

As submitted to:

Medical Teacher

And later published as:

**Psychostimulant Drug Abuse and Personality Factors in
Medical Students**

Volume 35, Issue 1, 2013, pages: 53-57.

DOI: 10.3109/0142159X.2012.731099

Joshua T Bucher, **M.D.**; Duc M Vu, **M.D.**; Mohammadreza Hojat, PhD.

Jefferson Medical College of Thomas Jefferson University.

Correspondence:

Joshua T. Bucher
317 Timber Hill Drive
Morganville, NJ 07751
732-492-6158
Joshua.t.bucher@gmail.com

Abstract

Background: Psychostimulants have a high abuse potential and are appealing to college students for enhancing their examination performance.

Aim: This study was designed to examine the prevalence of psychostimulant drug abuse among medical students and to test the hypothesis that medical students who use psychostimulant drugs for non-medical reasons are characterized by a sensation seeking and aggressive-hostility personality and exhibit lower empathy.

Methods: The Zuckerman-Kuhlman Personality Questionnaire and the Jefferson Scale of Empathy were completed anonymously on-line by 321 medical students in 2010-2011 academic year.

Results: Forty-five students (14%) reported that they had abused psychostimulant medications either before or during medical school. Results of multivariate analysis of variance provided **partial** support for **one of** our research hypothesis: students who reported using psychostimulant compared to the rest, obtained a significantly higher average score on the Aggressive-Hostility personality factor. No other significant differences were observed.

Conclusions: Further research is needed to confirm the rate of psychostimulant drug abusers among medical students in other medical schools. In particular, it is desirable to examine if such psychostimulant drug abusers are likely to abuse other substances in medical school and later in their professional career.

Introduction

Psychostimulant medications, such as dextroamphetamine or Adderall, have high abuse potential. As a result, these medications have been listed as controlled substances by the DEA (**Drug Enforcement Administration**). Unfortunately, these drugs have a market for illicit use, most commonly by students. (McCabe, et al. 2005).

College students have been shown to be a large group that perpetuates psychostimulant medication abuse. McCabe (2005) found that these students were most commonly Caucasian males who were in fraternities, with lower GPAs, and were subsequently more likely to report other substance abuse as well. Students generally justify this abuse in order to enhance academic prowess, mainly their ability to study or “cram” for exams. Students may take these medications and study for hours without requiring a break, which is appealing to college students. This behavior could progress into medical education and have adverse effects on the future performance of medical students and young physicians, as well as potential legal repercussions.

Several studies have shown there is a higher incidence of psychostimulant medication abuse in centers for higher education (Adan, 1994). However, these drugs are not used in a legal, controlled or prescribed manner when they are abused. This creates a dangerous situation, since these drugs have many potential side effects. In addition, these substances can carry the dangers of overdose and withdrawal, and abusing these medications by obtaining them through illegal methods without counseling from a physician can increase the risk for both.

When these drugs are used to enhance performance and, subsequently, grades on examinations, it can lead to imbalances in exam performance. Students may alter both their performance on exams and the grading for all students taking standardized exams. Since the **United States Medical Licensing Examination (USMLE)** is graded in a relative scale, if a large number of students use these drugs to attain higher grades, then the entire grading system will be altered, which could negatively affect students who did not abuse them.

Furthermore, drug abuse, regardless of the reason, is a sign of poor professionalism. It is illegal in many countries around the world, including the United States, and often carries high penalties including jail time and fines. The Yale University School of Medicine Statement of Professionalism, which is included in their medical student handbook, specifically forbids the use of alcohol or drugs in a way that could “compromise patient care or bring harm to themselves or others.” (Yale, 2010) Policies such as these are not specific to Yale; many institutions have the same policies for their medical students, and it is explicitly forbidden and deemed unprofessional. The consequences of substance abuse extend beyond the realm of professionalism as well.

A study of undergraduate students found that the students who abused psychostimulant medications, particularly if they used them frequently or via parenteral intake such as snorting, were at nearly twice an increased risk of co-morbid mood disorders. (Teter, et al. 2010). This is an additional detrimental factor that could affect the performance of **medical clinical** students and young physicians.

The non-medical abuse of psychostimulant medications for enhancing academic performance among medical students is an area that has not been widely studied, although Tuttle and colleagues (2010) found that 4.6% of the students at one United States medical school had admitted to using non-prescribed psychostimulant medications. Watkins (1970) found that at a medical school in the southern U.S., over 50% of the respondents abused psychostimulant medications at some point; these findings may indicate an even worse problem compared to undergraduate college students. Furthermore, a study conducted in Iran found that 10% of their sample **of medical students** abused stimulants to increase concentration and enhance studying ability (Habibzadeh, et al. 2011). This study shows that the issue of medical student psychostimulant abuse is not exclusive to the United States and Western countries.

It is important to examine if certain personality factors are associated with increased risk of psychostimulant abuse since this information can identify the at risk students who might need preventive consultation. We designed this study to investigate the prevalence of psychostimulant drug abuse among a sample of students in a private medical school in the United States, and to examine the relationships between drug abuse and personality measures. We hypothesized that medical students who are at an increased risk of psychostimulant drug abuse are characterized by a sensation seeking and aggressive-hostility personality and exhibit lower empathic skills.

Methods

This correlational study was approved by the Thomas Jefferson University Institutional Review Board, and is independent of any commercial entities. The investigators prepared a 73-

item survey which was administered on-line to all students attending a single medical school (n=1035). The survey was posted by the student council, which has access to the mailing lists for all students. Survey participants include first, second, third and fourth-year medical students. Responses were anonymous and participants were asked whether they had used psychostimulant medications (e.g., Aderrall, Ritalin, Dexamphetamine, methamphetamine) for medical or non-medical purposes, and if it was before or during medical school. The survey had reminders on each page that the data would remain confidential and anonymous and that the entire survey had to be completed in order to be included in the study. Also, students were informed that the study was initiated by student investigators without any involvement of or input from school administrators. Students who reported using psychostimulant medications for a medical purpose prescribed by a physician were excluded from the study.

In addition to soliciting demographic questions, included in the survey were the Jefferson Scale of ~~Physician~~ Empathy JSE (Hojat, 2007) and the Zuckerman-Kuhlman Personality Questionnaire (ZKPQ) (Zuckerman, 2002). The JSE is a validated measure of empathy which includes 20 items, each answered on a 7-point Likert scale. This instrument was developed to specifically measure empathic orientation, attitudes, or behavior in the context of patient care. Extensive evidence has been published in support of the validity and reliability of this instrument in medical students, physicians, nurses, and other health profession students and practitioners (Hojat, 2007; Hojat, 2001; Hojat, 2002, Hojat, 2002).

The Zuckerman-Kuhlman Personality Questionnaire- Short Form (ZKPQ-S) was used in this study. This personality questionnaire was developed to measure the five big factors of

personality or temperament that have a strong biological-evolutionary basis. (Zuckerman, 2002; Zuckerman, 2007). There are five personality scales in this questionnaire:

1. "Impulsive Sensation Seeking" described as a tendency to act quickly on impulse without planning, often in response to a need for thrills and excitement, change and novelty.
2. "Neuroticism-Anxiety" described as a tendency to be tense and worry, overly sensitive to criticism, easily upset, and obsessively indecisive.
3. "Aggression-Hostility" described as a tendency to express verbal aggression and show rudeness, thoughtlessness, vengefulness, spitefulness, a quick temper and impatient behavior.
4. "Sociability" described as tendencies to interact with others, enjoyment in being with others, and intolerance for social isolation.
5. "Activity" described as a tendency to be active, to prefer challenging work, and being impatient or restless when there is nothing to do.

The ZKPQ-S has been previously used in medical student samples to examine the associations between personality and specialty interest (Hojat & Zuckerman, 2008; Hojat, et al. 2005). We used correlational and analysis of variance methods for statistical analyses of data. Computer software of Statistical Analysis System (SAS), version 9.1 for Windows, was used for analysis.

Results

There were 34 students who indicated they had used psychostimulant medications for medical reasons. They were excluded from this study. The remainder of respondents (n=321,

173 women, 148 men) were included in this study. The total number of students in the 2010 – 2011 academic year, the year the study was performed, was 1035. The response rate was 31% (321/1035). Table 1 presents **frequency and percent distributions of data for these** respondents who **abused ~~did or did not use~~** psychostimulant drugs before or during medical school.

Of the 321 total students included in the study, 45 students (14%) had reported they had used psychostimulant medications either before or during medical school or for studying purposes; 37 (11%) had used the drugs before, and 14 (4%) had used them during medical school, and 32 (10%) reported that they had used drugs to improve their learning and memory. Due to overlap, none of these figures are mutually exclusive.

In general, more students in their earlier years of medical school responded than students in their later years (100, 93, 69, and 59, in years 1, 2, 3 and 4, respectively). Males represented 46% (n=148) and females represented 54% (n=173) of the respondents. Caucasian (72%, n=231) and Asian-American (18%, n=58) were the largest ethnic groups. The majority of the students (n=225, 70%) were originally from the Northeast of the country with the remainder of the students from other regions.

Students who used stimulants to enhance their studying were evenly split between men (15%, n=22) and women (13%, n=23) ($\chi^2_{(1)} = .16, p = .68$). There was a trend towards increasing use in the first-year students (19%, n=19), versus 12% for all other years) but this difference was

non-significant. There was also a trend towards increasing use by Caucasian students and students from the Northeast, but these differences were also non-significant ($\chi^2_{(1)} = 2.99, p=.39$).

Means and standard deviations of the six personality measures comparing stimulant drug abusers and the rest of their cohort, and summary results on multivariate analysis of variance (MANOVA) are reported in Table 2.

As shown in the table, the stimulant drug abusers scored significantly higher than the rest of their classmates on the aggressive-hostility measure of personality ($F_{(1,311)}=11.90, p=.0006$). Also, there was a marginal statistical difference between the two groups on the impulsive sensation seeking personality measure so that psychostimulant drug abusers scored higher on this personality factor ($F_{(1,311)}=2.9, p=.08$). No other significant difference was observed on other personality measures between the psychostimulant drug abusers and the rest of their classmates. Also, there was no significant association between psychostimulant abuse and empathy, with both groups scoring similarly on the empathy scale.

Discussion

Findings of this study provide partial support for our research hypothesis. Psychostimulant drug abuse among medical college students was significantly associated with aggressive-hostility personality, and to some extent, but not at the conventional level of statistical significance ($p < 0.05$), sensation seeking or thrill-seeking behavior.

The finding that 14% of medical students in our sample have abused psychostimulant drugs for non-medical reasons highlights a problem amongst medical students. Despite knowledge of substance abuse and psychostimulant medications, some students continued to abuse these substances after entering medical school. As noted by McCabe and colleagues (2005), the college students that abused stimulant medications were likely to also abuse other substances, such as cocaine and ecstasy. Thus, one may speculate that some medical students who abuse psychostimulant drugs may be likely to abuse other substances as well; although, this needs further empirical verification. **This is deemed to be unprofessional behavior on the behalf of medical students and all medical professionals, and should be seriously considered.**

This is not the first study to note that medical students have abused prescription stimulants for nonmedical reasons, some in order to enhance studying and academic performance. As stated before, an Iranian study noted that almost 10% of their sample population had also abused stimulants in order to increase concentration and enhance studying ability (Habibzadeh, 2011). In addition, a study by Watkins (1970) found that at a southern medical school, over 50% of the respondents had abused psychostimulant medications at some point. Another study by Lord and colleagues (2009) found that 7% of pharmacy students had abused psychostimulant medications in their sample of 1,500 and 5% had within the last year. This study examined current pharmacy students, indicating that this issue is not limited to undergraduate and medical student populations, and that this unprofessional behavior is spread throughout multiple professional fields of study (Lord et al. 2009). All of these studies provide evidence that psychostimulant medication abuse is a prevalent and growing problem among medical students.

In our study, 71% of users who had abused the psychostimulant drugs had admitted to using them for studying adjuncts (32/45). In a study reported by Teter et al. (2010), 58% of participants cited a need for increased concentration and 43% needed an increase in alertness. Eight percent of participants were motivated to abuse prescription stimulants for counteracting effects of other drugs and 43% were motivated by an experienced high. The study also showed there was no statistically significant difference in responses between men and women regarding justification for abusing prescription stimulants (Teter et al. 2010). These studies highlights the fact that the majority of respondents reported increased concentration and increased alertness as motivating factors for abusing psychostimulant drugs, again, leading not only to the unprofessional behavior of abusing drugs, but also contributing to an attempt to enhance performance on examinations and studying, which is unprofessional in and of itself.

There are several limitations to the study. The sample population was limited to medical students at a single private medical school, which may not be representative of the entire medical school population in the U.S. In addition, there was not a sufficient sample size of ethnic minorities in our sample, compared to the Caucasian population, to address the incidence and correlates of drug abuse among minority medical students. Also, data was obtained via an on-line survey posted on the Internet, which like all self-report surveys, can be subject to social desirability response bias.

In conclusion, our findings suggest that facets of aggressive-hostility personality such as a tendency to express verbal aggression and show rudeness, thoughtlessness, vengefulness, and a

quick temper and impatient behavior (Zuckerman, 2007) would be a red flag for substance abuse among medical students. These personality facets of aggressive-hostility are not only detrimental to physicians in training but also are an impediment to physician-patient relationships in the practice of medicine. The repercussions of the unprofessional behavior of psychostimulant medication abuse include adverse effects on the health of the medical student as well as affecting the lives of their fellow students and future patients. Further research is needed to examine the detrimental effects of the stimulant drug abuse in undergraduate and graduate medical education, and in physician performance.

Practice Points:

- **The findings that 14% of physicians-in-training have reported abusing psychostimulant drugs for non-medical reason is alarming.**
- **Psychostimulant drug abuse is associated with higher scores on aggressive and hostile personality traits.**
- **Psychostimulant drug abuse is marginally ($p=.08$) associated with impulsive seeking behavior. No significant association exists between psychostimulant drug abuse and scores on the Jefferson Scale of Empathy.**
- **It is desirable to further examine if psychostimulant drug abusers in medical school are likely to abuse other substances during their medical education and later in their professional career.**

Acknowledgements:

We thank Clara Callahan, MD and Susan Rattner, MD for their critical review of the manuscript, and Dorissa Bolinski for her editorial assistance.

Declaration of Interest:

All authors declare no conflicts of interest that could potentially affect this study. The authors had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Notes on Contributors:

JOSHUA T. BUCHER, MD was a medical student at Jefferson Medical College when this study was undertaken, he is currently a PGY-1 emergency medicine resident at UMDNJ-RWJMS.

DUC M. VU, MD was a medical student at Jefferson Medical College when this study was undertaken, he is currently a researcher at UCSD Pediatric Neurology.

MOHAMMADREZA HOJAT, PHD is a research professor at the Department of Psychiatry and Human Behavior and the Director of Jefferson Longitudinal Study, Jefferson Medical College.

.

References

Adan A. (2010) Chronotype and personality factors in the daily consumption of alcohol and psychostimulants. *Addiction* 1994; 89(Tuttle, 2010): 455-462.

Habibzadeh A, Alizadeh M, Malek A, et al. (2011) Illicit methylphenidate use among Iranian medical students: prevalence and knowledge. *Drug Des Devel Ther* 2011;5: 71-76.

Hojat M, Gonnella JS, Mangione S, Nasca TJ, Veloski JJ, Erdmann JB, Callahan C, Magee M. (2002) Empathy in medical students as related to clinical competence, gender, and academic performance. *Med Educ* 2002; 36: 522-527.

Hojat M, Gonnella JS, Nasca TJ, Mangione S, Veloksi JJ, Magee M. (2002) The Jefferson Scale of Physician Empathy: further psychometric data and differences by gender and specialty at item level. *Acad Med* 2002; 77 (10 Suppl): S58-S60.

Hojat M, Gonnella JS, Nasca TJ, Mangione S, Vergare M, Magee M. (2002) Physician empathy: definition, components, measurement and relationship to gender and specialty. *Am J Psychiatry* 2002; 159: 1563-1569.

Hojat M, Mangione S, Nasca TJ, Cohen MJM, Gonnella JS, Erdmann JB, Veloski JJ, Magee M. (2002) The Jefferson Scale of Physician Empathy: development and preliminary psychometric data. *Educ Psychol Measure* 2001; 61; 349-365.

Hojat M, Zuckerman M. (2008) Personality and specialty interest in medical students. *Medical Teacher* 2008; 30: 400-406.

Hojat M. (2007) *Empathy in patient care: antecedents, development, measurement, and outcomes*. New York: Springer 2007.

Hojat M., Zuckerman M., Gonnella J.S., Mangione S., Nasca T.J., Vergare M., & Magee M. (2005) Empathy in medical students as related to specialty interest, personality, and perceptions of mother and father. *Personality and Individual Differences* 2005; 39: 1205-1215.

Lord S, Downs G, Furtaw P, et al. (2009) Nonmedical use of prescription opioids and stimulants among student pharmacists. *J Am Pharm Assoc* 2009; Jul-Aug; 49(Tuttle, 2010): 519-528.

McCabe SE, Knight JR, Teter CJ, Wechsler H. (2005) Non-medical use of prescription stimulants among US college students: prevalence and correlates from a national survey. *Addiction* 2005; 100(1): 96-106.

Teter CJ, Falone AE, Cranford JA, et al. (2010) Nonmedical use of prescription stimulants and depressed mood among college students: frequency and routes of administration. *J Subst Abuse Treat* 2010 38(Teter, 2010): 292-298.

Tuttle JP, Scheurich NE, Ranseen J. (2010) Prevalence of ADHD diagnosis and nonmedical prescription stimulant use in medical students. *Acad Psychiatry* 2010; 34(Teter, 2010): 220-223.

Watkins C. (1970) Use of amphetamine by medical students. *South Med J* **1970**; 63: 923-929.

Yale Student Handbook (2010). Yale University School of Medicine Statement on Professionalism [WWW] Available from

http://medicine.yale.edu/education/osa/100421_Professionalism%20Yale%20Progress%20Committee%20Final%20Draft%2012%2008%2010.pdf [Accessed 7/10/12]

Zuckerman M. (2002) Zuckerman-Kuhlman Personality Questionnaire (ZKPQ): an alternative five-factorial model. In B. De Raad & M. Perugini (Eds.) *Big five assessment*, pp. 377-396. Seattle, WA: Hogrefe & Huber.

Zuckerman M. (2007) *Sensation seeking and risky behavior*. Washington, DC: American Psychological Association.

Table 1: Frequency and Percent Distributions of Psychostimulant Drug Abuse in 321 **Jefferson** Medical Students by Gender (who completed the On-Line Survey in January 2011) (**31% of all students; n = 1035**)

	Men (n = 148)		Woman (n = 173)		Total (n = 321)	
		%		%		%
Abused drugs before medical school	18	12%	19	11%	37	12%
Abused drugs during medical school	7	5%	7	4%	14	4%
Abused drugs to help learning	13	9%	19	10%	32	10%

† **The categories (psychostimulant drug abuse before medical school, during medical school and to help learning) are not mutually exclusive.**

Table 2: Means, Standard Deviations, and Summary Results of Statistical Analyses of Empathy and Personality Scores for 321 Medical Students by Their Report of Using Psychostimulant Drugs (who Completed an On-Line Survey in January, 2011)†

Variables	<u>Used Psychostimulants</u>		<u>Did not use Psychostimulants</u>		p‡
	(n = 45)		(n = 276)		
	M	SD	M	SD	
Empathy	104.7	8.5	105.3	9.1	.68
Aggressive-Hostility	2.6	1.7	1.7	1.5	.0006
Impulsive Sensation-Seeking	2.4	1.7	1.8	1.7	.08
Neuroticism-Anxiety	2.5	2.0	2.7	2.1	.53
Sociability	3.9	2.2	3.8	2.2	.78
Activity	4.0	2.1	4.5	1.9	.16

† Wilks' Lambda = .95, related multivariate $F_{(6,306)} = 2.8$, $p = .01$

‡ p-values for the post-hoc pair-wise mean comparisons.