IDENTIFICATION OF BEHAVIORAL RISK FACTORS FOR MEDICALLY UNSUPERVISED USE OF PRESCRIPTION MEDICATIONS IN UTAH

by

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STATEMENT OF DISSERTATION APPROVAL

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ABSTRACT

Prescription drug misuse has become a widespread problem in the United States. Misuse of prescription drugs is second only to marijuana as the nation's most prevalent drug problem. National data shows that in 2002–2003 through 2005–2006, Utah ranked among those states with the highest rates of the past year nonmedical use of pain relievers among those age 12 and older.

Using data from the 2008 Utah Behavioral Risk Factor Surveillance System (N=5,330) and the 2007 Utah Higher Education Health Behavior Survey (N=8,834), we completed three studies exploring nonmedical prescription drug use among the Utah adult population. There were three different outcomes: medically unsupervised use of prescription pain medication; obtaining prescription drugs for nonmedical purposes; and using prescription drugs to manage pain. The last two outcomes were within the population of Utah college students.

Univariate and multivariable logistic regression was conducted to model the influence of individual demographic and lifestyle risk factors on the probability of nonmedical prescription drug use in the Utah adult population.

These studies identified factors that put people at risk for nonmedical use of prescription drugs. Some of our findings were consistent with previously published research that those who use prescription medications nonmedically also use other drugs. Our findings show that if someone had an alcohol or drug problem of some type in the

past year then they were more likely to obtain or use prescription drugs nonmedically. Other risk factors were race, general health, and cigarette smoking. Mental health surfaced both as psychological distress and life dissatisfaction. Those who are "religiously adherent" (active) are more likely than those with "no religious preference" or "not religiously active" to obtain prescription drugs for nonmedical purposes among the Utah college student population. These studies are an important first step in understanding the extent of and factors associated with nonmedical use of prescription drugs. Future studies are needed in order to continue to address this important public health problem and to gain greater understanding of this issue.

For my father, one of the smartest people I know

Without your support this would not have been possible

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CHAPTER 1

INTRODUCTION

The nonmedical use of prescription drugs has gained increasing attention over the last several years. Recent data from 2008 National Survey on Drug Use and Health (NSDUH), document that 6.2 million individuals (aged 12 or older), or 2.5 % of the U.S. population, used prescription-type psychotherapeutic drugs nonmedically (past month), which is lower than reported in 2007 (6.9 million or 2.8 %, p=0.05).[1] The psychotherapeutic category includes four prescription-type drug groups: pain relievers, tranquilizers, stimulants, and sedatives.[1] Past month use rates for the different types of drugs include an estimated 4.7 million persons using pain relievers nonmedically in the past month, 1.8 million using tranquilizers, 904,000 using stimulants, and 234,000 using sedatives.[1]

The Substance Abuse and Mental Health Services Administration (SAMHSA) released a series of reports that are exclusive to each state. The information reported is data from the NSDUH, comparing data years 2002–2003 through 2005–2006.[2] At that time, Utah ranked among those states with the highest rates of the past year nonmedical use of pain relievers among those age 12 and older.[2] The rates for this measure were at or above the national rates for all age groups (individuals age 12–17; individuals age 18–25; and individuals 26 and older).[2] Between 2005–2006 and 2006–2007, Utah had a decline in reported nonmedical pain reliever use, from 6.21 % to 5.24 % (p=0.05).[3] Utah also has

rates that are equal to or above the national rates for serious psychological distress, in the age group 18 to 25 the rates have consistently been among the highest in the country.[2]

National data sources such as NSDUH have information and data available on the Utah population, but the number of surveyed participants is a rather small. The national surveys have provided good baseline data and have been able to show trends but more detailed and accurate information is needed. Datasets collected by the state of Utah have larger sample sizes and address issues of nonmedical prescription drug use with different questions than the NSDUH. Two instruments used in Utah are the 2007 Utah Higher Education Health Behavior Survey (UHEHBS) and the 2008 Behavioral Risk Factor Surveillance System (BRFSS). They are observational studies with cross-sectional study designs. The study design methods chosen for both surveys were influenced by resources and feasibility in collecting the appropriate responses. The UHEHBS was a collaborative effort between state agencies, colleges, and the consultant evaluators. The team approach to this survey was the driving force behind the decisions that were made as to the items generated for the questionnaire and for the methodology. The BRFSS is a national survey instrument coordinated through the Centers for Disease Control and administered in Utah by the Utah Department of Health (UDOH).

Data from the Utah Medical Examiner's office illustrate that there is a high rate of deaths in Utah by drug poisoning with nonillicit drugs.[4-6] Additional information is needed to determine at what age this problem first emerges; looking at the UHEHBS and the BRFSS data will potentially provide some insights into risk factors that might lead to understanding who uses prescription drugs nonmedically so that interventions can be implemented. The data from the Utah Medical Examiner's office details who is dying by

drug poisoning of nonillicit drugs, but there is a lack of information for Utah on who is actually using prescription drugs nonmedically.

There are many qualities that make Utah a unique state and set it apart from others in the nation. In order to understand the issues that relate to substances of abuse it is important to have an understanding of those unique qualities. As of July 1, 2008 the Census Bureau estimated Utah had a population of 2,736,424.[7] It also determined Utah to be the fastest growing state in the country.[8] Utah is known for being one of the most religiously homogeneous states in the United States, with approximately 58 % of its adult population reporting membership in The Church of Jesus Christ of Latter-day Saints (also known as the Mormon Church or the LDS Church).[9] The Church of Jesus Christ of Latter-day Saints reports a different figure for its Utah membership, as of January 2008, "The net growth in Utah among members of the Church is growing steadily, approaching 1.8 million or 72 % of the population according to end-of-year 2006 statistics."[10] A possible reason for the difference is that the first figure only includes self identified religious affiliation of adults, children are not included. Members of this faith subscribe to a strict health code that directs abstaining from the use of tobacco, consumption of alcohol, coffee or tea, and includes not abusing prescription drugs.[11]

Likely due in part to the influence of the LDS Church, Utahns typically use most substances at lower rates than residents of other states. As described by the Utah Department of Health in a report covering the years 2001–2005, the state's chronic drinking rate is 2.9 % compared to the U.S. rate of 7.7 %; binge drinking 8.9 % versus 15.2 %; cigarette use 11.7 % versus 21.9 % [12] The NSDUH "States in Brief" reports Utah

ranking among the lowest of all states (for all age groups) for tobacco and cigarette use, past month binge drinking, and marijuana use.[2]

Utah went through an extensive data gathering and evaluation process in 2006–2007 to determine substances of most risk using the State Epidemiological Outcomes Workgroup (SEOW).[4] Fatal overdoses related to prescription pain drugs were selected as a state priority for action.[4] The Utah Office of the Medical Examiner reported that nearly two-thirds of 476 drug-related deaths in 2006 were caused by legal drugs, either prescription or over-the-counter with the average decedent a 40-year-old male.[13] This issue is a priority for both UDOH and the Utah Division of Substance Abuse and Mental Health (DSAMH).

The Prescription Pain Medication Management and Education Program was initiated at the Utah Department of Health in July 2007 after the Utah State Legislature appropriated funds to establish a program to reduce deaths and other harm from prescription opiates. A steering committee made of up experts from various fields oversees the initiative; these include: Utah Division of Occupational and Professional Licensing, HealthInsight, Utah Poison Control Center, Utah Labor Commission, Attorney General's Office, Utah Department of Human Services and several offices from the Utah Department of Health. They meet monthly and oversee and guide the Advisory Committee.[14] The Advisory Committee meets quarterly and is broken into four workgroups: Provider Behavior Change; Patient and Community Education; Policy, Insurance and Incentives; and Data, Research and Evaluation.[14]

The Prescription Pain Medication Management and Education Program has proposed theories as to why Utah has such high use rates for nonmedical prescription

pain drug use, they include: the Utah population might have different ways of coping with stress and life issues, since there is less alcohol consumption amongst Utahns; there is a stigma of addiction, and, thus, individuals do not recognize or admit to the problem, and they fail to seek help.[15]

In April 2009, a new group was convened to focus on prescription drug use to address the Utah pharmaceutical drug problem. The Utah Pharmaceutical Drug Crime Project (UPDCP) includes health, law enforcement (both local and federal) and health insurance officials.[16] The main goal of UPDCP is to decrease the nonmedical use of prescription drugs by reducing availability, increasing the awareness of risks, and decreasing tolerance of the nonmedical use of pharmaceutical drugs.[17]

The Utah State Substance Abuse Prevention (USSAP) consortium has been the primary group that focuses on college student substance abuse problems in Utah. It is made up of partnerships between colleges, the Board of Regents, and local and state agencies. It started in 1990 in order to network for resources and visibility around substance abuse issue in higher education. USSAP has encouraged campuses to convene Advisory boards to focus on campus substance abuse issues. These are usually coordinated through the campus Alcohol and Drug Prevention Offices. These campus groups have a wide representation across campus departments and also include local community agencies. The majority of Utah college students are from Utah [18] and so have grown up with some of the attitudes or ideals that might be yielding to the higher use rates. Thus, the information gathered with the college populations can have further implications for the Utah population. There have not been any prevention or education efforts thus far on nonmedical prescription drug use among college students in Utah.

Purpose of the Study

Nonmedical prescription drug use is of great concern at the local and national level. At the local level, there are gaps in the research as to the risk factors associated with nonmedical prescription drug use. This dissertation uses available data to address the issue of nonmedical prescription drug use in the Utah adult population. Specifically, this dissertation will identify risk factors for unsupervised use of prescription medications in Utah adults both in college and not in college. In particular there will be a focus on medically unsupervised prescription pain medication use, nonmedical use of prescription pain drugs to manage pain, and obtaining prescription drugs for nonmedical use.

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CHAPTER 2

IDENTIFICATION OF BEHAVIORAL RISK FACTORS FOR MEDICALLY UNSUPERVISED USE OF PRESCRIPTION PAIN MEDICATIONS IN UTAH

Abstract

The purpose of this study is to identify risk factors for medically unsupervised use of prescription pain medications in Utah residents, age 18 and older. The 2008 Utah Behavioral Risk Factor Surveillance System (BRFSS) surveyed 5,330 respondents. A state-added section includes a series of questions on use and acquisition of prescription pain medications. Medically unsupervised use of prescription pain medication is defined as "use of one's own medication more frequently or in higher doses than prescribed for a specific problem and/or use of prescription pain medication that was not prescribed to the individual." The following factors are associated with medically unsupervised use of prescription pain medications: adults between the ages of 35 and 44, White race, life dissatisfaction, prior problems with substance use, mild range psychological distress scores (using the K6 screening scale, which identifies potential mental health problems).This study contributes to an understanding of the use of medically unsupervised prescription pain medications in the Utah population, and can be used to guide prevention efforts

Introduction

Prescription drug misuse has become a widespread problem in the United States.[1-2] According to the National Institutes on Drug Abuse, approximately 50 million people (ages 12 and older), around 20 % of the U.S. population, report using prescription drugs for nonmedical reasons during their lifetime.[2] Misuse of prescription drugs is second only to marijuana as the nation's most prevalent drug problem.[1-2] Opioid pain relievers are the most commonly abused prescription drug category, which has been recognized as a serious and growing public health problem. The 2007 National Survey on Drug Use and Health (NSDUH) reports that, in the United States, an estimated 5.2 million persons aged 12 or older used pain relievers nonmedically in the past month. This is the same number as 2006, which is higher than in previous years.[3] In 2007, the number of new users of nonmedical pain relievers was approximately 2.1 million people.

Utah residents have typically reported low rates of substance abuse compared to other states;[4] however, morbidity and mortality from prescription narcotics has been identified as a state priority. In 2005, Utah had the highest population-adjusted rates of nonmedical use of pain relievers in the nation.[5] Rates in poisoning deaths of unintentional or undetermined intent caused by nonillicit drugs tripled from 1.5, during 1991–1998, to 4.4, during 1999–2003.[6] Mortality data from the Utah Office of the Medical Examiner shows that over one-third of 485 drug-related deaths in 2006 were caused by opioids.[7] In order to better understand how Utahns obtain and use prescription pain medication, twelve questions were added to the 2008 Utah Behavioral Risk Factor Surveillance System (BRFSS) survey. Utah is the only state, thus far, to add questions on opioid use to the BRFSS.

The NSDUH defines nonmedical use as use of the medication "without a prescription belonging to the respondent or use that occurred simply for the experience or feeling the drug caused."[2] It does not include legitimate use of prescription drugs under a physician's direction, nor does it include use of over-the-counter medications. Medically unsupervised use of prescription pain medication—as it was defined for this study—encompasses use more frequently, or in higher doses, than prescribed for a specific problem, and use of prescription pain medication that was not prescribed to the individual. Reasons for using pain medication, other than as prescribed, include using for recreation or euphoric effects—to get high, to have fun, to get a lift, to calm down, or to manage pain in a way not originally intended by a doctor.[8] This study's definition differs from the NSDUH study in that it captures individuals who use higher doses than prescribed even when the intent of use may be for medically valid reasons.

This analysis evaluates potential predictive factors that may improve early identification and treatment of medically unsupervised use of prescription opioids. The research will be used to direct and guide prevention efforts to reduce misuse of prescription pain medication.

Methods

The data were collected using the Behavioral Risk Factor Surveillance System (BRFSS), which is an annual, random-digit-dial landline telephone survey jointly conducted by the Centers for Disease Control and Prevention and state health departments. The base modules are conducted by all 50 states, the District of Columbia, Puerto Rico, Guam, and the Virgin Islands, and states may add additional questions to gather data of local priority. Self-reported data are obtained on health risk behaviors and

preventative health practices, primarily related to chronic disease and injury. Participation in the survey is strictly voluntary, and personal identifiers such as names and addresses are not collected.[9] Interviews are conducted monthly so as to prevent seasonal bias.

The target population for the Utah BRFSS is English or Spanish-speaking adults age 18 and older.[9] A stratified random sampling design is used to identify telephone numbers, with more numbers selected within rural health districts.[10] In 2008, there were 5,330 respondents in Utah, which is a sample that is not proportionate to the population in order to study subpopulations, which include small areas and health districts. In 2008, the Utah response rate, using the CASRO (Council of American Survey Research Organizations) definition, was 64.87% compared to a median of 53.31% nationally, with Utah being in the top ten nationally for response rates.[11] The Utah Department of Health's Survey Center conducts the monthly interviews using a computer-assisted telephone interviewing system to directly record individual answers to a computerized database.[12] Data were weighted by age, sex, race, and design factors to account for differences in the probability of selection.[13] Design factors included the number of adults in a household, the number of residential telephones in a household and geographic stratification.[12-13] Respondents were asked up to 12 questions regarding use and acquisition of prescription pain medication in the past year (Figure 2.1). Respondents were asked to list, without prompting, the names of the prescription pain medications they used in the past year.

For this analysis, medically unsupervised use was defined as an affirmative response to either: 1–"The last time you filled a prescription for pain medication, did you use any of the pain medication more frequently or in higher doses than directed by a

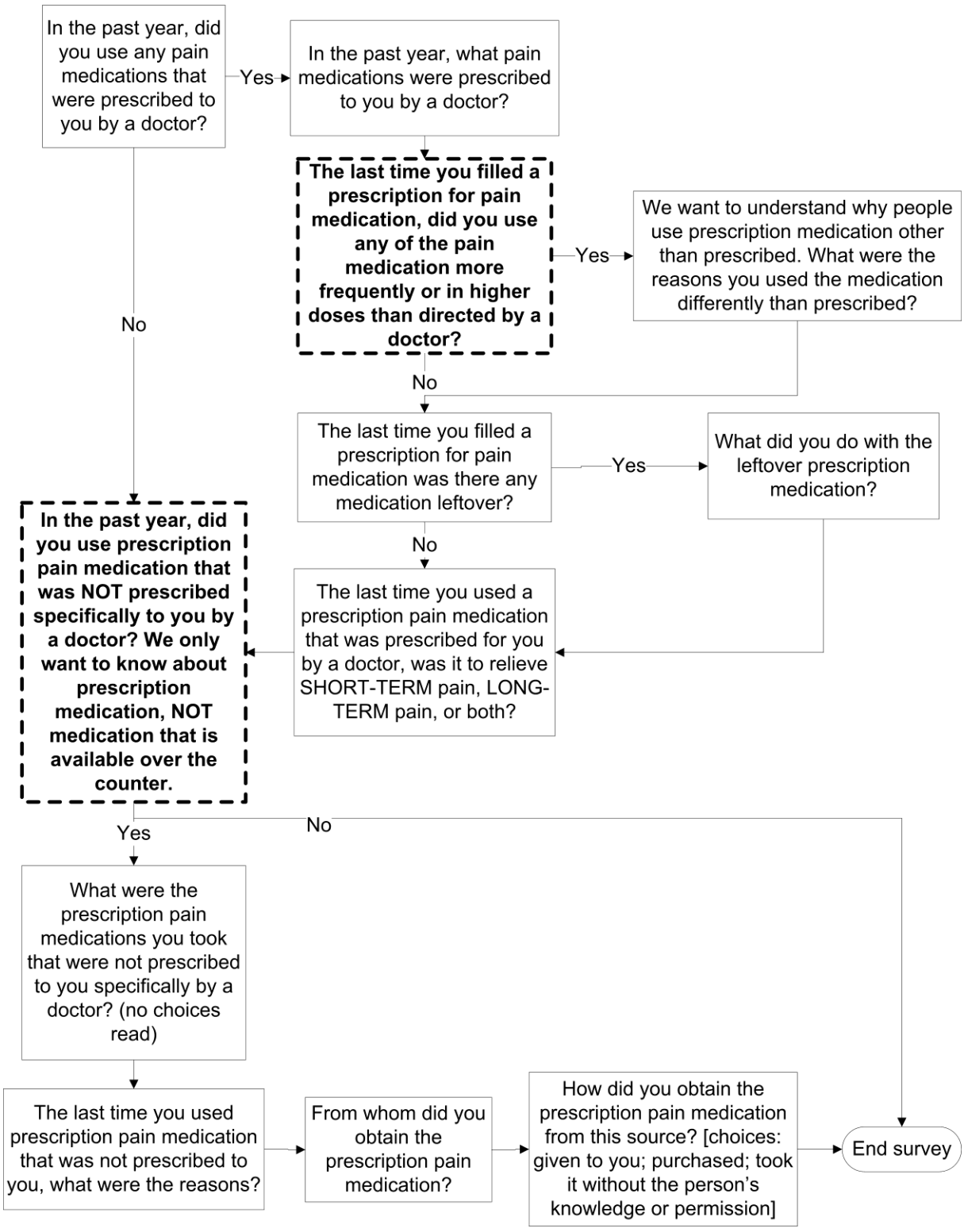

Figure 2.1. BRFSS prescription pain medication questions (broken boxes represent the outcome questions)

doctor?" or 2– "In the past year, did you use prescription pain medication that was NOT prescribed specifically to you by a doctor?"[14] Respondents answering YES to either question 1 (n=37, 2.8%), or question 2 (n= 177, 3.8%), were combined into the category of medically unsupervised use. Thirteen participants answered both questions affirmatively, so a total of 201 unique respondents reported medically unsupervised use of prescription pain medication.

The individual is the unit of analysis for this study. Statistical analyses include a description of the characteristics of the respondents. Pearson chi-square tests and logistic regression were used to identify associations between factors associated with medically unsupervised use of prescription pain medications.

A number of measures known to be associated with substance use were included as independent variables. Demographic characteristics include respondent gender (male/female),[15-19] race,[16, 19] age,[15-17, 19-20] marital status,[15, 19] employment status,[15] annual household income,[17, 19] education,[15, 17] and geographic location or area of residence,[12] Variables related to prior or current substance use include tobacco use, alcohol use (binge drinking, heavy use),[21-22] and any reported problems with substance use in the past.[17] Some other individual characteristics are potentially associated with substance use and were included as independent variables: body mass index calculated from self-reported height and weight, reported current physical activity, disability, seat belt use, general health, physical health, life satisfaction,[23-24] mental health status.[17-18, 20, 25]

For this analysis, mental health was defined using the BRFSS mental health question which asks the respondent, "Thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30

days was your mental health not good?"[14] The respondent stated the number of days, and, for this analysis, they were divided into four categories: zero, 1–10, 11–20, and 21–30 days. To determine emotional support, "How often do you get the social and emotional support you need?" The responses were collapsed into three groups: always/usually, sometimes, and rarely/never.[14] Life satisfaction is a measure of a person's perceived level of well-being and happiness. This is determined in this survey with one question, "In general, how satisfied are you with your life?" For purposes of this study, responses were collapsed into two groups: very satisfied/satisfied and dissatisfied/very dissatisfied.[14]

Psychological distress was determined using a six-item scale (K6) of mental illness or nonspecific psychological distress developed for use in the core of the redesigned US National Health Interview Survey (NHIS), using cut points to determine the severity.[26-27] Respondents were asked to rate how frequently they felt each descriptor over the past 30 days: "nervous; hopeless; restless/fidgety; depressed so that nothing could cheer you up; worthless; or that everything is an effort."[14] Response categories ranged from (1) all of the time to (5) none of the time. Items were reverse coded, from 0–4, so that higher values reflect greater distress and the final psychological distress variable is a mean of these six items.[28] Kessler and colleagues[29] determined a score of 13 or above indicates serious psychological distress.

Univariate and multivariable logistic regression was conducted to model the influence of individual demographic and lifestyle risk factors on the probability of medically unsupervised use of prescription pain medications among the Utah adult population. Analyses were performed using SAS statistical software, version 9.1.3 (SAS Institute Inc, Cary, NC).

Results

Respondents with missing data on outcome questions were dropped leaving 4,778 observations in this analysis as a response-based stratified sample from the 5,330 observations in the entire sample (Table 2.1). The sample consisted of 55.5% females and 44.5% males. Racial/ethnic distribution of respondents exactly matched the US Census Bureau estimates for 2008.[12]

4.4 percent of the respondents reported medically unsupervised use of prescription pain medication, female (1.9%) and males (2.5%) (Table 2.2). The groups with the highest proportion of medically unsupervised prescription pain medications were: age groups 25–34 (1.3%) and 35–44 (1.1%); married/member of unmarried couple (3.1%); households with incomes of $50,000 or more (2.5%), though over half of the survey respondents reply to this question was "refused, missing, or don't know"; high school graduates or those that attended college (1.3%); and those living in urban areas (3.6%).

Table 2.3 shows selected variables from the univariate logistic regression model with the odds ratio (OR) and 95% confidence interval (CI) for each level of the independent variables. Those less likely to use prescription pain medications without medical supervision are at least 65-years-old and are retired.

For the three-category K6 score variable used in this study, the majority of respondents (90%) had a score of 0–7; they formed the reference group. The mild group (7.5%) had an average score of 8–12, and the serious group had scores 13 and above (2.0%).

Table 2.1 Selected demographic characteristics—sample sizes compared to weighted % and overall Utah population data: 2008 Utah Behavioral Risk Factor Surveillance System

Variable		Utah BRFSS Sample	Sample percent	Weighted percent	State of Utah population (18and older) percent
Sex	Female	2663	55.5	49.6	49.8[a]
	Male	2135	44.5	50.4	50.2[a]
Age	18–24	260	5.5	17.5	12.1[a]
	25–34	787	16.5	23.7	16.5[a]
	35–44	896	18.8	17.9	12.2[a]
	45–54	938	19.7	16.5	11.5[a]
	55–64	831	17.4	11.9	8.3[a]
	65+	1056	22.1	12.5	8.5[a]
Race/Ethnicity	Other	432	9.1	11.4	9.1[b]
	White NH	4331	90.9	88.6	90.9[b]
Geography	Urban	2342	58.4	76.4	88.2[c]
	Rural	1971	41.6	23.6	11.8[c]

[a]IBIS[30]
[b]U.S. Census Bureau, 2008 American Community Survey[31]
[c]U.S. Census Bureau, Census 2000[32]

Table 2.2. Demographic characteristics of weighted sample data: 2008 Utah Behavioral Risk Factor Surveillance System

Demographic Variable		No problem with Rx pain drugs—Weighted percent (N=4597)	Medically unsupervised Rx pain drug use—Weighted percent (N=201)
Sex	Female	47.7	1.9
	Male	47.9	2.5
Age	18–24	16.7	0.8
	25–34	22.4	1.3
	35–44	16.8	1.1
	45–54	5.7	0.8
	55–64	0.5	0.1
	65+	12.4	0.1
Race/Ethnicity	Other	11.2	0.2
	White NH	84.4	4.2
Geography	Urban	72.9	3.5
	Rural	22.6	0.9
Marital Status	Married/Member of an unmarried couple	68.5	3.1
	Divorced/Widowed/ Separated	10.4	0.5
	Never Married	16.6	0.8
Household Income	$50,000 or more	54.9	2.5
	$35–$50,000	15.5	0.9
	$25–$35,000	9.7	0.5
	Less than $25,000	15.2	0.7
Education	Graduated College/Technical	31.0	1.1
	Attended College/Technical	32.1	1.3
	High School Graduate	27.0	1.3
	Did not graduate HS	5.6	0.6

Table 2.3. Weighted univariate logistic regression models of medically unsupervised use of prescription pain medication among the Utah adult population

	Variable	OR (95 % CI)	p-value
Sex	Female	1.00	
	Male	1.32 (0.90–1.93)	0.156
Age	18–24	1.00	
	25–34	1.19 (0.54–2.60)	
	35–44	1.34 (0.63–2.89)	
	45–54	1.11 (0.51–2.40)	
	55–64	0.72 (0.29–1.76)	0.005
	65 & older	0.13 (0.04–0.40)[a]	
Race/Ethnicity	Other	1.00	0.007
	White	2.51 (1.25–5.04)[b]	
Geography	Urban	1.00	0.441
	Rural	0.85 (0.66–1.79)	
Marital Status	Married/Unmarried couple	1.00	
	Divorced/Separated/ Widowed	1.08 (0.66–1.79)	0.843
	Never Married	1.17 (0.62–2.21)	
Household Income	$50,000 or more	1.00	
	$35,000–$50,000	1.29 (0.69–2.39)	
	$25,000–$35,000	1.19 (0.69–2.06)	0.794
	Less than $25,000	0.99 (0.55–1.81)	
Education Level	Graduated College/ Technical School	1.00	
	Attended College/Technical School	1.14 (0.74–1.77)	0.007
	High School Graduate	1.36 (0.82–2.25)	
	Did not graduate High School	3.08 (1.43–6.63)[a]	
Employed	Employed/Self employed	1.00	
	Homemaker	1.09 (0.65–1.82)	
	Out of work/unable to work	1.95 (1.01–3.79)[b]	
	Retired	0.23 (0.10–0.52)[a]	0.010
	Student	1.50 (0.53–4.26)	

Table 2.3 continued

	Variable	OR (95% CI)	p-value
Substance Use	No use	1.00	<.0001
	Any use	5.96 (3.75–9.49)[a]	
Alcohol Consumption (any in last 30 days)	No	1.00	<.0001
	Yes	2.65 (1.78–3.95)[a]	
Cigarette use	Never smoked	1.00	<.0001
	Former smoker	2.10 (1.26–3.49)[a]	
	Current smoker - some day	3.80 (1.80–8.05)[a]	
	Current daily smoker	4.16 (2.26–7.65)[a]	
General Health	Excellent	1.00	0.002
	Very good	1.47 (0.77–2.80)	
	Good	2.27 (1.21–4.26)[b]	
	Fair/Poor	3.25 (1.57–6.75)[a]	
Life Satisfaction	Very satisfied/Satisfied	1.00	<.0001
	Dissatisfied/Very dissatisfied	6.58 (3.44–12.58)[a]	
Disability	No	1.00	0.0006
	Yes	2.01 (1.34–3.03)[a]	
Psychological Distress	None	1.00	<.0001
	Mild	5.10 (3.01–8.63)[a]	
	Serious	5.35 (2.69–10.61)[a]	
Mental Health (stress, depression)	None	1.00	<.0001
	1–10 days in last 30 days	2.56 (1.67–3.92)[a]	
	11–20 days in last 30 days	5.30 (2.29–12.24)[a]	
	21–30 days in last 30 days	4.76 (2.52–8.98)[a]	
Emotional/ Social Support	Always/Usually	1.0	<.0001
	Sometimes	2.96 (1.70–5.16)[a]	
	Rarely/Never	2.38 (1.18–4.82)[b]	

[a]$p<0.0001$
[b]$p<0.05$
Other variables were tested but not included in table.

There are several characteristics of those more likely to use medically unsupervised prescription pain medications. In univariate analysis, non-Hispanic whites were 2.5 times more likely than non-whites to use them, and those out of work/unable to work were almost two-times more likely to use than employed/self employed. Concerning education, those who did not graduate from high school were three-times more likely than high school graduates, or those with at least some college education, to use medically unsupervised prescription pain medications. Regarding substance use, cigarette or alcohol users were two- to four-times more likely to use unsupervised prescription pain medications than those that never consumed alcohol or smoked. Those with a disability were two times more likely than those without one, and any level of depression, stress, or psychological stress are two- to five-times more likely to use than those without any mental health issues. The strongest indicator is life dissatisfaction; those individual experiencing life dissatisfaction are 6.5 times more likely to use medically unsupervised prescription pain medications than those satisfied with life.

Demographics and lifestyle factors were used to predict any medically unsupervised use of prescription pain medication. The variables chosen for the multivariate models included variables from the univariate logistic regression models that had p-values at least at the 0.01 level (Table 2.3). Although a standard alpha level of 0.05 is often used, for the primary model, a stricter significance level of 0.01 was used to establish significance because so many variables were included. Some variables had more than one question that described similar behaviors in the logistic regression model, such as tobacco and alcohol. One of each type of variable was chosen so that they did not

compete within the multivariate model. They were chosen on the basis of the variable that had broader focus.

Table 2.4 reports the findings for the multivariable logistic regression model. These analyses were performed using proc survey logistic. The multivariable logistic regression analyses found associations between medically unsupervised use of prescription pain medications and age, race, any substance use problems, cigarette use, general health, life satisfaction, and psychological distress. Whites were over four times more likely (OR=4.48, CI=1.94–5.08) than the other race/ethnic category to use medically unsupervised prescription pain medication. A person who had self-reported troubles in the past 12 months with alcohol or drugs were three times more likely (OR=3.14, CI=1.94–5.08), and former smokers (OR=1.79, CI=1.08–2.96) and current daily smokers (OR=2.02, CI=1.04–3.92) around two times more likely to use medically unsupervised prescription pain medication.

Those dissatisfied or very dissatisfied with life were over two times more likely (OR=2.40, CI=1.14–5.03), and those with mild psychological distress were three times more likely (OR=3.18, CI=1.90–5.35) to use medically unsupervised prescription pain medication. Those reporting general health that is fair/poor (OR=3.37, CI=1.55–7.34), good (OR=2.35, CI=1.25–4.40) or very good (OR=1.88, CI=1.01–3.50) are two to three times more likely to use medically unsupervised prescription pain medications. Those less likely to use prescription pain medications without medical supervision are at least 65-years-old (OR=0.17, CI =0.05–0.55). Model fit was evaluated using the Akaike Information Criterion (AIC), the Schwarz Criterion (SC), and the log likelihood (–2 Log L).

Table 2.4. Weighted multivariate logistic regression models of medically unsupervised use of prescription pain medication among the Utah adult population

	Variable	OR (95% CI)	p-value
Age	18–24	1.0	<.0001
	25–34	1.84 (0.86–3.90)	
	35–44	1.98 (0.96–4.12)	
	45–54	1.29 (0.57–2.91)	
	55–64	0.83 (0.32–2.13)	
	65 & older	0.17 (0.05–0.55)[a]	
Race/Ethnicity	Other	1.0	.0004
	White	4.48(1.94–5.08)[a]	
Substance Use	No use	1.0	<.0001
	Any use	3.14 (1.94–5.08)[a]	
Life Satisfaction	Very satisfied/Satisfied	1.0	.0209
	Dissatisfied/Very dissatisfied	2.40 (1.14–5.03)	
Psychological Distress	None	1.0	<.0001
	Mild	3.18 (1.90–5.35)[a]	
	Serious	1.78(0.66–4.85)	
Cigarette use	Never smoked	1.00	.0568
	Former smoker	1.79 (1.08–2.96)	
	Current smoker - some day	1.55 (0.61–3.95)	
	Current daily smoker	2.02 (1.04–3.92)	
General Health	Excellent	1.00	.0168
	Very good	1.88 (1.01–3.50)	
	Good	2.35 (1.25–4.40)	
	Fair/Poor	3.37 (1.55–7.34)	

[a]Statistically significant at ≤ 0.05 or better

Discussion

In recent years, there has been a dramatic increase in the prevalence of medically unsupervised use of prescription drugs, particularly pain medications. As this is an emerging problem, the user profile has not been completely characterized. Few studies have examined risk factors associated with medically unsupervised prescription drug use, and even fewer studies have focused on prescription pain medication. This research seeks to fill this gap by examining associations between medically unsupervised use of prescription pain medication among a sample of Utah residents.

The results from the multivariate logistic regression model clearly indicate that those who reported medically unsupervised use of prescription pain medication are more likely to also report that they had substance use problems in the past year, are current (daily) or former smokers, are generally dissatisfied with life, experienced psychological distress in the past 30 days (as measured by the K6 mental health screening tool), report their general health below the excellent level, and are white.

Reported substance abuse in the past year was strongly associated with medically unsupervised use of pain medication. A substance abuse problem in the past year was defined through a series of questions with at least one of the items as a result of alcohol or other drug use: neglecting responsibilities; wanting or needing to cut down use; having family, friends, or someone else objecting to use; using substances to relieve feelings such as sadness, anger, boredom; or thinking a lot about using substances. The questions refer to alcohol and drug use, both illicit use and prescription drugs not taken as prescribed. Prior studies have documented that the best predictor of medically unsupervised prescription medication use is the use of illicit drugs.[33-36] Looking

specifically at opioid misuse, Knisely et al.[37] and Ives et al.[38] found the subject characteristics of opioid misusers to be age, previous alcohol use, and previous cocaine abuse. While the questions in this study did not differentiate which substance led to the problem, it does validate that individuals who report medically unsupervised prescription drug use are more likely to have had prior substance problems within the past year.

Cigarette use was an indicator of medically unsupervised use of prescription pain medication for current daily smokers or former smokers. Former smokers were almost as likely as current smokers to use medically unsupervised prescription pain medications. Utah (2008) rates for cigarette use are the lowest in the nation, with 9.2 % compared to the U.S. rate of 18.4 %.[39] In Utah men's rate of cigarette use is higher than women (10.6% vs. 7.9%).[39] Kandel and Yamaguchi[40] showed that there is a sequential pattern of drug involvement, starting with licit drugs (alcohol or cigarettes), and then often progressing on to an illicit substance— usually marijuana, followed by cocaine, followed by other illicit substances. In a review of 58 studies of illicit substance use among adolescents, Petraitis et al.[41] found illicit use followed smoking and alcohol use. Tetrault et al.[42] found women and cigarette smoking were associated with past-year nonmedical use of prescription opiods.

Race has not been clearly associated in nonmedical prescription drug use. Our study found that Whites were more likely to use medically unsupervised prescription pain medication. There is not much diversity in this sample, but it is within the expected values. The literature shows that, in different studies, different races arise as being at risk for use. Huang et al.[19] found that Native Americans had greater odds of using nonmedical prescription drugs and having drug use disorders. Blanco et al.[17] found that Blacks had

lower odds than the rest of the population for nonmedical prescription abuse and dependence, but the protective effect decreased between the years in their study.

Experiencing mild psychological distress is another indicator of medically unsupervised pain medication misuse. The group using medically unsupervised prescription pain medication reported significantly higher mild psychological distress than the group who did not report using medically unsupervised prescription pain medication. The K6 tool is typically used with a cut-point of 13, so a mild category isn't determined. Pratt[43] suggested that using the K6 tool for 30-day prevalence rates instead of one-year prevalence rates with the cut-point of 13 may only capture those with the most severe cases of psychological distress, and that using other cut-offs may identify people with poor mental health. Thus we used the cutpoints of 8–12 for mild psychological distress. Takala et al.[44] found that persons with mental disorders showed a high tendency for drug use, even when those drugs had no direct attachment to the mental problem. McCabe et al.[45] found that the use of prescription opioids to achieve psychoactive effects is highly prevalent among high schoolers, and puts them at risk to develop more serious drug-related problems. Sullivan et al.[46] found that those with major depression or other mental health problems had higher rates of prescription opioid use than those without disorders.

General health levels are an indicator of medically unsupervised use of prescription pain medication. Those that have "fair/poor" health have the highest risk of use of medically unsupervised prescription pain medications compared to those in "excellent" health. The other levels of health, "good" and "very good," were also significant. Substance abuse and health problems seem to be inextricably related.[47]

Research has focused on health issues as a result of alcohol use more than other drug use. Several health issues have been identified that are associated with heavy drinking.[48-49] Some studies have shown associations between particular medical problems and specific drugs.[47] Mertens et al.[47] studied medical and psychiatric conditions prevalent among alcohol and drug treatment patients in an HMO and found approximately one third of the conditions examined were more common in the substance abuse patients than among matched controls. They also found that pain-related diagnoses were more prevalent among the substance abuse patients, especially those dependent on narcotic analgesics. Simoni-Wastila et al.[33] found "poor/fair" health a significant predictor of any nonmedical prescription drug use.

Our findings are in agreement with previous studies. We found life dissatisfaction was associated with medically unsupervised prescription pain medication use. Strine et al.[24] found that life dissatisfaction is related to obesity and adverse health behaviors such as smoking, heavy drinking, and physical inactivity. They also saw increased life satisfaction inversely related to mental health areas and physical health complaints.[24]

Prevention interventions for medically unsupervised use of prescription pain medication should focus on the population that fits the following profile: white, dissatisfied with life, mild psychological distress, a history substance problems within the past year, former or current daily smokers, and those reporting less than excellent general health. Those aged 65 years and older had a reduced odds of reporting nonmedical use of prescription pain medication. Members of this group may have better access to medical care through the Medicare program than persons in other age groups and thus might be

getting the medications that they need directly from their doctors rather than through inappropriate, informal channels.

It is of interest to note that there was no correlation between gender and medically unsupervised prescription pain medication use. McCabe et al.[50] found no gender differences in college students and nonmedical use of prescription opioids. Other studies found that males have an increased tendency to misuse or abuse alcohol and illicit substances more than females (Merline et al.[15]). This further establishes how broad the profile is of those who use medically unsupervised prescription pain medication, impacting males and females equally.

According to NSDUH (2005), Utah ranked fourth nationally for persons 12 or older who report nonmedical use of prescription drugs with a rate of 6.21%. They report variation by age group. For Utah, 12-to 17-year-olds ranked nineteenth in the nation, 18–25-year-olds ranked thirty-first in the nation, and 26-year-olds and older ranked second in the nation.[51] The NSDUH (2006) survey the following year reported declines in all age categories in Utah.[3] The most dramatic changes were for persons 12 or older with the ranking moving to 22nd in the nation, and the and 26-year-olds and older ranking at 24th in the nation.[3] It is important to note that the NSDUH definition for nonmedical prescription drug use differs from this study's definition. This study captures individuals who use in higher doses, even when the intent of use may be for medically valid reasons.

This study has several limitations. First, categorization of prescription-related use and acquisition was not exhaustive. For example a respondent who took his own leftover prescription for an unrelated injury would not be captured into the misuse category. In

order to be complete, questions ascertaining prescription-related behaviors should be more complete and elicit some contextual information.

Second, the data is self-reported; therefore, it is subject to recall and social desirability biases. The sample was weighted to balance the demographics of the sample with the expected distribution of the source population, but nonresponse bias is likely to remain. Third, the study is a landline phone survey. Those without a phone, or who use a cell-phone exclusively, are excluded from the survey. Participation of the youngest age category can be partially attributed to the lack of landline phones in this age group.[52]

Fourth, nonresponse bias is a concern, but Utah is well above the national CASRO response rate.[9] Finally, the study generalizability may be limited since this study was completed based on the population of Utah.

Those who did not answer the questions were included in the analysis. Approximately 500–600 participants were nonresponders. Of those nonresponders, there were more males (55.5%) compared to females (44.5%), p=0.077. The 25–34 age group (25.7%) included a predominant amount of nonresponders; the 35–44 age group (18.8%) were secondary; and the 55–64 (11.2%) age group was tertiary, p=0.0003. The employed/self-employed group (62.3%) had the most nonresponders, with homemaker (14.0%) and retiree (12.3%) groups having the least amount of nonresponders, p=<0.0001. Married/members of an unmarried couple (66.7%) had more nonresponders, with the divorced/widowed/separated groups being the most responsive (13.4%), p=<0.0001. Those with an income of $50,000 or more (47.4%) were predominantly non-responsive compared to the $25–35,000 income category (11.5%), of which, most

responded, p=<.0001. High school graduates (35.5%) were predominantly non-responsive, compared to those who did not graduate high school (12.6%), p=<0.0001.

The findings of this study suggest that prevention for medically unsupervised use of prescription pain medication should focus on those that report that they had substance use problems in the past year, are current (daily) or former smokers, are generally dissatisfied with life, experienced psychological distress in the past 30 days, report their general health below the excellent level, and are white. Future research could benefit from examining long-term usage patterns of medically unsupervised prescription pain medication, comorbidities, medical conditions related to users, and more specific information about a person's history of substance use.

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CHAPTER 3

USING MEDICALLY UNSUPERVISED PRESCRIPTION DRUGS TO MANAGE PAIN: A STUDY OF UTAH COLLEGE STUDENTS

Abstract

Medically unsupervised use of prescription pain drugs has been increasing. The purpose of this study is to examine the associations between medically unsupervised use of prescription drugs for pain management and risk factors such as demographics, health behaviors, and substance use in the Utah college population. Participants were students enrolled during spring semester 2007 (N=8,384) at the nine state institutions of higher education in Utah. Weighted cross-sectional data from the Utah Higher Education Health Behavior Survey were analyzed using logistic regression to examine correlates and potential predictors of the medically unsupervised use of prescription medication for pain management.

Utah college students that report use of prescription drugs to manage pain are more likely to have used heroin in the past year, have a history of any illicit drug use, be current smokers, have gotten drunk often in the past 30 days, and have "high/very high" scoring on the Positive Mental Health Index (PMHI) which determines mental health distress. Neither religiosity nor religious groups were significantly associated with the outcome. Findings from this study suggest that there is a need to target Utah college

students with prevention efforts regarding use of medically unsupervised prescription medications for pain management.

Introduction

Many studies have examined substance use among college students with frequent focus on alcohol use and binge drinking.[1-5] Prescription drug abuse is a new and growing concern in this population.[6] Approximately 50 million people (ages 12 and older) report using prescription drugs for nonmedical reasons in their lifetime; this represents approximately 20 % of the U.S. population.[5] The U.S. young adult population, ages 18–24, accounts for about 35 % of the total population.[7] There are over 17 million undergraduate and graduate students (58 % are ages 18–24) attending more than 4,000 colleges and universities in the United States.[8] Culturally, the college years are viewed as a time of transition, experimentation, and risk-taking, especially with regard to substance use.[9] Exposure to the college environment may place students at increased risk for substance use.[10] Health-related behaviors in early life have been shown to influence later risks for lifestyle-related disorders.[11] It is important that institutions of higher learning take seriously the charge of understanding the underlying causes of substance abuse on their campuses, since these problems compromise a students' ability to learn and also compromise their ability to become active and involved members of society.[12] It is therefore essential to investigate health behaviors among young adults and identify interventions to target those behaviors.[11]

Despite millions of dollars spent on traditional public health programs to reduce the use and abuse of drugs and alcohol among late adolescents and young adults, the numbers still remain alarmingly high.[13] The National Center on Addiction and Substance

Abuse (CASA) at Columbia University (2007) reported that 1.8 million full-time college students (22.9 %) meet the medical criteria for substance abuse and dependence, which is two and one half times the 8.5 % of the general population who meet these same criteria.[1] While there have been many studies conducted on alcohol use, particularly binge drinking among college students, the research is minimal on medically unsupervised use of prescription drugs. Two large national surveys that focus on college student health behaviors, the National College Health Assessment and the Core Institute's Alcohol and Other Drug Survey, either lack questions on medically unsupervised use of prescription drugs or don't have sufficient questions.[3-4]

The abuse of opioid pain relievers has been recognized as a serious and growing public health problem.[14-15] The Substance Abuse and Mental Health Services Administration (SAMHSA) 2007 National Survey on Drug Use and Health (NSDUH) reports that the number of new users for nonmedical pain relievers was 2.1 million, the average age of first time use for ages 12 to 49 was 21.2 years.[5] Between 2002 to 2007 (NSDUH), among young adults aged 18 to 25, the rate of current nonmedical use of prescription pain relievers has risen 12 % (from 4.1 to 4.6 %, p=0.05).[16] Among the 25 and older group the rate has risen 23 % (from 1.3 to 1.6 %), and the 12 to 18 age group saw a large drop by 16 % (from 3.2 to 2.7%).[5] Based on the 2007 NSDUH data, 12.3 % of young adults aged 18–25 (4.0 million persons) used prescription pain relievers nonmedically in the past year (10.7 % in Utah), and 1.7 % met the criteria for past year prescription pain reliever dependence or abuse.[16] Utah has seen an increase in recent years of fatal and nonfatal overdoses from prescription pain medications.[17]

Approximately 140,000 students attend the nine state universities and colleges in Utah, with 54 % of the students ages 18–24.[18] Utah has a potentially unique student population to study with a high proportion of married students (32% from the 2007 UHEHBS[19]) compared to national estimates. The National Center for Education Statistics (2007) reports that 18 % of college undergraduates are married.[20] The majority of Utah students are members of the same religious group. Seventy-three % of students report being members of the predominant religion, The Church of Jesus Christ of Latter-Day Saints (LDS).[19] Members of this faith subscribe to a strict religious code of no alcohol or tobacco use. Religiosity (how often attending religious services) and religious group are thought to be protective, as shown in studies on other health behavior,[21-23] which will be explored in this research.

This study will use data from the 2007 Utah Higher Education Health Behavior Survey (UHEHBS) to estimate the prevalence of medically unsupervised use of prescription drugs to manage pain in the Utah college student population and identify factors associated with such use. The primary hypothesis of this analysis is that religiosity influences medically unsupervised use of prescription drugs to manage pain. There are many assumptions and inferences about prescription drug misuse behaviors among members of the LDS religion. One study that included the Utah population is a pharmacy benefits management company that surveyed their members by tabulating prescription orders. In 2002, an article referring to the survey discussed the high use of anti-depressants in Utah and stated, "Utah leads the nation in the use of narcotic painkillers such as codeine and morphine-based drugs."[24] The article also discusses some possible reasons, one being the LDS religion. However, no studies are published that

examine the relationship between religious affiliation and medically unsupervised use of prescription drugs to manage pain that include the LDS population.

Methods

Substance use and other health-risk behaviors of college students attending nine publicly-funded colleges in Utah were assessed in spring 2007 using the Utah Higher Education Health Behavior Survey (UHEHBS). Students were selected by academic class using a stratified random sampling procedure within each of the nine institutions. A sample size of approximately 400–500 students per academic class per college was planned in order to achieve a +/- 5% margin of error at the 95% confidence level within each class at a college.[19] The unit of analysis is the individual.

The UHEHBS includes over 250 responses. It was created by individuals representing Utah college campuses, the Utah Department of Health, Utah Department of Human Services (Division of Substance Abuse and Mental Health), and Bach-Harrison L.L.C., an independent survey research organization. Questions were selected from national survey tools that include the CORE Institute Alcohol and Drug Survey,[25] the Youth Risk Behavior Survey (YRBS),[26] Behavioral Risk Factor Surveillance System (BRFSS)[27] questionnaire, and the Utah Student Health and Risk Protection Survey (SHARP).[28] Additional questions not covered in these surveys were developed with input from Alcohol and Drug Prevention Specialists at the Utah campuses.

The sample size for each campus was determined using the college enrollment figures by academic class, as on record with the Utah Board of Regents. Colleges were given the choice of in-class paper (estimated approximately 70% return rate) or online (estimated approximately 25% return rate) survey administration. For state-level

analyses, the data were weighted so that each school contributed the same proportion to the survey results as to the total college population.

Collected data items used in the analysis include demographic measures, substance abuse measures and health status and behaviors. The demographic measures include respondent gender,[29-31] age,[29-31] race/ethnicity,[29-31] employment status,[32] and religious affiliation.[33] Standard measures of substance use include: high-risk use of alcohol,[34] alcohol use in the past month (past year and lifetime),[34-35] cigarette use,[34, 36] age of initiation of licit and illicit substances,[34] illicit drug use[34] and attitudes regarding substance use.[37] The health status and behavior variables include: mental health indicators,[38-40] physical activity level and body mass index,[41-43] self-reported disabilities,[44] prior suicide attempts in the past year,[45] and religious activity level.[21, 23] College level variables are college type (2- vs. 4-year), and campus location (urban vs. rural).[46]

Medically unsupervised use of prescription medications for pain management was defined by any positive response to choices a–d for a single question. More than one response was allowed.

> Have you ever used prescription drugs to manage pain in a way that was not originally intended by your doctor?" (Mark all that apply)
> (a) I have used medication for a longer time period than originally intended by my doctor
> (b) I have used medication at a higher dosage than originally intended by my doctor
> (c) I have used pain medication for an unrelated injury, pain, or problem
> (d) I have used someone else's prescription
> (e) I use prescription drugs as prescribed

Two outcome variables were generated from this question. Respondents were categorized as users if any responses “a–d” were selected and nonusers if only response “e” was selected. Degree of use was created as an ordinal variable, zero for nonusers and the sum of all selected responses “a–d” among users (range 0–4).

The influence of individual demographic and lifestyle risk factors on the probability of medically unsupervised use of prescription drugs to manage pain among Utah college students was modeled by univariate logistic regression. Conditional logistic regression techniques used the ordinal outcome to model degree of use. The ordinal outcome represents the level of misuse, ranging from 0–4. The multivariable logistic model used associated variables to generate a dichotomous outcome modeling probability of use. The variables chosen for the multivariable model included variables from the univariate logistic regression model that had p-values at least at the 0.01 level. All significant variables from the univariate model were initially included in the multivariate model. With so many significant variables, multicollinearity was assessed and several conflicting variables were removed. Model building was achieved variable by variable backwards elimination to determine Type 3 Analysis of Effect. Model fit was evaluated using the Akaike Information Criterion (AIC), the Schwarz Criterion (SC), the log likelihood (-2 Log L), and the c-statistic in the Association of Predicted Probabilities and Observed Responses. Analyses were performed using proc surveylogistic in the SAS statistical software, data version 9.1.3 which allows for the weighted structure of the data (SAS Institute Inc, Cary, NC).

Results

The study sample is comprised of 8,834 students ages 18 and older consisting of females (55.3%), whites (87.8%), full-time students (78.9%), and those younger than age 25 (73.5%). Demographics of the sample population were similar to the student population as reported by the Utah State Board of Regents (Table 3.1). Surveys were administered two ways: online and in-class. The response rates for each method were lower than anticipated with 63.9% from the in-class mode and 9.5% from the web-based mode. The online response rate is much lower than other national alcohol and drug studies which usually receive a response rate of approximately 25%.[19] Medically unsupervised use of prescription drugs to manage pain, "any misuse," was reported by 28.2 % of the respondents (Figure 3.1). Students could select multiple responses: Group 1: 880 (15.7%) students marked that they "used as prescribed" ("e"), along with marking one of the other answers ("a–d"); Group 2:702 (12.5%) marked only the misuse responses ("a–d"); and Group 3: 4,033 (71.8%) students marked only "used as prescribed" ("e"). Students who report "any misuse" (Groups 1 and 2) were included in the analysis since it appears that many students think that they can both "use as prescribed" and participate in one of the other behaviors ("a–d"). A check for differences between "Group 1" and "Group 2" revealed that there were differences in gender ($p=0.04$) and race ($p=0.0005$), but not in age group ($p=.1270$), marital state ($p=.9276$), or religious group ($p=.1706$). The item with the most unrelated injury, pain or problem" (15.1%) (Table 3.2). Of the students that reported "any responses of misuse is "using some else's prescription" (17.3%) followed by "used for an misuse," 56% selected only

Table 3.1. Selected demographic characteristics—survey results compared to the Utah System of Higher Education Data Book, Utah State Board of Regents

Variable		UHEHBS College Survey 2007 (N=8,384)	Utah State College Enrollment 2007 (N=140,605)
		Percent	Percent
Sex	Male	44.7	50.6
	Female	55.3	48.8
Age	24 and younger	73.5	63.1
	25 and older	26.5	36.6
Class	Freshmen and Sophomores	58.0	62.0
	Juniors and Seniors	37.3	29.3
	Graduate Degrees (Ph.D., M.A., M.S., etc.)	1.7	8.0
Ethnicity[a]	American Indian/AK Native	3.2	1.1
	Hispanic	4.4	4.2
	Asian	2.8	2.5
	Pacific Islander	1.1	0.5
	White	87.8	78.7
	Black	0.7	0.9
Student Status	Full-time	78.9	51.9
	Part-time	21.1	48.1

[a]Utah State enrollment 12.2% are listed as "nonresident aliens" or "race not reported"

Source: Table provided by Bach-Harrison, LLC [19]

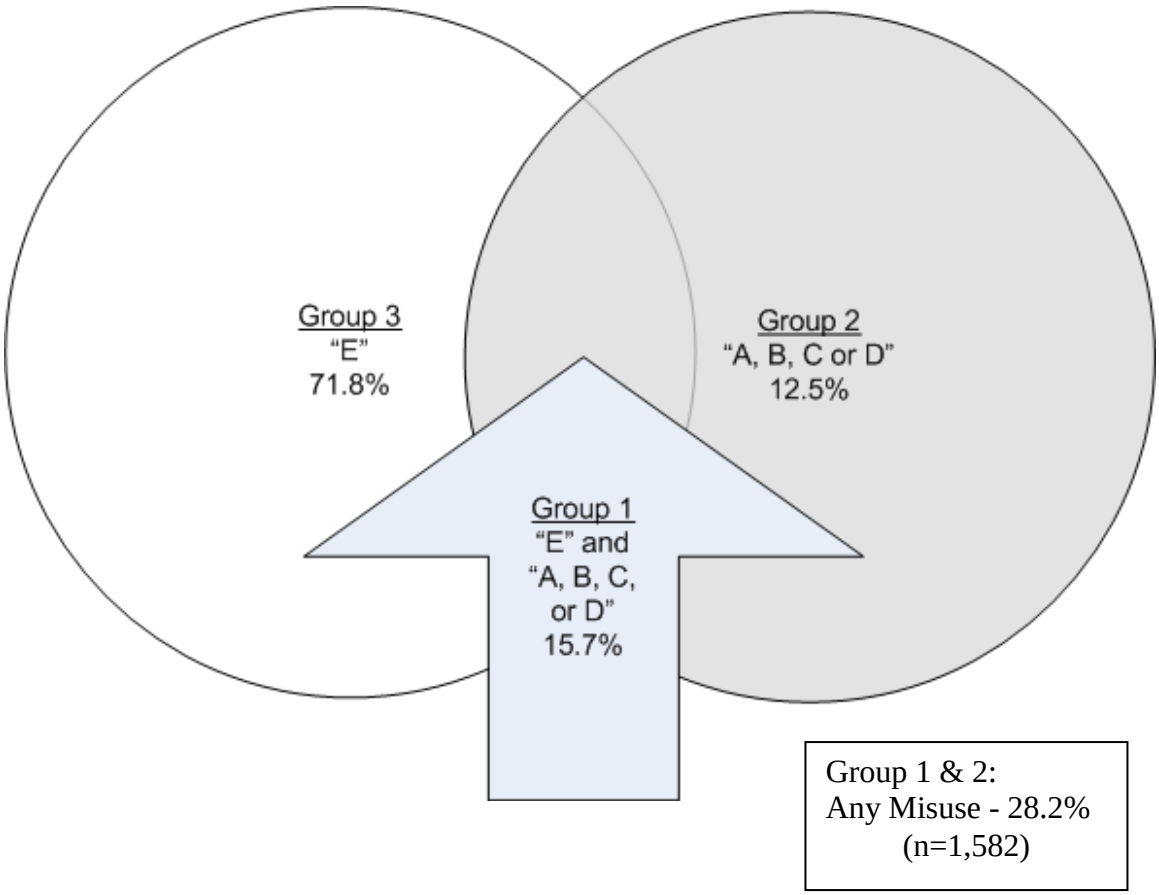

Figure 3.1. Weighted responses to the prescription drug to manage pain question
A= used prescription longer, B=used at a higher dosage, C= used or unrelated injury or pain, D=used someone else's prescription, E= Used prescription drugs as prescribed

Table 3.2. Medically unsupervised use of prescription drugs to manage pain

"Have you ever used prescription drugs to manage pain in a way that was not originally intended by your doctor?" (Mark all that apply)	Yes
A- Used for longer time period	449 (8.0%)
B- Used at a higher dosage	486 (8.7%)
C- Used for an unrelated injury, pain, or problem	848 (15.1%)
D- Used someone else's prescription	971 (17.3%)

*1851 students skipped the entire question

one of the four possible misuse responses with two types of misuse reported by 24%, three types by 8.4% and all four types of misuse by 11% of users.

Univariate Analysis

Males report slightly more use of prescription drugs to manage pain than females—28.7% vs. 27.8% (p=0.0201) (Table 3.3). The 25 and older age groups report the most use and the 18–20 year old group report the least use (32.3% vs. 24.3%, p=0.0003). Students that cohabitate have the highest percent of use compared to married students (58.2% vs. 25.1%, p=<0.0001). Students on campuses that are urban are more likely to use compared to rural (29.6% vs. 24.4%, p=<0.0001). This survey result shows that the Latter-day Saint religious group uses less compared to those with no religious preference (24.5% vs. 41.9%, p=<0.0001).

There are several demographic characteristics that are of importance in the univariate analysis. Those at an urban-based college are 1.3 times more likely to use prescription drugs to manage pain without medical supervision. Of the nine campuses surveyed, four are urban colleges. Single students are 1.2 times more likely to report such use and students that are cohabitating 3.8 times more likely to use than married students. Those less active in their religious activities or services are at higher risk for using prescription drugs to manage pain without medical supervision. Those who "rarely" attend are 2.5 times more likely, and those that "never" attend are 3.1 times more likely to use than those that attend services at least once a week.

One measure of mental health was the Positive Mental Health Index (PMHI), which is a subscale of the General Well-Being Schedule.[19, 39] The 10-item scale provides an "excellent overall measure of psychological well-being."[47] The State of Utah, Division

Table 3.3. Weighted univariate on selected demographics by level of misuse of prescription pain drugs: 2007 UHEHBS (ordinal outcome variable used)

Variable		Total (%)	Level of Misuse of Prescription Pain Drugs					OR (95% CI)	p-value
			None (%)	1 (%)	2 (%)	3 (%)	4 (%)		
Sex	Female	55.1	72.2	16.0	7.2	2.2	2.4	1.0	.0210
	Male	44.9	71.3	15.9	6.1	2.6	4.0	1.06 (0.93–1.22)	
Age	18–20	35.7	75.7	14.6	5.4	2.1	2.2	0.66 (0.48–0.90)[a]	.0003
	21–24	40.5	70.9	16.8	6.7	2.8	2.9	0.84 (0.62–1.15)	
	25–28	17.8	67.6	15.9	9.2	2.3	5.0	1.02 (0.73–1.42)	
	29–31	6.0	67.8	16.2	9.2	1.4	5.4	1.0	
Race	White	94.2	72.2	15.7	6.7	2.3	3.2	1.0	0.1409
	Other	5.8	69.4	16.6	6.0	5.1	3.0	1.16 (0.86–1.56)	
Marital status	Married	28.5	75.0	14.6	6.6	1.6	2.3	1.0	<.0001
	Separated/ Divorced/ Widowed	2.0	70.0	12.8	7.4	2.0	7.8	1.39 (0.84–2.30)	
	Single	66.0	72.0	16.3	6.5	2.4	2.9	1.17 (1.00–1.37)	
	Cohabitating	3.6	46.9	20.8	13.4	8.2	10.7	3.76 (2.64–5.36)[b]	
Geography	Rural	27.6	75.6	14.8	5.8	2.0	1.8	1.00	<.0001
	Urban	72.4	70.4	16.3	7.1	2.5	3.6	1.33 (1.17–1.50)[b]	

Table 3.3 continued

Variable		Total (%)	Level of Misuse of Prescription Pain Drugs					OR (95% CI)	p-value
			None (%)	1 (%)	2 (%)	3 (%)	4 (%)		
Religious Activity	1/time week (or more)	66.2	78.1	14.0	5.0	1.5	1.3	1.0	
	1–2x's/ month	7.8	67.0	17.2	7.5	3.7	4.5	1.82 (1.43–2.32)[b]	<.0001
	Rarely	13.2	58.3	24.2	9.2	3.4	5.0	2.50 (2.07–3.02)[b]	
	Never	12.9	56.7	16.0	12.9	4.8	9.6	3.14 (2.58–3.83)[b]	
Religious Group	LDS	76.7	75.2	15.2	5.8	1.8	2.0	1.0	
	All other	12.9	63.2	17.5	10.2	4.4	4.7	1.85 (1.51–2.25)[b]	<.0001
	No preference	10.4	58.1	18.7	9.7	4.2	9.3	2.39 (1.93–2.94)[b]	
Alcohol & Drug problems—past year	Do not use	71.8	80.1	12.8	4.9	1.1	1.1	1.00	
	No misuse	5.1	60.7	25.9	7.2	3.2	2.9	2.45 (1.83–3.28)[b]	<.0001
	Any misuse	23.2	47.5	22.2	13.0	6.1	11.2	4.91 (4.17–5.79)[b]	
Alcohol (any in last year)	None	71.7	78.3	14.0	5.0	1.3	1.4	1.00	
	Yes	28.3	55.4	20.9	11.3	5.0	7.4	3.09 (2.68–3.56)[b]	<.0001
Illicit year	None	86.3	78.1	14.2	5.2	1.3	1.3	1.00	
	Any use	13.7	32.6	26.9	16.9	8.9	14.8	8.05 (6.75–9.59)[b]	<.0001

Table 3.3 continued

Variable		Total (%)	Level of Misuse of Prescription Pain Drugs					OR (95% CI)	p-value
			None (%)	1 (%)	2 (%)	3 (%)	4 (%)		
Cigarette use	Never	73.1	79.2	13.4	4.8	1.3	1.3	1.00	
	1–2 times	11.4	59.3	21.8	11.0	4.0	4.0	2.64 (2.17–3.23)[b]	
	Occasionally	5.9	46.9	26.3	12.0	7.4	7.4	4.39 (3.42–5.62)[b]	<.0001
	Former	6.7	48.5	18.5	14.0	5.6	13.5	4.90 (3.77–6.38)[b]	
	Current	2.9	37.2	30.3	12.5	6.0	14.1	6.42 (4.56–9.04)[b]	
Mental Health	Little or none	14.3	78.5	13.2	5.1	1.3	1.9	1.0	
	Mild	37.6	75.7	14.1	5.7	1.8	2.7	1.18 (0.94–1.49)	<.0001
	Moderate	22.1	72.2	15.1	6.5	2.9	3.4	1.44 (1.12–1.83)[b]	
	High	18.6	63.8	18.8	9.4	3.7	4.3	2.11 (1.66–2.69)[b]	
	Very high	7.4	58.0	23.2	10.5	3.3	5.1	2.60 (1.94–3.48)[b]	
Ease to obtain Rx drugs	Hard	50.6	77.6	13.9	5.8	1.5	1.3	1.0	<.0001
	Easy	49.4	65.3	18.1	8.0	3.4	5.2	1.91 (1.66–2.19)[b]	
Perceived Peer Use of Rx	20% or less	51.0	76.1	14.7	5.5	1.7	2.0	1.0	<.0001
	21% or more	49.0	67.4	17.3	8.0	3.0	4.3	1.58 (1.38–1.80)[b]	

[a]p-value ≤ 0.01
[b]p-value <0.0001
Other variables were tested but not included in the table.

of Substance Abuse and Mental Health has used this scale in past substance abuse needs assessment studies to assist in identifying psychological distress and dysfunction.[19] Each question has six responses that are scored 0 to 5 (scores range from 0 to 50, with 0–20 a "very high" distress level and 44–50 "little or none"). The questions all have to do with feelings within the past week or two. They include: how you are feeling; bothered by nervousness or your nerves; been in firm control of your behavior, thoughts, emotions, or feelings; felt sad, discouraged, hopeless; satisfaction, with personal life; under strain, stress, or pressure; loss of control over the way you talk, think, or feel; been anxious, worried, or upset; felt down-hearted and blue; and feeling emotionally stable and sure of self. This analysis found that those with a "high" or "very high" scores (which is deemed as clinically significant and indicates that treatment is needed)[19] were between 2.0–2.6 times as likely to use medically unsupervised prescription drugs to manage pain as those with scores of "little" or "none."

Use of current substances, both licit and illicit, put students at risk of using medically unsupervised prescription drugs to manage pain. The highest risk is for students who have had any problem in the past 12 months with alcohol or drugs, they are 4.4 times more likely to use as nonusers. Those that have consumed any alcohol (more than a few sips) are 3.1 times more likely to use than abstainers. Any level of cigarette user increases the risk from 2.6 to 6.4, depending on the level of use compared to a person who never used cigarettes. Students who think its "very easy/sort of easy" to obtain prescription drugs for nonmedical purposes are 1.9 times as likely to use as student who think it is "sort of hard/very hard" to obtain them. Students are 1.6 times as likely to

use prescription pain drugs to manage pain without medical supervision if they perceive more than 20 % of their peers to be users of prescription drugs for nonmedical purposes in the past year.

Multivariable Logistic Regression

Illustrated in Table 3.4, the findings for the multivariable logistic regression model show associations between medically unsupervised use of prescription drugs to manage pain and those that have obtained prescription medications for nonmedical purposes; being drunk or very high from alcohol in the past 30 days; past 30 day/past year illicit drug use; past year heroin use; cigarette smoking; age of initiation to sedatives; ease of access to prescription drugs for nonmedical purposes; perceived peer use; suicide–seriously considered attempting in past year; and mental health distress. The same associations were found using religious activity instead of religious group in the model, religious activity itself was not significant.

Discussion

In an attempt to try to better understand the factors associated with medically unsupervised use of prescription drugs to manage pain in the Utah collegiate population, student characteristics were examined. Significant factors include: obtaining prescription medications for nonmedical purposes; being drunk or very high from alcohol in the past 30 days; past 30 day/past year illicit drug use; past year heroin use; cigarette smoking; age of initiation to sedatives; seriously considered suicide attempts in past year; mental health distress; ease of access; and perceived peer use of medically unsupervised prescription drug use. Some factors that typically surface in other research—race, age,

Table 3.4. Weighted multivariate logistic regression models of medically unsupervised use of prescription drugs to manage pain among Utah college students

Variable		OR (95% CI)	p–value
Religious group	No preference	1.00	0.5422
	LDS	1.04 (0.71–1.52)	
	All Other	0.85 (0.55–1.32)	
Drinking—drunk or very high from alcohol (past 30 days)	None	1.0	0.0079
	1–5 times	1.19 (0.81–1.74)	
	6–19 times	2.27 (1.12–4.60)[a]	
	20 or more times	0.31 (0.11–0.88)[a]	
Obtain Rx drugs for nonmedical reasons	No	1.0	<.0001
	Yes	54.94 (37.36–80.79)[b]	
Cigarette smoke	Never smoked	1.0	.0005
	Once or twice	1.83 (1.34–2.49)[a]	
	Former smoker	0.92 (0.51–1.63)	
	Occasionally	1.29 (0.74–2.24)	
	Current smoker	2.38 (1.28–4.41)[a]	
Heroin-past year	None	1.0	<.0001
	Any use	38.69 (3.62–20.91)[b]	
Any Illicit use	None	1.0	0.0017
	Any use	1.84 (1.26–2.68)[a]	
Sedatives -age of first use	Did not use	1.0	<.0001
	17 and under	4.38 (2.43–7.90)[b]	
	18–20	0.78 (0.38–1.61)	
	21 and above	0.86 (0.42–1.79)	
Mental Health	Little or none	1.0	0.0029
	Mild	0.97 (0.67–1.38)	
	Moderate	1.14 (0.78–1.65)	
	High	1.61 (1.10–2.34)[a]	
	Very High	1.70 (1.04–2.79)[a]	
Suicide —seriously considered attempting in past year	Never	1.0	0.0270
	1–2 times	0.82 (0.54–1.25)	
	3–6 times	1.29 (0.70–2.37)	
	7 or more times	2.74 (1.32–5.66)[a]	
Ease to obtain Rx drugs	Hard	1.0	0.0203
	Easy	1.28 (1.04–1.58)[a]	
Perceived Peer Use of Rx	20% or less	1.0	0.0170
	21% or more	1.29 (1.05–1.59)[a]	

[a]Statistically significant at ≤ 0.05 [b]Statistically significant at <0.0001

gender, and grade point average— were not found to be significant. The strongest predictors of medically unsupervised use of prescription drugs to manage pain are past year use of heroin and obtaining prescription drugs for nonmedical purposes. These two predictors dwarf all the others. When the model was run without "obtaining prescription drugs for nonmedical purposes," heroin was still significant but at a much lower rate. Initiation of use for sedatives remained fairly constant. This aligns with previous research on substances which found that the best predictors of medically unsupervised prescription drugs are the use of illicit drugs.[31, 48-50]

Any illicit use in the past was defined as a student indicating that they had used any amount of heroin, marijuana, stimulants (other than methamphetamines), or sedatives in the past year or 30-days without a doctor prescribing. Past year heroin use (OR=8.69, 95% CI=3.62–20.91) was significant as a standalone substance. When all illicit substances were combined together for past, use it too was significant (OR=1.84, 95% CI=1.26–2.68).

Sedatives are the only substance that showed significance for age of initiation. The categories for initiates had to be modified due to the smaller numbers of users in the younger ages, the age category was changed from "11 and under" to "17 and under." Sedative use was significant for any use that started at age 17 or younger (OR=4.38, 95% CI=2.43–7.90).

Cigarette use was an indicator of medically unsupervised use of prescription drugs for pain management for current smokers (OR=2.38, 95% CI=1.28–4.41), or those that smoked "once or twice" (OR=1.83, 95% CI=1.34–2.49). Students who tried cigarettes "once or twice" were almost as likely as current smokers to use medically

unsupervised prescription drugs to manage pain. This seems unusual considering that often this type of experimentation is done as a youth, though this survey did not collect information on age of initiation of cigarettes, so there is no way to correlate the "once or twice" response with age. Patterson et al.[36] cited that cigarette smoking has increased on colleges campuses nationwide. This does not hold true for the Utah college population, which has seen a steady decline from 2003–2007.[19] Kandel and Yamaguchi[51] showed that there is a sequential pattern of drug involvement, starting with licit drugs (alcohol or cigarettes), and then often progressing on to an illicit substance— usually marijuana, followed by cocaine, followed by other illicit substances. In a review of 58 studies of illicit substance use among adolescents, Petraitis et al.[52] found illicit use followed smoking and alcohol use. Another concern is the link between smoking and depression. Depression and smoking are related, but it is not clear if smoking predisposes one to depression, or if initiating smoking predisposes someone to depression.[53] In this study, both cigarette smoking and mental health distress were significant, so it is important to try to understand the implications they have on medically unsupervised prescription drug use for pain management.

Students that rated "high" (OR=1.61, 95% CI=1.10–2.34) or "very high" (OR=1.70, 95% CI=1.04–2.79) on the PMHI were over 1.5 times more likely to be using medically unsupervised prescription drugs to manage pain. A related finding are those with serious thoughts of suicide in the past year. Students who considered attempting suicide seven or more times in the past year (OR=2.74, 95% CI=1.32–5.66) were over 2.5 times more likely to have used medically unsupervised prescription drugs to manage pain.

Sullivan et al.[54] found those with major depression or other mental health problems had higher rates of prescription opioid use than those without disorders. Kessler et al.[55] reviewed research on the prevalence and correlates of serious mental illness. Their findings suggest that the percentage of the U.S. adult population that meets the criteria for serious mental illness in any given month is 2.4 to 3.3 %, and that 5.4 to 7.2 % of the population experience it at some time during the year. They also noted that serious mental illness is significantly related to substance use disorders, but most people with serious mental illness do not have a co-occurring substance use disorder problem.

A very interesting study looking at substance use and mental health was conducted by Schedler and Block,[56] studying a group of youth from preschool to age 18. They looked at the psychological differences between drug users, experimenters, and abstainers. In their article they state, "The data clearly indicate, that the relative maladjustment of the frequent users precedes the initiation of drug use."[56] This makes a strong case for drug use as a symptom and not a cause or personal and social problem. Drug use needs to be understood in the context of a person's development and personality. This could have strong implications in the college age population, as colleges could put into practice programs that address students' mental health and social development in order to address substance use/abuse.

Students are 1.3 times more likely to say it would be "very easy/sort of easy" (OR=1.28, 95% CI= 1.04–1.58) to get prescription drugs for nonmedical reasons if they currently use medically unsupervised prescription drugs for pain management than those that said it would be "very hard/sort of hard" to access them. Those that used medically unsupervised prescription drugs to manage pain are 55 times more likely to also have

obtained prescription drugs for nonmedical reasons (OR=54.94, 95% CI=37.36–80.79), the majority (12.8%) of those students report taking someone else's prescription. This study did not specifically survey who they obtained their drugs from, but other studies show that the majority of prescription controlled substances for nonmedical use are "obtained for free from a friend or relative (60%), purchased from a friend or relative (8%), taken from a friend or relative without asking (4%) and from prescriptions from one doctor (17%)."[16, 57-58] A Utah study focusing on medically unsupervised use of prescription pain drugs in the adult population, found the majority of respondents acquired their illicit prescription drugs from friends or relatives, and most of them indicated that there was no cost for them.[17]

Students tend to overestimate the substance use prevalence among other students, including nonmedical use of prescription drugs. McCabe[59] studied misperceptions of stimulants, opioids, and marijuana in a web-based survey at one college. He found that the majority of undergraduate students overestimated the prevalence of the nonmedical use of prescriptions, stimulants, and opioids among peers on their campus. In this survey, when students were asked, "What do you think the percentage of students at your school who, in the past year, have used prescription drugs for nonmedical reasons," those who felt that over 20% of their peers use prescription drugs without medical supervision (OR=1.29, 95% CI=1.05–1.59) were 1.3 times were more likely to have used prescription drugs to manage pain in a way not originally intended by their doctor. Figure 3.1 shows that 28.2% of students have used prescription drugs to manage pain in a way that was not originally intended by their doctor, so student assessment of other student use is somewhat accurate.

This study suggests that identification of medically unsupervised use of prescription drugs for pain management may be difficult since it frequently occurs with the use of other substances. Though for prevention purposes, this study has many factors that can be looked for when identifying use of medically unsupervised prescription drugs to manage pain. Of particular importance, when screening, is to look for past year use of heroin, any use of illicit drugs in the past 30 days/year, initiation age for use of sedatives, cigarette smokers, those that have obtained prescription drugs for nonmedical reasons, and mental health distress. Screening and survey tools could be streamlined to include only items identified to be significant for determining those at risk for medically unsupervised use of prescription drugs for pain management. Questions that explore additional issues regarding medically unsupervised prescription use are needed on survey instruments. Campus health centers and other medical providers of college students in the surrounding areas need to be informed of what puts a student at risk for using of medically unsupervised prescription drugs for pain management. Education on the dangers and illegal issues regarding medicine sharing is necessary since the majority that used medically unsupervised prescription drugs for pain management used someone else's medications. Universities have implemented mandatory alcohol screening through the use of an anonymous online assessment, AlcoholEdu®[60], that must be completed before students may register for classes.[61-62] The intent is to help students self identify that they may have a problem and give them resources for services on campus, this type of program could be expanded to include nonmedical use of prescription drugs. This is a relatively new area in substance abuse prevention, so there is very little in the literature concerning prevention efforts.

Strengths and Limitations

Strengths of this study include: it is a large representative sample of the nine state colleges; the data are a good match with the overall student population, as reported by the Board of Regents; it will add to the body of knowledge since there is little information in the literature on medically unsupervised use of prescription drugs for pain management in college students and none on Utah college students.

There are a few limitations worth noting. It is evident that the question on the UHEHBS regarding medically unsupervised use of prescription drugs for pain management was not well developed, and there are potential problems. The completion rate was low for the key question, with approximately 78% of the students responding to the specific question, though these students were demographically similar to those that did not answer the question. Questions directly before and after these questions had an approximate 98% completion rate. Because of the potentially sensitive nature of these questions, it is not unexpected to have a lower response rate; however there are also difficulties with the wording that could have been related to this non-completion. Question response order was handled differently for the key question than other questions. Typically if the respondent was a nonuser, the first item they marked on the survey was "none," "not applicable," "0", etc. For the key question, the respondents marked the last item if they used prescription pain drugs appropriately; thus many respondents could have skipped the question when they didn't see the response that "fit" them first. Since this is currently the only data available for Utah college students addressing medically unsupervised use of prescription drugs for pain management, it is important to explore the existing data.

The data analyzed are self-reported, which raises the question of validity. Nonresponse bias may have impacted the results of the present study given the response rate. The concerns regarding nonresponse bias were lessened because demographic characteristics of the sample closely resembled the characteristics of the overall state student population. This study is a secondary analysis, so the survey data may not have measures that are optimal for addressing the specific research issues of interest. The data are cross-sectional, so no retrospective or prospective studies can be conducted. Campuses cannot be disclosed due to an agreement with the nine college presidents not to release any information or data concerning individual campuses. Therefore, the college characteristics of campus location and campus type were explored; neither was significant in the multivariable analysis. There was no information collected regarding the quantity of use or from whom they got their drugs. Lastly, although the sample was ascertained with use of stratified random sampling methods, and it was not simply a volunteer or convenience sample, the study was conducted in Utah, therefore the results might not be generalizable to other states or institutions nationally because the nonmedical use of prescription drugs has been shown to vary across individual colleges and universities.[46]

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CHAPTER 4

OBTAINING PRESCRIPTION DRUGS FOR NONMEDICAL USE AMONG UTAH COLLEGE STUDENTS

Abstract

Medically unsupervised use of prescription medication has been increasing nationally. Utah collected data on college student substance use and abuse via the Utah Higher Education Health Behavior Survey (UHEHBS). This study analyzes the UHEHBS dataset for associations between demographic and other potential risk factors and medically unsupervised acquisition of prescription medication in the Utah college population. Medically unsupervised acquisition of prescription medication is proxy for medically unsupervised use of prescription medication since the survey question is about acquisition and not use. The study participants are students enrolled during spring semester 2007 (N=8,384) at the nine state institutions of higher education in Utah. Weighted cross-sectional data from the Utah Higher Education Health Behavior Survey was analyzed using logistic regression to examine potential predictors for obtaining prescription drugs for nonmedical purposes.

Utah college students who obtain prescription drugs for nonmedical reasons are more likely to be religiously adherent, have used medically unsupervised prescription drugs to manage pain, used marijuana and/or stimulants in the past year, had alcohol and/or drug problems in the past year, used stimulants, sedatives or heroin/opioids in the

past, and found it "very easy/sort of easy" to obtain prescription drugs for nonmedical purposes. Findings from this study will enable religious leaders, prevention specialists, and campus administrators to have a greater understanding of students that obtain prescription drugs for nonmedical reasons so that prevention, education, and treatment efforts can be targeted to those at most risk.

Introduction

There is a growing concern within both the public health and law enforcement communities about the increased use of pharmaceutical drugs for nonmedical purposes, especially among young adults.[1] Misuse of prescription drugs is second only to marijuana as the nation's most prevalent drug problem.[2] The Substance Abuse and Mental Health Services Administration (SAMHSA) National Survey on Drug Use and Health (NSDUH) is one of the most comprehensive sources of information on substance abuse in the U.S. The survey provides yearly national-and state-level estimates of substance use and abuse.[3] It covers four classes of prescription psychotherapeutic drugs: pain relievers, tranquilizers, stimulants, and sedatives. According to the 2007 NSDUH data, an estimated 6.9 million persons (2.8% of the population) aged twelve or older, used psychotherapeutic drugs nonmedically (past month).[4] It is estimated that there were 5.2 million nonmedical users of pain relievers, 1.8 million tranquilizer users, 1.1 million stimulant users, and 346,000 sedative users (past month).[4] Young adults comprise a population of particular concern with regards to nonmedical prescription drug use. The 12-month prevalence of nonmedical use of prescription-type drugs is highest among young adults 18–25 years of age (6.0%) compared to any other age group (2.2% for adults 26 and older, 3.3% for youth ages 12–17).[4] The NSDUH reports that the average

age of first-time nonmedical use of any psychotherapeutics for ages 12 to 49 was 21.8 years.[5] Young adults also reported the highest prevalence (12.5 %) of driving under the influence of illicit drugs during the past year.[4]

Prescription medications are pharmaceuticals dispensed by a pharmacist once they have received a prescription written by a physician, dentist, or other health care provider who is legally authorized to write prescriptions.[6] Nonmedical use of a prescription medication is defined as use for reasons other than those indicated in the prescribing literature, or as instructed by their physician. Students report use of prescription drugs nonmedically "for recreation and for psychic effects—to get high, to have fun, to get a lift, to calm down"[7]; to manage pain in a way not originally intended by a doctor; to help with concentration when studying for tests or writing papers; to increase energy to cope with workload; to self-medicate for anxiety or depression; and to enhance stamina when playing sports.[8-10]

The three classes of prescription drugs that are most commonly abused are opioids, stimulants, and central nervous system depressants (sedatives, tranquilizers).[11] Earlier studies have cited the potentially severe consequences of opioid use, such as addiction, abuse, and overdose.[12-14] The NSDUH reports that, from 2002–2007, there has been an increase among the young adult population in the rate of nonmedical prescription pain reliever use (4.1 to 4.6 %, $p=0.05$).[4] Central nervous system depressants are used to treat anxiety and sleep disorders.[11] They are easily abused as a hypnotic and are addictive. Tolerance can occur and overdose is common.[6]

Stimulants are typically prescribed to treat attention-deficit hyperactivity disorder (ADHD).[11] Some students think of prescription stimulants as a safe way to help

maximize performance—to improve concentration, focus, alertness and energy—with minimal risk[8, 11] Methylphenidate (e.g., Ritalin) is the most widely misused and researched of these drugs.[15] The frequency of stimulant or Ritalin abuse is estimated to be 3–10 % among U.S. college students, with a higher frequency among males than females.[8] The majority of studies on the young adult college population regarding medically unsupervised use of prescription drugs have been focused on stimulant use.[9, 16-19]

The nonmedical use of Ritalin has shown a decline in use rates for past year use over a six year period. Among college students, the % who used in the past year was 5.7% in 2002 and 3.9% in 2006. Those not in college had lower use rates of 2.9% in 2002 and 2.6% in 2006.[20] The Harvard School of Public Health College Alcohol Study (CAS) found that the prevalence of medically unsupervised prescription stimulant use varied dramatically among colleges (from 0% to 25%), with higher rates of use at colleges that had stricter admission criteria.[17]

In Utah, several instruments were used to collect data on medically unsupervised use of prescription drugs within the population, but data specific to the student population are available only from the Utah Higher Education Health Behavior Survey (UHEHBS). College students are unlike other young adult populations and so it would be expected that there would be differences in their substance use rates. It is important to understand these differences, and the UHEHBS provides an opportunity to explore the distinctiveness of this population.

This analysis provides a unique opportunity to evaluate correlations between obtaining medically unsupervised prescription drugs and other characteristics among a

representative sample of all college students from one state. Understanding associations between potentially modifiable factors and medically unsupervised prescription drugs among college students could be beneficial since institutions of higher education are charged with promoting safe living and learning environments. College students comprise an accessible population which might be easier to study and target for prevention as opposed to those not enrolled in college.

The primary hypothesis of this analysis is that religious groups and/or religiosity influences the behavior of obtaining prescription drugs for nonmedical purposes. Those more religiously adherent are presumed to obtain fewer prescription drugs than the less adherent or those with no religious preference. Utah is distinctive in that the dominant religious group is The Church of Jesus Christ of Latter-Day Saints (LDS).[21] The LDS church has a strict health code that directs its members to abstain from tobacco use, consumption of alcohol, coffee or tea, and specifically includes not abusing prescription drugs.[22] Much of the previous research about prescription medications in Utah has focused on fatal overdoses.[23] No existing literature reports the medically unsupervised use of prescription drugs in the Utah college population.

Methods

Substance use and other health-risk behaviors of college students attending nine publicly funded colleges in Utah were assessed in spring 2007 using the Utah Higher Education Health Behavior Survey (UHEHBS). Students were selected by academic class using a stratified random sampling procedure within each of the nine institutions. A sample size of approximately 400–500 students per academic class per college was

planned in order to achieve a +/- 5% margin of error at the 95% confidence level within each class at a college.[24] The unit of analysis is the individual.

The UHEHBS includes over 250 responses. It was created by individuals representing Utah college campuses, the Utah Department of Health, Utah Department of Human Services (Division of Substance Abuse and Mental Health), and Bach-Harrison L.L.C., an independent survey research organization. Questions were selected from national survey tools that include the Core Institute Alcohol and Drug Survey,[25] the Youth Risk Behavior Survey (YRBS),[26] Behavioral Risk Factor Surveillance System (BRFSS)[27] questionnaire, and the Utah Student Health and Risk Protection Survey (SHARP).[28] Novel questions were developed with input from Alcohol and Drug Prevention Specialists at the campuses.

The sample size for each campus was determined using the college enrollment figures by academic class as on record with the Utah Board of Regents. Colleges were given the choice of in-class paper (estimated approximately 70% return rate) or on-line (estimated approximately 25% return rate) survey administration. For state-level analyses, the data were weighted so that each school contributed the same proportion to the survey results as to the total college population.

Collected data items used in the analysis include demographic measures, substance abuse measures, and health status and behaviors. The demographic measures include respondent gender, [29-31] age, [29-31] race/ethnicity ,[29-31] employment status,[1] and religious affiliation.[32] Standard measures of substance use include: high-risk use of alcohol,[33]alcohol use in the past month, past year and lifetime,[33-34] cigarette use,[33, 35] age of initiation of licit and illicit substances,[33] illicit drug use[33] and attitudes regarding

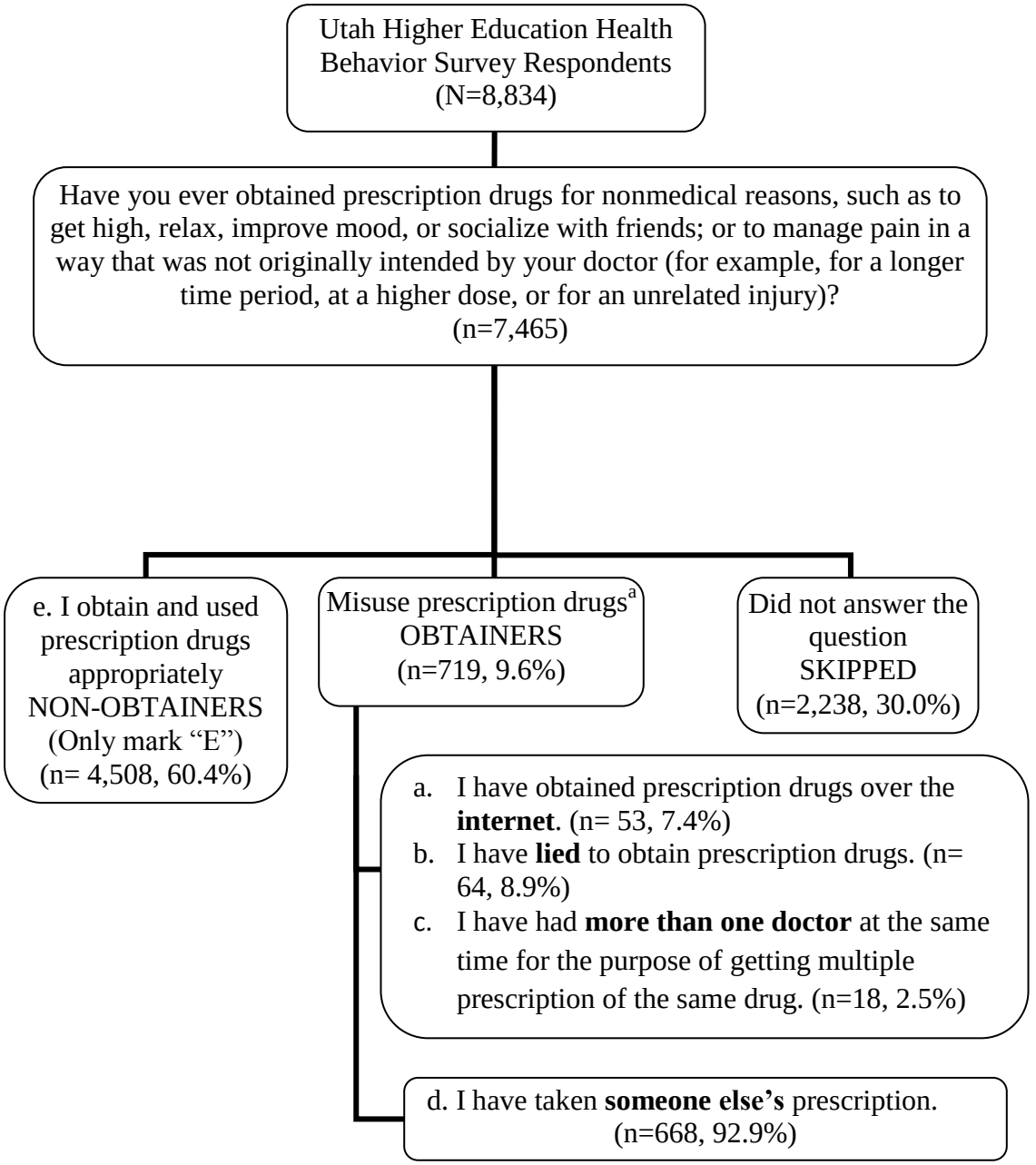
substance use.[36] The health status and behavior variables include: mental health indicators,[37-39] physical activity level and body mass index,[40-42] self-reported disabilities,[43] prior suicide attempts in the past year,[44] religious adherence.[45-46] College level variables are college type (2– vs. 4–year), and campus location (urban vs. rural).[47]

Religious adherence is a combination of the variables: religious activity level and religious group. Religious adherence represents whether a student is active in their religious preference. Active is defined by combining "1–2 times a month" and "about once a week or more" for religious service/activities attendance. Not active is defined by combining "never" and "rarely" attending services or activities.

The outcome is defined using a single question. Any positive response to choices a–d defines an "obtainer." It is important to clarify that "obtaining" is not the same as using, even though the main reason for obtaining is likely for personal use, although sale or distribution are also possible reasons for obtaining. More than one response was allowed (Figure 4.1):

> Have you ever obtained prescription drugs for nonmedical reasons, such as to get high, relax, improve mood, or socialize with friends; or to manage pain in a way that was not originally intended by your doctor (for example, for a longer time period, at a higher dose, or for an unrelated injury)? (Mark all that apply)
>
> (a) I have obtained prescription drugs over the internet
> (b) I have lied to obtain prescription drugs
> (c) I have had more than one doctor at the same time for the purpose of getting multiple prescription of the same drug
> (d) I have taken someone else's prescription
> (e) I obtain and use prescription drugs appropriately

The influence of individual demographic and lifestyle risk factors on the probability of obtaining prescription drugs for nonmedical purposes among Utah college students was modeled using univariate logistic regression. Conditional logistic regression



[a]Anyone that answered that they were a user of any type was counted in the USERS category [325 students answered "e" (nonuser) and at least one response "a-d" (user); 394 students answered "a–d" only (user)].

Figure 4.1. UHEHBS key question on prescription drug use and misuse.

techniques were used to model degree of obtaining using the ordinal outcome. The ordinal variable has three categories: non obtainer, one obtain, and two to four obtains (this category was collapsed due to the small response rate on "a–c"). The multivariable logistic model used associated variables to generate a dichotomous outcome modeling probability of use. The variables chosen for the multivariable model included variables from the univariate logistic regression model that had p-values at least at the 0.01 level. All significant variables from the univariate model were initially included in the multivariate model. With so many significant variables, multicollinearity was assessed and several variables were removed that conflicted. Model building was achieved variable by variable backwards elimination to determine Type 3 Analysis of Effect. Model fit was evaluated using the Akaike Information Criterion (AIC), the Schwarz Criterion (SC), the log likelihood (-2 Log L), and the c-statistic in the Association of Predicted Probabilities and Observed Responses. Analyses were performed using proc surveylogistic in the SAS statistical software, data version 9.1.3 which allows for the weighted structure of the data (SAS Institute Inc, Cary, NC).

Results

The final sample consists of 7,465 Utah college students (Table 4.1). This study focuses on college students ages 18–31. The original sample included respondents over age 31, so they were eliminated for this analysis. The study sample is primarily white (93.0%), single (61.1%), religiously active at least once a week (66.1%), and LDS (75.1%). Those aged 18–24 comprise 75.2% of the sample; with 18.8% aged 25–28 and 6.0% aged 29–31.

Table 4.1. Explanatory variables in the analysis population and differences in sample characteristics by gender

Variable		Total Sample Percents (n=7,465)	Males Percents (n=3,432)	Females Percents (n=3,903)
Total		100	46.8	53.2
Age[a]	18–20	34.7	18.5	46.8
	21–24	40.5	49.7	32.5
	25–28	18.8	25.3	13.2
	29–31	6.0	6.5	5.6
Race[b]	White	93.0	93.8	92.4
	Other	7.0	6.2	7.6
Marital Status[a]	Married	28.5	33.8	23.8
	Separated/Divorced/Widowed	2.1	1.3	2.8
	Single	66.1	62.7	69.1
	Cohabitating	3.4	2.2	4.4
Religious Activity[a]	1/time week (or more)	66.1	70.2	62.4
	1–2x's/month	7.5	7.3	7.7
	Rarely	13.0	10.3	15.4
	Never	13.5	12.2	14.6
Religious Group[a]	No preference	11.1	10.0	12.0
	LDS	75.3	79.5	71.5
	All other	13.7	10.5	16.5

[a]Gender difference statistically significant at $p \leq 0.0001$
[b]Gender difference statistically significant at $p \leq 0.05$

Figure 4.1 shows the distribution of outcome responses to the outcome question. The majority of students (60.4%) report using prescription drugs appropriately (non-obtainers). One-third of the students did not answer the question and were classified as "skipped" (30.0%). Students were classified as "obtainers" (9.6% obtainers) if they responded to any of the "obtain" questions, even if they also marked that they obtain and use appropriately since multiple responses were allowed. The majority of students that report obtaining prescription drugs for nonmedical reasons report only one type of "obtain." The most frequent "obtain" response is "have taken someone else's prescription," followed by, "have lied to obtain prescription drugs." Only 1.23% of the students who are "obtainers" (n=64) marked multiple responses.

Table 4.2 categorizes illicit substance use by religious group and religious activity. Those with no religious preference use at a higher rate for all of the substances listed. The LDS group had the lowest rate for medically unsupervised prescription drug use to manage pain, obtaining prescription drugs for nonmedical purposes, and for stimulant use. The "All Other" group had the lowest rate for sedatives and heroin use. There is a higher rate of use for all substances listed for those that "never attend" religious services, and the lowest rate for those who attend "once weekly or more".

The religiously adherent groups use at lower rates than those that are not religiously adherent or those with no religious preference (Table 4.3). The strict LDS health code is evident based on the low use rates of substances, particularly telling are those that report "do not use" alcohol or other drugs. The "LDS— active" group has the lowest use of the two religiously adherent groups. The "LDS —not active" group has the

Table 4.2. Past year illicit substance use by religious group and religious activity level

Illicit Substance	None	LDS	All Other	Never attend	Rarely attend	1–2 times/ month	Once weekly or more
	11.0%	75.3%	13.7%	13.5%	13.0%	7.6%	65.9%
[a]Obtain Rx drugs for nonmedical reasons[b]	25.9	11.0	20.4	28.0	23.0	18.3	8.7
[a]Used medically unsupervised Rx drug to manage pain[b]	41.9	24.8	36.8	43.3	41.7	33.0	22.0
Stimulants (past year)[b]	4.1	0.8	3.9	4.5	3.2	2.5	0.6
Sedatives (past year)[b]	11.2	8.8	3.7	12.1	10.1	6.8	2.8
Opioids/heroin (past year)[b]	9.4	5.7	2.2	9.1	8.7	5.5	1.1

[a]Lifetime use
[b]$p<.0001$

Table 4.3. Distribution of respondents by religious adherence, 2007 UHEHBS

Characteristic		Religious Preference				
		LDS religion		Non-LDS		No preference
		Active	Not active	Active	Not active	
		68.3%	6.9%	5.0%	8.7%	11.1%
Total						
Gender[a]	Female	49.5	61.8	66.1	62.9	57.8
	Male	50.5	38.3	33.9	37.2	42.2
Age[a]	18–20	33.7	35.0	44.3	38.1	34.3
	21–24	43.3	33.7	35.5	33.6	34.9
	25–28	18.2	19.9	13.7	20.8	22.3
	29–31	4.8	11.4	6.5	7.5	8.5
Race[a]	White	96.1	93.5	78.0	82.3	88.4
	Other	3.9	6.5	22.0	17.7	11.6
Marital Status[a]	Married	33.7	20.5	16.8	15.3	16.7
	Separated/ Divorced/ Widowed	1.4	6.0	4.0	3.0	2.1
	Single	64.6	67.5	75.5	67.7	69.1
	Cohabitating	0.2	6.1	3.7	14.0	12.1
Obtain Rx drugs[a]	No	90.6	73.6	85.7	76.2	74.1
	Yes	9.4	26.4	14.3	23.8	25.9
Stimulants (past year)[a]	No use	99.4	97.1	97.3	95.5	63.0
	Any use	0.6	2.9	2.7	4.6	4.1

Table 4.3 continued

Characteristic		Religious Preference				
		LDS religion		Non-LDS		No preference
		Active	Not active	Active	Not active	
		68.3%	6.9%	5.0%	8.7%	11.1%
Medically unsupervised Rx drug use to manage pain[a]	No	77.3	55.2	71.3	58.8	58.1
	Yes	22.7	44.8	28.7	41.2	41.9
Alcohol & Drug problems-past year[a]	Do not use	90.2	46.2	31.8	23.4	19.7
	No misuse	3.59	6.5	7.0	10.8	11.0
	Any misuse	6.2	47.4	61.3	65.7	69.3
Sedatives (past year)[a]	No use	97.0	89.5	95.4	88.7	88.8
	Any use	3.0	10.5	4.6	11.3	11.2
Heroin/ opioids (past year)[a]	No use	98.6	90.0	97.1	92.7	90.6
	Any use	1.4	10.0	2.9	7.3	9.4
Ease to obtain Rx drugs[b]	Hard	51.2	50.9	62.1	54.6	55.6
	Easy	48.8	49.1	37.9	45.4	44.4

[a] $p<0.0001$
[b] $p\leq.0.05$

highest rates of any group for obtaining prescription drugs for nonmedical reasons, using medically unsupervised prescription drugs to manage pain, and use of heroin/opioids. The "Non-LDS—not active" group and the "No preference" group have the highest rates for stimulant and sedative use, which are nearly identical rates.

Univariate Analysis

The majority of variables associated with obtaining prescription drugs for nonmedical purposes were in the expected direction and are likely to predict use of prescription drugs for nonmedical purposes (Table 4.4). Not controlling for the influence of other factors, gender and race do not have a statistically significant association with obtaining prescription drugs for nonmedical use. Positive and significant factors of obtaining prescription drugs for nonmedical use include cohabitating, separated/divorced /widowed, or single; residing in an urban setting; religious activity, group, and adherence; medically unsupervised prescription drug use for pain management alcohol and/or drug problems within the past year; any illicit drug use in the prior year; any alcohol use in the past year; any level of cigarette user; and mental health distress at any level. Negative and statistically significant predictors include the 18–20-year-old age group, the LDS religious group, and those that are religiously adherent.

Involvement with licit and illicit substances puts a student at risk for obtaining prescription drugs for nonmedical purposes. Those using medically unsupervised prescription drugs to manage pain are 93.7 times more likely to have obtained prescription drugs for nonmedical purposes; this clearly is the strongest predictor. Students using any illicit substances over the past year are 11.7 times more likely to

Table 4.4. Weighted univariate distribution of selected demographic characteristics by level of misuse of prescription drugs: 2007 UHEHBS

Variable		Total (%)	Level of Misuse of Prescription Drugs			OR (95% CI)	p-value
			None (%)	1 (%)	2–4 (%)		
Gender	Female	54.8	87.2	11.8	1.5	1.0	0.123
	Male	45.2	85.1	13.3	1.5	1.19 (0.99–1.43)	
Age	18–20	35.7	89.4	10.2	0.4	0.59 (0.39–0.91)[a]	0.003
	21–24	40.5	85.8	12.5	1.7	0.84 (0.56–1.28)	
	25–28	17.5	82.6	15.7	1.7	1.06 (0.68–1.66)	
	29–31	6.0	83.5	14.5	2.0	1.0	
Race	White	94.7	86.3	12.4	1.3	1.0	0.862
	Other	5.3	85.1	13.8	1.1	1.10 (0.73–1.66)	
Marital Status	Married	28.5	89.5	9.5	1.0	1.0	<.0001
	Separated/ Divorced/ Widowed	12.5	79.2	17.1	3.6	2.28 (1.27–4.09)[a]	
	Single	47.1	86.1	13.0	0.9	1.37 (1.09–1.72)[a]	
	Cohabitating	15.8	67.7	23.8	8.5	4.36 (2.77–6.86)[b]	
Geography	Rural	27.7	88.6	10.8	0.6	1.00	0.0003
	Urban	72.3	85.3	13.2	1.5	1.34 (1.13–1.59)[b]	

Table 4.4 continued

Variable		Total (%)	Level of Misuse of Prescription Drugs: None (%)	1 (%)	2–4 (%)	OR (95% CI)	p-value
Religious Activity	1/time week (or more)	66.5	91.3	8.1	0.6	1.0	
	1–2x's/month	7.9	81.7	16.6	1.7	2.36 (1.72–3.24)[b]	<.0001
	Rarely	12.7	77.0	20.4	2.6	3.16 (2.45–4.08)[b]	
	Never	12.9	72.0	25.0	3.1	4.11 (3.22–5.25)[b]	
Religious Group	No preference	10.2	74.1	22.4	3.5	1.0	
	LDS	77.3	89.0	10.2	0.8	0.35 (0.27–0.45)[b]	<.0001
	All other	12.5	79.6	18.4	2.0	0.73 (0.52–1.01)	
Religious adherence	No preference	10.2	74.1	22.4	3.5	1.0	
	Non-LDS—not active	8.0	76.2	21.5	2.4	0.89 (0.62–1.27)	
	Non-LDS—active	4.5	85.6	13.0	1.3	0.47 (0.28–0.79)[b]	<.0001
	LDS—active	69.8	90.6	8.7	0.65	0.29 (0.22–0.38)[b]	
	LDS—not active	7.5	73.6	24.0	2.4	1.01 (0.71–1.44)	
Medically unsupervised Rx drug use to manage pain	No	75.0	98.9	1.1	--	1.0	
	Yes	25.0	48.8	46.2	5.0	93.77(65.47–34.3)[b]	c
Alcohol & Drug problems—past year	Do not use	72.1	93.1	6.5	0.4	1.00	
	No misuse	5.0	80.1	18.8	1.1	3.35 (2.23–5.03)[b]	<.0001
	Any misuse	22.9	63.9	31.2	4.9	7.80 (6.29–9.67)[b]	

Table 4.4 continued

Variable		Total (%)	Level of Misuse of Prescription Drugs: None (%)	1 (%)	2–4 (%)	OR (95% CI)	p-value
Alcohol (past year)	None	71.7	92.0	7.5	0.5	1.00	<.0001
	Yes	28.3	71.7	25.3	3.0	4.55 (3.76–5.50)[b]	
Cigarette use	Never	73.7	92.5	7.1	0.5	1.00	<.0001
	1–2 times	11.0	80.8	17.3	1.9	2.92 (2.21–3.86)[b]	
	Occasionally	5.6	64.2	34.0	1.8	6.66 (4.90–9.05)[b]	
	Former	6.8	58.0	36.1	5.9	9.09 (6.77–12.20)[b]	
	Current	2.9	57.1	36.7	6.1	9.42 (6.26–14.19)[b]	
Illicit year	None	86.6	91.9	7.7	0.4	1.00	<.0001
	Any use	13.4	49.7	43.7	6.6	11.70 (9.48–14.45)[b]	
Mental Health	Little or none	14.4	92.0	7.4	0.8	1.0	<.0001
	Mild	38.1	87.5	11.4	1.1	1.59 (1.13–2.23)[a]	
	Moderate	22.1	86.5	12.7	0.7	1.73 (1.20–2.48)[b]	
	High	18.3	81.0	17.1	2.1	2.67 (1.87–3.81)[b]	
	Very high	7.1	80.6	17.4	2.0	2.70 (1.77–4.12)[b]	
Ease to obtain Rx drugs	Hard	50.8	91.2	8.5	0.3	1.0	<.0001
	Easy	49.2	80.8	16.9	2.3	2.48 (2.04–3.02)[b]	

[a]p-value ≤ 0.05 [b]p-value <0.0001 [c]undefined due to small number of values
Other variables were tested but not included in the table.

obtain prescription drugs for nonmedical purposes. Illicit drug use is defined as using sedatives, stimulants, or opioids/heroin without a doctor prescribing or using marijuana. Any level of cigarette use increases the risk from 2.9 to 9.4, depending on the level of use compared to a person who never used cigarettes. Students reporting problems with alcohol or drugs in the past year from any or all of a group of six questions are 3.4–7.8 times more likely to have obtained prescription drugs for nonmedical purposes. The questions are all in regard to the past 12 months and have to do with behaviors and emotions. Alcohol consumption of one or more drinks in the past year, yields to 4.5 times more likely to obtain prescription drugs for nonmedical purposes than those who abstain from alcohol.

84 Demographics that are of statistical significance include geography, marital status, and age. Students that are cohabitating are 4.4 times more likely to obtain prescription drugs for nonmedical purposes. Separated/divorced/widowed students are 2.3 times more likely. Single students are 1.4 times more likely than married students. Students attending colleges in urban settings are 1.3 times more likely than students at rural based colleges to obtain prescription drugs for nonmedical purposes. The youngest age group, 18–20 year olds, is a little over one-half as likely to obtain prescription drugs for nonmedical purposes. This was the only statistically significant age group (OR=0.59, 95% CI=0.39–0.91).

Those less active in their religious activities or services are at higher risk of obtaining prescription drugs for nonmedical reasons. Those who “rarely” attend are 3.2 times more likely, and those who “never” attend are 4.1 times more likely to obtain prescription drugs for nonmedical purposes than those that attend services at least once a

week. Students that are religiously adherent are half as likely or less to obtain prescription drugs for nonmedical purposes. Students who think it's "very easy/sort of easy" to obtain prescription drugs for nonmedical purposes are 2.5 times as likely to obtain prescription drugs for nonmedical purposes as students who think it is "sort of hard/very hard" to obtain them.

The main measurement for mental health is the Positive Mental Health Index (PMHI), a sub-scale of the General Well-Being Schedule.[24, 38] It is a 10-item scale to measure psychological well-being.[48] The State of Utah, Division of Substance Abuse and Mental Health has used this scale in past substance abuse needs assessment studies to assist in identifying psychological distress and dysfunction.[24] The questions all have to do with feelings and emotions within the past week or two. This analysis found that those with a "high" or "very high" score (which is deemed as clinically significant and indicates that treatment is indicated)[24] were 2.7 times as likely to obtain prescription drugs for nonmedical purposes as those with scores of "little" or "none."

Multivariate Analysis

Illustrated in Table 4.5 are the findings for the multivariate logistic regression model which shows associations of obtaining prescription drugs for nonmedical purposes. As was the case in the unadjusted model, the odds of obtaining prescription drugs for nonmedical purposes were higher among those who had used medically unsupervised prescription drugs for pain management, had alcohol and/or drug problems in the past year, used illicit substances in the past year, and thought it "sort of easy/easy" to obtain prescription drugs for nonmedical purposes. Some variables that were significant in the unadjusted model, such as any past year alcohol use, any level of

Table 4.5. Weighted multivariate logistic regression model of medically unsupervised use of prescription drugs among Utah college students

Variable		OR (95% CI)	p–value
Religious adherence	No preference	1.00	0.0311
	Non–LDS—not active	1.03 (0.53–1.97)	
	Non–LDS—active	2.69 (1.06–6.81)[a]	
	LDS–active	2.15 (1.23–3.78)[a]	
	LDS–not active	1.53 (0.77–3.02)	
Medically unsupervised Rx drug use to manage pain	No	1.0	<.0001
	Yes	52.09 (34.14–79.48)[b]	
Alcohol & drug problems-past year	Do not use	1.0	<.0001
	No misuse	1.69 (0.95–3.01)	
	Any misuse	2.53 (1.66–3.87)[b]	
Marijuana—past year	None	1.0	0.0095
	Any use	1.94 (1.18–3.19)[a]	
Stimulant—past year	None	1.0	0.0074
	Any use	3.20 (1.37–7.48)[a]	
Stimulants—age of first use	Did not use	1.0	0.0019
	17 and under	1.98 (0.77–5.11)	
	18–20	4.50 (1.64–12.33)[a]	
	21 and above	0.33 (0.08–1.32)	
Sedatives—age of first use	Did not use	1.0	<.0001
	17 and under	1.59 (0.89–2.81)	
	18–20	3.80 (1.91–7.55)[a]	
	21 and above	5.02 (1.99–12.68)[a]	
Opioids/heroin—age of first use	Did not use	1.0	<.0001
	17 and under	4.65 (2.24–9.68)[b]	
	18–20	3.51 (1.50–8.18)[a]	
	21 and above	3.29 (1.03–10.48)[a]	
Ease to obtain Rx drugs	Hard	1.0	0.0101
	Easy	1.49 (1.10–2.03)[a]	

[a]Statistically significant at ≤ 0.05
[b]Statistically significant at <0.0001

cigarette use, any past year illicit drug use, and mental health distress, became insignificant in the full, multivariable model. Those that report being "active" in their faith (religiously adherent) in the unadjusted model, were less likely than those with no preference to obtain prescription drugs for nonmedical purposes. But in the full model, the "active" group became more likely than "no preference" group to obtain prescription drugs for nonmedical purposes.

Discussion

This is the first study to provide information on correlations between the LDS religion and prescription drug misuse. In an attempt to better understand the factors associated with obtaining prescription drugs for nonmedical reasons in the Utah collegiate population, student characteristics were examined. Significant factors are: religious adherence; medically unsupervised use of prescription drugs for pain management; alcohol and/or drug problems in the past year; past year use of marijuana and/or stimulants; age of initiation to sedatives, stimulants, and opioids/heroin; and ease of access for nonmedical use of prescription drugs. Race, age, gender, and marital status were not found to be significant. The strongest predictor of obtaining prescription drugs for nonmedical purposes is the use of medically unsupervised prescription drugs for painmanagement. Those that have obtained prescription drugs for nonmedical reasons are 52 times more likely to also have used medically unsupervised prescription drugs to manage pain (OR=52.09, 95% CI=34.14–79.48). Age of initiation for sedatives, stimulants, and opioids/heroin was the second strongest predictor. They fell between 3.3 and 5.0 times more likely to obtain prescription drugs for nonmedical reasons, according to what age they initiated use.

Huntington[49] explained that "religiosity is one of the critical aspects of American culture that defines who we are." It is important to understand the social and cultural aspects of a community and how those aspects influence the use of substances.[50] The religious community provides a social network that may be even stronger for those adhering to the religious practices. This network could be a possible source for obtaining prescription drugs for nonmedical use, especially if sharing prescriptions is not perceived as wrong. Targeted education programs could be directed to these religious communities.

Several studies have reported on the correlation between religious affiliation and substance use and how religion influences behavior and consumption. Some studies report that there is a protective and rehabilitative effect by those that are "active," while others suggest that religion may foster denial and repression, leading to increased substance consumption.[50-54] The protective effect may be due to individuals internalizing their strong "religio-ethical norms." Disobedience of these norms could cause feelings of guilt, shame, or fear of divine punishment. [53] Such individuals may also conform to religious norms because they fear not being accepted, or they want to align themselves with members in the community that follow that belief.[53] Yet it is possible that these same social norms and pressures can also increase the negative consequences of certain stressors,[52, 55] which could lead to risky or unhealthy behaviors. Herman-Stahl et al.[56] found high religiosity to be a risk factor for methamphetamine use in the past year in young adults, but not in past year nonmedical use of prescription stimulants. Even with the conflicting views of previous research, a surprising result of this study is that the religiously adherent are at risk for obtaining prescription drugs for nonmedical purposes. Those that are active in their religion, whether LDS (OR=2.15, 95% CI=1.23–3.78) or

Non-LDS (OR=2.69, 95% CI=1.06–6.81), are more likely to obtain prescription drugs for nonmedical purposes than "not active" groups, or those without a religious preference.

Previous research has shown that adolescents that use prescription medications nonmedically are heavily involved in other drug use[57-58] and undergraduate students that use prescription stimulants nonmedically or without medical supervision, were much more likely to use other drugs.[32] The best predictors of medically unsupervised use of prescription drugs are the use of illicit drugs.[30, 55, 58-59] McCabe et al.[59] found that the nonmedical use/medical use ratio for stimulant medication among college students is much higher than other classes of prescription drugs. Illicit substance use (past year) by religious group and religious activity level (Table 4.2) show rates of use for sedatives and opioids/heroin to be highest in this study. In the multivariable analysis, these substances were not significant, but stimulants (OR=3.2, 95% CI=1.37–7.48) and marijuana (OR=1.94, 95% CI=1.18–3.19) are significant for predicting those that obtain prescription drugs for nonmedical purposes.

It is clear from studies of youth that a number of personality characteristics, behavioral dispositions, and environmental influences are predictive of individual differences in age of initiation to alcohol and other drug use, in substance use intensity,and the experience of negative consequences during adolescence.[60] In Utah, youth tend to have a delayed age of initiation for use of substances compared to students in the nation.[24] But, even with a delayed use, it is important to understand when this initiation occurs so that interventions can be targeted to the specific age groups. Age of initiation is significant for the following substances: stimulants, sedatives, and opioid/heroin. Age of initiation has four categories: did not use, 17 and under, 18–20, and

21 and above. A student who initiated sedative use at the age of twenty-one or older was 5.0 times more likely to obtain prescription drugs for nonmedical purposes (OR=5.02, 95% CI=1.99–12.68). Those who initiated opioid/heroin use before age seventeen (OR=4.65, 95% CI=2.24–9.68), and stimulants between ages 18–20 (OR=4.50, 95%CI=1.64–12.33), were 4.5 times more likely to obtain prescription drugs for nonmedical reasons. Opioid/heroin is the only substance that the three age categories are significant for the prediction of obtaining prescription drugs for nonmedical use. The highest risk is for the "17 and under" group and the other two age groups are approximately 3.5 times more likely to obtain prescription drugs for nonmedical purposes.

Another indicator of prior or concurrent substance use is self-reported problems with another substance. Students that had troubles in the past 12 months with alcohol or drugs were 2.5 times more likely (OR=2.53, 95% CI=1.66–3.87) to obtain prescription drugs for nonmedical purposes. Students self-reported prior problems with alcohol or drugs in the previous 12 months by answering six questions combined into one variable. The questions include: more time using than intended, neglected some usual responsibilities, wanted to cut down on use, anyone objected to use, frequently find yourself thinking about using, and use to relieve feelings such as sadness, anger or boredom.

Obtaining prescription medications for nonmedical use is reported to be easy.[18, 30, 61] The Internet is a source for obtaining prescription drugs that are used for nonmedical purposes,[6] though only a small percentage of students in this survey reported obtaining drugs in this way. DeSantis et al.[18] used quantitative and qualitative surveys to investigate

college students' perceptions on use of illegal stimulants. They found that students primary sources for substances were friends or significant others. A Utah study that focused on the medically unsupervised use of prescription pain drugs found the majority of respondents acquired their illicit prescription drugs from friends or relatives, and most of them indicated that there was no cost for them.[23] The UHEHBS survey did not collect information on access to prescription drugs for nonmedical use, but it did ask, "If you wanted to get some prescription drugs for non-medical reasons, how easy would it be for you to get some?" Students reported that it would be "very easy/sort of easy" (OR=1.49, 95% CI=1.10–2.03) to get prescription drugs for nonmedical reasons.

The identification of those obtaining prescription drugs for nonmedical purposes may be difficult, as they report "active" in their religious adherence. With the strict health code policies of the LDS religion, students of that faith might not be willing to admit that they are not following the guidelines and may not be willing to seek help. Yet, since the students are "active", locating them for prevention efforts will be easier. Targeting group norms rather than individuals can influence and educate them without identifying them. The results from this study may be helpful to religious leaders and prevention specialists in Utah that work with young adults in order to help them understand factors that put an individual at risk for use of nonmedical prescription drugs. Education on campuses about the dangers of medicine-sharing could be useful since the majority of those that are "users" have taken someone else's prescription. Student use could be discouraged by placing nonmedical prescription drug use in the same context as illicit drugs in order to discourage use. Mandatory screenings could be implemented at colleges by requiring students to take an online assessment before registering for classes in order to help

students self identify that they may have a problem and direct them to resources for services on campus. The LDS church could increase efforts to inform their members that use of prescription drugs other than as prescribed is a violation of the health code. Future studies should include in-depth questions regarding all aspects of nonmedical prescription drug use in order to understand use and motives. This study is an important first step in understanding the extent of and factors associated with obtaining prescription drugs for nonmedical purposes.

Strengths and Limitations

There are a number of strengths of this study. It is a large representative sample of the nine state colleges in Utah; the data are a good match with the overall student population, as reported by the Board of Regents; and the survey did not collect any personal identifying information (e.g. name, address), so it is expected that the responses were honest. There are no published studies on correlations between the LDS religion and obtaining prescription drugs for nonmedical purposes; thus, Utah provides an ideal setting, given it has the highest concentration of the LDS denomination in the nation.[21]

This study has several limitations. The data are cross-sectional, so there are no longitudinal patterns of use available. This study is a secondary analysis; the measured variable for the main outcome is not ideal. More robust questions on prescription drug misuse are needed. A large group of students (30.0%) did not answer the outcome question (skipped), as seen in Figure 4.1, though these students were demographically similar to the other students (obtainers and nonobtainers). Nonresponse bias may have impacted the results of the present study, given the response rate. The question before and after the outcome question had only a small percentage of skips. This yields to the

suspicion of poor question development, as the response pattern was very different for the outcome question than for the rest of the survey. There are just two questions assessing religious adherence. Additional questions would potentially provide a more in-depth understanding of the associated issues of religiosity. Qualitative data could be useful in furthering the understanding of the complex issues of religiosity.[53] Individual campuses cannot be identified due to an agreement with the college presidents at the time of data collection; therefore, college type (2– vs. 4–year) and college location (urban vs. rural) were included in the analysis. Neither produced any significance in the multivariable analysis. There was no information gathered on quantity of prescriptions used illicitly per occasion, route of administration, or sufficient information on the source of the prescription drugs. Lastly, the study sample consists of students from a single state, which limits the generalizability of the results.

Conclusion

This analysis revealed that the religiously adherent (active) are significantly more likely than those with no religious preference or not religiously active to obtain prescription drugs for nonmedical purposes. In particular, those that obtain prescription drugs for nonmedical purposes are at higher risk for using medically unsupervised prescription drugs for pain management. They also have a past year history of alcohol and/or drugs problems and have used marijuana and/or stimulants in the past year.

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CHAPTER 5

CONCLUSION

Prescription drug misuse has become a widespread problem in the United States.[1-2] There is a growing concern within both the public health and law enforcement communities about the increased use of pharmaceutical drugs for nonmedical purposes, especially among young adults.[3] The work that Utah is currently conducting is addressing prescription drug misuse in the state. Our findings will be useful since we identified risk factors for medically unsupervised use of prescription medications in the Utah adult population. These had not been previously identified and will be valuable in prevention and treatment issues. This research evaluated three different outcomes: medically unsupervised use of prescription pain medication; obtaining prescription drugs for nonmedical purposes; and using prescription drugs to manage pain. The last two outcomes were within the population of Utah college students. Comparing our survey results with other studies is problematic in that there is not a standardized set of questions that have been used to assess the nonmedical use of prescription medications. Some definitions include legitimate use of prescriptions drugs under a physician's direction, but using other than prescribed such as at a higher doses or for a longer period of time. Other definitions capture using someone else's prescription or using for the experience or feeling the drug causes. Another defines prescription misuse as obtaining prescription drugs for nonmedical purposes but doesn't specify actual use of the prescription, though

it is assumed that if one is obtaining a prescription for nonmedical purposes they are probably using them.

Key Findings

Prescription drug overdose is a big concern as it has been a growing problem both nationally and in Utah.[4] We now have evidence of factors that put people at risk for nonmedical use of prescription drugs. Some of our findings were consistent with previously published research that those who use prescription medications nonmedically also use other drugs.[5-7] Our findings show that if someone had an alcohol or drug problem of some type in the past year then they were more likely to obtain or use prescription drugs nonmedically. Other risk factors were: race, general health, and cigarette smoking. Mental health surfaced both as psychological distress and life dissatisfaction. The most surprising finding is that the "religiously adherent" (active) are more likely than those with "no religious preference" or "not religiously active" to obtain prescription drugs for nonmedical purposes among the Utah college student population. Our studies did not address the sources of the prescription medications, but another Utah study identified that of the respondents that obtained prescription medication for nonmedical use the majority got it from a friend or relative that gave it to them.[4]

With the identified risk factors, prevention and intervention programs can be developed. Programming can be directed at religious communities since those that are active in religious communities will be able to be "found" due to meeting regularly and participating in church activities or services. Educational components on the dangers and consequences of nonmedical prescription drug use can be incorporated in community and religious settings. Illegal issues regarding medicine sharing is necessary since the

majority that used medically unsupervised prescription drugs for pain management used someone else's medications.

Most of the college campuses have student religious organizations that can be worked with for program development and information dissemination. Mandatory screenings could be implemented at colleges requiring students to take an online assessment before registering for classes in order to help students self identify that they may have a problem and give them resources for services on campus. Colleges have services on campuses that are not available to outside community members, such as student health services, mental health counseling and a variety of other student services specific to only students attending the college. It will be important that these offices are informed about the risk factors and included in planning. Rural, smaller campuses tend to not have as many services available and so often need to rely on the community to get needed services, so in those communities it will be important to collaborate with the service providers.

These studies are an important first step in understanding the extent of and factors associated with nonmedical use of prescription drugs. Future studies are needed in order to continue to address this important public health problem and to gain greater understanding of this issue.

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