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A Study of the Management of Opioid Prescriptions Among Patients with a History
of Substance Abuse

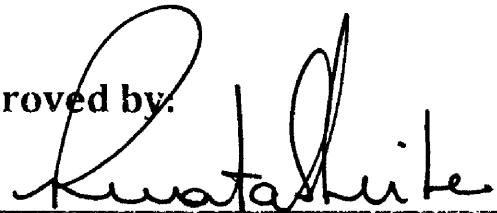
Kara G. Veeder, D.M.D.

**A thesis submitted to the faculty of the Medical University of South Carolina in
partial fulfillment of the requirement for the degree of Master of Science in
Dentistry in the College of Dental Medicine.**

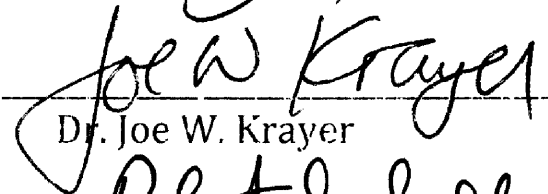
Department of Stomatology
Division of Periodontics

2012

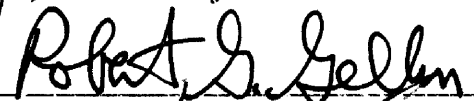
Approved by:



Dr. Renata Leite, Chair



Dr. Joe W. Krayer



Dr. Robert G. Gellin



Dr. Kathleen T. Brady

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ABSTRACT

KARA GRASSO VEEDER. A Study of the Management of Opioid Prescriptions Among Patients with a History of Substance Abuse. (Under the direction of DR. RENATA LEITE).

Prescription opioid abuse is the fastest-growing drug problem in the United States and has been declared an epidemic by the U.S. White House Office of National Drug Control Policy. Immediate release (IR) opioids, especially hydrocodone and oxycodone, are abused or misused most commonly. Dentists are only second to family physicians in the number of IR opioid prescriptions written. Just under ten percent of the population in the United States in 2010 were classified with substance dependence or abuse in 2009. This study poses the following questions: 1. Do patients with a personal or family history of substance abuse manage prescription opioids differently than patients without a personal or family history of substance abuse? 2. Are they more or less likely to lend, borrow, save and/or properly dispose of leftover pills? 3. Do differences exist between their pre-knowledge and post-knowledge of prescription safety behaviors after going through a prescription safety intervention?

Opioid analgesics were prescribed to sixty-two consenting adult outpatients treated at the Medical University of South Carolina Post-Doctoral Periodontic program or at the pain management clinic. Participants completed a brief, interactive, patient-tailored, web-based Script Safety intervention, which provided patient education regarding the hazards of prescription opioid misuse, and safe use, storage and disposal of prescription opioids. At one-week and one-month post

intervention, participants were contacted via telephone to assess knowledge change and/or retention, medication misuse behaviors, and patient satisfaction.

Forty-eight point four percent (N=30) of participants qualified for a positive personal or familial history of addiction. Participants with a positive history of addiction were more likely than chance to lend their prescriptions to other people. These participants were also more likely to borrow pills from other people. Therefore, identification of these patients is essential for the dental community to offer proper counseling and prescribing practices tailored to their individual needs. In doing so, it is likely that fewer drugs will be diverted.

INTRODUCTION

Prescription opioid abuse is the fastest-growing drug problem in the United States and has been declared an epidemic by the U.S. White House Office of National Drug Control Policy.¹ The Journal of the American Dental Association featured a cover story examining the dentist's role in preventing prescription opioid abuse.² Analgesics are classified as opioids and non-opioids.³ Opioids activate specific receptors in an identical manner as that of an opiate, such as morphine.³ The non-medical use, abuse and dependence on prescription opioids have grown alarmingly over the last 10 years and are a public health concern.^{1, 4, 5} The combination of hydrocodone/acetaminophen is the most prescribed medication of any category of drug, exceeding statins and antibiotics.⁶ Among teens, opiate analgesics are among the most commonly used drugs with hydrocodone being the second most abused drug surpassed only by marijuana.^{7, 8}

Non-medical use of opioids falls into two categories: misuse and abuse. Misuse is use of a medication (prescribed for a medical purpose) other than as directed or as indicated, whether willfully or unintentionally, and whether or not harm results from use.^{9, 10} Abuse is defined as any use of an illegal drug or the intentional self-administration of a medication for a nonmedical purpose such as altering one's state of consciousness.^{9, 10} Addiction is a pathological, behavioral

syndrome characterized in part by cravings for, loss of control over, and inability to abstain from opioids.¹¹ According to the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM-IV TR), the definition for substance abuse is more specific and is defined as a maladaptive pattern of substance use leading to clinically significant impairment or distress as manifested by one (or more) of the following, occurring within a 12-month period: 1. Recurrent substance use resulting in a failure to fulfill major role obligations at work, school, or home (such as repeated absences or poor work performance related to substance use; substance-related absences, suspensions, or expulsions from school; or neglect of children or household); 2. Recurrent substance use in situations in which it is physically hazardous (such as driving an automobile or operating a machine when impaired by substance use); 3. Recurrent substance-related legal problems (such as arrests for substance related disorderly conduct); 4. Continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance (for example, arguments with spouse about consequences of intoxication and physical fights).¹² This differs from substance dependence which is accepted to be a maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by three (or more) of the following, occurring any time in the same 12-month period: 1. Tolerance, as defined by either of the following: (a) a need for markedly increased

amounts of the substance to achieve intoxication or the desired effect; (b) markedly diminished effect with continued use of the same amount of the substance; 2. Withdrawal, as manifested by either of the following: (a) the characteristic withdrawal syndrome for the substance; (b) the same (or closely related) substance is taken to relieve or avoid withdrawal symptoms; 3. The substance is often taken in larger amounts or over a longer period than intended; 4. There is a persistent desire or unsuccessful efforts to cut down or control substance use; 5. A great deal of time is spent in activities necessary to obtain the substance, use the substance, or recover from its effects; 6. Important social, occupational, or recreational activities are given up or reduced because of substance use; 7. The substance use is continued despite knowledge of having a persistent physical or psychological problem that is likely to have been caused or exacerbated by the substance (for example, current cocaine use despite recognition of cocaine-induced depression or continued drinking despite recognition that an ulcer was made worse by alcohol consumption).¹²

Immediate release (IR) opioids, especially hydrocodone and oxycodone, are abused or misused most commonly. In the United States, dentists are only second to family physicians in the number of IR opioid prescriptions written.^{8, 13} Emergency department visits associated with nonmedical opioid use have dramatically increased between 2004 and 2008.¹⁴ The National Survey on Drug Use and Health

(NSDUH) from 2009 determined that millions of people age 12 and older used psychotherapeutic medications non-medically for the first time in the preceding year, the majority of whom used pain relievers. The majority of those pain relievers were acquired through a friend or family member for free, some were bought from a friend or family member, taken from a friend or family member without permission or acquired from a stranger or drug dealer.^{1, 13} It is astounding that most adolescents acquire their opioids for misuse or abuse from family or friends. Teens who report abusing controlled prescription drugs are more likely to use alcohol, marijuana, heroin, Ecstasy and cocaine.¹⁵

Focusing on people in the United States in 2010 who were 12 years of age or older, it was estimated that just under 10% of the population were classified with substance dependence or abuse in 2009.^{13, 16} Only a small fraction of those with substance dependence or abuse received treatment at a specialty facility. Furthermore, despite the strong link between substance misuse and health related problems, nurses and other health care professionals have been reluctant to engage with this patient population.¹⁷ This may be due to lacking the proper guidance with regard to what the dentist should do or in part due to the fact that the dentist has no financial incentive to take the time to ask psychosocial or substance abuse questions.¹⁶

Based on the current status of opioid misuse and the high percentage of

Americans with a personal or family history of substance abuse, a secondary data analysis was performed on data from a study done to pilot test a Script Safety intervention. The intervention consisted of a “Video Doctor” counseling session discussing risks, proper handling and disposal of prescription opiates. A brief questionnaire to assess demographics, risk factors and history of prescription drug misuse was used, followed by a pre-knowledge assessment. A post-intervention knowledge assessment at the end of the program measured comprehension of material delivered. Based on data gathered from the Script Safety study, it is prudent to ask the following questions: Do patients with a personal or family history of substance abuse manage prescription opioids differently than patients without a personal or family history of substance abuse? Are these patients more or less likely to lend, borrow, save and properly dispose of leftover pills? What differences exist between their pre-knowledge and post-knowledge of prescription safety behaviors? This study seeks to answer these questions and has the potential to reduce the occurrence of prescription opioid misuse and abuse while encouraging physicians and dentists to identify patients who may be at greater risk for diversion.

REVIEW OF LITERATURE

Economic costs

In the United States, the economical cost of the nonmedical use of prescription opioids exceeds \$50 billion annually. Seventy-nine percent of these costs are attributable to lost productivity, 15% to criminal justice, 4% to drug abuse treatment and 2% to medical complications.¹⁸

Growth Rate of Opioid Abuse

Between 1992 and 2003, abuse of controlled prescription drugs has been growing at a rate twice that of marijuana abuse, 5 times greater than cocaine abuse and 60 times greater than heroin.¹⁹ Immediate release (IR) opioids, especially hydrocodone and oxycodone, are abused or misused most commonly; dentists prescribe 12% of all IR opioid prescriptions in the United States, second only to family practice physicians who prescribe 15%.^{8, 13} More than 12 billion dosage units of opioids are dispensed each year in the United States; 1 to 1.5 billion of those doses are estimated to have been prescribed by dentists.¹⁶ According to The Drug Abuse Warning Network (DAWN) administered by the Substance Abuse and Mental Health Services Administration (SAMHSA), there was a 111% increase of emergency departments visits associated with nonmedical opioid use and a 123% increase in

visits involving hydrocodone products between 2004 and 2008.¹⁴

The National Survey on Drug Use and Health (NSDUH) conducted in 2010 determined that 3.0 million people age 12 and older used psychotherapeutic medications non-medically for the first time in 2009; 2.0 million of those used pain relievers. Fifty-five point three percent of those pain relievers were acquired through a friend or family member for free; 9.9% bought them from a friend or family member; 5% took them from a friend or family member without permission and 4.8% acquired them from a stranger or drug dealer.¹³ Combining these data, it is astounding that 7 out of 10 adolescents acquire their opioids for misuse or abuse from family or friends.¹ The Monitoring the Future (MTF), in 2009, surveyed students in 8th, 10th and 12th grades and concluded that among 12th grade students, the lifetime prevalence of prescription opioid misuse was 13.2%.⁸ Teens who report abusing controlled prescription drugs are twice as likely to use alcohol; five times likelier to use marijuana; 12 times likelier, heroin; 15 times likelier, Ecstasy; and 21 times likelier to use cocaine.¹⁵ Approximately 33% of new-users over the age of 12 first started with non-medical use of a prescription drug.^{1, 13}

Focusing on people in the United States, who are 12 years of age or older, in 2010, it was estimated that 22.1 million were classified with substance dependence or abuse in the preceding year, that is 8.7 percent of the population. Those classified with a dependence or abuse on particular substances were as follows: 2.9 million

on both alcohol and illicit drugs; 4.2 million on illicit drugs but not alcohol; and 15.0 million on alcohol but not illicit drugs. Twenty three point one million persons needed treatment for substance dependence or abuse. Of these, only 2.6 million received treatment at a specialty facility.¹³ Abuse of prescription opioids for one year increases the chance of legal or medical problems by 3%; prescription opioid abuse for 10 years increases that chance by 34% as determined by a study of 5,686 patients who were abusing opioids.²⁰

In response to the high rate of substance abuse among Americans, federal mental health and substance abuse treatment agencies have seen funding increase for many programs including substance abuse treatment and prevention for the second year in a row.²¹ Treatment initiation generally refers to beginning the treatment process and can include presenting for and completing an initial assessment and returning for follow-up contact within a specified period of time.^{22,}
²³ Treatment engagement has been defined by attendance at a specified number of treatment sessions within a specified number of weeks.^{23, 24} ENREF 24 Treatment adherence generally refers to complying with a plan for treatment that has been formulated by a treatment team with a client's participation.²³ Almost 20 million people with substance abuse or dependence went untreated in 2010.¹³

Combining the number of people untreated for substance abuse or dependence with the number of new users misusing prescription opioids, it is

understandable that opiate overdoses due to prescription painkillers are increasing.²⁵ In 2006, it was found that of 250 overdose-related decedents in a West Virginia population, 65% had died from unintentional overdose using opioid analgesics.²⁶ The most significant opioid effects are mediated through mu and kappa receptors. Effects generated by mu receptors produce an unlimited dose response, but those mediated by kappa receptors have a ceiling to their effects. Opioids act as agonists or antagonists at these receptors.³ According to Becker, the mu receptor is responsible for mediating analgesia as well as respiratory depression and dependence. Mu effects have unlimited intensity which increase proportionately with dose. The kappa receptor mediates analgesia and respiratory depression but does not increase with greater doses. Novel compounds that act as agonists at kappa receptors but act as antagonists at mu receptors are called agonist-antagonists, produce less respiratory depression at higher doses and have less potential for abuse. Some recommend these as good choices for patients with a history of drug seeking but not for those currently dependent.³ While others suggest these do not provide adequate analgesia for use in patients with a history of substance abuse or dependency.²⁷

While opioid analgesia certainly has a place in dentistry, it is important to understand the degree of post-operative pain relief necessary. A pilot study investigating the use of prescription opioids among 15 patients post-implant

placement, illustrated that 93% of patients needed to use opioid analgesics for only 3 days versus 5 days for impacted third molar extractions.²⁸ Approximately 3.5 million third-molar extractions were performed in the United States in 2006; most of these patients received a prescription for an opioid analgesic for post-operative pain. Therefore, 3.5 million patients in their early twenties were exposed to opioids as a result of third-molar extractions in 2006 alone.² Dentists are cautioned to avoid prescribing any opioid product for patients already receiving opioids for chronic pain disorders and for those under treatment for opioid abuse. Rather, it is appropriate to request an increase in dosage from the prescribing physician if necessary.³

The National Center on Addiction and Substance Abuse (CASA) surveyed physicians and found that 57% of doctors believe that they bear primary responsibility for preventing prescription drug diversion and abuse. This survey also reveals, however, that only 19% received training in prescription drug diversion in medical school, 39% in residency, and 34% through continuing medical education. Physicians reveal that they are not well trained to spot signs of substance abuse and dependence.^{16, 19} In 2000, a national survey of medical residency programs found that only 56% required substance use disorder training and even then the training consisted of between 3 to 12 curricular hours.²⁹ A focus group of dentists involved in the CASA survey concluded that dental training in

controlled prescription abuse, diversion, addiction and pain management was very limited. This group of health professionals rarely discussed the risks of addiction with patients. Dentists are not knowledgeable about laws and regulations on what actions to take if a patient or colleague is suspected of diversion.¹⁹ A British study of 115 general practice physicians determined that whether or not opioids were prescribed for persistent non-cancer pain was mainly determined by the doctor's personal beliefs about appropriateness of opioids for this problem.³⁰ In 2010, a survey representing 33% of West Virginia dentists and their prescribing practices, the *Tufts Health Care Institute Program on Opioid Risk Management: The Role of Dentists in Preventing Opioid Abuse* was conducted. The findings illustrate that 36% of dentists did not ask new patients about a history of substance abuse yet 76% of dentists estimated that between 1% and 20% of their patient population were substance abusers.^{2, 16}

In light of the prescription opioid epidemic¹, its financial burden, increasing number of new users, high percent of Americans with a history of substance dependence or abuse and the role of dentists in prescribing opioids, it is necessary to investigate the handling practices of patients with a personal or family history of addiction with respect to their opioid prescriptions.

MATERIALS AND METHODS

Participants

Opioid analgesics were prescribed to 62 adult outpatients treated at either an academic pain management clinic or the Medical University of South Carolina Post-Doctoral Periodontic programs. Institutional review board (IRB) approval, HR#20520, was attained for each clinic. The periodontal patients were screened by phone interview to determine their interest in participation and were then scheduled for informed consent by the research assistant prior to their surgical appointments for which they were prescribed the opioid analgesic. Interested patients then met with the research assistant in a private office to discuss the study, evaluate inclusion criteria, and answer any questions patients may have had regarding participation. Inclusion criteria included: (1) patient age between 21 and 80; (2) patient of record at one of the participating clinics; (3) a prescription opioid medication prescribed at the appointment; (4) accessible for follow-up via telephone; and (5) cognitively and physically capable to complete the web-based intervention. Eligible patients were given a full description of the study and asked to read and sign an IRB-approved informed consent form before any study procedures occurred. Ineligible patients were referred for treatment-as-usual.

Procedures

Consenting participants remained in a private office and completed the Script Safety intervention on an internet-connected laptop computer. The intervention included answering questions about the participant's demographics, history of familial or personal drug use (See Appendix D), knowledge of appropriate prescription medication storage, use and disposal of prescription medications, and an interactive video addressing proper storage, use and disposal of prescription medications. The Script Safety website was accessed by the research assistant who indicated the specific opioid medication that the participant was prescribed which specifically tailored the program to that medication. Participants listened to the program through headphones. At one-week and one-month post intervention, the research assistant contacted participants via telephone to assess knowledge change and/or retention, medication misuse behaviors, and patient satisfaction. Participants received \$10 gift cards for completing the Script Safety intervention, \$15 for the one-week follow-up and \$20 for the one-month follow-up.

Study Intervention

Script Safety as described by Back *et. al.*³¹ is a brief, interactive, patient-tailored, web-based intervention designed to provide patient education regarding the hazards of prescription opioid misuse, and ways to safely use, store and dispose

of prescription opioids. It is easy to understand and uses engaging multimedia formats to convey the information. The following components are included in the Script Safety program: (1) assessment of demographics and opioid medication misuse risk factors; (2) pre-intervention assessment of knowledge regarding appropriate use, storage and disposal of prescription opioids; (3) interactive educational program including a “Video Doctor” consultation reviewing the risks, and proper handling and disposal of the patient’s specific opioid medication; (4) post-intervention assessment of knowledge to measure comprehension of material and provide immediate corrective feedback; and (5) a personalizable handout highlighting key learning points and risk reduction strategies.³¹

Statistical Analyses

The primary aim of this study was to compare those patients with a self-reported personal or family history of substance abuse with regard to their self-reported risk behavior and risk knowledge at baseline as well as risk knowledge at immediate post-intervention assessment with patients who did not have a personal or familial history of substance abuse. Chi-square and univariate Analysis of Variance (ANOVA) were conducted using SPSS (v. 17) statistical software. Alpha was set at 0.05 for all analyses.

RESULTS

Demographic Characteristics

As shown in Appendix A, the mean age of participants was 58 years old, most were Caucasian (77.4%) and unemployed (59.7%). A higher percentage of unemployment was found among participants at the pain clinic compared to participants at the dental clinic ($p=0.004$). No other significant differences in demographic characteristics were found. Almost half (45.2%) of the sample reported a family history of addiction and 11.3% reported a personal history of addiction. Approximately 10% of participants indicated that they were living with someone who had a current or lifetime history of addiction. Accounting for the overlap of these categories, 48.4% (N=30) of participants qualified for a positive personal or familial history of addiction (see Appendix B). There appeared to be no difference between clinics with respect to patients reporting a personal or familial history of addiction.

Medication Misuse Behaviors and Pre-Intervention Knowledge of Participants with a Positive Personal or Familial History of Addiction

Participants with a positive personal or familial history of addiction were more likely than chance to lend their prescriptions to other people ($\chi^2 [1,62]=7.28, p<0.01$). These participants were also more likely to borrow pills from other people

($\chi^2 [1,62]=7.28, p<0.01$). There was no significant difference with respect to their taking more of their opioid than prescribed ($\chi^2 [1,62]=1.99, ns$), nor were they more likely than chance to take their medication for reasons other than prescribed ($\chi^2 [1,62]=1.21, ns$). These patients were neither more likely to report saving unused medication ($\chi^2 [1,62]=0.83, ns$) nor securing medications from illicit sources ($\chi^2 [1,62]=1.08, ns$) than participants without any addiction history (See Appendix C).

A trend toward significance was elucidated with respect to pre-intervention knowledge regarding the best place to store medication, among those with a positive personal or familial history of addiction, who were more likely to answer incorrectly ($\chi^2 [1,62]=3.28, p=0.07$). There was also a trend toward a significant difference in pre-intervention knowledge regarding lending pills to family or friends ($\chi^2 [1,62]=3.63, p=0.07$) with those positive for abuse history being at increased likelihood of responding incorrectly. No significant differences in pre-intervention knowledge regarding saving unused pills ($\chi^2 [1,62]=0.39, ns$), borrowing pills ($\chi^2 [1,62]=2.61, ns$), disposal of unused pills ($\chi^2 [1,62]=0.63, ns$) or using expired medication ($\chi^2 [1,62]=0.56, ns$) was found. Addiction history did not have a significant effect with regard to the number of correct answers on pre-intervention knowledge test ($F(1,60)=2.56, ns$).

Post-Intervention Knowledge and Medication Misuse Behaviors of Participants with a Positive Personal or Familial History of Addiction

Subsequent to completing the intervention, the only trend that could be elucidated among participants with a positive personal or familial history of addiction with regard to post-intervention knowledge was a difference in the proper disposal of prescription medications such that participants with a personal or family history of substance abuse were more likely to answer disposal questions incorrectly ($\chi^2 [1,62]=3.67, p=0.055$). No significant differences were found in post-intervention knowledge of storage ($\chi^2 [1,62]=0.00, ns$), saving unused medications ($\chi^2 [1,62]=1.08, ns$), or in keeping expired medications ($\chi^2 [1,62]=0.02, ns$). Addiction history did not have a significant effect with regard to the number of correct answers on post-intervention knowledge test ($F(1,60)=2.56, ns$).

A knowledge change variable was calculated to reflect knowledge change from pre-intervention to post-intervention. Utilizing this variable, there was a trend toward a significant effect of addiction history on the change in knowledge from pre-intervention to post-intervention ($F(1,60)=3.65, p=0.06$). Patients with a personal or familial history of substance abuse did not demonstrate as much of a change in knowledge score as patients without a history.

DISCUSSION AND CONCLUSION

The significant findings of this research indicate that patients with a personal or familial history of addiction lend and/or borrow prescription opioids more often than patients without a personal or familial history of addiction. These findings are consistent with current research in the literature. Historically, studies have supported the expectation that people with pre-existing substance use disorders and/or legal problems related to substance use are at a higher risk for prescription opioid misuse.³² A study of 15,160 veterans determined a diagnosis of non-opioid substance abuse disorder was the strongest predictor of prescription opioid abuse or dependence.³³ Another study of 98 patients with chronic non-cancer related pain found that a lifetime history of substance use disorder was predictive of prescription opioid abuse behavior.³⁴

Due to the small sample size (N=62), the power to detect a difference between the two groups, those with a personal or familial history of addiction and those without, was relatively low with only a 35% chance of finding an effect. This could mean either that there is no difference between these groups or that the difference is too small to detect with this sample size. One way to overcome this would be to conduct a Script Safety study among patients with a known history of addiction, such as those affiliated with a treatment center. This would help to eliminate another shortcoming of this study, that of not implementing a gold

standard for history of substance abuse such as urine screening tests or a validated screening questionnaire such as the Prescription Drug Use Questionnaire (PQUD). The classification of a participant having a personal or family history of substance abuse was determined by responses to ten questions in the Script Safety questionnaire (see Appendix D).

Determining the stage of addiction was not attempted either; this may influence different behavioral patterns. Patients still abusing substances would likely misuse prescription medications more readily than patients who are in some stage of recovery. Those in recovery from addictions are encouraged to increase their recovery activities as this supports the safer use of therapeutic opioids and decreases the risk that such use might trigger a relapse.³⁵

Additionally, the small sample number of only 62 participants potentially may have been skewed by participation/volunteer bias meaning those willing to participate might not be representative of a substance abuse population.

It is known that certain patients who are given an opioid prescription may misuse the opioids because of biologic and environmental susceptibility factors such as a family history of addiction.³⁶ In a study of 145 patients taking opioids for chronic pain, those with a family history of substance abuse, a history of legal problems and drug or alcohol abuse had a tendency toward more aberrant drug-related behaviors.³⁶ A screening tool, the Prescription Drug Use Questionnaire

(PDUQ), developed to identify patients with addiction and problematic substance use was tested for efficacy on 52 subjects. While this tool is geared toward use by trained mental health professionals, the findings are useful for the dental community in that Compton *et. al.* found that patients who have a positive addiction status are more likely to seek limited care from the dental community, to take analgesics of family members, to supplement with alcohol and other drugs and to visit the emergency department for analgesics.³⁷ It is important to remember that not all patients with a personal or family history of addiction will misuse opioids, of the 52 participants in the previous study, 27% with personal history of addiction and 50% of those with a family history of addiction, used opioid analgesics in an appropriate manner.³⁷ The Current Opioid Misuse Measure (COMM) is a 17-question self-report measure regarding current aberrant drug-related behavior that appears promising in identification of patients at risk.³⁸

Prescribing recommendations for treating acute pain in dentistry have been set forth for treating patients with a history of substance abuse.³⁹ These include asking new patients about their history of addiction or substance abuse including alcohol. Six to 10 % of the general population has attended Alcoholics Anonymous, which translates into the need for dentists to be comfortable treating acute pain in patients with alcoholism.²⁷ If the patient is in recovery, then the recovery team should be contacted as to the best ways to manage the controlled substance; often

times a trusted other will take responsibility for managing the patient's medications. Encouraging a patient in recovery to intensify involvement in their recovery program before and after any dental treatment that may result in postoperative pain is recommended.²⁷ As for the dosing intervals, when ibuprofen and acetaminophen are inadequate for alleviating postoperative pain, it is recommended that dentists prescribe around-the-clock opioid administration for the first 24 hours (in moderate pain) or the first 48 hours (in severe pain) rather than on an "as needed" basis.^{27, 39} Current recommendations for dentists treating anticipated postoperative pain relief in patients who can tolerate non-steroidal anti-inflammatory drugs (NSAIDs) include 200-600 mg of ibuprofen 4-6 hours for the first 24 hours for mild to moderate pain. If pain relief is inadequate, then 500 mg acetaminophen can be added every 6 hours. For severe pain, 650 mg acetaminophen with 10mg hydrocodone would be added to 400-600mg of ibuprofen every 6 hours for the first 48 hours then followed with ibuprofen as needed for pain. For patients who cannot tolerate NSAIDs, acetaminophen 650-1000 mg every 6 hours is recommended for mild to moderate pain. Ten milligrams of hydrocodone can be added for the first 24 hours. If pain relief continues to be inadequate then 650 mg of acetaminophen can be coupled with 10 mg oxycodone administered every 6 hours for 48 hours only. Then 650-1000mg acetaminophen alone taken as needed for pain should suffice.³⁹ Postoperative pain relief will also

be reduced by administration of pre-operative NSAIDs and postoperative administration of a long acting local anesthetic such as bupivacaine. Using these guidelines, prescriptions would be written for eight opioid pills rather than the more common prescription of 20 pills.⁴⁰

There is a need to increase awareness, education and management of patients with a history of substance abuse. A survey of 548 undergraduate students enrolled in health related studies in Australia illustrated that patients with a substance abuse problem are poorly regarded by the respondents; these students were reluctant to go out of their way for the patients and felt that their skills were not relevant to patients presenting with substance abuse.⁴¹

It is important that dentists understand the contribution the dental profession makes toward opioid diversion and misuse. Due to the staggering number of opioid analgesics prescribed for postoperative dental pain, this community must identify patients with a personal or familial history of addiction and utilize resources to ensure their safe handling of these prescriptions. Educating all patients who receive an opioid analgesic in safe storage, use and disposal of their prescriptions will permit fewer drugs to be diverted. Explaining the risks to patients, offering the Script Safety interactive video to patients and increasing the knowledge base for both patients and practitioners may have a profound effect on decreasing the misuse of prescription opioids. The drug dealer on the street corner

has taken a back seat to the medicine cabinet in the bathroom as a source for misused and abused substances. Dental and medical education needs to increase efforts to properly prepare graduates for identification, referral and proper treatment strategies for patients with a history substance abuse.

The Script Safety interactive video was very effective at educating patients in the proper storage, use and disposal of their prescription opioids. A similar interactive video may be a useful tool to educate dental professionals either in their pre-doctoral training, post-doctoral residencies or as a form of continuing education.

The findings of this study illustrate that patients with a personal or familial history of substance abuse are more likely to lend and/or borrow medications. Therefore, identification of these patients is essential for the dental community to offer proper counseling and prescribing practices tailored to their individual needs. In doing so, it is likely that fewer drugs will be diverted.

Appendix A: Demographic Data

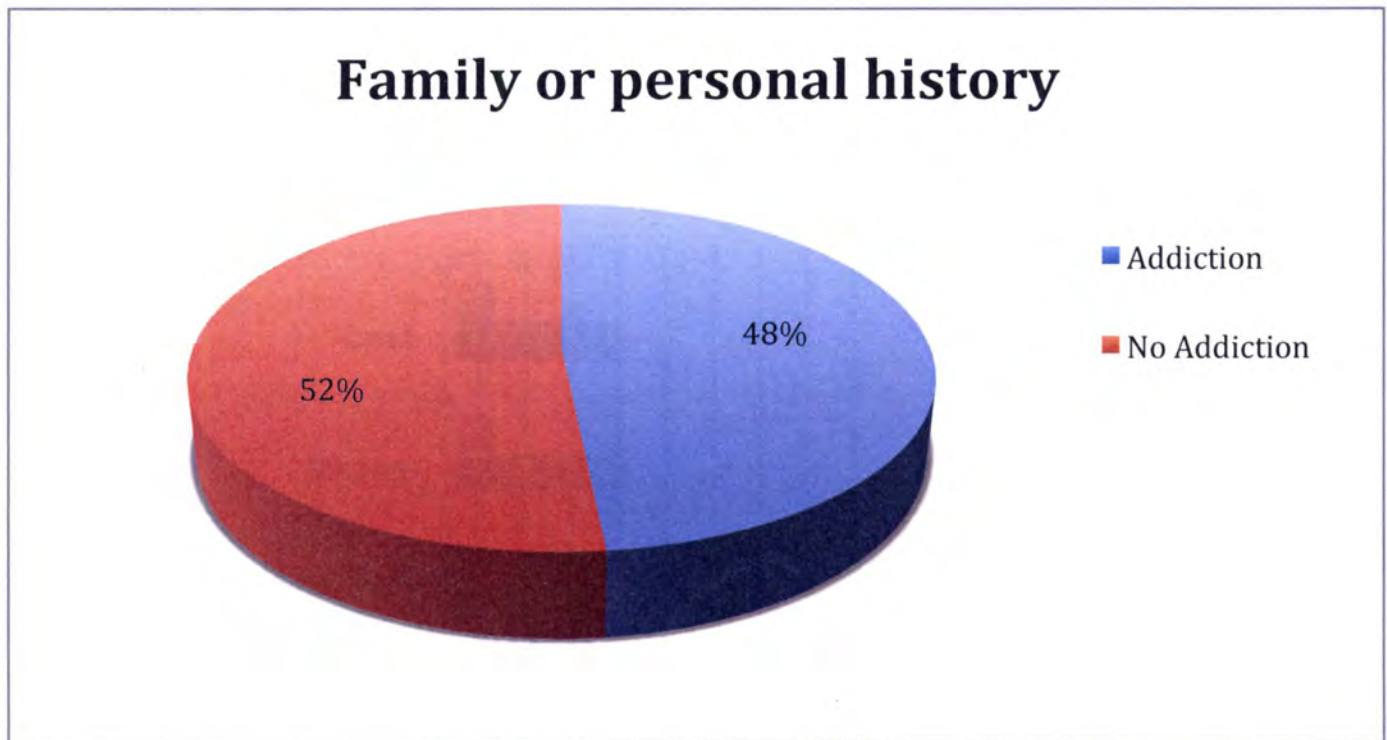
	No. (%) Dental Clinic n=30	No. (%) Pain Clinic n=32	No. (%) Total Sample n=62	p-value
Age, <i>M</i> (<i>SD</i>) ^a	57.6 (12.0)	56.0 (11.7)	56.7 (11.8)	0.6
Gender, male	16 (53.3)	15 (46.9)	31 (50.0)	0.62
Race/ethnicity ^b				
African American	5 (16.7)	7 (21.9)	12 (19.4)	
Caucasian	23(76.7)	25(78.1)	48(77.4)	
Asian	1 (3.3)	0 (0.0)	1 (1.6)	
Hispanic	1 (3.3)	0 (0.0)	1 (1.6)	
Unemployed	12 (40.0)	25 (78.1)	37 (59.7)	0.004
Family history of addiction	13 (43.3)	15 (46.9)	28 (45.2)	0.78
Personal history of addiction	2 (6.7)	5 (15.6)	7 (11.3)	0.27
Living with a person at risk ^c	2 (6.7)	4 (12.5)	6 (9.7)	0.67

^a*M*(*SD*) = Mean(Standard Deviation). Analyzed by analysis of variance. All others by χ^2 .

^bSelf-identified by patients. Assessed to examine potential differences in demographic characteristics across settings.

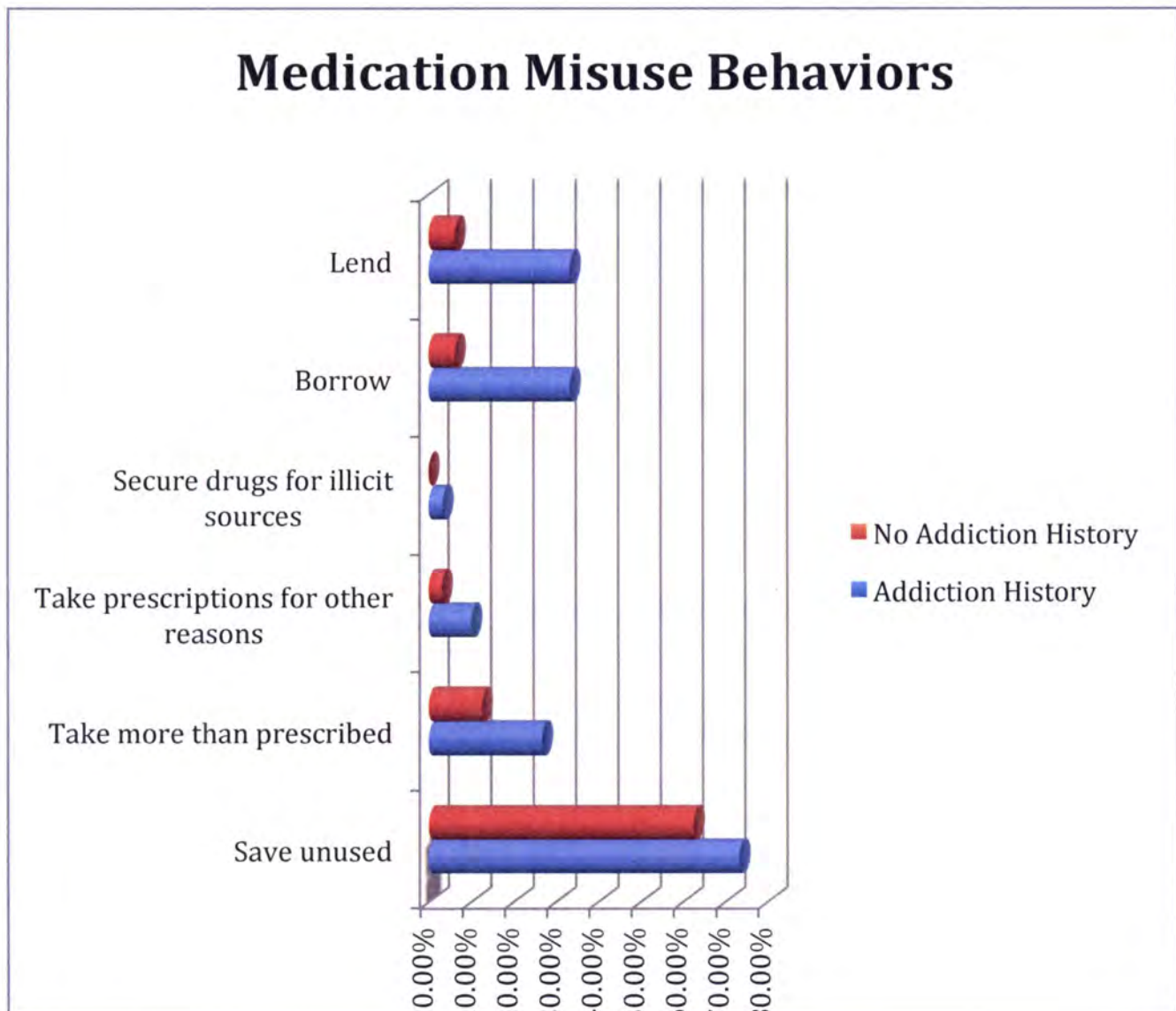
^cDefined as having a current or lifetime substance use problem.

Appendix B: Family or Personal History of Addiction



48.4% of participants reported a personal, household or family history of addiction

Appendix C: Medication Misuse Behaviors Among Participants with and without a history of addiction



Appendix D: Questions related to personal or familial history of substance abuse.

1. Has anyone in your household ever had, or do they currently have, a problem with alcohol or drug use (e.g., marijuana, cocaine, pills, etc)?

Yes

No

2. Is there a history of alcohol or drug abuse in your family, even among your grandparents, aunts, cousins or uncles?

Yes

No

3. Have you ever had a problem with alcohol or drugs (e.g., alcohol, marijuana, cocaine, pills, etc)?

Yes

No

Please check all that apply. In the past, when you have been prescribed a pill by a doctor, did you ever:

4. Lend some of your pills, even one pill, to someone else who needed it?

Yes

No

1	2	3	4	5
Once	A Few Times	Several Times	Regularly	Often

5. Borrow or take pills from someone else when you needed it?

Yes

No

1	2	3	4	5
Once	A Few Times	Several Times	Regularly	Often

6. Take *more* pills than your doctor told you to, or take the pills *more often* than your doctor told you to?

Yes

No

1	2	3	4	5
Once	A Few Times	Several Times	Regularly	Often

7. Use your pills for other reasons than what it was prescribed (e.g., to help you sleep better, to improve your mood, to relieve stress, to calm your nerves)?

Yes

No

1	2	3	4	5
Once	A Few Times	Several Times	Regularly	Often

8. Save your unused pills in case you needed them later?

Yes

No

1	2	3	4	5
Once	A Few Times	Several Times	Regularly	Often

9. Have to get pills from more than one doctor in order to have enough, or get them from non-medical sources (e.g., other than my doctor, on the street)?

Yes

No

1	2	3	4	5
Once	A Few Times	Several Times	Regularly	Often

10. Have you ever had any legal problems or been charged with driving while drunk?

Yes

No

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