than a decade (Franklin County, 2012). The county is 80% Caucasian, with a sizable

African-American minority and a smaller Hispanic one (Franklin County, 2012). Median household income is $31,000, 63% of the statewide average. Female-headed households (age 35–55 cohort) account for 20% of total households (Franklin County, 2012).

Among the 12–17 age cohort in Franklin County, PDA is high when compared to the Florida statewide average (State of Florida, 2013d). According to the 2012 FYSAS for Franklin County, 4% of the age cohort in question reported nonmedical use in the month preceding the survey date, although high school seniors reported such use at a 5.3% rate (State of Florida, 2013d). The statewide average was 2.3% and 2.9% for all persons in the 12–17 age cohort and high school seniors, respectively (State of Florida, 2013d). Nonmedical use of prescription opioids in Franklin County is 82% higher among 17-year-olds than the statewide average, and 74% higher for the entire 12–17 age cohort (State of Florida, 2013d). Lifetime prescription opioid abuse for the 12–17 age cohort was 12.8%, 100% higher than the comparable statewide age cohort (State of Florida, 2013d).

For middle school students, family opportunities factor was significant at 56% (State of Florida, 2013d). For high school students, family opportunities was 54% (State of Florida, 2013d). Lack of commitment to school was significant among risk factors for middle school students at 65% (State of Florida, 2013d). Among high school students, lack of commitment to school was 66% (State of Florida, 2013d).

Gulf County

Gulf County is a largely rural community in Florida's panhandle and on the Gulf of Mexico. The county's 2012 population was 16,000, 75% of which was Caucasian and the remainder almost entirely African American (Gulf County, 2012). Median household

income in 2012 was $34,900, 78% of the statewide Florida average (Gulf County, 2012). Female-headed households (age 35–55 cohort) accounted for 20% of total county households (Gulf County, 2012).

Gulf County's 12–17 age cohort, in its entirety, has an increased propensity for PDA than does that same cohort statewide (State of Florida, 2013e). Data metrics in the 2012 FYSAS for Gulf County indicated that 8.7% and 10.6% of county middle and high school students, respectively, have used prescription opioids nonmedically at least once (State of Florida, 2013e). This contrasts to the statewide metrics, which are 3.8% and 8.7%, respectively (State of Florida, 2013e). Recent use metrics are equally significant. Gulf County middle and high school students reported PDA during the near term at rates of 4% and 3.6%, whereas comparable statewide averages for 2012 were 1.7% and 2.8% (State of Florida, 2013e). Among county middle school students, PDA was abnormal because it was higher in 2012 than comparable abuse among the county's high school students (State of Florida, 2013e). This was a reversal of the general pattern, one in which nonmedical prescription drug use increased during students' high school years (State of Florida, 2013e).

In 2012, Gulf County middle school students favorably assessed family opportunities at 50%, and religiosity at 65% (State of Florida, 2013e). Their high school counterparts favorably assessed those same factors at 59% and 73%, respectively (State of Florida, 2013e). Middle school students assessed the risk factor of lack of commitment to school at 62% (State of Florida, 2013e). High school students assessed this risk factor at 49% (State of Florida, 2013e). The disparity in assessment of both favorable and unfavorable factors by Gulf County's middle and high school cohorts is pronounced and

significant. Although the trend-lines follow the larger pattern for the 11 Florida counties under assessment for this data analysis, this degree of disparity can only be described as anomalous. Given the perceptions and abnormally high percentage of PDA by the county's middle school students, the age cohort in question is at a more serious risk than counterparts in other counties in the state.

Indian River County

Indian River County is located midway down the Florida peninsula and sits adjacent to the Atlantic Ocean. The county's 2012 population was more than 140,000, having risen almost 30,000 during the preceding decade (Indian River County, 2012). Indian River County is 78% Caucasian, with the remaining population evenly divided between African-American and Hispanic individuals (Indian River County, 2012). Median household income is $42,700, 95% of Florida's statewide average (Indian River County, 2012). Female-headed households account for 27% of total county households (Indian River County, 2012).

The 2012 FYSAS for Indian River County provides metrics indicating PDA is at levels somewhat lower than the statewide average (State of Florida, 2013f). Middle and high school cohorts report lifetime nonmedical prescription opioid use at rates of 3.1% and 7.5%, respectively, compared with 3.8% and 8.7% statewide (State of Florida, 2013f). The county's middle and high school students reported recent nonmedical prescription opioid use at rates of 1.4% and 2.3%, respectively, in 2012 (State of Florida, 2013f). The comparable statewide metrics are 1.7% and 2.8% (State of Florida, 2013f).

Middle school students in Indian River County reported the importance of the family opportunities (56%) and religiosity (49%; State of Florida, 2013f). The high

school cohort identified the effect of those same factors at 58% and 60%, respectively (State of Florida, 2013f). The county's middle school students assessed the importance of the risk factor lack of commitment to school at 51% (State of Florida, 2013f). The county's high school counterpart assessed the same risk factor at a rate of 56% (State of Florida, 2013f).

Lake County

Lake County is located in central Florida, northwest of Orlando. The county is largely urban, with a population of 303,000 in 2012 (Lake County, 2012). It is one of the fastest growing counties in the state, having increased population by almost half in the preceding decade. Lake County is 75% Caucasian, with the remainder divided between African-American and Hispanic individuals (Lake County, 2012). Median household income in 2012 was $42,000, 94% of the statewide average (Lake County, 2012). Female-headed households comprise approximately 32% of total county households (Lake County, 2012).

Lake County middle and high school students reported lifetime opioid prescription pain reliever abuse at rates of 4.8% and 11.8%, substantially higher than statewide middle and high school metrics for such abuse (State of Florida, 2013g). Recent PDA rates for those two cohorts were 2.3% and 3.7%, again substantially higher than the statewide average (State of Florida, 2013g). County middle school students assessed the importance of family opportunities and religiosity at rates of 57% and 54%, respectively (State of Florida, 2013g). Their high school counterparts rated those same protective factors both at 61% (State of Florida, 2013g). Middle and high school students assessed the effect of lack of commitment to school at 54% (State of Florida, 2013g).

Lake County middle and high school metrics, in terms of both favorable and risk factors, reflect age and school grade patterns consistent with counties in which median family income is close to the Florida state average (State of Florida, 2013g).

Marion County

Marion County is located in central Florida, with Ocala serving as the largest metropolitan area in the county. It is 69% urban and 31% rural. In 2012, the county population was 335,000, having increased by almost 80,000 during the preceding decade (Marion County, 2012). The county is 74% Caucasian, with the remainder evenly divided between African-American and Hispanic individuals (Marion County, 2012). Median household income in 2012 was $39,000, 87% of the statewide average (Marion County, 2012). Female-headed households (age 35–55 cohort) account for 30% of total households (Marion County, 2012).

Marion County's middle and high school students in 2012 reported lifetime opioid PDA experience at rates slightly higher than the statewide average (State of Florida, 2013h). Recent PDA was fractionally higher than the state average for middle school students, while the high school metrics were identical to those statewide (State of Florida, 2013h). Middle school students in 2012 described the effect of family opportunities at 55% and religiosity at 52% (State of Florida, 2013h). High school counterparts assessed those same factor effects at 55% and 64%, respectively (State of Florida, 2013h). Middle school students assessed the effect of the selected risk factor lack of commitment to school (50%; State of Florida, 2013h). High school students considered the same risk factor significant at a rate of 48% (State of Florida, 2013h).

Pasco County

Pasco County is located on the Gulf coast, north of the Tampa-Clearwater metropolitan area. In 2012, the county had a population of 470,000, having increased by 125,000 during the preceding decade (Pasco County, 2012). Pasco is 91% urban and 9% rural (Pasco County, 2012). The population is 80% Caucasian, with the remainder mostly Hispanic individuals (Pasco County, 2012). Median household income in 2012 was 40,200, 90% of the statewide average (Pasco County, 2012). Female-headed households (age 35–55 cohort) account for 40% of total county households (Pasco County, 2012).

In 2012, Pasco County middle school students reported lifetime opioid PDA at a rate 25% higher than the statewide average (State of Florida, 2013i). However, their high school counterparts reported such abuse at a rate identical to the statewide average (State of Florida, 2013i). Recent PDA for both middle and high school students during 2012 was virtually identical with the statewide averages (State of Florida, 2013i). In 2012, Pasco County middle school students evaluated the effect of family opportunities and religiosity at rates of 57% and 54%, respectively (State of Florida, 2013i). The county's high school cohort evaluated those same protective factors at rates of 58% and 53%, respectively (State of Florida, 2013i). Middle school students rated the effect of the risk factor for substance abuse (lack of commitment to school) at 46% (State of Florida, 2013i). The county high school cohort evaluated the effect of the same risk factors at a rate of 44% (State of Florida, 2013i).

St. Johns County

St. Johns County is a predominantly urban polity located directly south of Jacksonville on the Atlantic coast. The county is 85% Caucasian, with the remaining

inhabitant population evenly divided between African-American and Hispanic groups (St. Johns County, 2012). St. Johns has experienced significant growth during the past decade, increasing from 120,000 to its current 205,000 (St. Johns County, 2012). Median household income is $61,000, substantially higher than the $45,000 Florida average (St. Johns County, 2012). Approximately 30% of households are female-headed (St. Johns County, 2012).

Prescription opioid abuse among high school students in the county spiked in 2004 (7.3%) and remained within a fraction of 4.7% from 2006–2012 (State of Florida, 2013j). The fraction of the 12–17 age cohort with any lifetime nonmedical prescription pain relief use averaged 8.6% during the 2002–2012 timeframe, compared with 6.4% of total state age cohort for the same timeframe (State of Florida, 2013j). The 2012 FYSAS for St. Johns County identifies a number of factors relating to propensity for substance abuse among the 12–17 age cohort during 2002–2012 (State of Florida, 2013j). Middle school students (60%) reported that family opportunities were a protective factor in avoiding substance abuse (State of Florida, 2013j). Among high school students, the family opportunities metric was similar to the middle school metric at 60% (State of Florida, 2013j). In terms of risk factors, middle school students identified perceived availability of drugs and peer rewards for antisocial behavior (both 43%) as being contributory factors (State of Florida, 2013j). High school age counterparts identified poor family management (40%), peer rewards for antisocial behavior (52%), and low perceived risks of drug use (53%) as significant risk factors (State of Florida, 2013j).

Volusia County

Volusia County is situated northeast of Orlando, on the Atlantic, and includes Daytona Beach, a major resort venue. The county population is 75% Caucasian with the reminder evenly divided between African-American and Hispanic populations (Volusia County, 2012). Median family income is 93% of the Florida average (Volusia County, 2012). County population is slightly under 500,000, of which 90% is urban and 10% is rural (Volusia County, 2012). In the age 35–55 age cohort, female-headed households account for 38% of total households, a significantly higher fraction than other county households selected for this study (Volusia County, 2012).

Lifetime nonmedical prescription opioid use among county teenagers tracks closely with statewide averages: 4.1% for the 12–14 age cohort (vs. 3.5% statewide) and 8.7% for the age 15–17 cohort (identical with the statewide metric; State of Florida, 2013k). Female prescription drug abusers slightly outnumber male counterparts (7% vs. 5.9%; State of Florida, 2013k). Recent prescription opioid abuse percentages are substantially lower than lifetime metrics and, for that matter, are considerably lower than statewide averages for last 30 days (State of Florida, 2013k). Of the 12–14 and 15–17 cohorts, 1.2% and 2.2%, respectively, reported such abuse in Volusia County (State of Florida, 2013k). This is slightly lower than the statewide metrics, which were 1.7% and 2.9%, respectively (State of Florida, 2013k).

Middle school students rated family opportunities at 48% (State of Florida, 2013k). For high school counterparts, this metric was 53% (State of Florida, 2013k). Middle school students identified a significant risk factor as lack of school commitment at 53% (State of Florida, 2013k). High school age cohort counterparts reported the same

risk factor at a rate of 52% (State of Florida, 2013k). Similar to middle school students, 35% of the 15–17 age cohort rated the early initiation of drug use as a significant risk factor (State of Florida, 2013k). Whether this similarity in cohort assessment is attributable to students' personal knowledge (e.g., friends and acquaintances describing street conditions) or to the efficacy of school and other education programs cannot be determined from the data currently available.

Data Analysis

I used the Statistical Package for the Social Sciences, Version 22 for the descriptive and inferential analyses conducted. By using descriptive statistics, sample characteristics—such as frequencies, percentages, gender, and level of education--became apparent and are presented in the following subsections. I have organized the analyses used by research question.

Research Question 1

What is the relationship between the incidence of female-headed households, the nature of the residential environment (urban vs. rural), and PDA?

$H_0$1: The incidence of female-headed households and the nature of residential environment does not predict PDA.

H_a1: The incidence of female-headed households and the nature of residential environment predicts PDA.

I conducted a multiple regression to assess if the independent variables (incidence of female-headed household and nature of residential environment) predict the dependent, or criterion, variable (prescription drug use). Multiple regressions are an appropriate analysis when the goal of the researcher is to assess the extent of a

relationship among a set of dichotomous or interval or ratio predictor variables on an interval or ratio criterion variable. I used the following regression equation (main effects model): y = b0 +b1*x1 + b2*x2 + e; where y = the response variable, b0 = constant (which includes the error term), b1 = first regression coefficient, b2 = second regression coefficient, x = predictor variables and e = the residual error (Tabachnick & Fidell, 2012).

I used the standard multiple regression—the enter method. The standard method enters all independent variables (predictors) simultaneously into the model. I evaluated variables based on what each adds to the prediction of the dependent variable that is different from the predictability provided by the other predictors (Tabachnick & Fidell, 2012). I used the *F* test to assess whether the set of independent variables collectively predicts the dependent variable. I reported and used R-squared (R^2)—the multiple correlation coefficient of determination—to determine how much variance in the dependent variable can be accounted for by the set of independent variables. I used the *t* test to determine the significance of each predictor and used beta coefficients to determine the extent of prediction for each independent variable. For significant predictors, every one-unit increase in the predictor, the dependent variable will increase or decrease by the number of unstandardized beta coefficients.

Prior to analysis, I assessed the assumptions of multiple linear regression. The assumptions of the multiple linear regression include normality, homoscedasticity, and absence of multicollinearity. Normality assumes a normal bell curve distribution between the predictor variables and the criterion variable, whereas homoscedasticity assumes that

scores are near equally distributed about the regression line. I assessed normality and homoscedasticity by examination of scatter plots (Tabachnick & Fidell, 2012).

Research Question 2

What is the relationship between the social factors adherence to religious precepts and PDA?

$H_0$2: There is no a relationship between adherence to religious precepts and PDA.

H_a2: Adherence to religious precepts predicts PDA.

A linear regression is an appropriate analysis when the goal of the researcher is to assess the extent of a relationship of a dichotomous or interval or ratio predictor variable on an interval or ratio criterion variable. A linear regression works similarly to a multiple regression, but uses the following regression equation: y = b1*x + c; where y = estimated dependent, c = constant, b = regression coefficients and x = independent variable (Tabachnick & Fidell, 2012). In addition, with a linear regression, no reason exists to assess for the absence of multicollinearity because of having one independent (predictor) variable.

I conducted a linear regression to assess if social factors adherence to religious precepts predicts prescription drug use (criterion) by way of the *F* test. I reported and used R^2 to determine how much variance in the dependent variable can be accounted for by the independent variable. I used the *t* test to determine the significance of the predictor and used beta coefficients to determine the extent of prediction of the independent variable. For a significant predictor, every one-unit increase in the predictor, the dependent variable will increase or decrease by the number of unstandardized beta coefficients.

I assessed the assumptions of a linear regression—linearity and homoscedasticity. Linearity assumes a straight-line relationship between the predictor variable and the criterion variable, and homoscedasticity assumes that scores are normally distributed about the regression line. I assessed linearity and homoscedasticity by examination of scatter plots (Stevens, 2009).

Research Question 3

What is the relationship between PDA and students' capability to achieve educational goals?

$H_0$3: There is no relationship between students' capability to achieve educational goals and PDA.

H_a3: PDA predicts students' capability to achieve educational goals.

I conducted another linear regression to assess if prescription drug use predicts the students' capability to achieve educational goals (criterion) by way of the *F* test. I reported and used R^2 to determine how much variance in the dependent variable can be accounted for by the independent variable. I used the *t* test to determine the significance of prescription drug use and used beta coefficients to determine the extent of prediction of the independent variable. For a significant predictor, every one-unit increase in the predictor, the dependent variable will increase or decrease by the number of unstandardized beta coefficients.

I assessed linearity and homoscedasticity again. Linearity assumes a straight-line relationship between the predictor variable and the criterion variable and homoscedasticity assumes that scores are normally distributed about the regression line. I assessed linearity and homoscedasticity by examination of scatter plots (Stevens, 2009).

Reliability and Validity

The value of a survey is only as high as the reliability of the survey itself. The level of confidence that can be placed in the results of a survey depends on several factors (Van Bennekom, 2014). These factors include the size of the population used in the survey, the desired segmentation analysis, the degree of variance in population responses, and tolerance for error (Van Bennekom, 2014).

The first factor is the size of the population used in the survey. Population is defined as "the group of interest for the survey" (Van Bennekom, 2014, p.67). From the initial population, a sample is drawn, of which generally only a percentage responds to the survey. The percentage responding is known as the response rate.

The second factor is the desired segmentation analysis (Van Bennekom, 2014). Researchers typically analyze data as a whole, and along specific demographic segmentation. For example, in the 2013 FYSAS, participants were divided by gender and racial or ethnic categories. However, to ensure reliability of results, racial or ethnic categories with too few participants were excluded from consideration (FYSAS, 2013).

The third factor is the degree of variance in population responses (Van Bennekom, 2014). When the responses received from a sample vary widely, a higher possibility of unreliability exists; when the responses are tightly clustered, reliability increases. The higher the variability in responses, the larger the sample size required to maintain reliability of results.

The fourth factor is tolerance for error (Van Bennekom, 2014). When accuracy is essential, minimal tolerance for error exists. I used the FYSAS to identify factors that can contribute to or protect against drug use in middle school and high school students

(FDCF, 2013). Protecting young people from harmful behaviors is a critical endeavor that must be based on accurate evidence. Therefore, the tolerance level for error in a survey such as this is low.

The FYSAS does not have any formal statistical reliability analyses available (FDCF, 2013). However, the survey was based on the Communities That Care Youth Survey (CTCYS; Arthur, Hawkins, Pollard, Catalano, & Baglioni, 2002). The CTCYS was created to measure factors for substance abuse, delinquency, and other adolescent behavior problems (Arthur et al., 2002). Arthur et al. (2002) administered the survey to youth across six states. The researcher correlated items on the CTCYS and used Cronbach's alpha to determine the reliability of each item across males and females from different grade levels (Arthur et al., 2002). Overall, the alpha for most of the scales averaged to .78, which shows that the scales had reliability.

Validity in the FYSAS has been measured by similar standards used in the CTCYS. In the FYSAS, five different strategies were employed to assess the validity of the survey forms. The strategies do not include standard validity assessments, such as face, content, or construct validity. Instead, the strategies describe design formatting considerations that help increase the validity of the FYSAS. The first strategy involved removing surveys that tended to show that the student did not take the survey seriously. This occurred by removing surveys from students who reported a combined average of four or more daily uses of nonmarijuana illicit drugs from the dataset. The second strategy involved removing surveys that indicated more than 120 incidents in the previous year of certain delinquent behaviors from analysis. These behaviors included attacking someone with intent to harm, attempting to steal a vehicle, being arrested,

getting suspended, and taking a handgun to school. This number of incidents was considered unrealistic.

The third strategy involved inclusion of a survey question regarding whether the student had used a fictitious drug. Responses indicating the student had used the nonexistent drug were eliminated from the data analysis. The fourth strategy involved eliminating logical inconsistencies on drug-related questions. For example, if a student reported having used a drug three to five times in the past 30 days, but also reported never having used that drug, the survey responses of that student would not be included in the results. Finally, the fifth strategy eliminated surveys in which less than 25% of the questions received an answer. This helped to identify responses from students who were not capable of full participation or who did not take the survey seriously.

Confidence intervals for the 2013 FYFSAS range from ±3.2 percentage points for the ninth-grade subsample, to ±3.6 percentage points for the 12th grade subsample (FDCF, 2013). This means that the survey provides an approximately 95% certainty of ±3.2 to ±3.6 accuracy, respectively, in the results (Van Bennekom, 2014). This percentage applies to behaviors with prevalence rates of 50%. The confidence interval is substantially narrower for less prevalent behaviors, such as heroin use and taking a handgun to school.

Threats to Validity

I cannot address the validity of the datasets presented in the FYSAS or reports of other state or county agencies. However, government reports relating to youth PDA levels (and other substance abuse levels, for that matter) regularly describe design-formatting considerations intended to reduce validity threats. Datasets developed for the

2013 Colorado Healthy Kids Survey are presented in terms of a 95% confidence level. However, achieving that confidence level is a function of considerable latitude among certain ethnicities. For example, PDA among Caucasian teenagers is 13.6%, with a percentage spread of 12.4% to 14.6%. Conversely, African-American PDA at the 95% confidence level assumes a percentage spread of 10.6% to 19.6%—footnoted observations infer that this may actually be the case.

Ethical Protection of Human Participants

This consideration is not applicable to this study because no subjects directly participated in the study. However, government sponsored dataset source documents invariably describe information gathering procedures and the implications for ethical protection. All steps were taken to ensure that students were treated ethically (FDCF, 2013).

Summary

In summary, in this chapter I detailed the assessment and influence of PDA and the efficacy of public containment that relies on assembly, coordination, and meta-analysis of already existing data research design. Through this study, I determined the levels of PDA among cohort segments, contributing aggravating factors, ameliorating conditions, and prospective long-term effect of official and nongovernment intervention stratagems. In Chapter 4, I present the results of the data analyses conducted.

Chapter 4: Results

Introduction

The purpose of this quantitative study was to examine aspects of prescription opioid abuse among Florida's middle and high school students, focusing on the incidence of female-headed households, the nature of the residential environment (urban vs. rural), adherence to religious precepts, and students' ability to achieve educational goals. This chapter will begin with a description of the data cleaning process and outlier removal. In the chapter, I then provide a description of the participant sample, followed by a brief summary of the findings, and a detailed description of the data analysis and results. Finally, I conclude the chapter with a brief chapter summary and transition to the discussion.

Preanalysis Data Cleaning

Data Collection

I retrieved data from the Florida Department of Children and Families Substance Abuse and Mental Health Program Office. After several weeks of e-mail contact, I obtained approval to use the FYSAS 2013 dataset in this study (State of Florida, 2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i, 2013j, 2013k). The original data set contained 12,034 participants. Of these participants, I randomly selected 150 to be included in the study. No discrepancies exist in the use of the secondary dataset from the plan presented in Chapter 3.

Composite Scores

To use the variables of PDA, the incidence of female-headed households, and educational goals in the analyses, I created composite scores. A mean composite score

was created for PDA, where the sum of variables FL46p, FL47p, FL24p, and FL25p was taken then divided by the total number of variables. This resulted in a single mean score that represented PDA. For incidence of female-headed households, I created a sum composite score where D5A, D5B, D5C, D5D, and D5E were summed together to create a single score. For educational goals, I took the sum of Q15, Q17, Q18, Q21, Q731, and Q3668. This allowed three single scores to represent each of the independent variables and dependent variable used in the following analyses.

Dummy Coding

To use region as a predictor variable in the regression analysis, I had to dummy code the variable. The variable region was a categorical variable, with five categories. The categories were dummy coded with the category "missing," which was represented by the option 99 and made up a significant portion of the responses. Once the region variable was dummy coded, it could be used in the regression analysis.

Cronbach's Alpha

To assess the internal consistency of the composite scores created, I used Cronbach's alpha. Also known as the coefficient alpha, the Cronbach's alpha provides the mean correlation between each pair of items and the number of items in a scale (Brace, Kemp, & Snelgar, 2012). Cronbach's alpha coefficients were evaluated using the guidelines suggested by George and Mallery (2016), where > .9 = Excellent, > .8 = Good, > .7 = Acceptable, > .6 = Questionable, > .5 = Poor, and < .5 = Unacceptable. Internal consistency for PDA was questionable ($\alpha = .67$), which means results with this variable should be interpreted with caution. Internal consistency for educational goals was good ($\alpha = .76$). I used a Kuder-Richardson coefficient of reliability to assess the incidence of

female-headed households because the variables that made up this composite score were binary. The Kuder-Richardson coefficient is measured the same way as the Cronbach's alpha and uses the same guidelines for interpretation (Traub, 1994). The results showed that the scale was unacceptable (.59). However, internal consistency was not a concern for this scale, as it measures instances of female-headed households, rather than a psychometric property or ability-based score (Brace, Kemp, & Snelgar, 2012). Instead, this variable represented whether a household was female-headed or not, and internal consistency is meaningless. Table 1 presents internal consistency scores for the composite scores.

Table 1

Cronbach's Alpha and Kuder-Richardson Reliability for Composite Scores

Composite Score	*KR*	α	Number of items
Prescription drug abuse		.67	4
Educational goals		.76	6
Incidence of female-headed households	.59		5

Descriptive Statistics

I used a total of 150 participants' data in the analyses. Participants were almost equally split between male (*n* = 76, 50.70%) and female (*n* = 74, 49.30%). Most participants were in the 10th grade (*n* = 29, 19.30%). The most common ages of the participants were 13 (*n* = 26, 17.40%), 15 (*n* = 26, 17.40%), and 16 years old (*n* = 26, 17.40%). Table 2 presents all frequencies and percentages of the participant sample's characteristics..

Table 2

Frequencies and Percentages for Sample Characteristics

Variable	*n*	%
Gender		
Male	76	49.3
Female	74	50.7
Age		
10	0	0.0
11	7	4.7
12	20	13.4
13	26	17.4
14	15	10.1
15	26	17.4
16	26	17.4
17	17	11.4
18	12	8.1
19 or older	0	0.0
Grade		
6th	26	17.3
7th	20	13.3
8th	21	14.
9th	17	11.3
10th	29	19.3
11th	19	12.7
12th	18	12.0

External Validity

To determine the external validity of the sample, I compared the demographic information to the samples of previous years. From 2004 to 2012, male participants of the FYSAS ranged from 45 to 50%, while female participants ranged from 48 to 51%. The amount of sixth graders from 2004 to 2012 was slightly lower (14% to 15%), with ninth graders making up the largest percentage of the sample (16% to 19%). Finally, the ages for the 2013 sample were similar to that of the previous years, with 12-year-olds (12% to

13%) making up the third highest portion of the sample, behind 13-year-olds (14% to 15%) and 14-year-olds (15% to 16%). Overall, the respondents from 2013 were similar to the samples of previous years of the FYSAS; however, the random sample chosen from the survey population was not as representative, but can still be considered a valid sample.

Summary of the Results

To determine the relationships between incidence of female-headed households, the nature of the residential environment (urban vs. rural), adherence to religious precepts, and PDA, I conducted a series of multiple linear regressions. The model using incidence of female-headed households and the nature of the residential environment to predict PDA was not found to be significant. The model using adherence to religious precepts to predict PDA was also not significant. Finally, the model using PDA to predict students' ability to achieve educational goals was found to be significant, indicating that PDA predicts lowered student ability to achieve educational goals.

Research Question 1

Research Question 1 was: What is the relationship between the incidence of female-headed households, the nature of the residential environment (urban vs. rural), and PDA? I conducted a multiple linear regression to assess the extent to which the incidence of female-headed household and the residential environment predicts PDA. Prior to analysis, I assessed the assumptions of normality, linearity, homoscedasticity, and multicollinearity. The assumption of normality was assessed using the Kolmogorov-Smirnov (KS) Test, and was found to be violated ($p < .001$). This indicated that the data were not normally distributed; however, Stevens (2009) stated that if the sample size is

larger than 30, the *F* test is strong enough to stand up to violations of this assumption. The assumptions of linearity and homoscedasticity were both assessed using a scatterplot, which showed no nonlinear trends and indicated meeting both assumptions (see Figure 1). The assumption of multicollinearity was also met, as the Variance Inflation Factor (VIF) level was below 10 (VIF = 1).

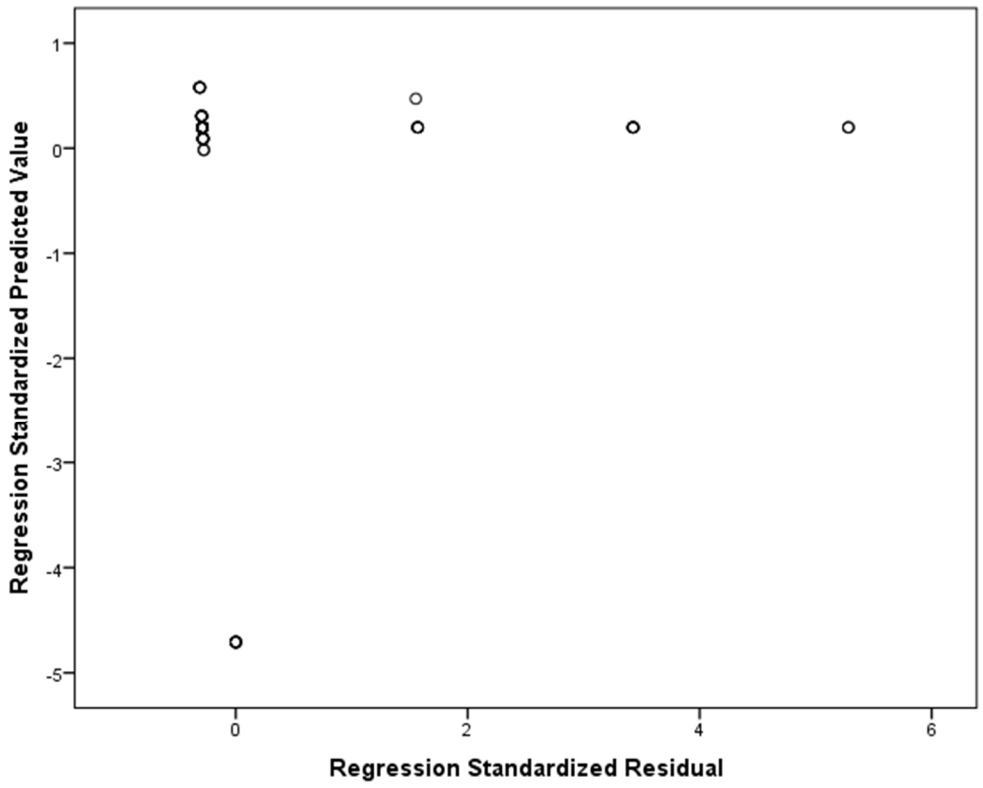

Figure 1. Scatterplot of the standardized and predicted values for the regression with residential environment and incidence of female-headed households predicting PDA.

Results showed a nonsignificant regression equation, $F(3, 137) = 0.16$, $p = .922$, $R^2 = .00$, suggesting that residential environment and the incidence of female-headed households do not account for any of the variability in PDA. Since significance was not found in the model, I did not conduct further analysis on the individual predictors. Table 3 presents the results of the multiple linear regression.

Table 3

Regression Results with Female-Headed Households and Residential Environments Predicting Prescription Drug Abuse

Source	*B*	*SE*	β	*t*	*p*
Farm	-0.17	0.31	-0.06	-0.54	.592
City	-0.01	0.23	-0.01	-0.05	.957
Female-headed household	-0.00	0.10	-0.00	-0.03	.973

Note. $F(3, 137) = 0.16$, $p = .922$, $R^2 = .00$.

Research Question 2

Research Question 2 was: What is the relationship between adherence to religious precepts and PDA? To examine the extent to which adherence to religious precepts predicts PDA among children, I conducted a linear regression. Prior to the analysis, I assessed the assumptions of normality, linearity, homoscedasticity, and multicollinearity. The KS Test assessed the assumption of normality, which was violated ($p < .001$). This indicated that the data were not normally distributed; however, Stevens (2009) stated that if the sample size is larger than 30, this violation can be safely disregarded. The assumptions of linearity and homoscedasticity were both assessed using a scatterplot, which showed no nonlinear trends and indicated meeting both assumptions (see Figure 2). The assumption of multicollinearity was met, as the VIF level was below 10 (VIF = 1.00).

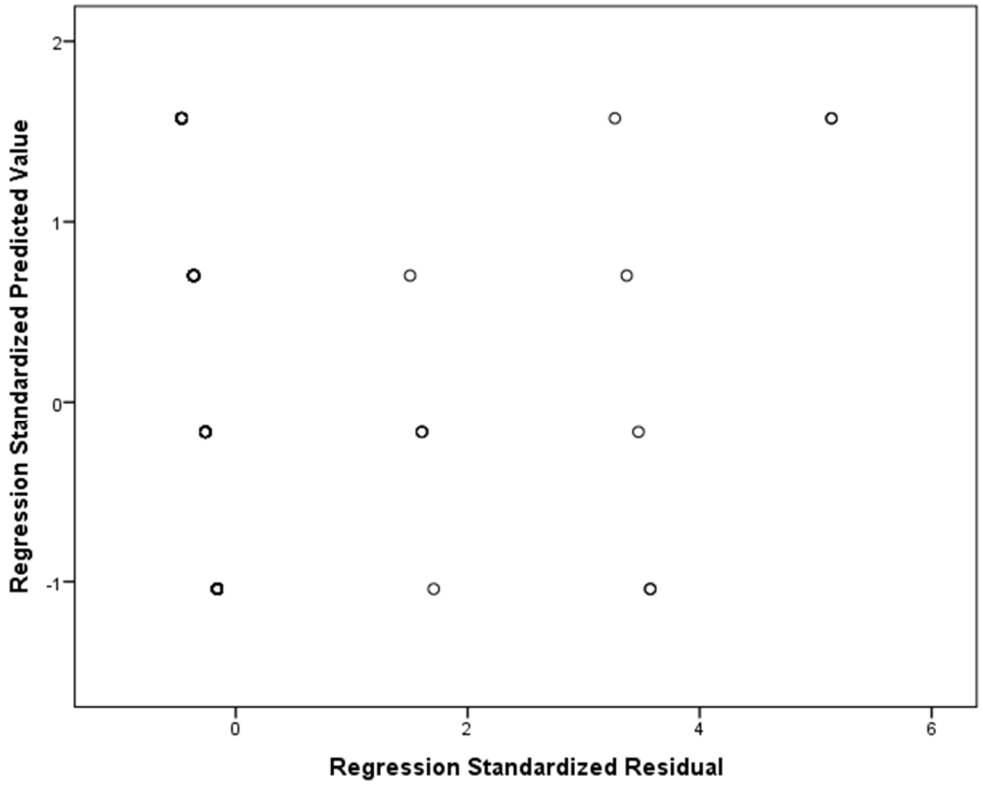

Figure 2. Scatterplot of the standardized and predicted values for the regression with adherence to religious precepts predicting PDA.

Results showed a nonsignificant regression equation, $F(1, 137) = 1.89$, $p = .172$, $R^2 = 0.01$, suggesting that no predictive relationship existed between adherence to religious precepts and PDA. As such, the coefficients were not examined further. Table 4 presents the results of the linear regression.

Table 4

Regression Results with Adherence to Religious Precepts Predicting Prescription Drug Abuse

Source	*B*	*SE*	β	*t*	*p*
Adherence to religious precepts	-0.06	0.04	-0.12	-1.37	.172

Note. $F(1, 137) = 1.89$, $p = .172$, $R^2 = 0.01$.

Research Question 3

What is the relationship between PDA and students' capability to achieve educational goals? To examine the extent to which PDA predicts students' capability to achieve educational goals, I conducted a third regression. Prior to the analysis, I assessed the assumptions of normality, linearity, homoscedasticity, and multicollinearity. The KS Test assessed the assumption of normality, which was violated ($p < .001$). This indicated that the data were not normally distributed; however, Stevens (2009) stated that if the sample size is larger than 30, the *F* test is strong enough to stand up to violations of this assumption. The assumptions of linearity and homoscedasticity were both assessed using a scatterplot, which showed no nonlinear trends and indicated meeting both assumptions (see Figure 3). The assumption of multicollinearity was met, as the VIF level was below 10 (VIF = 1.00).

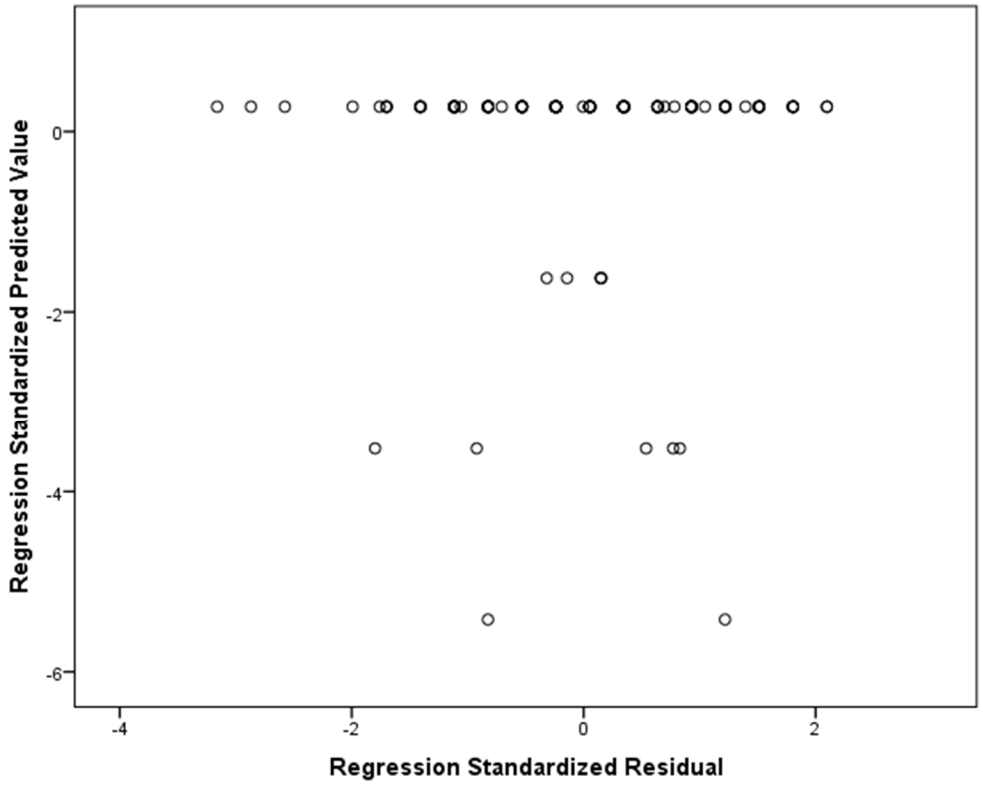

Figure 3. Scatterplot of the standardized and predicted values for the regression with PDA predicting students' capability to achieve educational goals.

Results showed a significant regression equation, $F(1, 143) = 6.04$, $p = .015$, $R^2 = .04$, indicating that approximately 4% of the variability in students' capability to achieve educational goals can be explained by PDA. PDA was found to be a significant predictor of students' capability to achieve educational goals, $B = -0.22$, $p = .015$. This suggests that abuse of prescription drugs decreased students' ability capability to achieve educational goals by 0.22 units per every 1 unit increase in PDA. Table 5 presents the results of the linear regression.

Table 5

Regression Results with Prescription Drug Abuse Predicting Students' Ability to Achieve Educational Goals

Source	*B*	*SE*	β	*t*	*p*
Prescription drug abuse	-0.22	0.09	-0.20	-2.46	.015

Note. $F(1, 143) = 6.04$, $p = .015$, $R^2 = .04$

Chapter Summary

I began Chapter 4 with a restatement of the purpose of the research, intended to frame the following findings. I then provided a description of the data treatment methods and a description of the final sample that was subjected to statistical analysis. Next in the chapter, I presented results of the analysis, indicating that incidence of female-headed households did not predict prescription drug use, that the nature of the residential environment (urban vs. rural) is not a significant predictor of PDA, that adherence to religious precepts did not predict PDA, and that PDA significantly predicts lowered students' ability to achieve educational goals.

In Chapter 5, I present the results in terms of the extant literature. I also discuss the implications to the body of knowledge. In addition, I detail any strengths and limitations of the study along with recommendations for future research in an effort to expand on the strengths and remedy any possible limitations.

Chapter 5: Discussion, Findings, Limitations, and Recommendations

Introduction

The primary purpose of this quantitative correlational study was to examine aspects of prescription opioid abuse among Florida's middle and high school students, focusing on the incidence of female-headed households, the nature of the residential environment (urban vs. rural), adherence to religious precepts, and students' ability to achieve educational goals. PDA, most notably the abuse of opioids, is one of the gravest and fastest growing threats to American public health, and Florida, particularly, has been affected by prescription opioid use. A central problem is the deficit of available data regarding social and environmental factors related to PDA among youth in Florida. Data regarding the social and environmental factors that predict PDA among youth could help explain the ineffectiveness of state efforts to reduce PDA and help to inform proactive measures to prevent PDA among youth.

In this study, I sought to determine whether female-headed households, a residential environment, and adherence to religious precepts predicted PDA in middle and high school students. I also tested whether PDA predicted students' ability to achieve educational goals. Individual analysis of the predictors revealed that the incidence of female-headed households, the nature of the residential environment (urban vs. rural), and adherence to religious precepts were not significant. However, I did find that the model using PDA to predict students' ability to achieve educational goals to be significant, indicating that PDA predicted lowered student ability to achieve educational goals. In this chapter, I provide an interpretation of the findings in relation to the

literature as well as sections regarding the limitations of the study, recommendations for further research, implications for practice and social change, and a conclusion.

Interpretation of the Findings

Taylor (2015) argued that sociocultural and environmental factors (e.g., familial, cultural, and socioeconomic factors) significantly influenced PDA among youth. For this reason, I employed Bronfenbrenner's (1992) ecological systems theory, which allows for understanding how individuals interact with environmental factors within a given context or environment on multiple levels. The findings of this study largely did not support Bronfenbrenner's ecological systems theory that factors of individuals' micro- and macrosystems influence individuals' behaviors. The factors of incidence of female-headed households, residential environment, and adherence to religious precepts did not predict decreases in youth PDA.

Female-Headed Households

According to Bronfenbrenner (1992), individuals' familial contexts are the part of their microsystem that most immediately influences their behavior and development. Families headed by single mothers have become one of the largest groups in a growing population of nontraditional families (e.g., single-parent families, divorced, or LGBT families that diverge from the traditional husband-wife couple; Roberts, Lewis, & Carmack, 2011). In addition, children born to single mothers have increased from 25% in 1965 to more than 70% in 2014 (Whitaker, Whitaker, & Jackson, 2014). Research shows that children who grow up in single-parent households are vulnerable to a variety of risks, including substance abuse (Roberts et al., 2011; Whitaker et al., 2014). However, emerging researchers suggest connections between female-headed households and

positive youth development (Nixon, Greene, & Hogan, 2012). The finding of this study that female-headed households as a factor of individuals' microsystems did not predict decreased rates of PDA in youth does not align with emerging literature (Nixon et al., 2012) regarding the positive influence of female-headed households on youth. The finding also suggests that more research is necessary to better understand the mixed results of previous and emerging research pertaining to the influence of female-headed households on youth outcomes and behaviors.

Nature of the Residential Environment

Although rates of illicit drug use (e.g., hallucinogens, marijuana, cocaine, and heroin) are similar for youth in urban and rural settings, recent numbers indicate the youth in rural settings are more likely to abuse prescription drugs than are youth in urban settings (Taylor, 2015). The findings of this study do not support recent research that residential location can serve as an indicator of the likelihood of youth PDA in urban and rural settings (Taylor, 2015). Taylor (2015) found that 13% of youth in rural environments reported using prescription drugs for nonmedical purposes, while 10% of youth in urban environments reported using prescription drugs for nonmedical purposes. Additionally, Taylor found that youth in rural settings were more likely to use tranquilizers and pain relievers than youth in urban settings (3.5% versus 2.5%, and 11.5% versus 10.3%, respectively). However, prescription drugs are ubiquitous, and their availability to youth as medicine cabinet drugs (Rennzazzisi, 2012) may lead to youth PDA being a problem in both urban and rural settings, necessitating more research on PDA among youth in relation to their residential environments.

Adherence to Religious Precepts

According to Bronfenbrenner (1992), religion is part of individuals' larger macrosystem that influences their behavior and development through a network of beliefs and attitudes that guide action and behavior. Although specific churches that individuals attend would be considered part of their microsystem, religious beliefs and the degree to which individuals adhere to their religious precepts represent part of the macrosystem that can significantly influence individuals' actions and behavior (Shukor & Jamal, 2013). In this study, I operationalized adherence to religious precepts as the degree to which individuals were committed to their religious beliefs and values and practiced them in daily life, which involved the observance of conventions and outward forms of a religious tradition (Shukor & Jamal, 2013). Research has shown that adherence to religious precepts was significantly related to individuals' attitudes toward controversial and moral issues, such as same-sex sexuality and same-sex marriage (Fuist, Stoll, & Kniss, 2012; Woodford, Levy, & Walls, 2012). However, researchers have not focused on adherence to religious precepts in relation to youth PDA, and adherence to religious precepts did not predict youth PDA in this study.

Students' Ability to Achieve Educational Goals

In this study, I also examined whether PDA predicted students' ability to achieve educational goals and found that students' ability to achieve educational goals was significant, indicating that PDA predicted lowered student ability to achieve educational goals. Items that constituted achieving educational goals included the praise of teachers and parents, feeling safe at school, and increased chances of being part of class discussions and activities. The finding that PDA predicted lowered students' ability to

achieve educational goals is novel and represents another important avenue for further research. Researchers have studied prescription opioid use, such as the use of Ritalin and Adderall, in high school students (McCabe, West, Teter, & Boyd, 2012) and college students (McCabe, West, Teter, & Boyd, 2014). McCabe et al. (2012) found that 1 in 5 high school seniors in the United States had used prescription opioids either medically or nonmedically. McCabe et al. (2014) found that that 1 in 4 college students had used prescription opioids either medically or nonmedically. However, researchers have yet to focus on PDA in youth and its connection to academic achievement.

Limitations of the Study

This study involved a secondary analysis of existing PDA data related to the incidence of female-headed households, the nature of residential environment, adherence to religious precepts, and students' capability to achieve educational goals. The data collection involved methods for cross-referencing the independent variables with data obtained in 11 selected Florida counties. I could not confirm the validity of the datasets presented in the FYSAS, or for that matter, reports of other state or county agencies, and the 2013 FYSAS does not have any formal statistical reliability analyses available. The findings of this study should be considered with these limitations in mind.

However, government reports relating to youth PDA levels regularly describe methods intended to reduce validity threats. The survey was created based on the CTCYS to measure factors for substance abuse, delinquency, and other adolescent behavior problems (Arthur et al., 2002). Arthur et al. (2002) administered the survey to youth across six states, correlated items on the CTCYS, and used Cronbach's alpha to determine the reliability of each item across males and females from different grade

levels. Overall, the alpha for most of the scales averaged out to .78, which is sufficient to say the scales had good reliability.

Validity in the FYSAS has been measured by similar standards used in the CTCYS (FYSAS, 2013). In the 2013 FYSAS, five different strategies were employed to assess the validity of the survey forms (FYSAS, 2013). The first strategy involved researchers removing surveys that tended to show that students did not take the survey seriously (FYSAS, 2013). The second strategy involved researchers removing surveys from analysis that indicated more than 120 incidents in the previous year of certain delinquents (FYSAS, 2013). In the third strategy, researchers used inclusion of a survey question regarding whether the student had used a fictitious drug and removed surveys that indicated the use of a fictitious drug (FYSAS, 2013). The fourth strategy involved eliminating logical inconsistencies concerning drug-related questions (FYSAS, 2013). Finally, in the fifth strategy, researchers eliminated surveys in which less than 25% of the questions received an answer (FYSAS, 2013).

Recommendations for Future Research

The findings of this study did not support that sociocultural factors, including factors of individuals' micro- and macrosystems, were significant predictors of youth PDA. Therefore, I recommend more research on the connections between sociocultural, environmental factors, and youth PDA in general. However, in order to add to emerging literature and because nontraditional family structures, including female-headed households, are on the rise, future researchers should focus on the connections between female-headed households and other nontraditional family structures and youth PDA. Such research may include qualitative studies to explore and more completely understand

specific experiences and challenges of female-headed households and single mothers in relation to youth PDA. In addition, future researchers should study the connection between adherence to religious precepts and decreased PDA, as well as how religion and adherence to religious precepts may act as protective factors for youth, especially as they relate to PDA. Using qualitative methods, researchers may also explore the role religion and adherence to religious precepts plays in the lives of children and families in relation to attitudes toward prescription drug use and abuse.

While the nature of the residential environment (urban vs. rural) was not significant to PDA in this study, the findings suggest that PDA may be a problem in both urban and rural settings. Therefore, further research should include studies designed to determine whether PDA is indeed a problem that cuts across urban and rural settings. Finally, more research is needed on youth PDA and students' ability to achieve educational goals. This may include not only studies to confirm the connection between PDA and decreased ability to achieve educational goals but also to distinguish between how legitimately prescribed drugs (e.g., Ritalin and Adderall) are linked to educational outcomes when compared to PDA. Future research on legitimately prescribed drugs, PDA, and educational outcomes may also include longitudinal studies to identify trends of prescription drug use and abuse as they relate to educational outcomes over time.

Implications for Professional Practice and Social Change

Findings from this study may have implications for both professional practice in community health education and social change. Although female-headed households did not significantly predict a decrease in youth PDA, emerging literature indicated connections between female-headed households and decreases in youth risks, including

drug use and abuse. Consequently, community health and prevention programs should be designed with the needs of families in general in mind, including concerns of scheduling and offering programs that do not coincide with typical work hours and that may include childcare for younger children during programs. Community efforts may also include working with private and nonprofit entities to help support the needs of families in their efforts to decrease risky behavior, including youth PDA.

Expanding the scope of community and school cooperation with private and nonprofit organizations may also include collaborating with churches or church programs, including church-sponsored retreats and church youth organizations. The idea behind such approaches would be to reinforce and supplement religious and moral foundations and precepts that may already play important roles in youths' lives. In addition, the efforts of private and church organizations may further serve to reinforce and supplement drug prevention messages youth may be receiving from school and community programs, which cannot and do not, respectively, base their approaches on moral or religious teachings.

Because youth PDA predicted lowered student ability to achieve educational goals, schools should ramp up PDA awareness and prevention programs. In addition, through identifying predictors of PDA that leaders and administrators of drug abuse prevention, intervention, and educational programs can use to inform their approaches, this study may lead to positive social change at the community level by helping to reduce PDA among youth and enhance students' ability to achieve educational goals. Finally, because youth PDA may be a significant contributing factor to PDA stabilization rates

among adults aged 40–44 (SAMHSA, 2014), reducing youth PDA may help to reduce PDA among older cohorts as well.

Conclusion

Sociocultural and environmental factors are part of individuals' micro- and macrosystems that can predict youth PDA, although findings of the present study did not support this. Information from this study regarding the factors that predict youth PDA contributes to the deficit of available data regarding social and environmental factors for PDA among youth in Florida. Data on the social and environmental factors that predict PDA among youth could help state efforts to reduce PDA and help to inform proactive measures in community public health to prevent PDA among youth, thereby potentially helping students to achieve their educational goals and reducing PDA among the older cohorts. Lastly, PDA prevention and education efforts are needed to support and reinforce positive influences and potential protective factors in students' lives.

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