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Published online: 04 Aug 2017.

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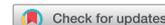
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Nonmedical Use of Prescription Medications Among Medical Students in Greece: Prevalence of and Motivation for Use

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ABSTRACT

Background: Non-medical use of prescription medications has risen to unprecedented levels over the past decade worldwide; however, studies assessing misuse across medical students are sparse. *Objectives*: The purpose of this study was to1) estimate the lifetime and the past-year prevalence of non-medical use of prescription medications among medical students in Greece 2) identify the motivation for use. *Methods*: 591 medical students completed an anonymous, self-administered, web-based survey assessing lifetime and past-year prevalence of non-medical use of four classes of prescription drugs (opioid painkillers, tranquillizers, sleeping and stimulant medications). According to the motivation to use the responders were classified into three subtypes (selftreatment, recreational, and mixed). *Results*: The prevalence of lifetime use was 10.7% for at least one of the four prescription drug classes and 9% of the respondents reported lifetime misuse of multiple categories of prescription drugs. The past-year prevalence was approximately 7.7% for at least one of the four prescription drug classes, while the majority misused the drugs "1-2 times per year". Senior students used tranquilizers more than junior students. Self-treatment and mixed subtypes of tranquillizers misuse was more prevalent among women than men while the self-treatment subtype was the most prevalent subtype in all the four drug classes. *Conclusions*: This is the first study investigating non-medical use of prescription medications among Greek medical students and indicates a high prevalence of misuse of some categories of prescription drugs, mostly for self-treatment purposes.

Introduction

Nonmedical use of prescription medications (NUPM) is a growing global public health issue because of its increasing prevalence and associated negative consequences. NUPM is defined as the use of prescription drugs, whether obtained by prescription or otherwise, other than in the manner, for the reasons, or time period prescribed or by a person for whom the drug was not prescribed (UNODC, 2011). NUPM is not a new problem, but it is one that deserves renewed attention. Several studies have shown that NUPM has increased significantly over the past two decades and is most prevalent among adolescents and young adults (Compton, Jones, & Baldwin, 2016; McCabe & Cranford, 2012). According to the United Nations office of drugs and crime, "the misuse of prescription drugs, including opioids, benzodiazepines, and synthetic prescription stimulants, is a growing health problem in a number of developed and developing countries" (UNODC, 2011). NUPM is associated with increased risk of morbidity and mortality; in

particular, epidemiologic studies show that emergency department visits due to the misuse of prescription opioids increased 153% between 2004 and 2011 in the United States, and the rates of death nearly quadrupled between 2000 and 2014 (DAWN, 2013). Furthermore, available data indicates that the nonmedical use of prescription opioids is a strong risk factor for heroin use (Compton et al., 2016).

A key risk period for the development of abusive behaviors is late adolescence into early adulthood, which encompasses the typical ages of college students, a population for whom increasing prevalence of NUPM has been reported. Based on data from more than 100,000 European students, the European School Survey Project on Alcohol and Other Drugs (ESPAD) reported a lifetime use of tranquillizers without a prescription at 6% of the students on average (ESPAD, 2012). The prevalence of nonmedical use of prescription stimulants is also considerably high among college students with past-year use rates ranging from 5% to 35% reported in various studies

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among college-age individuals (Wilens et al., 2008). Medical students may also be at a high risk for licit and illicit substance misuse. Several contributing factors to this behavior include increased depression and anxiety levels, stressful academic curricula, and familiarity and easier access to drugs (Dyrbye, Thomas, & Shanafelt, 2006). Misuse of prescription drugs, mainly for self-treatment purposes, among medical students and practicing physicians has long been reported (McAuliffe et al., 1986); however, recent data concerning NUPM among medical students is sparse(Abbasi-Ghahramanloo, Fotouhi, Zeraati, & Rahimi-Movaghar, 2015; Akvardar, Demiral, Ergor, & Ergor, 2004; Buchanan & Pillon, 2008; Ihezue, 1988; Petroianu, Reis, Cunha, & Souza, 2010). The lifestyles of medical students, the doctors of tomorrow who will be involved in the future of health care, is of interest, considering that substance use by medical students may affect their future professional behavior.

Furthermore, despite the increase in prevalence of NUPM, data on the motivations to use is limited among student populations, especially among medical students. The understanding of the motivation to use is important to fully comprehend the risks associated with NUPM because persons who engage in self-treatment may face different consequences than those who misuse for recreational purposes (McCabe, Boyd, & Teter, 2009). Within the context of NUPM, self-treatment is motivated by the desire to alleviate symptoms consistent with the primary pharmaceutical indication of the prescription drug and does not involve coingestion with alcohol or other drugs or nontherapeutic routes of administration (Boyd, McCabe, Cranford, & Young, 2006).

The objectives of this study were to (1) estimate the lifetime and past-year prevalence of nonmedical use for four classes of prescription drugs (opioid painkillers, tranquillizers, sleeping, and stimulant medications) among medical students in Greece and examine gender and preclinical/clinical level differences and (2) identify the motivation for NUPM and classify the misusers into three subtypes (self-treatment, recreational, and mixed). The study group consisted of medical students from the Medical School of Thessaloniki, the second largest city in Greece. To our knowledge, this is the first study conducted in Greece assessing both prevalence and motivation of NUPM among medical students.

Materials and methods

Study design

The present cross-sectional study was conducted in 2014, drawing on a total student population of over 3500 undergraduates attending the Medical School of the Aristotle University of Thessaloniki, the second largest Medical School in Greece. A random sample of 1000 students was selected from the total undergraduate student population. The entire sample was mailed a pre-notification e-mail describing the study and inviting students to self-administer a web survey by using a URL. The final response rate was 59.1% ($n = 591$), and the completion rate was 100% (participants were required to answer all survey questions prior to submission). No incentives were provided to the students for completing the survey.

Compliance with ethical standards

The study received the approval of the Bioethics Committee of the Faculty of Medicine of the Aristotle University of Thessaloniki.

Sample

The final sample consisted of 591 undergraduate medical students (56.3% women and 43.7% men; 37.2% preclinical level students and 62.8% clinical level students). In Greece, the clinical level studies at the Medical school start at the fourth year of study. The demographic characteristics of the sample closely resembled the overall student population of this university. The mean student age in the sample was 21.7 years old (SD = 1.8 Range = 18–28 years).

Measures

Assessment of lifetime and past-year prevalence

To assess lifetime and past-year use the questions used were based on similar questionnaires reported previously (McCabe et al., 2009). The lifetime prevalence of NUPM was assessed with the following question: "Have you ever used (not under a doctor's order) the following types of drugs?" The past-year prevalence was assessed with the question: 'In the past 12 months have you used the following types of drugs, not under a doctor's order? How many times?" There were separate questions for each of the following four classes of prescription drugs: (a) opioid painkillers (e.g., codeine-paracetamol, tramadol, and fentanyl); (b) tranquillizers (e.g., alprazolam, diazepam, and bromazepam); (c) sleeping medication (short-acting tranquillizers, e.g., temazepam, triazolam, and Z-drugs, e.g., zolpidem and zopiclone); and (d) stimulant medication (methylphenidate). It is important to note that among opioid painkillers, semisynthetic opioid formulations (e.g., hydromorphone, oxycodone, and hydrocodone) widely misused worldwide are not legally available in Greece. Similarly, the only licensed stimulant in Greece is methylphenidate, while

amphetamine/dextroamphetamine, the most common prescription stimulant in most countries, is not available. The response scale for all prescription drug classes was (1) no use, (2) 1–2 times per year, (3) 1–2 times per month, (4) 1–2 times per week, and (5) every day.

Assessment of motivation to use

Motivations for prescription drug misuse were assessed by asking respondents to provide the reasons why they used each class of prescription drugs not under a doctor's order. Based on previous studies, respondents who reported nonmedical prescription drug misuse were asked to select all that apply from a list of motives (McCabe et al., 2009). Seven motivations were listed for all four prescription drug classes: "because it helps decrease anxiety," "because it helps me sleep," "because it gives me a high," "because it counteracts the effects of other drugs," "because it is safer than street drugs," "because of experimentation," and "because I am addicted." In addition, for opioid painkillers, one other motivation was provided: "because it relieves the pain." For stimulant medication, three additional motivations were provided: "to increase alertness," "to help me concentrate," and "to help me stay awake"). Using a variable-centered approach, if respondents only endorsed the motivation that was most consistent with the drug's primary pharmaceutical indication (i.e., sleeping medication to sleep, tranquillizer medication to decrease anxiety, opioid painkillers to relieve pain, and stimulant medication to increase alertness), they were characterized as demonstrating self-treatment motivations. In addition, respondents were considered engaging in self-treatment motivations if they endorsed the primary indication and an additional motivation that was related to the pharmaceutical indication of the drug (e.g., nonmedical misuse of sleeping medication to help sleep and decrease anxiety, nonmedical misuse of tranquillizers to decrease anxiety and help sleep, nonmedical misuse of opioid painkillers to relieve pain and help sleep, and nonmedical misuse of stimulant medication to aid in concentration). If respondents only endorsed motivations consistent with recreational misuse, they were characterized as engaging in recreational motivations (i.e., because it gives me a high, because it counteracts the effects of other drugs, because it is safer than street drugs, because of experimentation, and because I am addicted). Finally, if respondents endorsed combinations of self-treatment and recreational motives, they were considered having mixed motivations.

Statistical analyses

Prevalence rates of nonmedical prescription drug-misuse subtypes were derived by dividing the number of respondents reporting each subtype by the total number of

Table 1. Prevalence of lifetime and past-year nonmedical use of each prescription class.

Drugs	Lifetime		Past-year	
	(N)	(%)	(N)	(%)
Opioid painkillers	114	19.3	78	13.2
Tranquilizers	43	7.3	38	6.4
Sleeping med	87	14.7	58	9.8
Stimulant med	8	1.4	8	1.4
Any prescription drug	63	10.7*	46	7.7*

*Represents nonmedical use of any of the four prescription drug classes.

respondents. The Chi-square test was used for univariate analysis of qualitative variables. Logistic regression analysis was used to identify factors independently associated with the lifetime use of each nonmedical prescription class. Estimated associations are described in terms of relative risks (RR) and odds ratios (OR) with 95% confidence intervals (CIs). The level of statistical significance was set at 0.05. All statistical analyses were performed using Statistical Package for Social Science (SPSS) v. 22.0.

Results

The prevalence of lifetime use was 10.7% for at least one of the four prescription drug classes (19.3% for opioid painkillers, 7.3% for tranquillizers, 14.7% for sleeping drugs, and 1.4% for stimulants) (Table 1). Approximately 9% of the respondents reported lifetime misuse of multiple categories of prescription drugs, 7.2% reported misuse of two prescription drug classes, and 1.5% reported misuse of three classes. The past-year prevalence was approximately 7.7% for at least one of the four prescription drug classes (13.2% for opioid painkillers, 6.4% for tranquillizers, 9.8% for sleeping drugs, and 1.4% for stimulants) (Table 1). The majority of students misused these drugs "1–2 times per year," while only a small percentage used them "1–2 time per month" (Table 2).

As illustrated in Table 3, the self-treatment subtype was the most prevalent of all four nonmedical prescription classes (18.4% for opioids, 5.4% for tranquillizers, 10.3% for sleeping drugs, and 1.4% for stimulants). A very small number of students reported use for recreational or mixed purposes. The lowest frequency of use was noticed for stimulants; only eight students (1.4%) reported lifetime misuse of stimulants, and all of them only for self-treatment purposes (Table 3).

Concerning the lifetime and past-year use of each class, in a univariate analysis, there were no statistically significant differences between men and women, but there were differences between the clinical level of students and the use of tranquillizers, indicating that students in their fourth, fifth, and sixth year of studies misused tranquillizers, mostly for self-treatment purposes (Table 4

Table 2. Frequency of past-year nonmedical use of the four prescription classes.

Frequency of use	Opioid painkillers	Tranquillizers	Sleeping med	Stimulant med
No use	86.8% ($n = 513$)	93.7% ($n = 553$)	90.2% ($n = 533$)	98.6% ($n = 583$)
1–2/year	10.2% ($n = 60$)	4.4% ($n = 26$)	7.6% ($n = 45$)	0.9% ($n = 5$)
1–2/month	2% ($n = 12$)	0.8% ($n = 5$)	1.4% ($n = 8$)	0.5% ($n = 3$)
1–2/week	0.8% ($n = 5$)	0.3% ($n = 2$)	0.8% ($n = 5$)	0.0% ($n = 0$)
Every day	0.2% ($n = 1$)	0.8% ($n = 5$)	0.0% ($n = 0$)	0.0% ($n = 0$)

and Table 5). In a multivariate model, the clinical level of students was independently associated with the lifetime [$p = .012$, OR = 2.744 (95%CI: 1.248–6.032), Table 4] and past-year [$p = .003$, OR = 4.178 (95% CI: 1.606–10.873), Table 5] use of tranquillizers. Senior students (fourth year of study or higher) tended to use tranquilizers more than junior students.

As indicated in Table 6, there were differences in the prevalence of tranquillizer misuse subtypes and gender ($p = .029$). Self-treatment and mixed subtypes of tranquillizer misuse tended to be more prevalent among women than men. In contrast, the recreational subtype was more prevalent among men than women for this drug class. Additionally, there were no differences between the prevalence of nonmedical prescription drug misuse subtypes and the study level.

Discussion

Nonmedical prescription drug misuse has risen to unprecedented levels over the past decade worldwide. In the United States, for example, the past two decades have been characterized by increasing levels of abuse of exceedingly diverse group of prescription drugs, including opioid medications; an estimated 25 million people initiated nonmedical use of pain relievers between 2002 and 2011 (SAMHSA, 2013). According to the Centers for Disease Control and Prevention, "The United States is in the midst of a prescription painkiller overdose epidemic," considering that since 1999, the amount of opioid painkillers prescribed and sold in the United States has nearly quadrupled (CDC, 2015). Based on this evidence, a new, hidden population dependent on prescribed medicines is emerging due to the increased exposure to available psychoactive drugs and formulations. This hidden population may differ from the usual drug user stereotypes and be more highly functioning, have higher

socioeconomic status, have better education and have more social support (Dobbin, 2014). The report from the United Nations office of drugs and crime on NUPM notes that individuals who report using prescription drugs nonmedically tend to be highly educated. The NUPM serves a number of different purposes for people who are in higher education, including self-medication, socio-recreation, and academic functioning. University settings are often highly competitive, and academic performance influences career opportunities (UNODC, 2011). Other vulnerable groups include young persons (including children, adolescents, and young adults) and health-care professionals (Merlo & Gold, 2008; SAMHSA, 2013). Considering that medical education has been reported to be one of the most stressful academic curricula worldwide, which can negatively affect the physical and mental health of students, medical students may be at a higher risk for licit and illicit substance misuse (Abbasi-Ghahramanloo et al., 2015). The study of substance abuse by medical students is important because the perception and detection of patients with substance abuse problems may be influenced by the personal experiences of physicians with substance abuse (Roncero et al., 2014).

To the best of our knowledge, there are no studies assessing fully the prevalence of and the motivation for NUPM among medical students in Greece. A previously published, small study among 114 medical students found a 5.8% prevalence of lifetime benzodiazepine use, which is lower than our observed 7.3% (Spyridi et al., 2011). Extensive evidence, although limited to adolescents (mean age of 15.8 years), comes from the ESPAD survey, which found that the lifetime nonmedical use of sedatives and tranquillizers was more common among the Greek students compared with the ESPAD average (9% and 6%, respectively) (ESPAD, 2012).

According to our results, the past-year prevalence of NUPM was 13.2% for opioid painkillers, 6.4% for

Table 3. Motivations of lifetime nonmedical use of the four prescription classes.

| Motivation of use[*] | Opioid painkillers ($n = 477$) | Tranquillizers ($n = 548$) | Sleeping med ($n = 504$) | Stimulant med ($n = 583$) |
No use				
Self-treatment	95.6% ($n = 109$)	74.4% ($n = 32$)	70.1% ($n = 61$)	100% ($n = 8$)
Recreational	0.9% ($n = 1$)	9.3% ($n = 4$)	13.8% ($n = 12$)	0% ($n = 0$)
Mixed	3.5% ($n = 4$)	16.3% ($n = 7$)	16.1% ($n = 14$)	0% ($n = 0$)

[*]Percentages are not mutually exclusive since a medical student could endorse more than one reason to use.

Table 4. Factors associated with the lifetime nonmedical use of each prescription class (univariate analysis in terms of Relative risk and 95% CI and multivariate logistic regression in terms of odds ratio and 95% CI; CI: confidence interval; RR: relative risk; OR: odds ratio).

	Opioid painkillers		Tranquillizers		Sleeping medication		Stimulant medication	
	RR (95% CI)	OR (95% CI)	RR (95% CI)	OR (95% CI)	RR (95% CI)	OR (95% CI)	RR (95% CI)	OR (95% CI)
Female	1.379 (.976–1.950)	.676 (.443–1.033)	1.446 (.789–2.650)	1.468 (.764–2.820)	1.047 (.707–1.551)	.951 (.600–1.507)	.465 (.112–1.927)	2.200 .520–9.300)
Male	Reference		Reference		Reference		Reference	
Clinical	1.285 (.898–1.838)	.740 (.478–1.145)	2.594 (1.226–5.491)*	2.744 (1.248–6.032)**	1.186 (.784–1.793)	.820 (.507–1.327)	1.779 (.362–8.738)	.548 (.109–2.744)
Preclinical	Reference		Reference		Reference		Reference	

*p = .009, **p = .012.

Table 5. Factors associated with the past-year nonmedical use of each prescription class (univariate analysis in terms of Relative risk and 95% CI and multivariate logistic regression in terms of odds ratio and 95% CI; CI: confidence interval; RR: relative risk; OR: odds ratio).

	Opioid painkillers		Tranquillizers		Sleeping medication		Stimulant medication	
	RR (95% CI)	OR (95% CI)	RR (95% CI)	OR (95% CI)	RR (95% CI)	OR (95% CI)	RR (95% CI)	OR (95% CI)
Female	1.384 (.897–2.133)	.693 (.442–1.136)	1.328 (.701–2.516)	1.330 (.670–2.640)	1.179 (.715–1.945)	.834 (.480–1.450)	.465 (.112–1.927)	2.200 (.520–9.300)
Male	Reference		Reference		Reference		Reference	
Clinical	1.334 (.850–2.095)	.724 (.433–1.209)	3.914 (1.551–9.877) [*]	4.178 (1.606–10.873) [*]	1.045 (.628–1.738)	.956 (.544–1.680)	1.779 (.362–8.738)	.548 (.109–2.744)
Preclinical	Reference		Reference		Reference		Reference	

[*] $p = .002$, [**] $p = .003$.

Table 6. Gender (female/male) and study level (clinical/preclinical) differences in prevalence of nonmedical prescription drug misuse subtypes (% among those who reported any lifetime nonmedical misuse).

	Opioid painkillers (n = 114)			Tranquillizers (n = 43)			Sleeping medication (n = 87)			Stimulants (n = 8)		
	Self-treatment %	Recreation %	Mixed %	Self-treatment %	Recreation %	Mixed %	Self-treatment %	Recreation %	Mixed %	Self-treatment %	Recreation %	Mixed %
				*	*	*						
Female	61	1	2	53	0	12	38	9	10	38	0	0
Male	34	0	2	21	9	5	32	5	6	62	0	0
Clinical	65	1	2	60	9	12	52	7	8	75	0	0
Preclinical	30	0	2	14	0	5	18	7	8	25	0	0

*p = .0029 based on Chi-square tests.

tranquillizers, 9.8% for sleeping drugs, and 1.4% for stimulants. The past-month prevalence was 2%, 0.8%, 1.4%, and 0.5%, respectively. Limited research exists worldwide on the prescription drug-use patterns of medical students. A recently published study conducted among 1992 medical sciences students in Iran revealed that the past-month prevalence of tranquillizers use was 0.4%, while 2% of the students had used opioid drugs, and 2.7% had used methylphenidate (Abbasi-Ghahramanloo et al., 2015).Our results on past-month use of opioids were similar (2%) but significantly lower for stimulants (0.5%). Petroianu et al. reported a 12% past-year prevalence for anxiolytics and 7.5% for stimulants among medical students in Brazil (Petroianu et al., 2010), which was higher compared to our observed rates (6.4% tranquillizers, 1.4% stimulants). However, some studies reported lower past-year prevalence for tranquillizers. In a study among Turkish medical students, the past-year prevalence for tranquillizers was 3.8% across senior students, while none of the junior students reported using this class of drugs (Akvardar et al., 2004). In a sample of 260 medical students in Honduras, the past-year prevalence of the tranquillizer diazepam was 3.8%, while the past-year prevalence of sleeping pills was 8.8% (Buchanan & Pillon, 2008). Finally, considering lifetime prevalence, the results from an older study among undergraduate medical students in Nigeria described the lifetime prevalence of tranquillizers was 12.6%, and the majority of the misusers took them two to three times per month (Ihezue, 1988). In our study, the prevalence of lifetime use of tranquillizers was significantly lower (7.3%). The misuse of tranquillizers by medical students is an important issue, especially in Western societies where these substances are used heavily (EMCDDA, 2013). Tranquillizer misuse by future physicians could affect the detection of addiction and related problems in the general population (Roncero et al., 2014).

Based on our results, senior students (fourth year of studies or higher) used tranquilizers more than junior students, and self-treatment and mixed subtypes of tranquilizer misuse was more prevalent among women than men. Our findings are consistent with those of a recently published review on substance use among medical students that highlighted two strongly associated factors, academic year, and gender. Medical students had higher substance use rates during the last years of school, and women had higher substance use rates for hypnotic drugs (benzodiazepines and barbiturates). In this review, a male:female ratio of 1:2 was suggested, which was consistent with international reports that indicated a greater use of tranquillizers among women in the general population (Roncero et al., 2015). According to the European School Survey Project on Alcohol and Other Drugs, tranquillizers or sedatives are a widely used group of prescription medication, but they may also, depending on the country, be more or less easily obtained without a prescription for the purpose of "getting high" rather than for medical reasons. Lifetime nonmedical use of these drugs is most commonly reported in Lithuania, Monaco and Poland (14%), while the lowest levels of use are reported in Faroe Islands, Germany, Liechtenstein, Moldova, the Russian Federation and Ukraine (2%). Sex distribution showed that on average, slightly more girls than boys report use without a prescription (8% vs. 5%). Notably, of all the substances assessed by this survey, sedatives/tranquillizers were the only class predominantly used by girls (ESPAD, 2012).

As mentioned earlier, a notable finding in our study was the very low percentage of stimulant misusers (1.4%); only eight students reported lifetime misuse of stimulants, and all of them just for self-treatment purposes. This percentage is not surprisingly low, considering that the overall percentage of medically prescribed stimulants in Greece (only methylphenidate is available on the market) is also low. Our findings are in contrast with the worldwide growing trend of nonmedical use of stimulants among students. Recent reviews identified that 5–35% of college students use stimulants without prescriptions, with a high proportion of children and young adults obtaining these drugs from off-market sources (Kollins, 2008; Wilens et al., 2008). The results of an online survey of stimulant use among 1115 medical students in Chicago indicated that on average, 18% of students had used stimulants at least once in their lifetime, 60% reported using

them during medical school, and 19% reported daily use (Emanuel et al., 2013). A Canadian study revealed that 15% of medical students admitted to nonmedical use of one or more pharmaceutical stimulants, of whom 4% had used stimulants within the last year (Kudlow, Naylor, Xie, & McIntyre, 2013). Finally, a recent study reported that the estimated 12-month prevalence of using cognitive-enhancing drugs was 20% among German university students (Dietz et al., 2013). Medical school is a challenging environment characterized by large volumes of study material, late nights of studying, and competitive classmates. Consequently, the prevalence of stimulant use, especially use intended for performance enhancement, is worth being studied among medical students; however, only a few studies have examined stimulant use in this population.

To fully comprehend the risks associated with the misuse and abuse of prescription medications, it is necessary to understand the motivations of that use. The present study revealed that the self-treatment subtype was the most prevalent for all four drug classes, especially for pain medication (18.4%). Among the substances used for self-treating pain, the majority of the students reported use of the paracetamol-codeine combination and the rest reported fentanyl, pethidine and tramadol use. A very small number of students reported use for recreational or mixed purposes. Among the small number of stimulant misusers (1.4%), all of them reported a self-treatment motive (to increase alertness and to help concentrate). There is a lack of published international studies among medical students assessing motivation subtypes of opioid painkillers and tranquillizer misuse; thus, a clear comparison with our results cannot be performed. Results from the quantitative analysis of a review of self-medication in physicians and medical students showed that self-treatment is deeply ingrained in medical culture and is acquired as early as medical school for aspiring physicians. In this review, the qualitative analysis of the literature indicated that inappropriate self-treatment is rooted in avoiding the patient role, occupational norms about self-treatment, the pressure to perform at work, and the need to keep things within the profession (Montgomery, Bradley, Rochfort, & Panagopoulou, 2011). Data exists, however, for undergraduate US university students (McCabe et al., 2009) and high school seniors (McCabe & Cranford, 2012). In the first study, among those who reported nonmedical prescription drug misuse, approximately 13% were classified into the recreational subtype, while 39% were in the self-treatment subtype, and 48% were in the mixed subtype (McCabe et al., 2009). The second study surveyed a nationally representative sample of US high school seniors and revealed a great deal of heterogeneity associated with NUPM because approximately 75% of past-year nonmedical users of prescription stimulants, tranquillizers, and opioids endorsed more than one motive for use (McCabe & Cranford, 2012).

Limitations

There are several limitations of the present study that need to be considered. First, the study design was cross-sectional, so we could not investigate a cause and effect relationship. Second, the study was questionnaire based, so some information bias may have occurred, such as under or overreporting of misuse. Third, our results cannot be generalized to all health profession students in Greece. In addition, the survey did not distinguish between medications that were prescribed by a doctor, but used nonmedically or medications that were illicitly obtained. Finally, our sample has a lower number of preclinical level students compared with the clinical level, and the response rate differed among the years of study, so some selection bias may have occurred.

Conclusion

To the best of our knowledge, this is the first study conducted in Greece assessing NUPM and the motivation to misuse prescription drugs among medical students. Our results indicate a high prevalence of misuse for some categories of prescription drugs, mostly for self-treatment purposes. Opioid painkillers and sedatives are the most commonly misused drugs, while the percentage of students using stimulants is low. Further international studies among medical students are needed to further clarify the epidemiology of NUPM and to extensively study student attitudes toward this risky behavior.

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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