



Prevalence of Ritalin Abuse and its Relationship with Demographic Characteristics Among Medical Students: A Cross-Sectional Study

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Abstract

Introduction: Substance abuse is a significant global issue, particularly among professional doctoral students who have increased access to medications like Ritalin. The misuse of Ritalin among this population poses substantial risks. Hence, understanding its prevalence and reasons is crucial. The purpose of this study was to assess the prevalence of Ritalin abuse among professional doctoral students at Lorestan University of Medical Sciences and investigate its relationship with demographic characteristics.

Methods: This study is a descriptive-analytical cross-sectional investigation involving 320 professional doctoral students at Lorestan University of Medical Sciences during the 2022-2023 academic year. A checklist was employed to assess the prevalence of Ritalin usage and its correlation with demographic factors. The acquired data were analyzed using SPSS version 22.

Findings: The study found that 10.6% of the students surveyed were misusing Ritalin. Most participants were female (56.9%) and were studying medicine (70%). A significant proportion had a good income level (38.8%), and clinical professional doctoral students had the highest rate of Ritalin misuse (52.9%). Gender, educational level, place of residence, and marital status showed significant associations with Ritalin misuse ($P < 0.05$).

Conclusion: Misuse of Ritalin among professional doctoral students (pharmacy, medicine, dentistry) at Lorestan University of Medical Sciences is widespread. Consequently, due to the negative impacts and issues stemming from unjustified and self-administered Ritalin misuse, strict control and supervision in drug distribution and sales are imperative, along with measures to deter non-prescription sales.

Keywords: Medical student, Ritalin, Methylphenidate, Pharmacy, Dentistry

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Introduction

Drug misuse is a significant global issue that communities are grappling with, requiring substantial resources to address its repercussions. Drug misuse can result in both physical and psychological damage. Reports from the World Health Organization (WHO) indicate that rates of drug misuse among teenagers and young people are increasing, with Iran being no exception. First-year university students are particularly identified as a high-risk category for drug usage among young individuals.^{1,2}

Methylphenidate (MPH) is a stimulant that influences the brainstem arousal system and cortex within the central nervous system. Both immediate-release and extended-release formulations of MPH and other stimulant medications have been sanctioned by the United

States Food and Drug Administration (FDA) for the management of attention deficit hyperactivity disorder (ADHD) and narcolepsy.^{3,4} In recent years, the rate of MPH consumption has increased significantly across all developed countries. Between 2014 and 2019, the rate of stimulant prescriptions in the US considerably climbed to 6.1 prescriptions per 100 individuals in 2019.⁵ When this drug is provided correctly and at the appropriate dose, the likelihood of developing pathological reliance on it is reduced.⁶⁻⁸ According to recent studies, kids are increasingly abusing this medication to improve their academic performance.⁹

Medical students and residents constitute a noteworthy subgroup when it comes to the misuse of MPH and other stimulants. Their academic responsibilities are substantial,



comprising numerous exams and assignments to be completed within strict time constraints. However, their ability to obtain information about the adverse effects and undesired outcomes of using stimulant drugs should empower them to make well-informed decisions on the subject.³

Using Ritalin for nonmedical purposes can have high stimulant effects and pose significant health hazards.¹⁰ Side effects of the medication encompass cardiovascular issues as well as neurological, digestive, metabolic, and behavioral diseases.¹¹ Ritalin can result in dependence and addiction. Medical students endure rigorous coursework. Ritalin is used by some people to cope with these circumstances and improve their performance on tests and productivity. Students who use Ritalin may encounter several adverse effects, including hallucinations, anxiety, dry mouth, and visual abnormalities.^{12,13} Ritalin withdrawal symptoms include weariness, sleep disturbances, and sadness. High doses of Ritalin might result in cardiovascular failure or deadly seizures.¹²

According to Cohen YG, 48.7% of the Israeli medical students in their cohort took MPH without a prescription, and 17% of them had taken it at least once. According to the study, the use of MPH increased gradually from 6% in the first year to 18% in the sixth year.¹⁴ Finger et al. showed that the onset of use was primarily observed during the academic year to enhance academic performance.¹⁵ De Bruyn et al. identified a correlation among competition, stress, and the misuse of prescription stimulants in the context of medical students.¹⁶ Jalilian et al. investigated 385 students from Kermanshah University of Medical Sciences. The lifetime prevalence of methylphenidate misuse stands at 5.4%. The survey identified focusing on lessons as the primary reason for abuse.¹⁷

There is a lack of precise data on Ritalin intake in Iran; it is misused by students due to its ability to enhance concentration.^{12, 18} Examining the prevalence of methylphenidate misuse among medical science students is crucial, as understanding its high prevalence can lead to the development of programs to raise awareness among medical science students about the harmful effects of misuse without indication. Therefore, the present study was designed and conducted to investigate the prevalence of methylphenidate misuse and its association with demographic characteristics among general professional doctoral students (pharmacy, medicine, dentistry) at Lorestan University of Medical Sciences.

Methods

Study Design and Participants

This is a descriptive-analytical study with a cross-sectional design, which was conducted on general professional doctoral students at Lorestan University of Medical Sciences in both pre-clinical and clinical stages of education between 2022 and 2023.

Sampling Method and Sample Size

In this study, stratified sampling was employed, where

the faculties of Lorestan University of Medical Sciences (Medicine, Pharmacy, and Dentistry) were considered as strata. Proportional to the population of students in each faculty, simple random sampling was then conducted from the list of students in each faculty. According to the successful study by Movafagh et al, with a significance level (α) of 0.05, a prevalence of methylphenidate misuse among students at 16%, and a precision of 3%, the sample size was calculated to be 323 individuals using the following formula.

$$n = \frac{\left(Z1 - \frac{\alpha}{2}\right)^2 p(1-p)}{d^2}$$

Inclusion and Exclusion Criteria

The inclusion criteria encompassed doctoral candidates in dentistry, medicine, and pharmacy in both pre-clinical and clinical stages, non-use of methylphenidate for therapeutic reasons prescribed by a psychiatrist, no previous diagnosis of ADHD, and willingness to provide informed consent for study participation. Exclusion criteria comprised incomplete checklist completion and unwillingness to continue cooperation during the research.

Data Collection Instruments

The data collection instrument was a checklist consisting of 9 elements pertinent to examining the frequency of methylphenidate usage and its correlation with demographic factors. These components consisted of (methylphenidate misuse, gender, history of psychiatric illness, educational level, field of study, place of residence (dormitory, personal home away from family, personal home with family), type of residence (urban and rural), marital status, family income level (less than 5 million Tomans=low, 5 to 10 million Tomans=moderate, 10 to 15 million Tomans=good, and more than 15 million Tomans=excellent).

Procedure

Following the acquisition of ethical clearance from the Ethics Committee of Lorestan University of Medical Sciences and the requisite coordination with the university's security and management, the researcher commenced the data collection process. A total of 323 professional doctoral students who satisfied the study's inclusion criteria were enrolled. Following necessary explanations regarding the study's objectives and assurance of confidentiality, an online checklist was made available to the students for better questionnaire completion. Additionally, to maintain confidentiality, the information collected was anonymized and did not contain any personal data. To complete the required data analysis and evaluate the correlations between variables, a statistical specialist used SPSS version 22 to examine the collected data.

Statistical Analysis

After collecting the necessary data, SPSS version 22

software was used for data analysis at a significance level of 0.05. The data were described using descriptive statistics, such as frequency and percentage for qualitative variables and mean and standard deviation for quantitative variables. To investigate the relationship between the variables of interest and the prevalence of methylphenidate misuse, Fisher's exact test and the Chi-squared test were used.

Results

In this study, 3 students were excluded, and finally, 320 students were included. As shown in Table 1, the majority of individuals participating in the study were female (56.9%) and studied medicine (70%). 10.6% of the study participants experienced Ritalin misuse during their academic years. Most individuals (49.7%) lived in their personal homes with their families during their studies, and 9.7% of individuals before university were living in urban areas. A significant portion of the study participants reported a good income level, accounting for 38.8% of the total, and clinical professional doctoral students had the highest rate of Ritalin consumption (52.9%). More information is provided in Table 1.

In Table 2, the relationship between gender and Ritalin misuse among professional doctoral students in general medical sciences in Lorestan is presented. In male students, the percentage of Ritalin misuse was higher than in female students (16.7% vs. 6%). Fisher's exact test

showed a significant relationship between gender and Ritalin consumption ($P=0.003$).

Additionally, the findings of the study demonstrated that, of the students with a history of mental illnesses, 39 (88.6%) did not abuse Ritalin, while only 5 (11.4%) did. Fisher's exact test indicated no significant association between a history of psychiatric disorders and Ritalin abuse ($P=0.796$).

The relationship between the place of residence before schooling and Ritalin consumption was examined in Table 2. The results indicated that among students who had resided in urban areas before entering university, 31 (10.7%) reported Ritalin misuse, compared with 3 (9.7%) among those who had resided in rural areas. According to Fisher's exact test, there was no statistically significant association between residence before university (urban vs. rural) and Ritalin misuse ($P>0.999$).

Fisher's exact test showed that there is a significant relationship between marital status and Ritalin consumption ($P=0.024$). Specifically, among married individuals, 3.1% reported Ritalin misuse, while among unmarried individuals, 12.5% reported Ritalin misuse.

Table 3 illustrates that the Chi-square test indicated no notable association between academic field and Ritalin consumption ($P=0.921$). Ritalin consumption was observed among 23 medical students, 5 dentistry students, and 6 pharmacy students. Also, the results showed that Ritalin consumption was higher among students living in dormitories than those in private homes. Table 3 shows that Ritalin consumption among students who had an average household income accounted for the highest percentage (18.8%). The Chi-squared test showed that there is a significant relationship between residence place during education (dormitory or private home next to the family), and Ritalin consumption ($P<0.05$).

The results showed that the percentage of Ritalin consumption was 53% among clinical students, 38.2% among basic sciences students, and 8.6% among both groups. As shown in Table 3, the Chi-squared test showed a significant relationship between education level (basic/clinical sciences) and Ritalin consumption ($P<0.001$).

Table 1. Distribution of demographic variables among professional doctoral students in general medical sciences in Lorestan

Variable	Category	Frequency (%)
Gender	Male	138(43.1)
	Female	182(56.9)
Marital status	Married	65(20.3)
	Single	255(79.7)
Field of Study	Medicine	224(70)
	Dentistry	47(14.7)
	Pharmacy	49(15.3)
The use of Ritalin during school years	Yes	34(10.6)
	No	256(89.4)
Residence during education	Student dormitory	105(32.8)
	A private house next to the family	159(49.7)
	A private home away from family	56(17.5)
Residence before university	Urban	289(90.3)
	Rural	31(9.7)
Household income level	Excellent	92(28.7)
	Good	124(38.8)
	Medium	85(26.6)
	Low	19(5.9)
History of psychiatric illness	Yes	44(13.75)
	No	276(86.25)
The level of education of Ritalin consumption	Clinical	18(52.9)
	Science Basic	13(38.2)
	Both sections	3(8.8)

Table 2. The relationship between marital status, gender, history of psychiatric illness, and place of residence before studying and Ritalin abuse in general professional doctoral students.

Variable	Category	Taking Ritalin		P-value
		yes	no	
Gender	male	23(16.7)	115(83.3)	0.003
	female	11(6)	171(94)	
History of psychiatric illness	yes	5(11.4)	39(88.6)	0.796
	no	29(10.5)	249(89.5)	
Residence before university	City	31(10.7)	258(89.3)	$P>0.999$
	Village	3(9.7)	28(90.3)	
Marital status	Married	2(3.1)	63(96.9)	0.024
	Single	32(12.5)	223(87.5)	

Table 3. The relationship between grade, field of study, residence place during education, household income level, and Ritalin abuse in general professional doctoral students

Variable	Category	Taking Ritalin		P-value
		Yes	No	
Field of Study	Medicine	23(10.3)	201(89.7)	0.921
	Dentistry	5(10.6)	42(89.4)	
	Pharmacy	6(12.2)	43(87.8)	
Grade	Clinical	18(53)	0(0)	<0.001
	Basic sciences	13(38.2)	0(0)	
	Both sections	3(8.8)	0(0)	
Residence place during education	Student dormitory	19(18.1)	86(81.9)	0.009
	A private house next to the family	10(6.3)	149(93.7)	
	A private home away from the family	5(8.9)	51(91.1)	
Household income level	Excellent	6(6.5)	86(93.5)	0.370
	Good	10(8.1)	114(91.9)	
	Medium	16(18.8)	68(81.2)	
	Low	2(10.5)	17(89.5)	

Discussion

Although Ritalin has therapeutic advantages, there are worries about its potential for abuse. Reports indicate a case of schizophrenia occurring after the use of a single dose of Ritalin.¹⁹ A prior study has indicated numerous aspects leading to the extensive usage of Ritalin among students, such as boosting academic performance, alertness, focus, concentration, weight reduction, and creating sensations of pleasure and bliss. Ritalin and other amphetamines can have detrimental effects on the kidneys, digestive tract, heart, and mind. They can also affect memory and learning. Moreover, the use of these drugs can result in substantial psychological dependency.²⁰ Given the greater availability of drugs, including Ritalin, to professional doctoral students and the risks associated with its arbitrary use in this population, exploring the extent and reasons for its abuse is crucial. Therefore, this study aimed to examine the incidence of Ritalin usage and its association with demographic variables among professional doctoral students at Lorestan University of Medical Sciences.

This study found that the prevalence of Ritalin usage among students was 10.6%, which aligned with the findings of Fallah et al, who reported that roughly 11% of medical students and assistants utilized Ritalin.²¹ In a study conducted by Sadeghi et al, 11.2% of medical students reported Ritalin consumption.¹³ This prevalence rate corresponds with the findings of Jain et al, who investigated the prevalence of Ritalin among medical students at the University of the Free, reporting it to be 11%.¹² The strains and tensions experienced by assistants and trainees during testing, along with the intense competitiveness among medical students, are significant factors contributing to the predisposition for methylphenidate misuse. Moreover, the pressure experienced by students during these periods can result in depression, thereby increasing the likelihood of students misusing stimulant substances.^{2,22}

The present study identified a notable correlation between gender and Ritalin misuse among students, revealing a greater prevalence of misuse among male students (16.7%) in contrast to female students (6%). These findings align with those presented by Khademi et al.²² and Karami Matin et al,²³ who reported a significant relationship between gender and Ritalin use among students, with more Ritalin abuse among male students. In the study by Sadeghi Bimorgh, the prevalence of non-medical use of Ritalin was higher among men than women (57.4% vs. 42.6%).¹³ Habibzadeh et al.¹⁸ examined the non-medical utilization of methylphenidate at Isfahan University of Medical Sciences. Methylphenidate misuse was reported by 92.5% of males, in contrast to 7.5% of females. One of the reasons for this could be that there is more control and supervision of girls from both the family and the dormitories. Also, boys are more likely to use Ritalin for euphoria than girls.

The results of this study demonstrated a substantial association between marital status and Ritalin usage, with unmarried students having a higher consumption rate compared to married students. According to a study by Lashkaripour et al,² married students used methylphenidate more frequently for non-medical purposes than unmarried students (28.1% vs. 15.9%), which is not consistent with the result of our study. The investigation suggests that the potential factor contributing to the increased prevalence of non-medical Ritalin use among residents may be the elevated percentage (78.8%) of married students within this group. This result suggests that marital status may influence the probability of Ritalin misuse.²

The findings of this study indicated that there was no notable correlation between a history of psychiatric disorders and Ritalin misuse. These results contradict the findings of Falah et al,²¹ who demonstrated a clear association between substance misuse and a history of psychiatric illnesses in their study. The difference in

the results could be attributed to the variations in the studied populations of students between the two studies. Therefore, conducting further studies in this area is recommended.

The findings of the present study, which looked at academic level, revealed a significant difference between academic level and Ritalin abuse, with the highest prevalence of misuse among clinical students (53%). The results presented here are inconsistent with the findings reported by Falah et al.²¹, which could be attributed to the efforts of clinical students to improve academic performance, increase concentration, and alertness. Additionally, the results of this study contradicted the findings of Sadeghi Bimorgh et al.¹³ who reported no significant relationship between academic level and Ritalin misuse. This difference may be due to the variations in the sample sizes studied in the two studies.

The findings of this research revealed a no relationship between residential status of the students and Ritalin misuse, with the highest prevalence of misuse among dormitory residents (18.1%). The results align with the findings presented by Falah et al.²¹

Conclusion

Ritalin misuse among professional doctoral students in general (pharmacy, medicine, dentistry) at Lorestan University of Medical Sciences is high. Therefore, given the adverse effects and problems associated with inappropriate and self-administered use of this medication, it is necessary to implement strict controls and monitoring in the distribution and sale of the drug, and to prevent the sale of medication without a prescription. Additionally, it seems that educational programs and strategic initiatives aimed at promoting proper study methods, precise planning, and time management workshops would be effective in reducing the tendency to use Ritalin.

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Authors' Contribution

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Competing Interests

There was no conflict of interest.

Ethical Approval

The research protocol received approval from the Ethics Committee of Lorestan University of Medical Sciences, under the supervision of the Vice-Chancellor for Research Affairs (Ethical Approval Code: IR.LUMS.REC.1401.151). All participants were fully briefed about the objectives of the study and voluntarily signed a written informed consent form before participation.

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References

1. Jalilian F, Ataee M, Karami Matin B, Ahmadpanah M, Ahmadi Jouybari T, Eslami AA, et al. Cognitive factors related to drug abuse among a sample of Iranian male medical college students. *Glob J Health Sci* 2015;7(5):143-51. doi:[10.5539/gjhs.v7n5p143](https://doi.org/10.5539/gjhs.v7n5p143)
2. Lashkaripour M, Dartomi S, Ghiasi Z, Farajian-Mashhadi F, Sargolzaei N. Frequency of non-medical use of methylphenidate (Ritalin) among medical students of Zahedan University of Medical Sciences. *Int J High Risk Behav Addict* 2019;8(2): e84694. doi:[10.5812/ijhrba.84694](https://doi.org/10.5812/ijhrba.84694)
3. Zahavi E, Lev-Shalem L, Yehoshua I, Adler L. Methylphenidate use and misuse among medical residents in Israel: a cross-sectional study. *Hum Resour Health* 2023;21(1):5. doi:[10.1186/s12960-023-00792-x](https://doi.org/10.1186/s12960-023-00792-x)
4. Chiappini S, Gramuglia PD, Mosca A, Cavallotto C, Miuli A, Corkery JM, et al. Methylphenidate abuse and misuse in patients affected with a psychiatric disorder and a substance use disorder: a systematic review. *Front Psychiatry* 2024;15:1508732. doi:[10.3389/fpsy.2024.1508732](https://doi.org/10.3389/fpsy.2024.1508732)
5. Board AR, Guy G, Jones CM, Hoots B. Trends in stimulant dispensing by age, sex, state of residence, and prescriber specialty - United States, 2014-2019. *Drug Alcohol Depend* 2020;217:108297. doi:[10.1016/j.drugalcdep.2020.108297](https://doi.org/10.1016/j.drugalcdep.2020.108297)
6. Quintero J, Gutiérrez-Casares JR, Álamo C. Molecular characterisation of the mechanism of action of stimulant drugs lisdexamfetamine and methylphenidate on ADHD neurobiology: a review. *Neurol Ther* 2022;11(4):1489-517. doi:[10.1007/s40120-022-00392-2](https://doi.org/10.1007/s40120-022-00392-2)
7. Cândido RC, Menezes de Padua CA, Golder S, Junqueira DR. Immediate-release methylphenidate for attention deficit hyperactivity disorder (ADHD) in adults. *Cochrane Database Syst Rev* 2021;1(1): CD013011. doi:[10.1002/14651858.CD013011.pub2](https://doi.org/10.1002/14651858.CD013011.pub2)
8. Moharram M, Kiang T. Pharmacokinetics of long-acting methylphenidate: formulation differences, bioequivalence, interchangeability. *Eur J Drug Metab Pharmacokinet* 2024;49(2):149-70. doi:[10.1007/s13318-023-00873-1](https://doi.org/10.1007/s13318-023-00873-1)
9. Javed N, Ahmed F, Saeed S, Amir R, Khan H, Iqbal SP. Prevalence of methylphenidate misuse in medical colleges in Pakistan: a cross-sectional study. *Cureus* 2019;11(10): e5879. doi:[10.7759/cureus.5879](https://doi.org/10.7759/cureus.5879)
10. Eslami AA, Jalilian F, Ataee M, Mirzaei Alavijeh M, Mahboubi M, Afsar A, et al. Intention and willingness in understanding Ritalin misuse among Iranian medical college students: a cross-sectional study. *Glob J Health Sci* 2014;6(6):43-53. doi:[10.5539/gjhs.v6n6p43](https://doi.org/10.5539/gjhs.v6n6p43)
11. Jaeschke RR, Sujkowska E, Sowa-Kućma M. Methylphenidate for attention-deficit/hyperactivity disorder in adults: a narrative review. *Psychopharmacology (Berl)* 2021;238(10):2667-91. doi:[10.1007/s00213-021-05946-0](https://doi.org/10.1007/s00213-021-05946-0)
12. Jain R, Chang CC, Koto M, Geldenhuys A, Nichol R, Joubert G. Non-medical use of methylphenidate among medical students of the University of the Free State. *S Afr J Psychiatr* 2017;23:1006. doi:[10.4102/sajpsychiatry.v23.1006](https://doi.org/10.4102/sajpsychiatry.v23.1006)
13. Sadeghi Bimorgh M, Akbarzadeh F, Ayati Afin A, Talaei A, Jafarian T, Mir Teimouri M, et al. Prevalence of nonmedical use of Ritalin among medical students of Mashhad University of Medical Sciences. *Journal of Fundamentals of Mental Health* 2023;25(1):29-34. doi:[10.22038/jfmh.2023.21808](https://doi.org/10.22038/jfmh.2023.21808)
14. Cohen YG, Segev RW, Shlafman N, Novack V, Ifergane G. Methylphenidate use among medical students at Ben-Gurion University of the Negev. *J Neurosci Rural Pract* 2015;6(3):320-5. doi:[10.4103/0976-3147.158749](https://doi.org/10.4103/0976-3147.158749)
15. Finger G, Silva ER, Falavigna A. Use of methylphenidate among

- medical students: a systematic review. *Rev Assoc Med Bras* (1992) 2013;59(3):285-9. doi:[10.1016/j.ramb.2012.10.007](https://doi.org/10.1016/j.ramb.2012.10.007)
16. De Bruyn S, Wouters E, Ponnet K, Van Hal G. Popping smart pills in medical school: are competition and stress associated with the misuse of prescription stimulants among students? *Subst Use Misuse* 2019;54(7):1191-202. doi:[10.1080/10826084.2019.1572190](https://doi.org/10.1080/10826084.2019.1572190)
 17. Jalilian F, Karami Matin B, Mirzaei Alavijeh M, Ataee M, Mahboubi M, Motlagh F, et al. Prevalence and factor related to Ritalin abuse among Iranian medical college student: an application of theory of planned behavior. *Ter Arkhiv* 2013;85(4s):22-7.
 18. Habibzadeh A, Alizadeh M, Malek A, Maghbooli L, Shoja MM, Ghabili K. Illicit methylphenidate use among Iranian medical students: prevalence and knowledge. *Drug Des Devel Ther* 2011;5:71-6. doi:[10.2147/dddt.S13818](https://doi.org/10.2147/dddt.S13818)
 19. Chan AY, Ma TT, Lau WC, Ip P, Coghill D, Gao L, et al. Attention-deficit/hyperactivity disorder medication consumption in 64 countries and regions from 2015 to 2019: a longitudinal study. *EClinicalMedicine* 2023;58:101780. doi:[10.1016/j.eclinm.2022.101780](https://doi.org/10.1016/j.eclinm.2022.101780)
 20. Jahed Taherani H, Dadgar Moghadam M, Baseri H. Frequency of methylphenidate (Ritalin) consumption and its associated factors in medical students. *Razavi J Med* 2018;6(3):11-6. doi:[10.30483/rijm.2018.20](https://doi.org/10.30483/rijm.2018.20)
 21. Fallah G, Moudi S, Hamidia A, Bijani A. Stimulant use in medical students and residents requires more careful attention. *Caspian J Intern Med* 2018;9(1):87-91. doi:[10.22088/cjim.9.1.87](https://doi.org/10.22088/cjim.9.1.87)
 22. Khademi L, Shariat SV. Prevalence of nonmedical use of methylphenidate (Ritalin) in residents of Tehran University of Medical Sciences and their attitude toward methylphenidate use. *Iran J Psychiatry Clin Psychol* 2013;19(1):20-7.
 23. Karami Matin B, Jalilian F, Ahmadi Jouybari T, Mirzaei Alavijeh M, Aghaei A, Ataee M. Illicit use of Ritalin among Iranian college student: prevalence, motive and attitude. *International Science Index* 2014;7:666-8.