Predictors of Pain Reliever Misuse Among Respondents of the United States 2017 National Survey on Drug Use and Health

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ABSTRACT: The risk factors for potential opioid misuse and abuse in patients receiving long-term opioid pain treatment have been a topic of interest in research for many years. There are differences among patients who receive long-term opioid pain treatment. These differences may or may not lead to opioid misuse. This study analyzes the different characteristics and predictors of prescription pain reliever misuse among respondents of the United States 2017 National Survey on Drug Use and Health. It examines the relationships of age, gender, income, perception of risk and availability of heroin, past substance use and alcohol use, the source of the pain relievers, and motivation to misuse pain relievers to pain reliever misuse and if these variables significantly predict pain reliever misuse. Data used in this study were analyzed through sequential multiple linear regression analyses. The significant positive predictors of prescription pain reliever misuse were being 26 or older, perceiving heroin as easily obtainable, and past methamphetamine use. The significant negative predictors of prescription pain reliever misuse were being 12 to 25 years old, perceiving heroin as a great risk, past alcohol use, and obtaining pain relievers from a friend or relative. The goal of this study was to increase the amount of knowledge regarding predictors of prescription opioid misuse to identify those who are at risk and decrease prescription opioid misuse and overdose rates in the United States.

KEYWORDS: Predictors, pain relievers, opioids, misuse, addiction

Introduction

The American opioid epidemic began in the late 1990s and rapidly became a state of emergency. In 2015, the United States declared an opioid crisis when opioid overdose rates significantly increased. Since 1999, heroin, fentanyl, and prescription opioid overdoses increased by more than 8 times.[1] From 1999 to 2017, 399 230 Americans died from an opioid overdose.[2] Although recent policies and programs such as the Prescription Drug Abuse Prevention Plan, the Food and Drug Administration risk evaluation and mitigation strategy, the 2017 Department of Health and Human Services five-point Opioid Strategy, and prescription drug monitoring programs have been implemented, America is currently facing devastating ramifications of opioid addiction. The prevalence of pain reliever misuse is higher than it has ever been and continues to escalate. Among people aged 12 or older in the United States, 3.3 million were currently misusing prescription pain relievers.[3] The increase in mortality rates is a tragic consequence of pain reliever misuse. On average, there are 130 opioid deaths a day in the United States.[4] The nation has also experienced an increase in the number of infants born with neonatal abstinence syndrome.[5] Lastly, there is potential for the spread of infectious disease through intravenous drug use. These negative effects have placed a significant and costly burden on our nation. This crisis impacts the health care system, workplaces, families, and communities. According to the Surgeon General's Spotlight on Opioids, the opioid crisis cost $504 billion dollars a year in 2015.[6]

In attempts to curtail opioid misuse, many researchers have studied the characteristics and predictors of prescription pain reliever misuse. Most of the research is discussed in the context of chronic opioid therapy. In reviewing the literature, past use of illicit drugs and a history of alcohol and/or substance use disorder appear to be the most reported significant predictors of prescription pain reliever misuse.[7-15] After analysis of data from the 2011 to 2012 National Survey on Drug Use and Health (NSDUH), it was concluded that past-year illicit drug use disorders were a significant predictor of pain reliever misuse.[12] Measures of socioeconomic status, race, gender, disability, and literacy were not associated with misuse.[8] In a more recent study, adults aged 18 to 49 years had a lower prevalence of prescription opioid use than older adults aged 50+.[16] The perceptions of risk and availability of substances, in particular heroin, may play a role in opioid misuse. The perception of risk, or the uncertainty of outcomes could lead patients to try new drugs regardless of the potential of addiction. Chronic pain patients' willingness to try new, addictive pain medication are associated with higher risk of opioid misuse.[17] Among those who misused pain relievers, individuals were more likely to report that heroin is easily obtainable.[18]

Common sources of pain relievers come from a doctor's prescription, friends, or family, and drug dealers. In 2015, 40.8% of adults who reported misusing pain relievers in the United States obtained prescription opioids free from friends or relatives for their most recent misuse; whereas, it was reported that the friends or relatives obtained the pain relievers from a doctor.[16] Widespread social availability suggests that prescription opioids are being dispensed in excessive amounts.[16] Most low-risk nonmedical individuals who misused opioid pain relievers obtained opioid pain relievers from friends and relatives yet

high-risk nonmedical individuals who misused opioid pain relievers were most likely to obtain opioid pain relievers from a physician's prescription or from a drug dealer.[19] In 2015, 63.4% of adults who reported misusing pain relievers in the United states reported that the motivation of their most recent misuse of pain relievers was to relieve physical pain.[16] To our knowledge, past research has not examined if sources of pain relievers and motivation to misuse pain relievers are predictors of pain reliever misuse. The results of this current study will be useful in identifying previously researched predictors of pain reliever misuse and contribute new findings in determining whether new added variables such as, source of pain relievers and motivation for misusing pain relievers, explain a significant amount of variance in pain reliever misuse.

Methods

Data were obtained from the National Survey on Drug Use and Health (NSDUH). The Substance Abuse and Mental Health Services Administration conducts the NSDUH annually to collect data on the use of tobacco, alcohol, illicit drugs, and mental health issues among civilian, noninstitutionalized population of the United States aged 12 and older, including residents of noninstitutionalized group quarters such as dormitories, group homes, shelters, rooming houses, and civilians living on military installations.[20] The survey tracks trends in specific substance use, addiction, prescription drugs, mental health, physical health, social environment, and employment.[20] More information on the NSDUH can be found on the SAMHSA data website.[20]

Survey items and responses used in this study are provided in Table 1.

Misuse of pain relievers was defined as use in any way a doctor did not direct you to use it/them.[3] Examples of use in any way a doctor did not direct respondents to use prescription drugs included (1) use without a prescription of the respondent's own; (2) use in greater amounts, more often, or longer than told to take a medication; or (3) use in any other way that was not directed by a doctor.[3]

Data were weighted to the United States population by SAMHSA.[21] Variables were collapsed and dummy coded prior to preliminary analysis. Race was not a significant predictor of pain reliever misuse. One effect of placing insignificant predictors in the model is on the p-values, it occupies degrees of freedom which does not aid interpretation. Models get clustered and it is challenging to interpret the results. It is necessary to eliminate effects that are not serving a purpose; therefore, race, education, and region were not entered into the regression model. Sequential multiple linear regression analyses were utilized to examine predictors of pain reliever misuse for the following research questions: (1) Among all people ages 12 or older in 2017 do differences exist among gender and age, on average, in terms of the number of days of prescription pain reliever misuse? (2) How is income associated with increased

pain reliever misuse? (3) Is the perception of risk of heroin use and availability of heroin related to pain reliever misuse? (4) Do differences exist among those who use heroin, methamphetamine, cocaine, marijuana, and alcohol, on average, in terms of the number of days of pain reliever misuse? (5) How is the source of pain relievers related to pain reliever misuse, beyond the effects of age, gender, income level, perception of heroin, and past substance use? (6) How is motivation to misuse pain relievers related to pain reliever misuse?

Block 1 included age and gender. Dummy variables compared ages 12 to 17 and ages 18 to 25, respectively to ages 26+. A dummy variable compared male to female. Additional characteristics of people aged 12 or older were entered as blocks; each block's contribution tested beyond preceding blocks. Block 2 included income. Block 3 included perception of the risk and availability of heroin. Block 4 consisted of use of other substances. Block 5 consisted of source of pain reliever. Block 6 included motivation of pain reliever misuse.

Results

Frequencies and percentages for demographic characteristics of pain reliever misuse respondents are provided in Table 2.

Intercorrelations for pain reliever misuse are presented in Table 3. The strongest correlate of pain reliever misuse, of all variables studied, was the perception that heroin is easily obtainable. Past use of heroin use was significantly correlated with pain reliever misuse, as well as, methamphetamine use, alcohol use, and getting pain relievers from a friend or relative. Age was significantly correlated with pain reliever misuse. The age group 26 or older was positively correlated with pain reliever misuse. The age groups of 12 to 17 and 18 to 25 were negatively correlated with pain reliever misuse. The multivariate analyses examined these relationships in greater depth.

Table 4 presents the zero-order relations between the predictors and the level of pain reliever misuse and the results of the sequential linear regression analysis. The order of entering the variables into the regression was selected to show if variables of interest, source of pain reliever and motivation of misuse, explained a statistically significant amount of variance in the dependent variable number of days of pain reliever misuse after accounting for all other variables. The zero-order correlations show that age, perception that heroin is easily obtainable, past year heroin use, past year methamphetamine use, alcohol use, and a friend/relative as a source of pain reliever correlated significantly with pain reliever misuse.

Overall, Model 1 was significant. Age and gender accounted for 3% of the variance in pain reliever misuse. There was a significant effect of age on pain reliever misuse. This is a small effect, with ages 12 to 17 misusing pain relievers at lower levels than ages 18 to 25 and age 26 and older. There was a significant difference between age 12 and 17 and age 26 or older on average number of days of pain reliever misuse among respondents 12 or older. There is a significant difference between age 18

Table 1. Survey items and responses.

SURVEY ITEMS	RESPONSES
Demographics	
Age at time of interview	1 = 12-17
	2 = 18-25
	3 = 26 or older
Gender	1 = male
	0 = female
Income	1 = less than $20 000
	2 = $20 000-$49 999
	3 = $50 000-$74 999
	4 = $75 000 or more
Perceived risk and availability of heroin	
Is there a great risk in trying heroine once or twice?	1 = great risk
	0 = not a great risk
Is heroin fairly or very easy to obtain?	1 = fairly or very easy
	0 = not fairly or very easy
Other substance use	
Did you use heroin in the past year?	1 = yes
	0 = no
Did you use methamphetamine in the past year?	1 = yes
	0 = no
Did you use cocaine in the past year?	1 = yes
	0 = no
Did you use marijuana in the past year?	1 = yes
	0 = no
Did you use alcohol in the past year?	1 = yes
	0 = no
Sources of pain relievers	
How did you obtain the last prescription psychotherapeutic drug (pain relievers, tranquilizers, stimulants, and sedatives) you misused?	1 = prescription from doctor or stole from doctor/health care provider
	2 = given by, bought from, or took from a friend or relative
	3 = got from another source (includes bought form a drug dealer or stranger and got in some other way)
Main reasons for misusing pain relievers	
What was the main reason for misusing pain relievers during the last episode of pain reliever misuse?	1 = physical pain
	2 = relax/relieve tension
	3 = feel good or get high
	4 = help with feelings or emotions
	5 = other (includes: experiment/see what it is like, help with sleep, increase/decrease other drugs, hooked or have to have the drug, and some other reason)
Pain reliever misuse	
How many times did you misuse pain relievers in the past month?	1 = 1-2 days
	2 = 3-5 days
	3 = 6-19 days
	4 = 20-30 days

These responses represent the variables prior to dummy coding.

Table 2. Frequencies and percentages for demographic characteristics of pain reliever misuse respondents.

VARIABLE	N	%
Age		
12-17 year old	134	17
18-25 year old	269	34.1
26 or older	387	49
Gender		
Male	405	51.3
Female	385	48.7
Race		
White	479	60.6
Black	105	13.3
Hispanic	133	16.8
Multiracial	38	4.8
American Indian or Native American, Asian, Native Hawaiian, and/or Pacific Islander	35	4.4
County metro/nonmetro status		
Large metro	331	41.9
Small metro	290	36.7
Nonmetro	169	21.4
Education		
Less than high school	91	11.5
High school graduate	211	26.7
Some college/associates degree	266	33.7
College graduate	88	11.1
12-17 year old (still in school)	134	17.0
Income		
Less than $20 000	207	26.2
$20 000-$49 999	273	34.6
$50 000-$74 999	119	15.1
$75 000 or More	191	24.2
Perceived risk of heroin*		
No risk	168	21.3
Great risk	610	77.2
Availability of heroin*		
Not easily obtainable	530	67.1
Easily obtainable	239	30.1
Past substance use		
Used heroin in the past year	72	9.1
Did not use heroin in the past year	718	90.9
Used methamphetamine in the past year	79	10
Did not use methamphetamine in the past year	711	90

(continued)

Table 2. (continued)

VARIABLE	N	%
Used cocaine in the past year	166	21
Did not use cocaine in the past year	624	79
Used marijuana in the past year	505	63.9
Did not use marijuana in the past year	285	36.1
Drank alcohol in the past year	658	83.3
Did not drink alcohol in the past year	132	16.7
Sources of pain relievers*		
Prescription from a doctor or stole from a health care provider	177	22.4
Given by, brought from, or took form a friend or relative	432	54.7
Got from another source (includes bought from a drug dealer or stranger and some other way)	123	15.6
Main reasons for misusing pain relievers*		
Relieve physical pain	409	51.8
Relax/relieve tension	76	9.6
Feel good or get high	139	17.6
Help with feelings or emotions	51	6.5
Other (includes experiment, help with sleep, increase/decrease other drugs, hooked)	97	12.3
Pain reliever misuse		
Number of days of pain reliever misuse in the past month		
1-2 days	345	43.7
3-5 days	186	23.5
6-19 days	162	20.5
20-30 days	97	12.3

*Variables have missing data.

and 25 and age 26 older. This is a small effect, with ages 18 to 25 misusing pain relievers at lower levels than age 26 or older. As age increases after the age of 26, the level of pain reliever misuse increases. There was not a significant effect of gender on levels of pain reliever misuse.

The second block of sequential multiple linear regression was used to determine whether income predicted level of pain reliever misuse. Multiple regression was also used to examine the effect of each income level while controlling for age and gender. Overall, Model 2 was not significant in predicting level of pain reliever misuse. Model 2 did not account for any variance in pain reliever misuse. Income was not found to be associated with increased pain reliever misuse.

The third block of the sequential multiple linear regression was used to determine whether perception of risk of heroin use and availability of heroin together, predicted level of pain reliever misuse. Overall, Model 3 was significant. Model 3

Table 3. Intercorrelations for pain reliever misuse.

VARIABLE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Age 12-17[a]	—																			
2. Age 18-25[b]	-.33***	—																		
3. Gender[c]	-.05		—																	
Income																				
4. Less than $20000[d]	-.09**	.11***	-.08*	—																
5. $20000-$49999[e]	-.00	.03	-.02	-.43***	—															
6. $50000-$74999[f]	.02	-.06	.04	-.25***	-.31***	—														
Perceived risk and availability																				
7. Heroin great risk	-.16***	-.02	-.04	-.01	-.00	.03	—													
8. Heroin easy to obtain	-.12***	.09**	.01	.05	.03	-.06*	-.03	—												
Past substance use																				
9. Heroin use	-.10**	.00	.10***	.02	.06	-.06*	-.04	.42***	—											
10. Methamphetamine use	-.03	.02	.06	.09**	.02	-.05	-.08**	.20***	.32***	—										
11. Cocaine use	-.11***	.19***	.09**	-.00	-.01	-.01	-.04	.19***	.27***	.16***	—									
12. Marijuana use	-.03	.20***	.07*	.04	-.04	-.04	-.02	.13***	.13***	.15***	.29***	—								
13. Alcohol use	-.13***	.14***	.03	-.10**	.03	.07*	.07*	.02	.00	.04	.15***	.34***	—							
Source of pain relievers																				
14. Got from a doctor[g]	-.06*	-.07*	-.06*	.02	-.03	-.01	.04**	-.10	-.10**	-.12**	-.17***	-.24***	-.20***	—						
15. Got from a friend/relative[h]	-.04	.02	-.01	-.08**	-.00	.03	.01	-.03	-.00	.05	.09**	.15***	.21***	-.60***	—					
Motivation to misuse																				
16. Physical pain[i]	-.14***	-.14***	-.05	-.10	.05	.06	.09**	-.10	-.13***	-.13***	-.19***	-.24***	-.03	.16***	-.06*	—				
17. Relax/relieve tension[j]	.00	.08**	-.01	.02	-.02	.01	.00	-.02	-.01	-.02	.06*	.09**	.03	-.07*	.06*	-.34***	—			
18. Feel good or get high[k]	.11***	.05	.09**	.07*	-.11**	.04	-.05	.05	.03	.06	.14***	.14***	.09**	-.19***	.13***	-.48***	-.15***	—		
19. Help with emotions[l]	.07*	.04	-.00	.01	.02	-.01	-.05	-.03	-.01	.14***	.05	.09**	.05	.01	-.01	-.27***	-.09**	-.12***	—	
20. Pain reliever misuse	-.14***	-.07*	.02	.04	.02	-.02	-.05	.23***	.19***	.15***	.03	-.04	-.11***	.05	.11***	-.04	-.00	-.04	.04	—

Pain reliever misuse is a continuous variable categorized into 4 levels: low, moderate, high, very high misuse.

a: 0=age 18+; 1=age 12 to 17.
b: 0=age 12 to 17; 0=age 26+; 1=age 18 to 25.
c: 0=female; 1=male.
d: 0=$20000+; 1=less than $20000.
e: 0=less than $20000; 0=$50000-$49999; 1=$20000-$49999.
f: 0=less than $50000; 1=$50000-$74999.
g: 0=got from friend/relative; 0=other; 1=got from doctor.
h: 0=other; 0=got from doctor; 1=got from friend/relative.
i: 0=relax/relieve tension; 0=feel good or get high; 0=help with feelings or emotions, 0=other; 1=physical pain.
j: 0=feel good or get high; 0=help with feelings or emotions, 0=other; 0=physical pain; 1=relax/relieve tension.
k: 0=help with feelings or emotions, 0=other; 0=physical pain; 0=relax/relieve tension; 1=feel good or get high.
l: 0=other; 0=physical pain; 0=relax/relieve tension; 0=feel good or get high; 1=help with feelings or emotions.
*$P \leq .05$. **$P \leq .01$. ***$P \leq .001$.

Table 4. Standardized regression coefficients predicting pain reliever misuse.

PREDICTOR VARIABLE	R	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5	MODEL 6
Age (26 or older)							
Age 12-17	−0.14***	−0.18***	−0.18	−0.17***	−0.18***	−0.19***	−0.20***
Age 18-25	−0.07*	−0.13***	−0.14	−0.15***	−0.14***	−0.14***	−0.15***
Gender	0.02	0.01	0.01	0.01	−0.01	−0.01	−0.01
Income							
Less than $20 000	0.04		0.06	0.05	0.02	0.01	0.01
$20 000-$49 999	0.02		0.05	0.04	0.03	0.02	0.02
$50 000-$74 999	−0.02		0.01	0.02	0.03	0.02	0.03
Perceived risk and availability							
Heroin great risk	−0.05			−0.07*	−.06	−.06	−.05
Heroin easy to obtain	0.23***			0.22***	0.17***	0.16***	0.16***
Past substance use							
Heroin use	0.19***				0.07	0.06	0.06
Methamphetamine use	0.15***				0.09**	0.10**	0.09*
Cocaine use	0.03				−0.03	−0.02	−0.03
Marijuana use	−0.04				0.07	0.08	0.07
Alcohol use	−0.11***				−0.14***	−0.12***	−0.12**
Source of pain relievers							
Got from a doctor	0.05					−0.01	−0.01
Got from a friend/relative	−0.11***					−0.10*	−0.10*
Motivation to misuse							
Physical pain	−0.04						−0.06
Relax/relieve tension	−0.00						−0.00
Feel good or get high	−0.04						−0.04
Help with emotions	0.04						0.03
Total R^2		0.03***	0.04***	0.09***	0.12***	0.13***	0.13***
ΔR^2		0.03***	0.00	0.05***	0.03***	0.01*	0.01

Reference category in parentheses.
*$P \leqslant .05$. **$P \leqslant .01$. ***$P \leqslant .001$.

accounted for 9% of the variance of pain reliever misuse and 5% of the variance was due to perceived risk and availability. There was a significant effect of perception of risk of trying heroin on level of pain reliever misuse. This was a small effect, with respondents who reported perceiving heroin as a great risk misused pain relievers at a lower level than those who perceived tying heroin as not a risk. There was a significant effect of perception of heroin being easily obtainable on level of pain relieve misuse. As respondents reported perceiving heroin as easily obtainable, levels of pain reliever misuse increased. There was a significant positive correlation between perception of heroin being easily obtainable and level of pain reliever misuse. The perception that heroin is easily obtainable appeared to be most important in predicting level of pain reliever misuse while controlling for demographics and income.

The fourth block of sequential multiple linear regression was used to analyze past substance use as a predictor of level of pain reliever misuse. Overall, Model 4 was significant. Model 4

accounted for 12% of the variance; 3% of the variance was due to past substance use. There was not a significant effect of past heroin use on pain reliever misuse. Past heroin use was not a significant predictor of pain reliever misuse. There was a significant effect of past methamphetamine use on pain reliever misuse. Respondents who self-reported using methamphetamine in the past year had higher levels of pain reliever misuse than respondents who did not report using methamphetamine in the past year. There was not a significant effect of past cocaine use on pain reliever misuse. There was not a significant difference between those who used cocaine in the past year and those who did not use cocaine in the past year on average. There was not a significant effect of past marijuana use on pain reliever misuse. There was not a significant difference between those who used marijuana in the past year and those who did not use marijuana in the past year on average level of pain reliever misuse among respondents.

There was a significant effect of past alcohol use on pain reliever misuse. Respondents who self-reported using alcohol in the past year had lower levels of pain reliever misuse than respondents who did not report using alcohol in the past year. Past year methamphetamine use, and past year alcohol use were significant predictors of level of pain reliever misuse. Past year heroin, cocaine, and marijuana use were not significant predictors of pain reliever misuse. According to the simple correlations, past heroin use was positively correlated with pain reliever misuse. Past methamphetamine use was positively correlated with past pain reliever misuse. Past cocaine use was not significantly correlated with pain reliever misuse. Past marijuana use was not significantly correlated with pain reliever misuse. Past alcohol use was negatively correlated with pain reliever misuse.

Overall, Model 5 was significant. Model 5 accounted for 13% of the variance; 1% of the variance was due to the source of pain reliever. Getting pain relievers from a doctor or health care provider was not a statistically significant predictor of level of pain relieve misuse. There was a significant negative effect of getting pain relievers from a friend and/or relative on level of pain reliever misuse. Those who got pain relievers from a friend and/or relative reported lower levels of pain reliever misuse than those who got it from a doctor, drug dealer, and/or stranger. According to the simple correlations, getting pain relievers from a doctor or health care provider was not significantly correlated with pain reliever misuse. The source of pain relievers, got from a friend and/or relative, was negatively correlated with pain reliever misuse.

Overall, Model 6 was not significant in predicting pain reliever misuse. There was no significant effect of motivation to use pain relievers on pain relievers among NSDUH respondents. The following motivations were specified to use pain relievers: to relieve physical pain, relax/relieve tension, feel good, or get high, help with feelings/emotions and all other reasons were not significant predictors of pain reliever misuse

after controlling for the other variables in the model. According to the simple correlations, motivations to misuse were not correlated to pain reliever misuse.

The significant positive predictors of prescription pain reliever misuse were being 26 or older, perceiving heroin as easily obtainable, and past methamphetamine use. The significant negative predictors of prescription pain reliever misuse were being 12 to 25 years old, perceiving heroin as a risk, past alcohol use, and obtaining pain relievers from a friend or relative. Gender, income, and motivation to misuse were not significant predictors of pain reliever misuse.

Discussion

The findings in this study are consistent with past research that reports past substance and alcohol use were significant predictors of pain reliever misuse.[7-15] However, this study looked at different substances used and found that past methamphetamine use was a significant positive predictor and alcohol use was a significant negative predictor. Remarkably, past heroin use, cocaine use, and marijuana use were not significant predictors of pain reliver misuse.

The findings in this study are consistent with past research that reports measures of socioeconomic status, gender, and race were not associated with misuse.[8]

These findings are inconsistent with findings from past research that noted adults aged 18 to 49 years had a lower prevalence of prescription opioid use than older adults aged 50+.[16] This inconsistency may be due to the fact that the current study measured age in smaller increments. Both findings suggest that there was a lower prevalence of pain reliever misuse in younger adults than older adults. This study provides an important extension on past research by examining the cut off age, age 26, for the direction of effect on pain reliever misuse.

In this study, there was a significant effect of perception of risk of trying heroin on pain relieve misuse. This was a small effect, with respondents who reported perceived trying heroin as a great risk misusing pain relievers at a lower level than those who perceived tying heroin as not a risk.

As expected, the findings demonstrate that the perception of heroin being easily obtainable was significantly positively correlated with pain reliever misuse.[18] Perception that heroin is easily obtainable appeared to be most important variable in predicting pain reliever misuse while controlling for demographics and income. This finding expands on previous research[18] by evaluating the perception that heroin is easily obtainable as a predictor variable of pain reliever misuse. In this study, 54.7% percent of all respondents who misused pain relievers 12 years or older obtained prescription opioids free from friends or relatives for their most recent misuse. Obtaining prescription opioids free from friends or relatives is a significant negative predictor of pain reliever misuse. These results extend on past research by reporting that getting pain relievers

from a doctor, drug dealer, or other source besides friends or relatives does not significantly predict pain reliever misuse.

Consistent with past research,[16] respondents of the NSDUH reported that to relieve physical pain was the main reason for their last misuse. The results of this study reveal that motivation is not a statistically significant predictor of pain relieve misuse.

Reanalyzing existing data is a strength of this study as it allows researchers to replicate the analysis and generate new insights. The strength of the NSDUH is that it is a reliable source of data when assessing pain reliever misuse. The NSDUH is a representative sample of the United States due to the large number of respondents (sample size of 56 000).[20]

However, limitations of the NSDUH are the exclusion of homeless and institutionalized populations, response bias due to the use of self-report data, variables were not tightly defined, and pain reliever misuse did not consider mass or volume. Limitations of the research design are that the sample used were selected cases of respondents who only misused pain relievers, 13% of the variance was accounted for, and the use of multiple models in a large regression equation may have reduced the ability to detect significant relationships if they existed.

Conclusions

Our findings revealed that age, perception of heroin, past substance and use, and source of pain relievers are significantly correlated with pain reliever misuse, yet differences existed among each group. The positive predictors of pain reliever misuse were being 26 or older, perceiving heroin as easily obtainable, and past methamphetamine use. The negative predictors of pain reliever misuse were being 12 to 25 years old, perceiving heroin as a risk, past alcohol use, and obtaining pain relievers from a friend or relative.

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Author Contributions

MSM contributed to the study conception and design, analysis and interpretation of results. MSM and TPJ contributed to the draft manuscript preparation. All authors reviewed the results and approved the final version of the manuscript.

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