

Short Communication

The Attitudes and the Use of Methylphenidate without Prescription among Health Care Trainees

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• Methylphenidate abuse; ADHD prevalence; Methylphenidate prevalence; Student's attitudes

Abstract

Objectives: In recent years, there has been an increase in the use of ADHD medications among students who do not have a diagnosis of ADHD in an effort to improve their academic performance. How healthcare trainees perceive and use these medications without prescription deserves a special focus as their current attitudes and choices may influence their future practice in managing the care of children.

Methods: Students were asked about symptoms of ADHD, about their attitudes towards the use of methylphenidate (MPH) and their personal use. Three hundred and twelve pediatric residents, and medical and psychology students and an additional 133 engineering students were sampled.

Results: Overall, 22% of all healthcare trainees reported some MPH use. Healthcare trainees were far less likely to carry a formal diagnosis of ADHD than engineering students (9% vs. 23%), although they tended to meet DSM diagnostic criteria to the same level (20% vs. 21%). Healthcare trainees were more likely to use these medications without a formal ADHD diagnosis, and they were far more likely to believe that MPH has an effect on people without ADHD.

Conclusions: Healthcare trainees should be educated about the importance of appropriate diagnosis of ADHD and of the risks of using of methylphenidate without appropriate diagnosis.

INTRODUCTION

Attention deficit/Hyperactivity disorder (ADHD) is one of the most common pediatric neurobehavioral (neurodevelopmental) disorders [1,2]. It has been estimated that 50% of patients diagnosed with ADHD under the age of 18 years continue to have symptoms as adults [3]. Overall, the prevalence of ADHD in adults ranges from 3.5%-4.5% [4], making adult ADHD one of the most common adult psychiatric disorders. Thus, ADHD medications, mainly psychostimulants, are widely prescribed for both children and adults.

The use of ADHD medications is not limited to patients with ADHD [5]. Several position papers over the last decade have suggested that it is ethically and legally permissible for physicians to prescribe medications to adults for the sole purpose of cognitive enhancement [6]. Though there is no clear evidence for the role of ADHD medications as cognitive enhancers [7], these medications are currently widely perceived as such [8]. Thus, in recent years there has been an increase in the use of prescribed and non-prescribed ADHD medications among students without a formal diagnosis of ADHD (either under diagnosed students or students without symptoms of ADHD) with the intent of improving academic performance, for greater efficiency while

performing academic tasks, and to a lesser extent to increase wakefulness, weight loss, and for recreational use [9-14].

Previous studies have established a prevalence of 6-18% among students using non prescribed ADHD medications for the aforementioned reasons [13,15]. How healthcare trainees perceive and use these medications without prescription deserves a special focus as their current attitudes and choices may influence their future practice in managing the care of children.

Our study aims to describe the use of ADHD medications and the attitudes and beliefs about the use of these medications among medical students, pediatric residents and psychology students.

METHOD**Study design**

This national study received institutional review board approval. The study was conducted from September 2013 to January 2014. Altogether 445 students and residents were sampled; representative samples of 312 students were taken from pediatric residents and university students studying medicine and psychology. An additional 133 engineering

students, also a high achieving academic group, were included for comparison purposes. University student participants were approached by a study coordinator during class and received the study questionnaire to fill out immediately. The questionnaires were completed and collected during the study coordinator's visit to their class. About 80% of the approached students completed and submitted the questionnaire. For further analysis, questionnaires were randomly sampled to represent the relative number of students in each academic faculty, and the various levels of training as further discussed below. Medical residents were approached during their department's morning meeting during a one day study visit to their hospital.

Study sample

Four major representative universities and five major representative hospitals were sampled. Sample size was determined based on CDC EPI Info 7 with a 95% confidence level. Altogether, 445 students and residents were sampled from a total of 7980 students and medical residents who attended these universities and hospital pediatric residencies during the course of the study. To equally represent students from different universities, samples were proportionally adjusted based on the size of the respective university campus. Students were sampled from each year of their university training in order to represent their different levels of training and education.

Questionnaire

The questionnaire included five different sections. Section 1 included demographics and background information (age, sex, institution, level of training). Section 2 included the DSM criteria rating scale for ADHD. Section 3 asked about the student's perception of their academic achievements relative to their classmates. Section 4 asked about the attitudes of the students and residents with regard to the use and the effect of ADHD medications for people with and without a diagnosis of ADHD. Section 5 inquired about a previous formal diagnosis of ADHD and previous experience with ADHD medications.

Participants were asked about MPH, since currently it is the only ADHD medication that is covered by the government health insurance and thus is prescribed in the major health care organizations, while the use of amphetamines is rare.

Statistical analysis

Chi-square test was used to compare frequencies of methylphenidate use by the different groups of students (GraphPad). For this study $P < 0.05$ was considered to be statistically significant.

RESULTS

Study sample demographics

Of the 445 students who filled out our questionnaire, the mean age was 26.7 years old. The pool was made up of 123 psychology undergraduate students (27%), 131 medical students (29%), 58 pediatric residents (13%), and 133 engineering undergraduate students (30%). Engineering undergraduate students, also considered to be a high achieving academic group, were included for the sake of comparison.

ADHD DSM symptoms criteria and previous ADHD formal diagnosis

The proportion of participants that reported the minimum threshold of five out of nine symptoms in either of the two DSM-5 categories (inattentive and hyperactive/impulsive) for ADHD was 21% (Table 1). Since ADHD may be diagnosed in two different categories (inattentive and hyperactive/impulsive), we looked for both of the subtypes. Of the study participants, 7% met the criteria for inattention by DSM-5 criteria, 6% of the participants met criteria for hyperactivity/impulsivity by DSM-5 criteria, and 8% met the criteria for both. No significant differences were found between healthcare trainees and engineering students in meeting self-reported symptom criteria (Chi squared equals 0.123, P value equals 0.7261).

Interestingly, although no differences were found between health care trainees and engineers, only 9% of the health care trainees were formally diagnosed with ADHD, while 23% of the engineers had such a diagnosis. These differences were statistically significant (Chi squared equals 27.2, P value < 0.0001).

Prevalence of methylphenidate use

The overall prevalence of students and medical residents that have reported using MPH was 25% (n=113). Among health care trainees 22% reported MPH use (Table 1). Mean while, engineering students exhibited higher frequencies of MPH use (22% vs 34% respectively, Chi squared=21.628; $P < 0.0001$).

Formal diagnosis of ADHD and Frequency of MPH use

Of the participants who reported using MPH, 65% (n=61) did not have formal diagnoses of ADHD and 52% did not meet DSM-5 symptoms criteria. Only 37% of health care MPH users did had formal diagnosis of ADHD vs. 60% among engineering trainees (Chi squared equals 15.297, P value < than 0.0001). Health care trainees were more likely to use MPH without having a diagnosis of ADHD than engineering students (Table 2).

Sixty one percent of methylphenidate users (n=69) reported using the medication less than 10 times during the last year while 10% (n=12) reported using it almost regularly. Most of the participants that reported using fewer than 10 MPH pills in the last year did not carry a diagnosis of ADHD as opposed to most of the frequent users who did have a diagnosis of ADHD.

Table 1: The proportion of participants that reported the minimum threshold of five out of nine symptoms in either of the two DSM-5 categories (inattentive and hyperactive/impulsive) for ADHD.

	DSM-5 Symptoms criteria n(%)	ADHD previous diagnosis n(%)	MPH users n(%)
Medicine	27 (20%)	9 (6%)	27(21%)
Psychology	27 (21%)	17 (14%)	33(27%)
Pediatric Residents	9 (15%)	1 (0.02%)	8(14%)
All healthcare trainees	63 (20%)	27(9%)	68(22%)
Engineering	28 (21%)	31 (23%)	45(34%)

Reason for MPH use

Among the participants who disclosed their reasons for using MPH, most used it for presumed cognitive enhancement. Other reported reasons included having a legitimate prescription, experimentation with MPH to see how they would react, and for recreational use. (Figure 1).

Among the participants reporting the reason for MPH use, 53% (n=36) reported using it for cognitive enhancement, 28% (n=19) had a medical prescription, 16% (n=11) reported trying MPH experimentally to explore their reaction to the pill, and 1% (n=1) reported using it for recreational use.

Among users, eighty-six percent of the participants that reported having used MPH thought that it achieved the purpose for which it was taken at least to some degree.

Attitudes and beliefs about methylphenidate

Ninety percent of the participants believed that MPH can improve the academic performance of students that suffer from ADHD at least to some degree (Figure 2), and 80% of the participants would recommend the use of MPH to students who suffer from ADHD. More interesting is that 67% of the participants believed that MPH improves the academic performance of students without ADHD (figure 3). Healthcare trainees were far more likely to believe that MPH has an effect on people with ADHD (96% vs. 77% respectively. Chi squared=64.481; P<0.0001), and an effect on people without ADHD (71% vs 55% respectively. Chi squared= 32.687; P<0.0001).

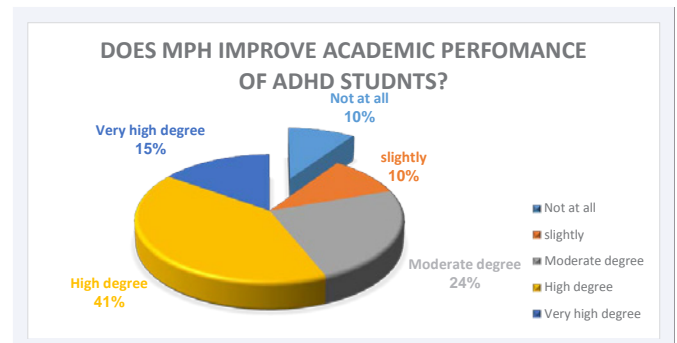


Figure 2 It shows whether the MPH improve the academic performance of ADHD Students.

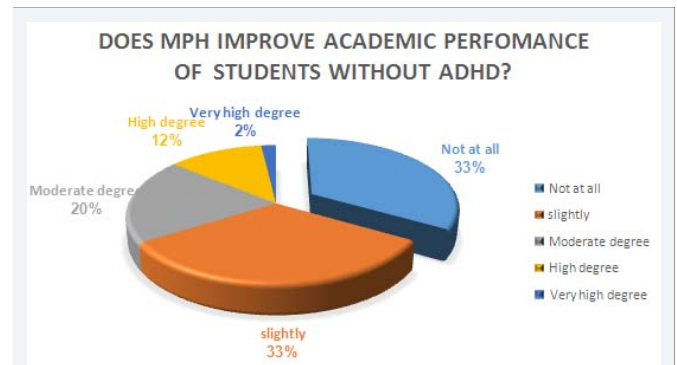


Figure 3 It shows whether the MPH improve the academic performance of Students without ADHD.

Table 2: Health care trainees were more likely to use MPH without having a diagnosis of ADHD than engineering students

Formal diagnosis and DSM 5 criteria among MPH users		
	Diagnosis of ADHD	DSM 5 criteria
Medical students	30%	33%
Pediatric residents	0%	38%
Psychology students	51%	58%
Health care	37%	45%
Engineering students	60%	56%

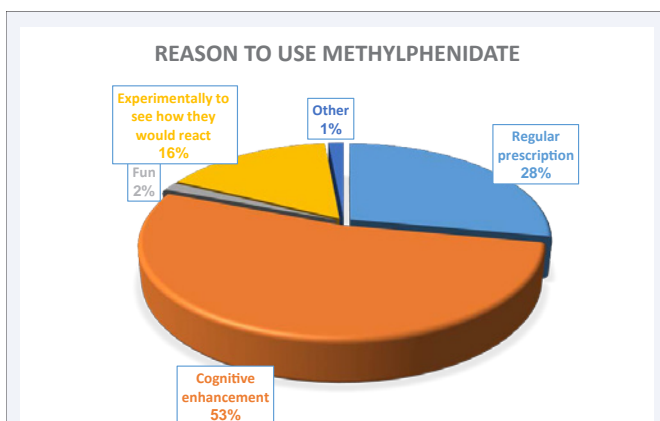


Figure 1 It shows the reason to use Methylphenidate.

DISCUSSION

How healthcare trainees perceive and use MPH medications deserves a special focus as their current attitudes and choices may influence their future practice in managing the care of children. This study examined the use of MPH and the attitudes toward the use of these medications among health care trainees and compared it with engineering students, who served as a control group of high achievers.

Overall, 25% of all students and medical residents sampled, reported MPH use to some degree. When comparing health care trainees to engineering students, the former tended to use less MPH than the latter (22% vs 34% respectively; P<0.0001). Most MPH consumers (60%) reported using MPH to improve their academic performance, and 86% percent reported that, to some degree, it achieved the purpose for which it is taken. Most of the MPH users reported that they only took MPH a few times a year. It is difficult to assess whether the perceived improvement in cognition is due to the actual effect of MPH or due to the known placebo effect [15].

Other reports have revealed a high prevalence of use of ADHD medication among students. A national mail survey in 2001 found that 4.1% of students used ADHD medication in the last year at US colleges [16]. In 2006, an American internet survey found that 5.9% of students use of these medications [13]. A later study conducted by anonymous questionnaires in Iran revealed that 8.7% of students used MPH for cognitive enhancement

[11]. In 2008, a study composed in the USA reported that 18% of students used ADHD medications [10]. Though there are methodological differences between these studies, it seems that throughout the years there has been a trend towards higher prevalence of using these medications in academia.

Higher rates of stimulants use have previously been reported among students in competitive faculties such as psychology (35%) [17], and medicine (14%) [18]. In our current study, 22% of the health care trainees admitted using MPH.

Health care trainees were far less likely to carry a formal diagnosis of ADHD compared with engineering students (9% vs. 23%), though both populations similarly met DSM 5 symptom criteria (20% vs. 21%). Though meeting symptom criteria is not the same as meeting diagnostic DSM criteria (which includes age of onset of symptoms and the impact of the symptoms on functioning). These findings suggest that either health care trainees are under diagnosed or engineering students are over-diagnosed. This may reflect availability of informal diagnosis and treatment for health care trainees or a hesitation of being labeled.

Health care trainees were more likely to use MPH without having a formal diagnosis of ADHD (37% vs. 60%), and were far more likely to believe that MPH has an effect on people without ADHD (71% vs 55%), although such an effect has yet to be proven [7,8].

CONCLUSION

Although the understanding and treatment of ADHD has improved in the last decade, inappropriate use of ADHD medications may come with significant risks. Regarding the appropriate use of ADHD medications. This study suggests that future professionals are not familiar enough with the need of using MPH with an appropriate diagnosis and with formal prescription. We believe that training for advancing the knowledge of health care professionals and trainees is needed.

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