

# Quantitative Survey on Prevalence of Prescription Pain Medications and Stimulants Use in Young Adults

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## ABSTRACT

**BACKGROUND:** Prescription drug use including pain relievers and stimulants has been a growing problem in young adults and the issue has been a public health concern for years.

**METHODS:** This Quantitative Cross-sectional study aimed to collect preliminary data regarding prescription opioid use, prescription stimulant drug use and overdose treatment knowledge in young adults between 18 and 24 years old in a southern New Jersey university through administering an online survey.

**RESULTS:** Of the 1663 students who completed the survey, 33% reported using prescription pain relievers and 15% reported using prescription stimulant drugs. Stimulant drug users were found to be more likely to use prescription pain relievers (49%) as compared to non-stimulant users (30%). Furthermore, students with overdose treatment knowledge of opioids were more likely to report misuse of prescription drugs (15%) than students with less knowledge (8%).

**CONCLUSIONS:** This study reiterates the increasing usage of prescription drugs and stimulant use among college students. There is a need for effective education strategies to inform students about the prescription medication uses and misuse to reduce nonmedical use of prescription medications.

**KEYWORDS:** Drug use, stimulant use, prescription drugs, young adults

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## Introduction

According to the National Institute on Drug Abuse (NIDA) and Substance Abuse and Mental Health Services Administration (SAMHSA), the misuse of prescription medications is the fastest growing drug problem in the United States of America (USA). While it is a problem which affects all age groups, it is most prominent among 18 to 25 years, with 14.4% of this group reporting nonmedical use in the past year.<sup>1</sup> The 2019 National Survey reported that the 2 most misused prescription medications among young adults aged 18 to 25, are prescription pain relievers and stimulants.<sup>2</sup> Previous studies have also reported the risk of adverse interactions with the central nervous system depressants, for overdose and for addiction.<sup>3</sup> All this evidence points toward the urgency to assess and create effective strategies in educating and preventing the misuse of these drugs.

When used inappropriately, prescription medications can have a range of negative consequences on short- and long-term health depending on the usage.<sup>4</sup> A study on adolescent brain development suggests that the human brain is still maturing during adolescence and this neurodevelopment may promote risk-taking and novelty seeking.<sup>5,6</sup> The misuse of prescription pain medication poses a great concern given the addictive and overdose risks of opioids.<sup>7</sup> In a study done in 2016 reported

that “four in five new heroin users started out misusing prescription pain relievers” and “roughly 21 to 29 percent prescribed opioids for chronic pain misuse them.”<sup>8</sup>

Opioids were involved in an estimated 100 306 drug overdose deaths in the United States during 12-month period ending in April 2021, an increase of 28.5% from the 78 056 deaths during the same period the year before. Deaths due to psychostimulants also increasing from 16 617 in 2019 to 32 856 in 2021. Considering these mortality rates and scientific reasoning, the need to act to reduce prescription opioid misuse and stimulant misuse is particularly urgent.<sup>9</sup>

When opioids attach to the receptors located in areas of brain and other organs, they block pain signals sent from the brain to the body and release large amounts of dopamine throughout the body.<sup>2</sup> This release of dopamine can induce a sense of euphoria which can strongly reinforce the desire to take the drug again.

Stimulants are a class of psychoactive drugs that block the reuptake of dopamine, norepinephrine, and serotonin in the synapses of the central nervous system (CNS).<sup>10</sup>

Stimulants are frequently prescribed to children and adults for the treatment of behavioral and attention disorders which may be a relevant factor for misuse.<sup>11</sup> The percentages young adults who were prescribed a stimulant on at least one occasion



by a psychiatrist was 10.1% in young adults (19–25 years)<sup>12</sup> and another study done in a single cohort reported 34.4% and 41.4% used prescription stimulants.<sup>13</sup>

### *Misuse of pain relievers and stimulants*

Adolescents are “biologically wired” to seek new experiences and take risks, as well as to carve out their own identities.<sup>2</sup> Additional reasons for illicit drug use and prescription misuse include an attempt to deal with problems, to conform to peer-pressure and to perform better in school.<sup>14</sup> Past studies have reported that use of prescription and non-prescription stimulants (NPS) among adolescents and young adults is motivated by the perceived benefits in improving concentration and study ability to bolster academic achievement.<sup>15</sup>

### *Perception of prescription drug safety and knowledge of risks of misuse*

Ease of access to prescription medications and the belief that they are less harmful than illicit drugs have been identified as likely factors in prescription medication misuse in previous reports by SAMHSA. Furthermore, while knowledge about the dangers of misuse might reasonably be expected to deter it, young adults may be less aware or discerning about the dangers of prescription medication misuse due to cognitive development processes.<sup>4</sup> Thus, limited judgment and decision-making skills in young adults may affect their ability to weigh risks accurately and make sound decisions regarding medication use and misuse.<sup>16</sup>

While reports from the NIDA and SAMHSA provide national and state specific information about the problem, effective prevention begins with an assessment of the problem at a local level. Therefore, an essential first step in prevention efforts at the local level is an assessment of the local conditions and needs of the student population.

### *The present research*

The National Institute on Drug Abuse has recommended the collection of more detailed information on the use and misuse of a comprehensive set of prescription drugs for policy and research purposes National Institute on Drug Abuse (NIDA).<sup>17</sup> To that end, this study was undertaken to obtain a data-driven understanding of the conditions at a mid-size suburban public university in southern New Jersey. A predominantly Caucasian student population and undergraduates with residential and commuter students were surveyed for this study. The objectives of this study were to assess student use and misuse of prescription medications as well as their overdose treatment knowledge about opioids, a drug often in the news due to its misuse on a national level. Specifically, the following research questions were posed:

RQ1. What percentages of students use prescription pain relievers and/or stimulants? Is there any association between prescription stimulant medication use and pain reliever medication use in students?

RQ2. Is there an association between the rate of prescription medication misuse and year of study in college?

RQ3. What is the knowledge of opioids and overdose treatment (who understood Fentanyl and Heroin are opioids and knew that Narcan help reverse an opioid overdose) level of drugs among students? What is the association between knowledge level and misuse of prescription medications?

## **Methods**

The study was approved by University’s Institutional Review Board and a consent form was provided to participants at the start of the survey questionnaire. This was a pilot cross-sectional study to assess drug use from the local demographics as the data is lacking for this population of students in South Jersey.

### *Research instrument*

The online questionnaire included 30 questions and the survey was created using Qualtrics. The demographic variables in the survey included age, gender, year in college (freshman, sophomore, junior, senior, graduates), race and ethnicity. The survey also included questions on nonprescription/over-the-counter drug use, use of prescription medications, and basic knowledge questions about drug use in younger adults.

Prescription drug usage was defined as the use of a drug that requires a prescription to use it legally. For this study, prescription drug misuse was defined as having taken a drug in the last 12 months that was not prescribed to them.

Knowledge of drug overdose, treatment (Fentanyl and Narcan), and their effects was measured. Perception and awareness were also observed based on the accuracy of information, safe usage, and the need to educate young adults about drug use and misuse based on the information provided by students. The questionnaire was pretested by 10 individuals randomly chosen within 18 to 24 years of age. The questionnaire was modified to include other drugs as an option in the drug names question after pretest.

### *Data analysis*

To answer RQ1, we examined what percentage of college students used pain relievers and/or stimulants. For RQ1, RQ2, and RQ3, Chi-Squared tests were performed, for example, to determine: (1) If there is an association between stimulant drug use and painkiller drug use in students, (2) If there is a difference in prescription drug misuse between class years in college, and (3) If there is an association between perceived knowledge

and drug misuse. For RQ3, to quantify the knowledge level of drugs among college students (specifically for Fentanyl and Heroin as opioids and knowing that Narcan can help reverse an opioid overdose) was recorded as a dichotomous variable. Microsoft Excel and SAS, version 9.3 (SAS Institute Inc., Cary, NC, USA) were used in the data analysis at  $<.05$  level.

## Results

### Participant information

The participants were students between 18 and 24 years of age, who were registered for the 2018 fall semester. Of the 7956 students enrolled in Fall 2018 semester, 1893 responses were received and after removing incomplete responses, there were 1663 (response rate: 21%) completed surveys and included in the analysis. The survey was done in a predominantly undergraduate Public University located in a sub urban setting of South Jersey. Most survey participants were female (72%), and the majority identified themselves as white (74%). The gender and racial profile of the survey participants reflects the university student population between 18 and 24 years of age (eg, female: 59%, white: 69%). The survey respondents are a representative sample of the University student population. The participants' demographic characteristics are summarized in Table 1.

*RQ1: Pain reliever use and stimulant use.* Figure 1 shows the summary of main medications used in the class of drugs (prescription pain relievers) reported by student. Reported usage of Oxycodone/Oxycontin was more than other drugs in the same class of drugs.

Figure 2 shows the summary of main medications used in the class of drugs (prescription stimulants) reported by students. Reported usage of Amphetamine and Dextroamphetamine was reported higher for this class of drugs.

Table 2 shows that 546 students (33% of the sample) used prescription opioid pain relievers in the past year, with Oxycodone being most used. Prescription stimulant medications were used by 251 students (15% of the sample) with the combination of Amphetamine and Dextroamphetamine the most used.

As shown in Table 3, prescription stimulant users were significantly more likely to use prescription pain relievers (49%) as compared to non-stimulant users (30%,  $X^2 = 35.10$ ,  $P < .0001$ ).

*RQ2: Is there an association between year in college and prescription drug misuse?* As shown in Table 4, with additional years in college, prescription medication misuse (having taken prescription drugs not prescribed to them in the previous 12 months) increased among the undergraduate students  $X^2 = 10.90$ ,  $P = .01$ . On the other hand, only 8 graduate student participants (9% of all graduate participants) reported misusing prescription drugs.

*RQ3: Knowledge of overdose drugs and misuse of prescription medications.* As shown in Table 5, students with a broader opioid

**Table 1.** Sample demographics.

DEMOGRAPHIC CHARACTERISTICS	FREQUENCY (N)	PERCENTAGE (%)
Gender		
Female	1202	72
Male	452	27
Age		
18	393	24
19	311	19
20	300	18
21	286	17
22	169	10
23	108	6
24	96	6
Ethnicity		
European American or White	1202	72
Others	412	25
Class standing		
Freshman	442	27
Sophomore	327	20
Junior	395	24
Senior	411	25
Graduate students	88	5

knowledge (who understood Fentanyl and Heroin are opioids and knew that Naloxone can help reverse an opioid overdose) were more likely to report the misuse of prescription medications (as having taken prescription drugs not prescribed to them in the past 12 months),  $X^2 = 19.50$ ,  $P < .0001$ .

## Discussion

This paper reports the results of a self-reported questionnaire study exploring college students' use of prescription opioid pain relievers and stimulants, misuse of prescription medication, and opioid drug overdose knowledge.

### Prescription pain reliever use in youth

Findings from this study showed that 33% of the participating college students (18-24 years of age) had used prescription opioid pain relievers of which Oxycodone was the most used in the past. In a retrospective analysis done in 2015 to 2016 using NSDUH data, the prevalence of opioid misuse among those without a drug use disorder was higher in 18 to 25 years (32%) compared to 12 to 17 years (21%).<sup>18</sup> A survey analysis of

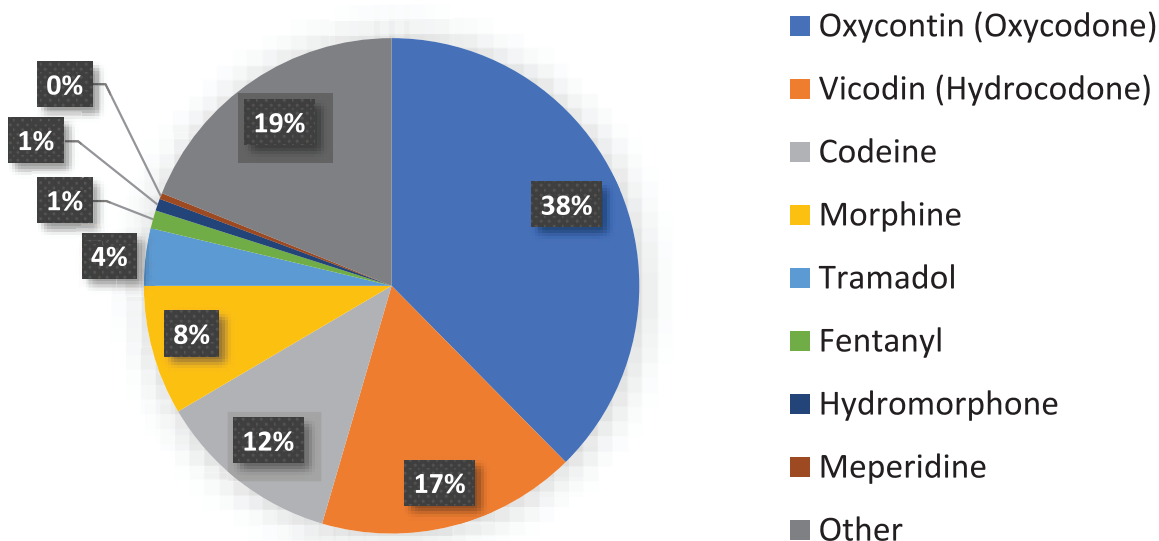


Figure 1. Prescription pain relievers used and reported by students.

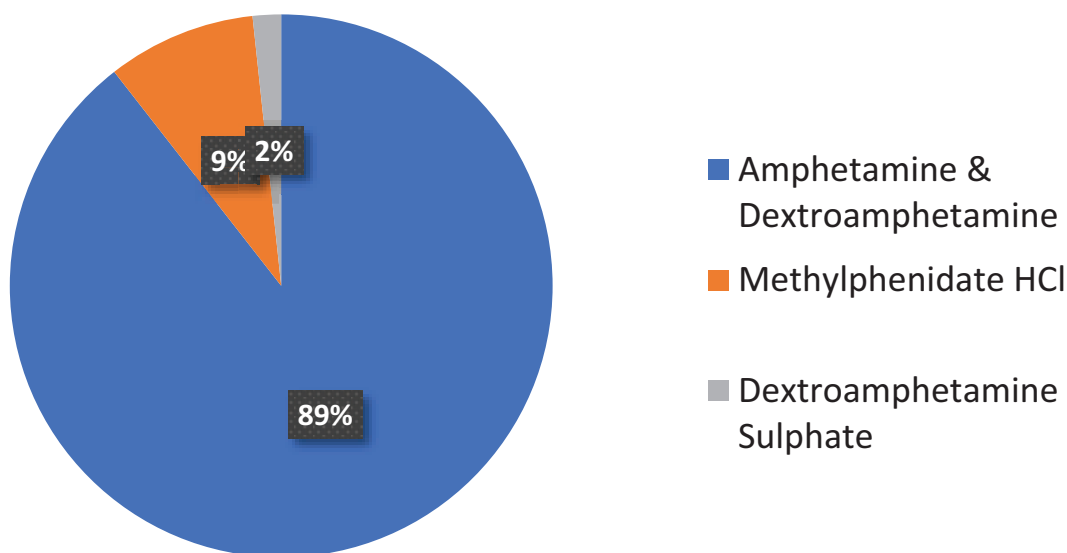


Figure 2. Prescription stimulant use reported by students.

Table 2. Past year medication use among college students.

MEDICATION TYPE	N REPORTING USE	% OF SAMPLE
Pain medication	546	33
Stimulant	251	15

life-time use of stimulants in college students reported that 48% reported non-medical use of pain relievers, and first years used less than other class years.<sup>19</sup> In the current study it was found that prescription stimulant users were more likely to use prescription pain relievers (49%) as compared to non-stimulant users (30%). The students self-reported use of prescription opioid medications was Oxycodone, Hydrocodone, Codeine,

Table 3. The number and percentage of students reporting the use of stimulant drugs and pain relievers.

LIFE-TIME USE OF STIMULANTS?	LIFE-TIME USE OF PAIN RELIEVERS?			TOTAL	
	YES	NO			
Yes	123	49%	128	51%	251
No	423	30%	989	70%	1412
Total	546	33%	1117	67%	1663

Morphine, Fentanyl, Tramadol, Hydromorphone, Meperidine, and others. In the past 12 months, 11% of students misused prescription medications, defined as taking prescription drugs not prescribed to them. With each additional year of undergraduate



**Table 4.** The number of students reporting prescription drug misuse by class year.

CLASS STANDING	PRESCRIPTION DRUG MISUSE?				
	YES		NO	TOTAL	
First year	37	8%	405	92%	442
Sophomore	28	9%	299	91%	327
Junior	50	13%	345	87%	395
Senior	59	14%	352	86%	411
Total	174	11%	1401	89%	1575

**Table 5.** The number of students reporting prescription drug misuse based on their drug knowledge.

HAVE KNOWLEDGE OF OPIOIDS?	PRESCRIPTION DRUG MISUSE?				
	YES		NO	TOTAL	
Yes	93	15%	510	85%	603
No	89	8%	971	92%	1060
Total	182	11%	1481	89%	1663

college level education, prescription drug misuse increased, from 8% among first year to 14% among seniors. Students with knowledge about overdose drugs for opioids were more likely to report the misuse of prescription drugs (15%) than students with less knowledge (8%).

### *Prescription stimulant drug use in youth*

This study findings showed that 15% of the sample had used prescription stimulants in the past year. The prescription stimulants study participants reported using were Amphetamine & Dextroamphetamine (Adderall), Methylphenidate (Ritalin), and Dexedrine. Amphetamine and Dextroamphetamine were the most used drugs; 89% of the prescription stimulant users reported using these drugs which aligns with another study from 2014 showing 72.8% reported using stimulants.<sup>19</sup> Another study also reported the use of non-prescription stimulants in college students in a 4-year period with 61.8% being offered prescription stimulants by year 4 for non-medical use and 31% using it.<sup>13</sup> Use of prescription stimulants among young adults is concerning, and previous studies have reported that the age at which they start stimulant treatment was positively related to the development of antisocial personality disorder and serious cardiovascular events in adulthood.<sup>20</sup> A 2001 study conducted on college students in the US, reported non-medical use of prescription stimulant prevalence among subgroups of college students in the north-eastern region of colleges with more competitive admission standards and the rates of non-medical use ranged from 0% to 25% at individual colleges.<sup>21</sup> The observations from the present study further reiterate the need to

educate college students about the serious adverse effects of prescription stimulant misuse and the long-term impacts these drugs can have on their health.

The results showed that stimulant users were more likely to use prescription pain relievers (49%) as compared to non-stimulant users (30%,  $P < .0001$ ). Referencing “smart drugs” and “smart doping,” many media outlets have fueled the myth that non-medical use of prescription stimulants boosts academic performance.<sup>22</sup> Past studies have demonstrated that stimulant misuse during adolescence and younger adulthood and continued long-term use, increases neurobehavioral risks including addictive habits.<sup>23</sup> College health personnel and clinicians should advise and carefully monitor students receiving long-term therapeutic administration of stimulant medications for signs of adverse effects on development, substance abuse, central toxicity, or psychological problems.

### *Knowledge and misuse of opioids*

This study found that student’s knowledge about opioids like Fentanyl, and reversal effects of Naloxone, did not reduce rates of prescription medication misuse. On the contrary, this study also aligns with another study reporting that students who reported having drug related knowledge were misusing prescription medications more often (14%) than those who possessed less knowledge (8%).<sup>24</sup> Misuse despite overdose drug knowledge and their effects, suggests that in addition to risk-taking behavior, and either the curiosity or insufficient information these students have in knowledge of the drugs, positively impacts abuse and misuse.<sup>25</sup> Previous studies have shown inconsistency with drug knowledge and misuse with negative correlation and others showing no significant differences.<sup>24</sup> Further research is needed to explore the existing gaps and identifying association between knowledge and misuse, specifically, knowledge of the risks of misuse, as this study only narrowly assessed knowledge as correctly identifying Fentanyl and heroin as opioids and Naloxone as an opioid reversal agent. However, the present findings provide justification for strengthening drug information campaigns in college campuses to highlight the adverse effects that are associated with not only opioids generally, but also the adverse effects that are associated with prescription medication use and misuse. The need for interactive drug campaigns with trained peer educators, alternative problem-solving solutions, identifying mechanisms to address the reasons for drug misuse and limiting accessibility through policies in college might reduce the percentage and frequency of misuse in college settings.<sup>26</sup>

### *Limitations*

Because the study was nonrandomized, an important limitation is the potential for unmeasured variables to serve as confounders in the data. The study did not focus specifically on opioid misuse and stimulant misuse in the current sample.

Future studies would help to establish the causal relationships between prescription drug misuse and the risk factors found with specific classes of prescription drugs and stimulants. This study did not look at the effect of stimulants and other drugs on specific organs and systems. The study did not focus on misuse of prescriptions of their own and the knowledge correlation with age. Future studies may investigate these specific areas. Furthermore, the use of a self-reported survey may lead to biases in data due to inaccurate reporting of prescription misuse, substance use, and/or other demographic variables. Finally, the convenience sampling of one predominantly white, suburban U.S. university indicated that the findings might not represent other higher education institutes in the country or institutes in other countries.

## Conclusion

This study provides quantitative data about the prevalence of prescription pain medication and stimulant use in college youth in supporting the need for developing effective prevention strategies to prevent its usage.

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## Author Contributions

SP: Primary author and Principal Investigator worked with the design, research questions, methodology, writing the paper sections, interpretation of data analyzed data and paper submission. YG: Worked with the different steps of the research process as co-investigator and did data analysis and interpretation and assisted with the drafts of paper submission. MP: Worked as co-investigator for the research and worked with the draft edits and interpretation of the data.

## Compliance With Ethical Standards

The study protocol was approved by Stockton University Institutional Review Board (IRB Reference Number: 2018.128).

## Supplemental Material

Supplemental material for this article is available online.

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