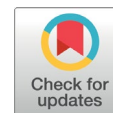




ORIGINAL ARTICLE



Non-medical use of methylphenidate by medical students: prevalence and motivations. Integrative review

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KEYWORDS

Methylphenidate
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ABSTRACT

Objective: This study performed a literature review evaluating aspects of prevalence and motivations on the non-medical use of methylphenidate by medical students.

Methods: We searched the Scopus, PubMed, SciELO, and Web of Science databases and the Google Scholar search tool using the keywords "Methylphenidate" and "Medical Student" and their correlates in Portuguese. A total of 472 articles were recovered, of which 24 were included for full reading and discussion after the application of the pre-established inclusion and exclusion criteria.

Results: It was observed that the prevalence of non-prescribed use of methylphenidate ranged from 0.51% in Lithuania to 35% in Colombia. The main motivations reported for using the drug were academic outcomes improvement and increase in concentration during studies, although research shows no significant improvement in academic performance with the use of medication by healthy individuals.

Conclusion: The non-prescribed use of methylphenidate presents a high and worrying frequency. Also, scientific studies questioning the use of psychostimulant medications for cognitive improvement by healthy students make the practice illegal and unfounded.

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INTRODUCTION

Methylphenidate belongs to the group of psychostimulant substances, which favors the brain's excitatory state, promoting sleep reduction, elevating mood, and motivation. Its mechanism of action is to inhibit the reuptake of dopamine, norepinephrine, and serotonin, increasing the availability of these neurotransmitters in the synaptic cleft^{1,2}. In Brazil, this drug is well known by their trade names Ritalina® and Concerta®, mainly prescribed for treating Attention Deficit Hyperactivity Disorder (ADHD), which consists of a persistent inattention pattern and hyperactivity/impulsivity².

Its use is legally authorized only for therapeutic purposes and under medical supervision, given its potential for abuse and dependence³. However, it is already considered the most consumed psychostimulant in the world⁴. According to data from the International Narcotics Control Board (INCB, 2019), in 2013, worldwide consumption of 71.8 tons of methylphenidate was identified, the highest consumption since 1990. In 2018 production decreased slightly to 62.7 tons.

In Brazil, the volume of methylphenidate, imported or produced in national territory, increased from 122 kg in 2003 to 578 kg in 2012, a 373% increase. In that same period, there was a 775% increase in drug consumption, making Brazil the second-largest consumer market for the drug⁵.

Two hypotheses may explain this significant increase in methylphenidate consumption: the expansion of the number of ADHD diagnoses⁴ and the non-medical use of the drug⁶. According to Arria e Wish⁷, the term "non-medical use" corresponds to a person who does not have a medical prescription or medication consumption guided by a doctor but in a dosage different from that recommended.

Healthy students have resorted to the non-medical use of methylphenidate to extend the study time and optimize academic efficiency^{8,9}. Medicine students are potentially at high risk for this practice due to the strenuous academic conditions they undergo during medical school, such as long hours without sleep, numerous institutional evaluations as indicators of their competence, stress, and the need to improve their focus and concentration skills during the study¹⁰. Ferraz et al.¹¹ observed that the use of methylphenidate was higher in the medical course compared to the other courses analyzed.

Considering the scope of methylphenidate consumption in Brazil and worldwide, and reports in the literature about nonprescription use of methylphenidate by university students, especially medical students, this study performed a literature review evaluating aspects of prevalence and possible motivations for non-medical use of the drug among medical students.

METHODS

An integrative literature review was conducted, using as guiding question "The non-medical use of methylphenidate by medical students - trends and motivations". A selection of the articles deposited in

Scopus, PubMed, SciELO, Web of Science, and Google Scholar was conducted during June and July 2018, using the following descriptors combined with the Boolean operator AND: "methylphenidate" AND "medical Student".

The inclusion criteria defined for selecting studies were articles in English, Spanish, or Portuguese, published between 2000 and 2018, and online availability of full texts. Studies that did not qualify as scientific articles were excluded, as well as literature reviews and duplicates. After applying the inclusion and exclusion criteria, eliminating duplicate references, reading titles, abstracts, and complete articles, 24 articles were selected for evaluation (Figure 1). After analysis, interpretation, and synthesis of results, a comparison was made between the data evidenced and the theoretical framework employed. Then, the synthesis and discussion of the data obtained was continued.

Ethical aspects

This article does not contain any studies with human participants or animals conducted by any author. Ethics approval and consent to participate were not applicable. For this type of study, formal consent was not required. This article does not contain patient data.

RESULTS

Studies evaluating the use of methylphenidate by medical students identified a prevalence ranging from 0.51% in Lithuania and 41% to 35% in Colombia¹². Although methylphenidate is used mainly in treating ADHD, the percentage of students who used the medication without the diagnosis drew attention. In South Africa, Jain et al. and Steyn^{13,14} pointed out that less than a third and only 2.9% of users were diagnosed with ADHD, respectively.

In the United States, Iran^{15,16} and Israel¹⁷, the use rates found were between 6.6% and 8.7% (Figure 2). In Brazil, the prevalence of methylphenidate without medical prescription reached values higher than 20% in universities in the states of Minas Gerais¹⁸, Tocantins¹⁹, Rio de Janeiro²⁰, and Rio Grande do Sul^{11,21} (Figure 3).

Regarding the articles that analyzed methylphenidate acquisition (9 articles), almost 70% showed that the friends were the leading intermediaries between the users and medication. In the USA, Emanuel et al.²² and Tuttle et al.²³ identified an expressive percentage of medical students, 63% and 70%, respectively, who reported having acquired methylphenidate or amphetamine salts through friends. In Iran¹⁰, like the North American studies, most users (32%) of non-medical methylphenidate had obtained medication through friends. Coli et al.¹⁸ and Silveira et al.²¹, when interviewing Brazilian university students, revealed that more than half of the students acquired methylphenidate without a prescription.

According to Jain et al.¹³, in a survey conducted in South Africa, the majority (67.9%) of non-medical methylphenidate users were intended to improve academic results. In New Zealand, Ram et al.²⁴ identified

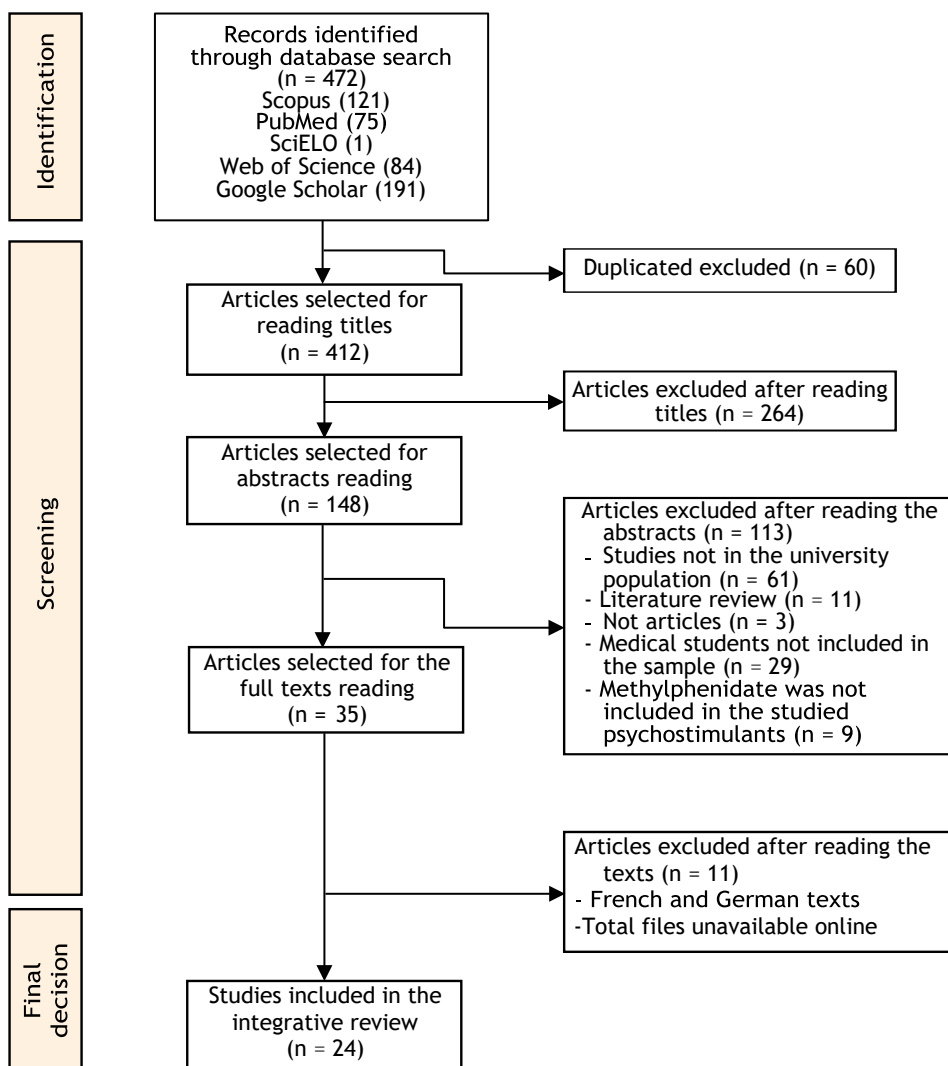


Figure 1 – Flowchart for the selection of studies. Outcomes of review the literature by record identification, screening, and analysis the articles.

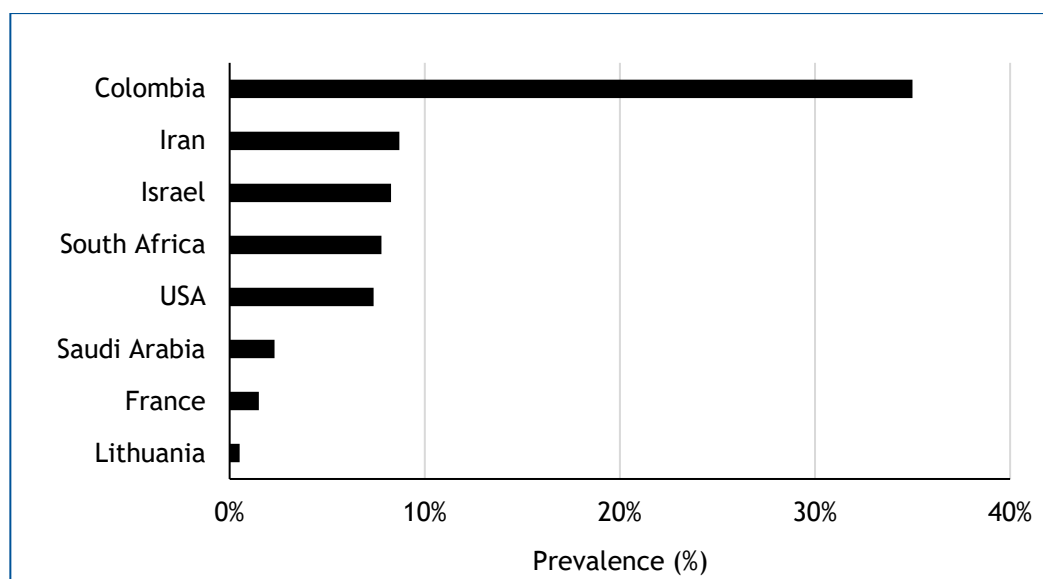


Figure 2 – Prevalence of non-prescribed use of methylphenidate in medical students worldwide.

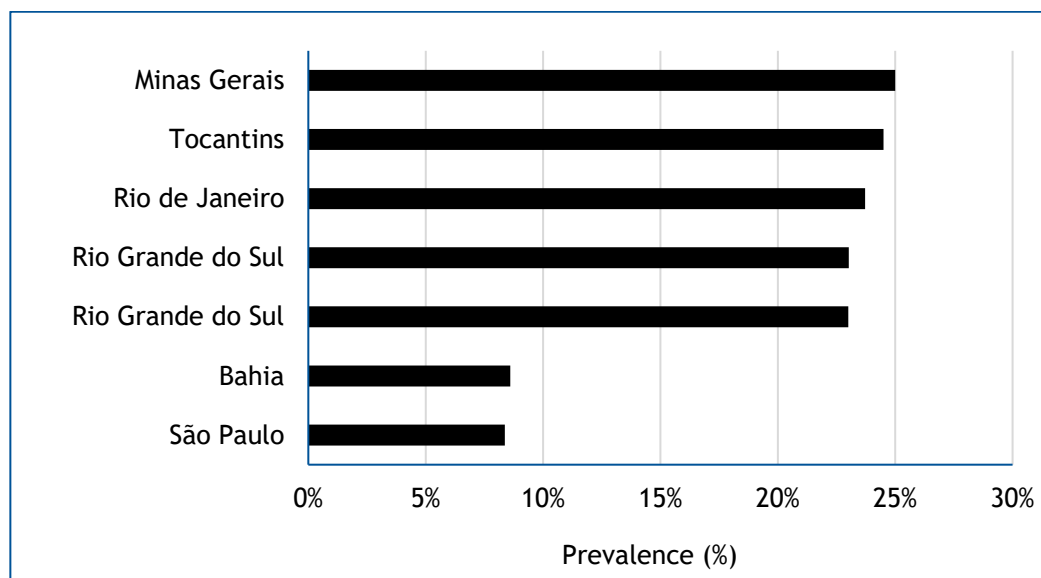


Figure 3 – Prevalence of non-prescribed use of methylphenidate in medical students in the Brazilian states.

as the main reasons for using the medication the increase of the alertness state and improvement in concentration during the study. Hildt et al.²⁵, through a qualitative study at the University of Mainz, Germany, reported that the use of psychostimulants for non-medical purposes, besides aiming at improving academic performance, also aimed at acquiring time and willingness to perform activities outside the university, thus maintaining a balance between study and free time.

In Brazil, studies point to similar motivations. Silva Júnior et al.¹⁹ identified that 24.5% of the medical students at the University Center of Gurupi in Tocantins used Ritalina® without prescription to increase academic performance. At the Federal University of Bahia²⁶, 87.5% of medical students who used non-prescribed methylphenidate indicated increased college performance as a reason for substance use. A worrying result was shown by Carneiro et al.²⁰, which revealed that 13.51% of the medical students at the University Center of Volta Redonda in the state of Rio de Janeiro who used methylphenidate without a prescription aimed to study for all the tests of the academic semester. Table 1 summarizes the main aspects identified in the selected articles.

DISCUSSION

College students have been consuming psychostimulant medications, such as methylphenidate, to achieve better academic performance. The analyzed studies showed very variable results, with the lowest frequencies reported in Lithuania²⁷ and France²⁸ and the highest frequencies in Colombia¹² and Brazil¹⁸. It is essential to note that just over half of the selected studies reported significant prevalence in Brazil, resulting in more than 20% of non-medical use among medical students^{18,21}.

The significant difference between the prevalence found in countries with lower and higher non-medical consumption of methylphenidate may have the

following explanations. In Lithuania, the prevalence of ADHD diagnosis is low (1%-3%) compared to the US (11%), according to 2011 data, making the drug less widespread in the population. Besides, accessibility to psychostimulant medications, especially methylphenidate, is hampered by strict legal control and high cost, making it unfeasible for students to acquire^{27,2}. There is great rigor in the prescription and distribution of methylphenidate in France because of its potential for abuse. Thus, psychostimulants can only be prescribed by neurologists, psychiatrists, and pediatricians working in hospitals. Family doctors can keep the prescription unchanged for up to a year when the individual should return to the specialist. This hinders drug abuse and leads to the acquisition of medications easier to access, such as corticosteroids^{28,29}.

In Brazil and Colombia, the high prevalence of non-medical use among medical students triggers the alert for a possible population at risk of abusive medication use. Ferraz et al.¹¹, when evaluating the consumption of psychostimulants among medical, law, and civil engineering students in Brazil's southern region, observed higher consumption of methylphenidate in medical students than the other courses. Similarly, Coli et al.¹⁸ showed that among the risk groups for the use of methylphenidate selected throughout Colombia, medical students were the largest consumers. Generally, factors such as extensive workload, need for full-time dedication to curricular activities, competitiveness instigated by students and teachers, and social demand for perfection corroborate the tendency of medicalization in the university environment, especially in medical school¹⁰.

Another critical aspect to be discussed refers to the ease of access to methylphenidate in studies that identified a high prevalence of non-prescribed medication use and the influence that the environment may exert on abusive drug use. In Colombia¹², 41.2% of universities acquired methylphenidate without prescription at the pharmacy, and almost all (97.6%) said psychostimulants were easily obtainable. At the Federal

Table 2 – Description of the articles included in the study that assessed the prevalence and/or motivations for the use of methylphenidate by medical students

Reference	Objectives	Methods	Results and conclusions
Jain et al, 2017 ¹³	Investigate the prevalence of non-prescribed use of methylphenidate and the knowledge of students about the drug.	This was a cross-sectional study. A self-administered, anonymous questionnaire was distributed during lectures to all students.	70.6% used no prescription and 30.2% had a diagnosis of ADHD. The students, in general, have low level of knowledge about methylphenidate.
Al-Shagawi et al, 2017 ²⁷	Investigate the level of self-medication by medical students.	A cross-sectional survey was conducted among undergraduate students of pharmacy and medical colleges of the university. The study used Perceived Stress Scale (PSS) to document academic stress. The responses of the students were analyzed using SPSS v. 22.	29.2% reported self-medication. The methylphenidate use rate was 2.3%, considered low when compared to other investigations.
Ferraz et al, 2018 ¹¹	To know the dynamics of the consumption of psychoactive substances among academics of different courses in a university in the south of Brazil.	Quantitative study, carried out with academics from medical, law and civil engineering courses, through a structured questionnaire.	Medical students have a higher frequency of use of methylphenidate compared to students in other courses.
Bilitardo et al, 2017 ³⁴	To evaluate the prevalence of students using methylphenidate and side effects in individuals without ADHD.	This was a cross-sectional study in which questionnaires were administered to students attending a university admission preparatory course (Intertexto Poliedro) and to undergraduate students attending the first three years of medical school at Universidade de Mogi das Cruzes.	63% of the users had no diagnosis of ADHD; 60% had adverse effects, of which 33.3% continued their use even with unwanted effects (tachycardia, tremor in the hands, loss of appetite, dry mouth, and anxiety);
Coli et al, 2016 ¹⁸	To identify the use of methylphenidate, the reasons, forms of acquisitions, and possible side effects.	The study is a cross-sectional, quantitative and descriptive study among 120 students of six series of the medical school. The instrument used for gathering data was an anonymous self-filling questionnaire, applied between August and December 2015.	29.16% reported use and 25% reported non-prescribed use. They used to increase concentration in times of testing. 60% received medication through friends. 23.33% reported insomnia, euphoria, tachycardia, reduced appetite, irritability, headache, and tremors.
Silva Júnior et al, 2016 ¹⁹	To estimate the prevalence of prescribed and non-prescribed use of methylphenidate among medical students.	Cross-sectional study with 373 students enrolled in the medical school of UNIRG University Center, the first to the eighth period, enrolled during the second half of 2014. It was used a self-administered questionnaire investigating demographics and the use of methylphenidate. For the data analysis the chi-square test was employed.	The improvement in academic performance due to the use of methylphenidate was reported by 63.8% of the users who consumed the medication for this purpose.
Silveira et al, 2014 ²¹	To evaluate the prevalence of the use of methylphenidate, to discriminate the use with or without medical indication and to correlate with the alcohol intake among medical students.	Cross-sectional study in which medical students were invited to answer a questionnaire to evaluate academic and socioeconomic status, MPH use patterns, and attitudes towards neuroenhancing drugs. The Alcohol Use Disorders Identification Test (AUDIT) was used to assess alcohol intake; a score ≥ 8 suggests potentially hazardous alcohol use.	34.2% had used methylphenidate, 23.02% had used without a medical indication. 17.4% used methylphenidate along with other drugs. 14.2% used alcohol simultaneously.

Table 2 – Description of the articles included in the study that assessed the prevalence and/or motivations for the use of methylphenidate by medical students (cont.).

Reference	Objectives	Methods	Results and conclusions
Carneiro et al, 2013 ²⁰	To analyze the prevalence of non-prescribed use of methylphenidate among medical students.	Cross-sectional study in which information was obtained from a questionnaire applied over students from 1st to 8th semesters of medical school.	23.72% reported non-prescription use and only 2.56% used under-prescription for ADHD treatment.
Cruz et al, 2011 ²⁶	To analyze the characteristics of methylphenidate use among medical students of the Federal University of Bahia.	Cross-sectional, analytical, quantitative and descriptive study among 186 students from the six years of the medical school from UFBA. The instrument used for gathering data was a standardized self-filling questionnaire, applied by the researchers in May 2009.	35.5% only knew student users, and only 8.6% reported having used it.
Barón et al, 2010 ¹²	To confirm the results of a study at the University of Manizales, which evaluated the consumption of psychostimulants to improve academic performance and inquire about the factors associated with their use.	Cross-sectional study in which students from the Medicine Program of the University of Manizales participated in the first semester of 2010. The population was 615; by means of a probability sampling, 234 students were selected. The instrument used was an anonymous survey that made it possible to identify the consumption of stimulants and associated risk factors.	51.9% confirmed using psychostimulants to improve academic performance, with ritalin being the most consumed psychostimulant (35%); 70.9% said they had reached the goal.
Mineo et al, 2018 ³⁵	To evaluate the prevalence of psychostimulant use, demographic characteristics, and use of associated substances. To explore the association between tendencies of affective temperament and the use of stimulants.	Cross-sectional study at a Northeast US medical school. A total of 303 students were investigated using the short form of Akiskal's TEMPS-A auto-questionnaire. The association of demographic variables and substance use (drinking, smoking, use of illicit drugs) with the nonmedical use of prescription stimulants was assessed. Predictors were investigated using logistic regression.	32.3% reported use; 6.3% diagnosed with ADHD. Trends in temperament and behavior, which are indicators of the use of psychostimulants have been identified.
Emanuel et al, 2013 ²²	To conduct an online census on the use and attitudes toward psychostimulants use among medical students.	In 2011, we conducted a multi-institutional census using a 31–48 item online survey regarding use of prescription psychostimulants. 2,732 actively enrolled medical students at four private and public medical schools in the greater Chicago area. Prevalence and correlates of psychostimulant use.	198 students used psychostimulants (amphetamine or methylphenidate) at least once in their lifetime and 11% reported use during medical school. The most used were amphetamine salts (75%) and methylphenidate (41%).
Tuttle et al, 2010 ²³	To determine the prevalence of the diagnosis of ADHD and the non-prescribed use of psychostimulants.	An anonymous survey was administered to 388 medical students (84.0% return rate) across all 4 years of education at a public medical school.	5.5% reported a diagnosis of ADHD and 10% reported non-prescribed use of psychostimulants. There is a high relative risk for the non-prescribed use of psychostimulants.
Fond et al, 2016 ²⁸	To evaluate the prevalence, characteristics of non-prescribed use and reasons for the use of psychostimulants (caffeine, energy drinks, steroids, methylphenidate, cocaine, and amphetamines) among medical students.	A population-based cross-sectional study using a self-administered online survey was done. A total of 1,718 French students and physicians (mean age, 26.84 ± 7.19 years, 37.1% men) were included.	33% reported use of psychostimulants, being 6.7% not prescribed such as corticoid, methylphenidate, modafinil, and piracetam; Of the non-prescribed medications, the most used was the corticoid (4.5%), followed by methylphenidate (1.5%).

Table 2 – Description of the articles included in the study that assessed the prevalence and/or motivations for the use of methylphenidate by medical students (cont.)

Reference	Objectives	Methods	Results and conclusions
Micoulaud-Franchi et al, 2014 ³⁶	To evaluate the prevalence and the reasons for the consumption of licit and illicit psychostimulants among medical and pharmacology students.	A validated questionnaire was sent to a French sample of medical and pharmacology students using email. The questionnaire investigated reasons for the use of pharmaceutical licit (vitamin C and caffeine tablets) and illicit (methylphenidate, amphetamines, modafinil, piracetam) drugs.	67.4% reported having used some psychostimulant at least once in the last 12 months, without prescription; 5.8% of the total sample consumed illicit psychostimulants. 3.6% used methylphenidate. Reasons for use include improvement in the academic performance, alert/wakefulness, and attention/concentration.
Fallah et al, 2018 ¹⁰	To evaluate the prevalence of the use of psychostimulants (ritalin and amphetamines), demographic characteristics and conditions of use among medical students and residents.	Cross-sectional study conducted among 560 medical students and clinical residents of Babol University of Medical Sciences during the academic year 2014-2015. A self-administered questionnaire was used for data collection.	11% of subjects used ritalin or amphetamine. The use was more frequent in the last periods of the course and in the medical residency. The acquisition was mainly through friends.
Eslami et al, 2014 ³⁷	To determine factors related to the non-prescribed use of Ritalin among medical students.	Cross-sectional study conducted among 264 Iranian medical college students; participants selected in random sampling, and data were collected by using self-report questionnaire. Data were analyzed by SPSS v. 21 at 95% significant level.	81.25% used to increase academic performance.
Habibzadeh et al, 2011 ¹⁵	To investigate the frequency of use of methylphenidate among medical students in Iran and their knowledge of the drug.	Anonymous, self-administered questionnaires were completed by all medical students entering the university between 2000 and 2007.	8.7% used the drug without a medical indication at least once in their lifetime. Of these, 74% claimed to have used in the last year and 11% in the last month; The level of knowledge about the drug was low.
Rahimi-Movaghar et al, 2011 ³⁷	To identify the reasons for the use of psychostimulants among medical students. Assess factors that contribute to the onset and continuity of substance use, as well as access routes.	Three qualitative methods have been used: focus group discussions with 7 groups (60 individuals) consisting of male and female students in the dormitories and in the university environment, in-depth interview with 20 drug user students, and interview with 20 key informants including counselors, managers and guards of dormitories, staff of the office for Culture and Welfare Affairs of students and members of students' organizations. Purposeful or opportunistic method was used for sampling.	The use of methylphenidate was cited as more prevalent than the use of ecstasy. Factors: more positive attitude compared to other drugs, curiosity about effects, academic competition and belief that would never cause addiction. The ease of access is a stimulus.
Cohen et al, 2015 ¹⁷	To evaluate the use of methylphenidate and the association between ADHD symptoms among medical students.	Medical students were asked to report methylphenidate use, symptoms and diagnosis of attention deficit disorder using a structured questionnaire.	17% of students use the drug, of which 48.7% take it without a prescription. Only 9.6% had a diagnosis of ADHD. The use by students without medical indication is recurrent.
Majori et al, 2017 ³⁸	To examine the frequency and reasons for the non-prescribed use of psychostimulants and their health effects on students in health courses.	To evaluate academic and extra-academic NMUPS (methylphenidate and amphetamines), an anonymous multiplechoice questionnaire was administered to a sample of Bachelor's and Master's degrees students attending a University North East of Italy. Data elaboration and CI 95% were performed with Excel software 2013. Fisher's exact tests were performed using GraphPad INSTAT software.	57.8% used without a prescription maximum 5 times in 6 months. 51% aimed at improving concentration during the study and 25.5% used the drug to improve performance in sports.

Table 2 – Description of the articles included in the study that assessed the prevalence and/or motivations for the use of methylphenidate by medical students (cont.)

Reference	Objectives	Methods	Results and conclusions
Lengvenyte et al, 2016 ³⁰	To evaluate the prevalence of use of cognitive enhancers, reasons for use and factors related to use (stress levels, sleep quality, having friends who used the drug).	A cross-sectional survey study was performed by analyzing a convenience sample of 579 in the two universities offering medical education in Lithuania, Vilnius University and the Lithuanian University of Health Sciences. In 2014, students were asked to fill in anonymous paper questionnaires consisting of 13 items on prevalence of substance use to enhance cognitive performance, and on reasons and correlates (response rate 95%) during lecture time.	The prevalence of methylphenidate use was approximately 0.51%. Having friends who indicated their use was the most prevalent factor among users. There was no significant relationship between stress levels and sleep quality among users.
Ram et al, 2016 ²⁴	To evaluate the prevalence and motivation for the use of nonprescription psychostimulants by healthy individuals.	Students from the Schools of Pharmacy, Nursing, Medicine, Law and Accounting at a university in New Zealand were invited to complete a paper-based questionnaire that elicited their views on the prevalence, reasons for use and attitudes towards use of CEs. Questionnaires were distributed at the end of a third-year lecture (August-October 2012). Reasons for use and attitudes towards use was measured using a 7-point Likert scale from strongly agree (1) to strongly disagree (7). Descriptive and prevalence statistics were calculated. Inferential statistics were generated to explore the overall associations between CE use and how the respondents had first learnt about CEs, and to investigate reasons for CE use.	6.6% used methylphenidate and amphetamines. The main motivations for the use of methylphenidate were to increase alertness, and to help in concentration during the study.
Ram et al, 2017 ³⁹	To investigate the factors that explain the decision to use cognition-enhancing drugs (CEs).	Students from the Schools of Pharmacy, Nursing, Medicine, Law, and Accounting at a university in New Zealand were invited to complete a paper-based questionnaire. The questionnaire elicited students' attitudes, subjective norms, and perceived control toward illicit use of CEs using TPB. An exploratory factor analysis was conducted.	Students who recognized the use of CEs as socially and ethically acceptable were more likely to use them.

University of Bahia²⁶, 7.5% of users said they knew where to buy methylphenidate without a prescription. When researching the factors related to the use of methylphenidate, Lengvenyte et al.³⁰ and Al-shagawi et al.²⁷ identified that those who had friends who used some cognitive enhancers were three times more likely to have used as well, corroborating with the finding found in most studies of illegal medication acquisition through friends.

There was a convergence among the analyzed studies regarding the motivations that led university students to consume psychostimulant medications. Most users consumed medication for increasing attention and concentration during studies and/or improving academic outcomes^{12,13,15,18,19,26,31}.

Barros and Ortega³, when analyzing the opinions of Brazilian university students about the reasons that led a person to use drugs to optimize academic achievement, identified that the social pressure to improve performance was the main reason. Accordingly, the perception that the social charge present in the university environment demanded too much competitiveness has also been reported. A Brazilian study published in 2020, using students from the Psychology course at the State University of Minas Gerais, confirmed that social and academic pressure and competitiveness were the primary motivations for the non-prescribed use of the drug. The use of the drug showed a positive effect regarding cognitive performance, and the strategies of having regulated sleep (36%), drinking coffee (35.6%), and practicing physical exercises, were also adopted by these students³².

A study conducted by Batistela et al.³³ aimed to verify the effect of acute administration of different doses of methylphenidate (10, 20, 40 mg, and placebo) on a wide range of cognitive functions in 36 healthy individuals between the ages of 18 and 30. They were randomly divided into four groups: one took the placebo, and the other three received a single dose of 10 mg, 20 mg, or 40 mg of the medication. After taking the pill,

participants underwent a series of neuropsychological tests to evaluate cognitive functions such as attention, working and long-term memory, and executive functions (ability to plan and perform tasks). The result showed similar performance in the four groups; the only difference observed was that those who took the 40 mg dose reported a subjective feeling of greater well-being compared to the others. Thus, the study demonstrated the ineffectiveness of methylphenidate in improving cognitive functions in healthy youngsters, making medication unjustifiable in this group of individuals.

CONCLUSION

The non-medical use of methylphenidate is a real trend. Although variations in the prevalence of methylphenidate use were recognized, all studies identified non-medical psychostimulant substance administration at least once in life. Concern data have been identified in some Brazilian universities, where the prevalence of non-medical use of methylphenidate reached values higher than 20%, which makes this condition a significant public health problem. Moreover, scientific studies questioning using psychostimulant drugs for cognitive enhancement purposes by healthy young people make these drugs illicit and unfounded. Therefore, it is suggested to develop educational and preventive measures to regulate better the distribution of this medication and alert university students to the illegal and scientifically questionable use of methylphenidate for non-therapeutic purposes.

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