

RESEARCH ARTICLE

Open Access



Gender differences in the nonmedical use of psychoactive medications in the school population- national trends and related factors

Pilar Carrasco-Garrido^{1*} , Isabel Jiménez-Trujillo¹, Valentín Hernández-Barrera¹, Nazaret Alonso-Fernández¹, Soledad García-Gómez-Heras² and Domingo Palacios-Ceña³

Abstract

Background: The nonmedical use of prescribed medicines among adolescents has increased significantly in recent years. Our study was designed to describe the prevalence of the nonmedical use of tranquilizers, sedatives, and sleeping pills (TSSp) among the school-age population residing in Spain from a gender perspective, and to identify factors associated with such use.

Methods: Nationwide, epidemiological, cross-sectional study on the nonmedical use during the previous 30 days, of TSSp by the Spanish school population. We used individualized secondary data retrieved from the 2004, 2006, 2008, 2010, 2012 and 2014 Spanish state survey on Drug Use in Secondary Education and a total of 179,114 surveys from respondents aged 14 to 18 years. Using logistic multivariate regression models, we estimated the independent effect of each of these variables on the nonmedical use of medicines. Two models were generated- one for females and one for males.

Results: 2.86% (5116) of the Spanish school population of both sexes made nonmedical use of TSSp. Prevalence was greater among girls than among boys for all the study years. Patterns of nonmedical use among female adolescents were related to alcohol, tobacco and marijuana use. Consumption of illegal psychoactive substances, other than marijuana, was the variable showing the greatest value among male teenagers (aOR 6.21 (95% CI 4.97–7.77)).

Conclusions: The prevalence of the nonmedical use of TSSp is higher in girls than in boys. The influence of legal and illegal psychoactive substances leads to a higher likelihood of nonmedical use of TSSp in high-school students in Spain.

Keywords: High-school students, Nonmedical use of prescription drugs, Gender, National Survey on drug use

Background

The latest World Drug Report [1] indicates that the period from early adolescence (12–14 years of age) to late adolescence (15–17) is one of high risk for starting psychoactive substance consumption. Research shows that the nonmedical use of prescribed medicines among adolescents has increased significantly in recent years [2, 3] reaching values close to 5% among US teenagers [4] and

9% among European teens [5]. Consumption prevalence for prescription medications such as psychodrugs has increased [6], but an increase in the nonmedical use of these drugs has also been observed among these teenagers [7]. This situation is reflected in the results of the National Survey on Drug Use and Health (NSDUH), and the European School Survey Project on Alcohol and other Drugs (ESPAD), with respect to the nonmedical use of tranquilizers and sedatives among the adolescent population of these countries [8, 9].

Gender differences in psychoactive substance use rates have been consistently studied among the general population. Men present the significantly highest rates of

* Correspondence: pilar.carrasco@urjc.es

¹Preventive Medicine and Public Health Teaching and Research Unit, Health Sciences Faculty, Universidad Rey Juan Carlos, Av. Atenas s/n. 28 922, Alcorcon, Madrid, Spain

Full list of author information is available at the end of the article



consumption, abuse and dependence values [10–12], although women present certain specific patterns of substance use [13–15].

The influence of gender on drug consumption habits is conditioned by a generational factor. For the adult population, who were mostly brought up with traditional gender role models, consumption among women is much lower than among men. On the other hand, for current adolescents, who are experiencing more egalitarian gender role models, a trend towards parity of drug consumption habits can be observed with parity already reached for legal psychoactive substances, such as tobacco and alcohol, where the lessening of the consumption gap by female teenagers is evident [16, 17].

Psychotropic drugs represent a type of legal psychoactive substance that affects all age groups of men and women differently with regard to gender for both medically prescribed drugs and drugs ingested for nonmedical use [18–20].

The scientific literature shows that the psychoactive substances that women consume tend to be legal psychoactive substances that are socially acceptable. This makes their consumption more likely to go unnoticed, becoming practically invisible to those who work in the drug addiction field and who, as a result, focus more frequently on consumption by the male population. This situation is especially relevant for adolescent females, whose consumption of legal drugs is clearly increasing and has surpassed males consumption of psychoactive substances including alcohol, tranquilizers, and tobacco [21, 22].

Studies have been published that analyzed factors that may influence the nonmedical use of psychodrugs among adolescent populations, and predicting factors identified for the nonmedical use of medications include age, gender, relationship with parents, school absenteeism, family environment and friends [23, 24], and the consumption of other psychoactive drugs [7]. However, there are too few studies specifically analyzing the differences between males and females regarding the nonmedical use of these psychoactive substances with respect to sociodemographic factors, substance abuse, and other variables that could act as predicting factors.

The objective of our study was to examine, from a gender perspective, the nonmedical use prevalence of tranquilizers, sedatives, and sleeping pills (TSSp) among the Spanish population and to identify factors associated with such consumption. We also assessed the evolution of nonmedical use of these drugs from 2004 to 2014 among the adolescent population of both sexes.

Methods

An analysis was performed on the data collected in the Spanish State Survey on Drug Use in Secondary Education (ESTUDES), as well as on the data from the six

surveys conducted between 2004 and 2014. A descriptive, cross-sectional study was conducted on the non-medical use of TSSp by Spanish adolescents. School population was the population of our study, based on data from 11,716 adolescents of both sexes aged 14 to 18 years. Details of the Spanish State Survey on Drug Use in Secondary Education methodology have been previously published in a related article [25].

As dependent dichotomous variables, “yes” or “no” answers were taken to the question, Have you taken a tranquilizer, sedative, and/or sleeping pill without a prescription during the last month?

As independent variables, we firstly analyzed a number of sociodemographic characteristics and then we continued with variables related to the use of other legal and illegal psychoactive drugs. For the analysis, we used certain variables related to the adolescent population context, such as risk perceived for consumption, ease of obtaining psychodrugs or information previously received on drugs.

Descriptive statistics of the main study variables have been used to calculate the nonmedical use of TSSp prevalence during the years 2006 to 2014. All calculations were used for both sexes. A generalized linear model with a binomial response and logit link function (logistic regression), using the year as the continuous variable was employed for the bivariate analysis of the changes in the variables by year.

The six EDADES surveys were grouped in order to be analyzed globally, and thus increase the power of contrasts.

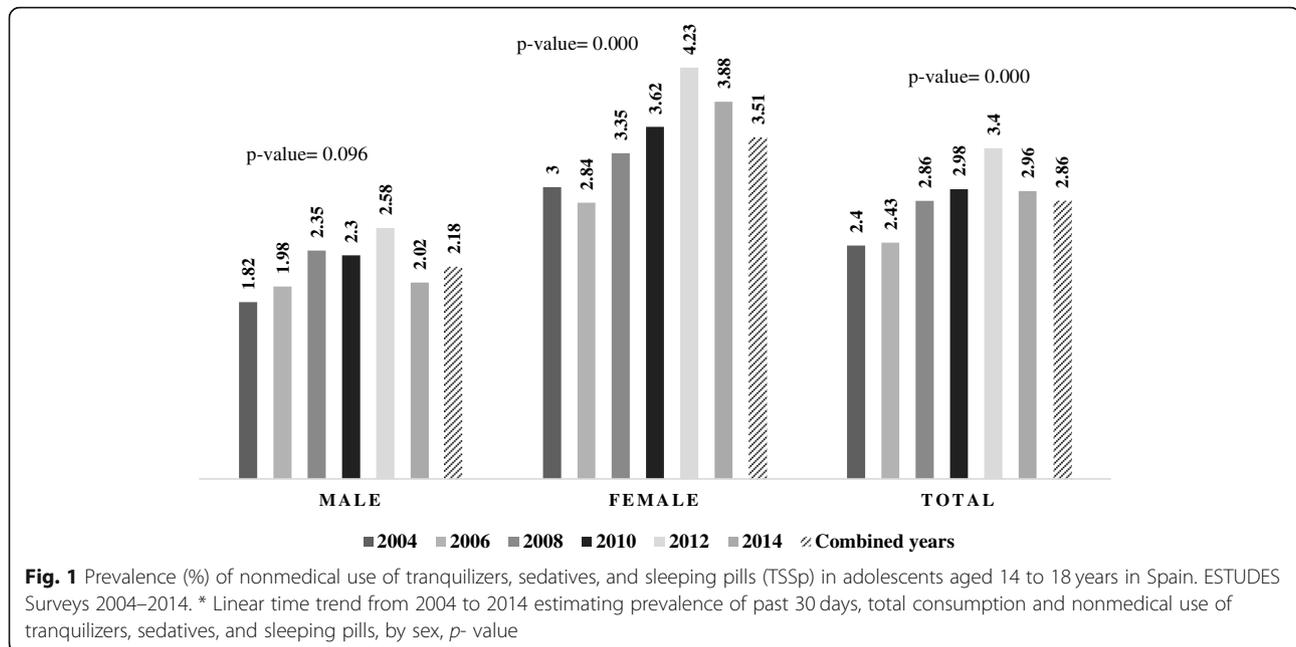
The raw odds ratio (OR) and its 95% confidence interval (95% CI) were used so as to determine the association between the non-medical use of TSSp and the study variables. Subsequently, two multivariate analysis models were designed (one for males and the other for females) using logistic regression models, thus obtaining the corresponding adjusted OR and 95% CI. Finally, trends of nonmedical use of TSSp from 2004 to 2014 were analyzed both in males and in females, with their corresponding odds ratios.

The `svy` function (survey command) of the STATA program (STATA Corp, College Station, Texas, USA) was used in the estimates, with the incorporation of the sampling design and weights of the statistical calculations already specifically developed in the study. Statistical significance was considered as a 2-tailed $\alpha < 0.05$.

Results

2.86% (5116) of the Spanish school population of both sexes reported nonmedical use of TSSp in the decade from 2004 to 2014. Consumption prevalence was greater among girls than among boys for all the study years (Fig. 1).

Tables 1 and 2 present prevalence data for nonmedical use according to sociodemographic variables, variables



related to co-ingestion of other legal and illegal psychoactive drugs, risk perception, availability of these drugs, and the information received about drug abuse in schools. TSSp consumption increased with age for both sexes and significantly increased among female immigrant adolescents during the study years. Regarding the co-ingestion of other psychoactive substances, the prevalence of nonmedical use of TSSp was greater among students of both sexes who reported having consumed alcohol, tobacco and/or marijuana during the previous 30 days. Among those students who had consumed illegal psychoactive drugs other than marijuana during the last year, nonmedical use prevalence values were higher for girls. The results show that the percentage of female adolescents who perceived no problem with the nonmedical consumption of TSSp was superior to that of males. The prevalence of prior month nonmedical use of TSSp among those female adolescents who perceived TSSp as easy/very easy to obtain was 6.5%.

Table 3 shows the results of two multivariate analysis models performed using logistic regression— one for males and the other for females. They show the independent effect of each study variable, adjusted for the other variables, on TSSp nonmedical use in our sample.

When analyzing patterns of nonmedical use among female adolescents, the variables related to consumption of psychoactive substances in the previous 30 days, which were independently and significantly associated with a greater probability of TSSp nonmedical use were alcohol, tobacco and marijuana consumption (aOR = 1.26, 95% CI 1.07–1.48). Female adolescents who reported having consumed some type of illegal psychoactive drug,

other than marijuana, in the previous 12 months, were 3.38 times more likely to make nonmedical use of TSSp (aOR = 3.38, 95% CI 2.70–4.23).

Among these adolescents, the perceived risks in consuming these substances and their availability (aOR = 3.51, 95% CI 2.98–4.14) acted as predicting factors for TSSp nonmedical use.

Among the male school adolescents in our study, alcohol and marijuana were also significantly associated with TSSp nonmedical use. Consumption in the previous year of any type of illegal psychoactive substance, other than marijuana, was the variable showing the greatest value in male teenagers, with a statistically significant association, presenting aOR values of 6.21 (95% CI 4.97–7.77). The perceived risk for the use of these substances (aOR = 3.04, 95% CI 2.55–3.62) and their availability showed a statistically significant association in these male teenage students.

When analyzing trends for TSSp nonmedical use from 2004 to 2014, female teenage students presented an OR = 1.04 (95% CI 1.02–1.05), taking 2004 as a reference. Confounding variables were controlled for so that statistical significance was maintained (OR: 1.06, 95% CI 1.04–1.08), which means that the nonmedical use of TSSp among adolescent females of the Spanish school population varied about 6% every year during the analyzed period of time.

Among male Spanish adolescent students, no significant association was found when analyzing TSSp nonmedical use trends during the study decade.

Discussion

The addition of the gender perspective to the study of drug addictions in recent years has generated new ways

Table 1 Prevalence of nonmedical use of TSSp in Male adolescents, according to sociodemographic variables, use of licit and illicit psychoactive drugs and variables related with perceived health risk, perceived availability and School information. ESTUDES Survey

	2004		2006		2008		2010		2012		2014		Combined years	^a Linear Trend p-value ^a
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)		
Age														
14–15	64(1.18)	94(1.7)	118(1.84)	114(1.65)	84(1.79)	132(1.63)	606(1.64)	0.208						
16–18	170(2.29)	156(2.19)	233(2.74)	245(2.81)	274(2.99)	242(2.33)	1321(2.57)	0.287						
Nationality														
Immigrants	NA	240(2.04)	308(2.29)	313(2.24)	319(2.59)	316(1.92)	1495(2.2)	0.778						
Spanish	234(1.82)	10(1.18)	44(2.95)	46(2.9)	40(2.55)	58(2.89)	197(2.64)	0.204						
Occupational status of parents														
Unemployed both	16(9.83)	11(3.04)	33(5.4)	25(3.72)	38(4.7)	27(2.67)	150(4.14)	0.018						
Employed one	38(2.58)	37(2.32)	65(2.75)	68(2.37)	88(2.78)	84(2.17)	380(2.48)	0.689						
Employed both	179(1.6)	202(1.9)	254(2.12)	266(2.21)	232(2.35)	263(1.93)	1397(2.01)	0.043						
Educational level of parents														
No formal education	20(3.42)	8(1.93)	24(4.28)	22(5.1)	20(5.36)	12(3.05)	106(3.83)	0.388						
Primary school	89(1.9)	116(2.65)	101(1.96)	106(2.11)	108(2.33)	85(2.18)	605(2.18)	0.766						
Secondary school	28(1.66)	31(1.53)	53(2.23)	71(2.35)	69(2.47)	77(1.66)	330(1.98)	0.713						
Higher education	61(1.74)	74(2.1)	106(2.7)	125(2.65)	101(2.51)	122(1.87)	589(2.25)	0.871						
Alcohol use in the past 30 days														
No	54(1.14)	50(0.94)	82(1.3)	83(1.26)	35(0.88)	71(0.96)	374(1.09)	0.440						
Yes	180(2.21)	200(2.73)	269(3.12)	276(3.07)	324(3.26)	303(2.73)	1552(2.87)	0.049						
Any cigarette smoking in the past 30 days														
No	17(3.08)	126(1.33)	190(1.85)	194(1.61)	192(1.86)	213(1.45)	932(1.62)	0.754						
Yes	106(3.3)	124(3.96)	161(3.48)	165(4.65)	167(4.66)	161(4.2)	885(4.03)	0.038						
Any marijuana use in the past 30 days														
No	112(1.2)	122(1.25)	166(1.44)	177(1.4)	224(1.98)	214(1.37)	1014(1.45)	0.035						
Yes	122(3.43)	127(4.54)	186(5.41)	183(6.05)	135(5.26)	160(5.46)	913(4.99)	0.001						
Any illicit psychoactive drug use other than marijuana in the last 12 months														
No	151(1.27)	155(1.3)	245(1.72)	232(1.55)	253(1.9)	280(1.55)	1316(1.56)	0.020						
Yes	83(8.83)	95(1.392)	106(15.19)	127(20.19)	106(18.76)	94(20.2)	610(15.35)	0.000						
Perceived health risk for consumption of TSSp														
No/few problems	67(6.02)	85(5.97)	126(7.10)	107(6.12)	94(8.48)	79(4.85)	557(6.34)	0.699						
Quite a few/many problems	120(1.29)	130(1.48)	143(1.47)	164(1.81)	184(2.12)	204(1.66)	946(1.64)	0.009						
Perceived availability of TSSp														
Impossible/very difficult to obtain	29(0.87)	32(0.9)	55(1.26)	49(1.44)	62(1.66)	86(1.55)	313(1.31)	0.004						
Easy/very easy to obtain	175(2.7)	175(3.46)	229(4.26)	222(3.97)	196(4.89)	196(3.92)	1193(3.79)	0.000						
Information on drugs received at school														
No	65(1.97)	95(1.99)	102(2.78)	111(3.04)	111(3.47)	101(2.48)	584(2.58)	0.012						
Yes	169(1.77)	155(1.97)	213(2.01)	226(1.98)	225(2.21)	242(1.76)	1230(1.94)	0.848						

NA not available

^aLinear time trend from 2004 to 2014 estimating prevalence of past 30 days nonmedical use of tranquilizer, sedatives and sleeping pills by demographic subgroup

Table 2 Prevalence of nonmedical use of TSSp in Female adolescents, according to sociodemographic variables, use of licit and illicit psychoactive drugs and variables related with perceived health risk, perceived availability and School information. ESTUDES Survey

		2004	2006	2008	2010	2012	2014	Combined years	^a Linear Trend <i>p</i> -value ^a
		N (%)	N (%)						
Age	14–15	138(2.56)	153(2.45)	200(2.94)	233(3.15)	161(3.4)	272(3.13)	1157(2.95)	0.013
	16–18	242(3.31)	241(3.16)	311(3.68)	360(4.01)	416(4.68)	464(4.51)	2032(3.95)	0.000
Nationality	Immigrants	NA	360(2.82)	445(3.28)	511(3.52)	487(4.04)	638(3.81)	2441(3.51)	0.000
	Spanish	380(3.00)	34(3.10)	65(3.96)	81(4.45)	89(5.68)	98(4.4)	368(4.39)	0.084
Occupational status of parents	Unemployed both	2(1.36)	16(3.76)	24(5.15)	39(5.38)	50(6.13)	72(6.64)	203(5.5)	0.007
	Employed one	67(3.99)	61(3.29)	104(3.57)	150(4.40)	156(4.29)	178(4.09)	715(4.01)	0.292
	Employed both	310(2.87)	317(2.74)	383(3.23)	404(3.30)	371(4.04)	486(3.59)	2271(3.28)	0.000
Educational level of parents	No formal education	16(2.97)	17(2.55)	22(3.26)	16(2.81)	22(4.76)	18(3.19)	111(3.19)	0.374
	Primary school	129(2.62)	158(2.97)	220(3.69)	214(3.67)	198(3.99)	194(4.03)	1113(3.5)	0.000
	Secondary school	49(2.9)	64(2.88)	64(2.82)	124(3.9)	119(4.31)	180(3.81)	600(3.56)	0.015
	Higher education	127(3.76)	97(2.91)	127(3.46)	171(3.88)	172(4.48)	246(3.9)	941(3.77)	0.097
Alcohol use in the past 30 days	No	81(1.79)	132(2.27)	156(2.52)	176(2.54)	78(2.21)	139(2.01)	763(2.25)	0.888
	Yes	299(3.66)	262(3.26)	354(3.91)	417(4.4)	498(4.94)	597(4.95)	2427(4.27)	0.000
Any cigarette smoking in the past 30 days	No	15(2.71)	214(2.23)	262(2.59)	346(2.98)	310(3.22)	413(2.84)	1560(2.78)	0.014
	Yes	188(4.57)	180(4.24)	248(4.83)	247(5.19)	266(6.68)	323(7.25)	1452(5.44)	0.000
Any marijuana use in the past 30 days	No	231(2.34)	291(2.56)	362(2.87)	417(3.00)	417(3.52)	530(3.16)	2246(2.94)	0.000
	Yes	149(5.3)	103(4.12)	149(5.66)	176(7.08)	160(8.97)	206(9.44)	943(6.55)	0.000
Any illicit psychoactive drug use other than marijuana in the last 12 months	No	318(2.61)	360(2.67)	456(3.06)	524(3.26)	512(3.82)	683(3.64)	2855(3.21)	0.000
	Yes	61(12.52)	34(8.86)	54(16.13)	68(23.76)	64(29.05)	53(24.62)	334(17.35)	0.000
Perceived health risk for consumption of TSSp	No/few problems	101(8.37)	106(7.70)	140(9.4)	148(9.05)	146(14.33)	183(10.99)	825(9.82)	0.001
	Quite a few/many problems	249(2.47)	236(2.20)	285(2.51)	338(3.09)	339(3.60)	417(3.1)	1864(2.82)	0.000
Perceived availability of TSSp	Impossible/very difficult to obtain	23(0.71)	64(1.59)	61(1.34)	65(1.96)	75(2.17)	101(1.94)	389(1.63)	0.000
	Easy/very easy to obtain	320(4.76)	278(4.8)	361(6.24)	432(6.79)	388(9.21)	448(8.30)	2226(6.50)	0.000
Information on drugs received at school	No	98(3.42)	154(3.14)	121(3.29)	154(4.54)	159(4.87)	176(4.22)	861(3.87)	0.003
	Yes	282(2.87)	240(2.68)	369(3.3)	423(3.35)	402(3.99)	533(3.74)	2248(3.36)	0.000

NA not available

^aLinear time trend from 2004 to 2014 estimating prevalence of past 30 days nonmedical use of tranquilizer. Sedatives and sleeping pills by demographic subgroup

of understanding the usage patterns of new consumers [10, 15, 26, 27]. This approach allows for the identification of male and female consumption patterns and makes female usage more visible.

When analyzing TSSp nonmedical use among Spanish adolescents, our results indicate that for the study decade, comprised from 2004 to 2014, the prevalence of nonmedical use of prescription medicine has experienced a significant increase of around 6 % in the female school population residing in Spain (aOR = 1.06, 95% CI 1.04–1.08). These results agree with those obtained during 2002

and 2005 by the United States (US) National Survey on Drug Use and Health (NSDUH), which indicated that US female adolescents presented higher rates of nonmedical use of tranquilizers and sedatives than male adolescents [28]. The investigation performed by Young et al. by means of the systematic review of the scientific bibliography on nonmedical use of prescribed medicines in adolescents found that, in most of the studies, female gender was more associated with tranquilizer use [29]. Also, the Brazilian study by Opaleye et al. shows that female adolescents have twice the probability (aOR = 2.19; 95% CI:

Table 3 Multivariable logistic regression of past 30 days nonmedical use of TSSp among the school population aged 14 to 18 years in Spain. ESTUDES Survey 2004–2014

		Male		Female	
		OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR(95% CI)
Occupational status of parents	Employed both	1	1	1	1
	Employed one	1.23(1.031-48)	1.09(0.87–1.38)	1.23(1.10–1.37)	1.17(1.01–1.35)
	Unemployed both	2.10(1.70–2.60)	1.59(1.13–2.24)	1.71(1.40–2.11)	1.37(1.04–1.80)
Alcohol use in the past 30 days	No	1	1	1	1
	Yes	2.67(2.31–3.09)	1.57(1.26–1.95)	1.94(1.74–2.16)	1.47(1.25–1.73)
Any cigarette smoking in the past 30 days	No	1	1	1	1
	Yes	2.54(2.23–2.90)	1.21(0.98–1.49)	2.00(1.83–2.21)	1.43(1.24–1.67)
Any marijuana use in the past 30 days	No	1	1	1	1
	Yes	3.57(3.14–4.07)	1.54(1.24–1.91)	2.31(2.09–2.55)	1.26(1.07–1.48)
Any illicit psychoactive drug use other than marijuana in the last 12 months	No	1	1	1	1
	Yes	11.44(9.88–13.25)	6.21(4.97–7.77)	6.32(5.43–7.35)	3.38(2.70–4.23)
Perceived health risk for consumption of TSSp	Quite a few/many problems	1	1	1	1
	No/few problems	4.07(3.55–4.67)	3.04(2.55–3.62)	3.74(3.36–4.17)	2.92(2.55–3.33)
Perceived availability of TSSp	Impossible/very difficult to obtain	1	1	1	1
	Easy/very easy to obtain	2.97(2.50–3.53)	2.20(1.77–2.74)	4.18(3.64–4.82)	3.51(2.98–4.14)

OR odds ratio, aOR adjusted OR, CI confidence interval

1.75–2.75) of reporting nonmedical use of these medicines than males [20].

When identifying patterns for TSSp nonmedical use among the Spanish school population, we found that the only socio-demographic variable in our study that acted as a predictor for the nonmedical use of these drugs, both in male and female adolescents, was unemployment for both parents. Some studies have indicated that students with a low socio-economic status present a greater tendency to consume substances in their adolescence [30, 31]. This relationship is described in studies such as that by Bali et al., in which they noted that individuals with family incomes lower than \$20,000 were more likely to make nonmedical use of prescription drugs [32]. Also, in the Canadian study performed with data from the Canadian Health Behavior in School-Aged Children study, results indicated that students with a lower socioeconomic status (SES) were 2.41 times more likely to make recreational use of any type of drug [24].

When we analyzed the consumption of legal psychoactive substances and their relationships with the non-medical use of TSSp, we found that alcohol use and smoking in adolescent females were significantly associated with the nonmedical use of these prescription drugs. This revealed a growing trend towards the incorporation of female adolescents into the consumption ranks of these legal drugs, surpassing male consumption rates [23, 26]. Recent research shows that the gender gap in alcohol consumption is decreasing [33]. These changes in normative standards, mainly for alcohol

consumption, are contributing to a series of gender gaps within Spanish society that could be related to the fact that female adolescents associate alcohol consumption with pleasure, and they now consume alcohol in public places [34].

With regard to adolescents, cannabis is the only illegal psychoactive substance whose consumption has increased among the Spanish female population in recent years, probably due to the normalization and acceptance of such use, as well as its low risk perception [35]. In our study, marijuana consumption was associated with TSSp nonmedical use in the school population of both genders. Several studies indicate that the probability of using marijuana increases among those adolescents who report nonmedical use of benzodiazepines and anxiolytics [36]. A recent US study assessing longitudinal associations between the nonmedical use of sedatives and anxiolytics during adolescence found that approximately 92.9% of the adolescents also consumed other psychoactive substances, mainly alcohol and cannabis [37].

In line with that, illegal psychoactive substance consumption is a risk factor related to starting nonmedical use of prescription drugs among adolescents. A cross-national study of the nonmedical use of prescription medications in five European countries found that 28% of those who engaged in nonmedical use of sedatives in the previous year had also consumed illegal drugs [5]. Our study showed that the use of illegal psychoactive substances was the factor most strongly associated with TSSp nonmedical use among school adolescents of both

genders. Male Spanish adolescents who reported that they consumed illegal drugs were six times more likely to make nonmedical use of these medicines. Similar results were obtained in a study performed in 31 European countries with data from the European School Survey on Alcohol and Other Drugs, the results of which showed that those adolescents who engaged in nonmedical use of tranquilizers and sedatives were 3.48 times more likely to consume illegal drugs [23]. In recent years, there has been an increase in illegal drug consumption among younger females although differences between female and male consumption rates remain considerable. These data have given rise to the so-called “convergence hypothesis”, which states that differences between males and females in drug use are lessening and are expected to continue in this same vein [38].

The use of drugs among adolescents has increased due to the low risk perception associated with their consumption. Therefore, it will be necessary to identify the factors that have led to this perception and to the corresponding increase in addictive drug behavior rates among adolescents [39]. The low risks perceived for TSSp nonmedical use among Spanish teenage students makes them 3 times more likely to consume drugs than those adolescents who perceive such consumption as highly risky. This agrees with data from a national survey performed with adolescents of both sexes, the results of which showed that those participants with a low risk perception of consumption (aOR = 1.53 95% CI 1.09–2.15) were the most prone to nonmedical use of tranquilizers and sedatives [21]. If we take together the low risk perception and the ease of obtaining TSSp for our adolescents, mainly among girls (6.50% indicate that they find it easy or very easy to obtain them), the problem is aggravated, since these two variables are associated with the nonmedical use of these medicines. We should bear in mind that drugs are often used by other family members through medical prescription and are, therefore, available inside adolescents’ homes. This can make adolescents conclude that their behavior is not that at odds with social standards, since their use complies with adult models. The access availability of TSSp is also reflected in other studies which show that 20.7% of students agreed that obtaining tranquilizers and sedatives was “very easy” or “quite easy” and indicated that the first drug they ever abused belonged to their parents [33, 40].

The scientific community has accepted the incorporation of the gender perspective to drug consumption, since women and men respond to different constraints and, therefore, any analysis, strategy or action, should separately contemplate and study the aspects and factors conditioning them. The question analyzes real life and circumstances for males and females in a separate manner with the objective

of identifying how gender constraints affect the issue of drug consumption.

One of the main strengths of this study is the application of a gender perspective to a nationally representative sample in order to study the prevalence of the nonmedical use of TSSp in school populations over a decade. Given that the methodology of the ESTUDES survey is similar to that used in other European Union countries and the United States, we feel empowered to make international comparisons.

However, our study is subject to a series of limitations. The first limitation of surveys about drug abuse comes from the cross-sectional nature of the study data, which does not allow for establishing the direction of the associations discovered.

The second limitation comes from using self-declared data. Thus, the prevalences obtained to generate non-medical use profiles for tranquilizers, sedatives and/or sleeping pills could be underestimated. This is because, due to sociocultural judgments surrounding the consumption of such substances, some school adolescents will have reservations about openly confessing their prescribed or self-medication consumption of these medications.

We also need to point out that the non-response rate (between 9 and 17.1% (ESTUDES)), affects our estimations of reported consumption, since those adolescents who refused to participate could share certain characteristics related to consumption, although the direction of the effect cannot be determined [35].

Conclusions

This study shows that trends in tranquilizer, sedative and/or sleeping pill nonmedical use among female adolescents in the school population residing in Spain increased by 6% in the decade comprised from 2004 to 2014.

When analyzing TSSp, nonmedical use patterns for alcohol, tobacco and marijuana act as prediction variables for adolescent females. Special mention should be made of adolescents from both sexes, but mainly among male adolescents, who reported that they consumed illegal psychoactive substances other than marijuana, because there is a higher probability of misusing these drugs.

Finally, a low perception of consumption risk and the ease in obtaining these drugs also presented a strong relationship with tranquilizer, sedative and sleeping pill nonmedical use among Spanish adolescent students of both sexes.

Addressing the consumption of drugs from a gender perspective involves taking into account the differences and particularities that gender introduces into use patterns for these substances and motivation for using drugs, as well as the effects and consequences derived from their use. We believe that this study provides

interesting and valuable results from the point of view of preventing the consumption of psychoactive substances, such as TSSp, among adolescents, and may effectively contribute to the development of prevention programs for drug consumption in adolescence, given the significant increase that has taken place in just one decade.

Abbreviations

95%CI: 95% confidence interval; aOR: Adjusted Odds Ratio; OR: Crude Odds Ratio; ESPAD: European School Survey Project on Alcohol and other Drugs; ESTUDES: Spanish State Survey on Drug Use in Secondary Education; NA: Not available; NSDUH: National Survey on Drug Use and Health; TSSp: Tranquilizers, sedatives, and sleeping pills; US: United States

Acknowledgements

Thanks to Spanish National Drug Plan (Ministry of Health, Social Services and Equality) for providing the survey data.

Authors' contributions

PCG and DPC originated and designed the study and coordinated the writing of the article. VHB contributed to the analysis of the data and to the drafting of the paper. IJT, NAF, and SGG contributed to the interpretation of the results and to the drafting of the paper. All authors had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. All authors have seen and approved the final version. PCG is the guarantor.

Funding

This study was funded by the FIS (Fondo de Investigaciones Sanitarias—Health Research Fund, grant No. PI16/00691, Instituto de Salud Carlos III) co-financed by the European Union through the Fondo Europeo de Desarrollo Regional (FEDER, “Una manera de hacer Europa”). The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Availability of data and materials

The datasets generated and/or analyzed during the current study are available in the Spanish National Drug Plan repository, http://www.pnsd.mscbs.gob.es/en/profesionales/sistemas/informacion/sistema/informacion/encuestas_ESTUDES.htm

Ethics approval and consent to participate

This article does not contain any studies with human participants or animals performed by any of the authors. This article does not require any certificate from the ethics committee, given the nature of the research. All the surveys analyzed were anonymous and dissociated and contained no recognizable personal information. This is in accordance with what is stated in the second paragraph, point 5 (Order SAS/3470/2009, December 16th) and not within the assumptions established in Article 2.e (Law 14/2007, June 3rd) concerning biomedical research.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Author details

¹Preventive Medicine and Public Health Teaching and Research Unit, Health Sciences Faculty, Universidad Rey Juan Carlos, Av. Atenas s/n. 28 922, Alcorcon, Madrid, Spain. ²Department of Basic Health Sciences, Health Sciences Faculty, Universidad Rey Juan Carlos, Av. Atenas s/n. 28 922, Alcorcon, Madrid, Spain. ³Department of Physical Therapy, Occupational Therapy, Rehabilitation and Physical Medicine, Universidad Rey Juan Carlos, Av. Atenas s/n. 28 922, Alcorcon, Madrid, Spain.

Received: 15 January 2019 Accepted: 20 September 2019

Published online: 21 October 2019

References

- United Nations Office on Drug and Crime. World Drug Report 2018: opioid crisis, prescription drug abuse expands; cocaine and opium hit record highs. Available: https://www.unodc.org/unodc/en/frontpage/2018/June/world-drug-report-2018_-_opioid-crisis%2D%2Dprescription-drug-abuse-expands-cocaine-and-opium-hit-record-highs.html [Accessed 19 July 2018].
- McCabe SE, West BT, Teter CJ, Ross-Durow P, Young A, Boyd CJ. Characteristics associated with the diversion of controlled medications among adolescents. *Drug Alcohol Depend.* 2001;118(2–3):452–8.
- Miech R, Bohnert A, Heard K, Boardman J. Increasing use of nonmedical analgesics among younger cohorts in the United States: a birth cohort effect. *J Adolesc Health.* 2013;52(1):35–41.
- Johnston, L. D., Miech, R. A., O'Malley, P. M., Bachman, J. G., Schulenberg, J. E., & Patrick, M. E. Monitoring the Future national survey results on drug use: 1975–2017: Overview, key findings on adolescent drug use. 2018 Ann Arbor: Institute for Social Research, The University of Michigan <http://www.monitoringthefuture.org/pubs/monographs/mtf-overview2014.pdf> [Accessed 23 July 2018].
- Novak SP, Håkansson A, Martinez-Raga J, Reimer J, Krotki K, Varughese S. Nonmedical use of prescription drugs in the European Union. *BMC Psychiatry.* 2006;16:274.
- Gilat Y, Ben-Dor DH, Magen A, Wolovick L, Veklerchik M, Weizman A, Zalsman G. Trends in prescribing of psychotropic medications for inpatient adolescents in Israel: a 10 years retrospective analysis. *Eur Psychiatry.* 2011; 26(4):265–9.
- McCabe SE, West BT. Medical and nonmedical use of prescription benzodiazepine anxiolytics among U.S. high school seniors. *Addict Behav.* 2014;39(5):959–64.
- National Survey on Drug Use and Health (NSDUH). Key Substance Use and Mental Health Indicators in the United States: Results from the 2016 National Survey on Drug Use and Health. Available <https://www.samhsa.gov/data/sites/default/files/NSDUH-FFR1-2016/NSDUH-FFR1-2016.pdf> [Accessed 23 July 2018].
- European Monitoring Centre for Drugs and Drug Addiction. European School Survey Project on Alcohol and other Drugs (ESPAD). (2015). Available: http://www.espad.org/sites/espad.org/files/ESPAD_report_2015.pdf [Accessed: 9 July 2018].
- Fernandez-Montalvo J, Lopez-Goñi JJ, Azanza P, Cacho R. Gender differences in drug-addicted patients in a clinical treatment center of Spain. *Am J Addict.* 2014;23(4):399–406.
- Kuhn C. Emergence of sex differences in the development of substance use and abuse during adolescence. *Pharmacol Ther.* 2015;153:55–78.
- Becker JB, McClellan M, Reed BG. Sociocultural context for sex differences in addiction. *Addict Biol.* 2016;21(5):1052–9.
- Ait-Daoud N, Blevins D, Khanna S, Sharma S, Holstege CP. Women and addiction. *Psychiatr Clin North Am.* 2017;40(2):285–97.
- Greenfield SF, Back SE, Lawson K, Brady KT. Substance abuse in women. *Psychiatr Clin North Am.* 2010;33(2):339–55.
- Tuchman E. Women and addiction: the importance of gender issues in substance abuse research. *J Addict Dis.* 2010;29(2):127–38.
- Deutsch AR, Steinley D, Slutsky WS. The role of gender and friends' gender on peer socialization of adolescent drinking: a prospective multilevel social network analysis. *J Youth Adolesc.* 2014;43(9):1421–35.
- Schulte MT, Ramo D, Brown SA. Gender differences in factors influencing alcohol use and drinking progression among adolescents. *Clin Psychol Rev.* 2009;29(6):535–47.
- Mojtabai R, Olfson M. National trends in psychotropic medication polypharmacy in office-based psychiatry. *Arch Gen Psychiat.* 2010;67:26–36.
- Meng X, D'Arcy C, Tempier R. Trends in psychotropic use in Saskatchewan from 1983 to 2007. *Can J Psychiatr.* 2013;58:426–31.
- Opaleye ES, Noto AR, Sanchez ZM, Amato TC, Locatelli DP, Gossop M, Ferri CP. Nonprescribed use of tranquilizers or sedatives by adolescents: a Brazilian national survey. *BMC Public Health.* 2013;13:499.
- Romo Avilés, Nuria. Género y uso de drogas: La invisibilidad de las mujeres. En *Monografía Humanitas 2006*, Fundación Medicina y Humanidades Médicas, Barcelona, volumen 5 Pp. 69–83.
- Jiménez Rodrigo, M.L. y Guzmán Ordaz, R. (2012). Género y usos de drogas: dimensiones de análisis e intersección con otros ejes de

- desigualdad. *Oñati Socio-legal Series*, 2 (6), 77–96. Available from: <http://ssrn.com/abstract=2111917>.
23. Kokkevi A, Fotiou A, Arapaki A, Richardson C. Prevalence, patterns, and correlates of tranquilizer and sedative use among European adolescents. *J Adolesc Health*. 2008;43(6):584–92.
 24. Pulver A, Davison C, Pickett W. Recreational use of prescription medications among Canadian young people: identifying disparities. *Can J Public Health*. 2014;105(2):e121–6.
 25. Carrasco-Garrido P, Jiménez-Trujillo I, Hernández-Barrera V, García-Gómez-Heras S, Alonso-Fernández N, Palacios-Ceña D. Trends in the misuse of tranquilizers, sedatives, and sleeping pills by adolescents in Spain, 2004–2014. *J Adolesc Health*. 2018;63(6):709–16. <https://doi.org/10.1016/j.jadohealth.2018.04.003>.
 26. Storbjörk J. Gender differences in substance use, problems, social situation and treatment experiences among clients entering addiction treatment in Stockholm. *Nordic Stud Alcohol Drugs*. 2011;28:185–209.
 27. Assari S, Mistry R, Caldwell CH, Zimmerman MA. Marijuana use and depressive symptoms; Gender Differences in African American Adolescents. *Front Psychol*. 2018;9:2135.
 28. Cotto JH, Davis E, Dowling GJ, Elcano JC, Staton AB, Weiss SR. Gender effects on drug use, abuse, and dependence: a special analysis of results from the National Survey on drug use and health. *Gend Med*. 2010;7(5):402–13.
 29. Young AM, Glover N, Havens JR. Nonmedical use of prescription medications among adolescents in the United States: a systematic review. *J Adolesc Health*. 2012;51(1):6–17.
 30. Goodman E, Huang B. Socioeconomic status, depressive symptoms, and adolescent substance use. *Arch Pediatr Adolesc Med*. 2002;156(5):448–53.
 31. Henkel D, Zemlin U. Social inequality and substance use and problematic gambling among adolescents and Young adults: a review of epidemiological surveys in Germany. *Current Drug Abuse Reviews*. 2016;9:26–48.
 32. Bali V, Raisch DW, Moffett ML, Khan N. Determinants of nonmedical use, abuse or dependence on prescription drugs, and use of substance abuse treatment. *Res Social Adm Pharm*. 2013;9(3):276–87.
 33. Dir AL, Bell RL, Adams ZW, Hulvershorn LA. Gender differences in risk factors for adolescent binge drinking and implications for intervention and prevention. *Front Psychiatry*. 2018;8:289.
 34. Romo N. Cambios y continuidades en el consumo de drogas y tóxicos en mujeres y niñas jóvenes 2018. Carmen Orte Socias, Rosario Pozo Gordaliza (eds). *Género, adolescencia y drogas. Prevenir el riesgo desde la familia*. Barcelona. Spain.
 35. Ministerio de Sanidad, Servicios Sociales e Igualdad. Plan Nacional sobre Drogas. Encuesta Estatal sobre Uso de Drogas en Enseñanzas Secundarias (ESTUDES). (2004–2014) Available en http://www.pnsd.mssi.gob.es/profesionales/sistemasInformacion/sistemasInformacion/encuestas_ESTUDES.htm [Accessed 25 May 2018].
 36. Schepis TS, West BT, Teter CJ, McCabe SE. Prevalence and correlates of co-ingestion of prescription tranquilizers and other psychoactive substances by US high school seniors: results from a National Survey. *Addict Behav*. 2016; 52:8–12.
 37. McCabe SE, Veliz P, Boyd CJ, Schulenberg JE. Medical and nonmedical use of prescription sedatives and anxiolytics: Adolescents' use and substance use disorder symptoms in adulthood. *Addict Behav*. 2017;65:296–301.
 38. Romo Avilés, N. ¿Para chicas o para chicos? Reflexiones en torno a la inclusión de la perspectiva de género en la prevención de drogodependencias, 2012. *Tecnologías de la Comunicación, jóvenes y promoción de la salud*. Logroño. Gobierno de la Rioja. Spain.
 39. Uribe Alvarado JI, Verdugo Lucero JC, Zacarías SX. Relationship between risky perception and drug consumption in high-school students. *Psicología y Salud*. 2011;21(1):47–55.
 40. Boyd CJ, Esteban McCabe S, Teter CJ. Medical and nonmedical use of prescription pain medication by youth in a Detroit-area public school district. *Drug Alcohol Depend*. 2006;81(1):37–45.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Ready to submit your research? Choose BMC and benefit from:

- fast, convenient online submission
- thorough peer review by experienced researchers in your field
- rapid publication on acceptance
- support for research data, including large and complex data types
- gold Open Access which fosters wider collaboration and increased citations
- maximum visibility for your research: over 100M website views per year

At BMC, research is always in progress.

Learn more biomedcentral.com/submissions

