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Prevalence and determinants of tobacco, e-cigarettes, and cannabis use among nursing students: A multicenter cross-sectional study

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ABSTRACT

Background: Nurses are important agents in public health, which includes being active in tobacco control. Studies show that nurses who smoke are less inclined to offer smoking cessation aid. Nursing students, as the future labor force of nursing, are one of the key groups to monitor.
Objectives: To identify the prevalence and determinants of use of several tobacco products, e-cigarettes, and cannabis among nursing students in Catalonia.
Design: Cross-sectional multicenter study.
Settings: 15 university nursing schools in Catalonia (Spain) in 2015–2016.
Participants: Nursing students attending class at the day of the survey.
Methods: An anonymous, self-administered questionnaire based on the Global Health Professional Survey was designed. The questions included information on consumption of several tobacco products (manufactured cigarettes, roll your own cigarettes, etc.), e-cigarettes, and cannabis. We estimated the prevalence of use (%) and computed multilevel logistic regressions models, at two levels, to calculate the odds ratios (OR) and their corresponding 95% confidence intervals (CI), adjusting for several individual sociodemographic variables and the nursing school as a grouping variable.
Results: 4381 students participated in the study (57.2% of Nursing students in Catalonia at the time of the survey). 29.7% (95%CI: 27.2–32.2) were smokers (18.4% daily and 11.3% occasionally). 66.4% smoked manufactured cigarettes, 47.0% roll your own cigarettes, 10.0% waterpipe, and 0.4% e-cigarettes. The main predictors of smoking were: being ≥25 years (OR = 2.57, 95%CI: 2.03–3.26) and belonging to other Spanish regions (OR = 1.82, 95%CI: 1.30–2.54). 71.5% had low nicotine dependence as defined by the Heavy Smoking Index. Among 11.5% (95%CI: 10.6–12.4) of students used cannabis (daily or occasionally), and men presented higher odds of use (OR = 2.81, 95%CI: 2.11–3.73) than women.
Conclusions: Tobacco and cannabis use is high among nursing students. It is necessary to carry out early tobacco and cannabis cessation programs among young nursing students.

1. Introduction

Nurses are important agents in public health, which includes being active in tobacco control (WHO Tobacco Free Initiative, 2005), due to tobacco use being the leading cause of preventable disease, disability, and death worldwide (World Health Organization, 2008).

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As the largest health care workforce, nurses are well placed to promote health options thanks to their skills and experience with patients in a variety of settings. Nurses are responsible for primary health care and education in tobacco control and act as role models (Sarna et al., 2010). The available evidence suggests that nurses' personal health behavior may influence their health promotion practices (Kelly et al., 2017); several studies show that nurses who smoke are less inclined to offer smoking cessation aid to their smoker patients (Duaso et al., 2017; Mujika et al., 2017; Radsma and Bottorff, 2009; Gonzalez et al., 2009). Therefore, monitoring tobacco consumption among nurses is of particular interest.

2. Background

Prevalence of tobacco use among nurses in Spain is high compared to nurses from other countries, such as the UK or USA (4.6–18%) (Duaso et al., 2017). Tobacco consumption prevalence among Spanish nurses is similar or slightly lower than in the general population (around 25–30%) (Duaso et al., 2017; Martinez et al., 2016); however, it is still high compared with doctors (16.4%) (Martinez et al., 2016). Several reasons have been offered to explain why the tobacco use is still higher among nurses compared to doctors including heavy workloads, long work hours, confrontation with harm and loss, and little time to take breaks, etc. (Nakata et al., 2010). Nevertheless, many nurses start smoking before beginning their nursing education. Since nursing is a professional area with significantly high female representation, the factors that influence tobacco consumption are similar to those that influence similar groups of females in the general population (Rowe and Macleod Clark, 2000; Clark and McCann, 2008).

Nursing students, as the future labor force of nursing, constitute one of the key groups to have their smoking consumption monitored to improve our understanding of the relation between their tobacco use and knowledge acquired during their studying years; this might be particularly valuable for active development of future tobacco control activities (WHO Tobacco Free Initiative, 2005). In 2005, the World Health Organization launched “The Global Health Profession Student Survey” (GHPSS), an international study aimed to assess tobacco use and exposure of second-hand smoke among third-year dental, medical, nursing and pharmacy students in several countries (GTSS Collaborative Group, 2006; Warren et al., 2011). This study pointed out that 20% of the students were current smokers and 10% of them used other tobacco products (Warren et al., 2008).

Although the GHPSS has not been conducted among nursing students in Spain, tobacco consumption has been monitored among Spanish nursing students in the last decade (Gonzalez et al., 2009; Pericas et al., 2009; Fernandez et al., 2010). These studies show that tobacco use ranges from 18.2% (Ordas et al., 2015) to 28.8% (Fernandez et al., 2010). However, these studies were conducted only in one university, had a limited sample size, only explored manufactured cigarette smoking prevalence, and hence are not representative of the general population of nursing students.

Tobacco use among the Spanish general population has changed over the last years, with an significant reduction in the prevalence of manufactured cigarette users and an increase of exclusively roll your own cigarettes users, as well as the combination of both called dual users (manufactured and roll your own) (Sureda et al., 2017a, 2017b, Perez-Rios et al., 2015). Moreover, there has been an increase in the use of other tobacco products, such as waterpipe and e-cigarettes, especially among the younger population (Lidon-Moyano et al., 2016a; Lidon-Moyano et al., 2016b). Furthermore, cannabis use in combination with tobacco is prevalent among the youth in Spain; with about one-third of University students who confirm having consumed it in the last 30 days (Nieves Y. Fundación Atenea, 2011).

3. Aim

Therefore, given the lack of comprehensive studies that monitor the use of all forms of tobacco products (including manufactured cigarettes, roll your own, and waterpipes), e-cigarettes, and cannabis among nursing students in Catalonia, this study was aimed to identify the prevalence and determinants of their use.

4. Method

4.1. Design and Participants

Cross-sectional multicenter study conducted in 15 University Nursing Schools in Catalonia. The participants were students enrolled in a Nursing degree from any of these University schools, from the first to the fourth year of school, during the period from October 2015 to June 2016 (2015–2016 academic year). Overall, 7660 students were enrolled at the 15 Catalan Nursing University schools during the academic year 2015–2016 (aggregated data provided by each university). For inclusion, subjects were required to meet the following criteria: (1) to be $\geq$18 year old, (2) to be registered in the core subject class in which the study data was collected, (3) to be at class the day of the data collection, and (4) to provide written informed consent to participate in the study.

4.2. Instrument and Variables

An anonymous, self-administered paper version questionnaire based on the Global Health Professional Survey (GHPS) (Warren et al., 2011) was designed. The questionnaire included 62 questions that contained information on smoking status, use of several types of tobacco products (waterpipe, joints, etc.), and cannabis use. The questionnaire (available upon request) was piloted in one of the Universities to test its reliability and acceptability (Martinez et al., 2017).

For this study, the main dependent variable was smoking status, classified into three categories: 1) daily smoker, person who smokes daily; 2) occasional smoker, a person who smokes but not every day; and 3) non-smoker, including a former smoker (person who smoked, but remained abstinent for 6 or more months) and/or a never smoker (Husten, 2009). Current (daily and occasional) and former smokers were asked about their age at starting smoking and number of cigarettes smoked per day. We obtained information about the type of tobacco product used (manufactured cigarettes, roll your own cigarettes, cigars/cigarillos/pipes, and waterpipes, also known as shisha or hookah); the number of cigarettes smoked per day (that were classified as <10, 10–19, ≥ 20); time before smoking the first cigarette ($\leq$30, >30); nicotine dependence was assessed using the Heavy Smoking Index (HSI), a six-point scale calculated from the number of cigarettes smoked per day and the time to smoking first cigarette after waking. The HSI score was then categorized into a three-category variable: low (0–2), medium (3–4) and high (5–6) dependence (Chabrol et al., 2005). We also explored the main reasons for continuing smoking, whether responders were thinking about quitting or reducing their current consumption, and if they had done a serious quitting attempt in the last year.

In addition, we asked all participants whether they consumed e-cigarettes and cannabis (daily or occasionally) or if they were former (person who consumed in the past but has not used in the last 6 months) or never consumed (person who has never used these products).

The main independent variables explored were sociodemographic data including sex, age (classified as <19, 20–24 and >25), year of Nursing school (first, second, third, and fourth), place of birth (Catalonia, from other regions of Spain, and from outside of Spain) and type of Nursing school (public, private with public funding or private).

4.3. Procedure

Before starting the fieldwork, we contacted the deans of each School of Nursing program to request their permission to conduct the survey. In addition, we requested their help for having a contact person who acted as a liaison in each center. All 15 Schools agreed to participate. The fieldwork implied several visits to each of the centers to reach all the courses.

In each of the selected classrooms, all students were orally informed about the main objectives of the study by one of the researchers, and a participant information sheet was provided. All participants gave an informed consent for voluntary participation before completing the questionnaire. Although students were keenly invited to participate, neither their teachers nor the researchers who conducted the fieldwork imposed students to participate. The questionnaire had an average time of 15 min for completion.

For the extraction of data, all the paper-based questionnaires were digitized and processed with Optical Character Recognition (OCR) and Intelligent Character Recognition (ICR) Kofax© technology.

The study was approved by the Ethics and Clinical Research Committee of ICO-IDIBELL (PR-173/16).

4.4. Data Analysis

We computed prevalence (%) and their corresponding 95% confidence intervals (CI). The Kolmogorov–Smirnov test was used to determine whether our data follow a normal distribution. All variables used in the analyses presented in this work follow the precepts of normality. Then, for bivariate analysis, we used Chi-square test for qualitative variables. For estimating factors of being a tobacco, a cannabis and, a waterpipe user we employed a multilevel logistic regression model with fixed-effects, taking Nursing School as the second level. We computed Odds ratios (OR) and 95% CI with weights derived from the participation rates adjusted for sex, age and place of birth. The analyses were conducted using SPSS© 21.0 and STATA 13 for Windows©.

5. Results

5.1. Description of the Sample/Characterization of Participants

The final sample was composed of 4381 students (57.2% of students enrolled in the academic year 2015–2016). 98.5% (4381/4447) of the students who were in class at the time of the survey agreed to participate.

Table 1 describes participants' sociodemographic characteristics. Overall, 83.9% of the study participants were women, 51.7% were 20–24 years old, and 32.0% were first-year students. The majority of the respondents were born in Catalonia.

Table 1
Descriptive sociodemographic characteristics of the participants.

	Total		Sex				p-Value
			Men		Women		
	n	%	n	%	n	%	
Overall	4381	100	707	16.1	3674	83.9	
Age groups							< 0.001
≤ 19 years	1364	31.4	150	21.3	1214	33.4	
20–24 years	2246	51.7	371	52.8	1875	51.5	
≥ 25 years	733	16.9	182	25.9	551	15.1	
Year of school							0.936
First	1352	32.0	207	31.0	1145	32.2	
Second	1108	26.2	180	27.0	928	26.2	
Third	949	22.5	151	22.6	798	22.4	
Fourth	813	19.3	129	19.4	684	19.2	
Place of birth							0.495
Catalonia	3296	77.6	524	77.3	2772	77.7	
Spain	602	14.2	104	15.3	498	14.0	
Outside of Spain	347	8.2	50	7.4	297	8.3	
Location of the nursing school							0.082
Barcelona	3406	77.7	549	77.7	2857	77.8	
Girona	322	7.4	42	5.9	280	7.6	
Tarragona	384	8.8	60	8.5	324	8.8	
Lleida	269	6.1	56	7.9	213	5.8	
Type of nursing school							0.244
Public	1970	45.0	299	42.3	1671	45.5	
Private with public funding	841	19.2	137	19.4	704	19.2	
Private	1570	35.8	271	38.3	1299	35.3	

5.2. Smoking Status

Among the participants, 29.7% were smokers (95%CI: 27.2–32.2), 57.2% (95%CI: 54.5–59.9) were never smokers and 13.1% (95%CI: 11.3–14.9) were former smokers. Overall, 38.1% of smokers were occasional smokers. The proportion of daily smokers was similar among men (20.5%) and among women (18.0%). Tobacco consumption prevalence increased by age group and year of school (Table 2). Participants from private schools had a higher percentage of smokers (daily and occasional together) than those from public or private with public funding schools (34.7%, 24.3%, 32.9%, respectively ($p < 0.001$).

Correlates of being a daily and a former smoker are displayed in Fig. 1. Smokers were more likely to be from the older groups (21–24 and ≥25 years-old) and being born in Catalonia (OR = 1.73; 95% CI: 1.29–2.30) or Spain (OR = 1.82; 95% CI: 1.30–2.54) compared to those born abroad. The model for daily smokers shows the same variables, with stronger associations (Fig. 1). Furthermore, the only significant correlate of being a former smoker was belonging to the older age groups (21–24 and ≥25 years-old) (Fig. 1).

As shown in Table 3, among current smokers, 65.2% had started to smoke before 17 years old. According to the type of tobacco products used, we observed that 66.4% of smokers consumed manufactured cigarettes, 47.0% roll your own cigarettes and 10.0% waterpipes. E-cigarettes were used by 0.4%. Users of roll your own cigarettes and waterpipes were more predominant in the youngest group compared to the oldest age groups ($p < 0.001$), and 17.7% of smokers were dual-users of both manufactured and roll your own cigarettes. This dual use was more frequent among the youngest ($p < 0.001$). The majority of these dual users consumed < 10 cigarettes per day (CPD) without differences between men and women. Most of the young students (≤19) consumed < 10 CPD (58.4%) while 42.1% of students those aged ≥25 smoked ≥20 CPD ($p < 0.001$) (Table 3).

Concerning nicotine dependence, 71.5% of smokers had a low dependence, but smokers from the oldest age group had a higher proportion of smokers with high nicotine dependence level compared to rest of age groups ($p < 0.001$) (Table 3).

With regard to the quit attempts, 26.2% of smokers had attempted to stop smoking in the last year and 50.8% of them made ≥2 attempts. Only 17.2% were seriously thinking about quitting at the time of the survey; however, 56.9% were thinking of reducing their consumption (Table 3).

5.3. Main Reasons for Relapsing and Continuing Smoking

The main reasons for relapsing from smoking were lack of social support (49.7%), to experiencing symptoms of abstinence (42.6%), as well as the idea that smoking can be controlled (29.8%). Only women considered that smoking was a good weight controller (0 vs. 9.7%, $p < 0.001$) (Table 3).

The main reasons for continuing smoking included considering smoking pleasurable (64.0%) controlling their stress (50.5%), not being able to quit (25.1%), and having smokers in their social environment

Table 2
Smoking status of nursing students according to sociodemographic characteristics.

	Current Smokers						p-Value*	Non-smokers				p-Value**
	All (a)		Daily		Occasional			Former smoker (b)		Never smoker (c)		
	n	%	n	%	n	%		n	%	n	%	
Overall	1288	29.7	797	18.4	491	11.3		567	13.1	2484	57.2	
Sex							0.447					0.146
Men	223	32.0	143	20.5	80	11.5		98	14.1	375	53.9	
Women	1065	29.3	654	18.0	411	11.2		469	12.9	2109	57.9	
Age groups							< 0.001					< 0.001
≤19 years	320	23.7	146	10.8	174	12.9		120	8.9	913	67.4	
20–24 years	703	31.5	446	20.0	257	11.5		258	11.6	1266	56.9	
≥25 years	252	35.0	199	27.6	53	7.4		181	25.1	288	39.9	
Year of school							< 0.001					0.013
First	398	29.7	221	16.5	177	13.2		145	10.8	798	59.5	
Second	295	26.9	169	15.4	126	11.5		153	13.9	650	59.2	
Third	299	31.9	206	22.0	93	10.0		123	13.1	514	54.9	
Fourth	258	32.0	176	21.8	82	10.2		112	13.9	437	54.1	
Place of birth							0.001					0.018
Catalonia	1002	30.6	642	19.6	360	11.0		428	13.1	1840	56.3	
Spain	178	29.7	103	17.3	75	12.5		76	12.7	344	57.5	
Outside of Spain	73	21.7	32	9.5	41	12.2		48	14.2	216	64.1	
Location of the nursing school												< 0.001
Barcelona	1053	31.3	656	19.5	397	11.8	0.928	437	13.0	1875	55.7	
Girona	76	23.6	46	14.3	30	9.4		52	16.1	194	60.2	
Tarragona	86	22.4	51	13.3	35	9.1		48	12.5	250	65.1	
Lleida	73	27.2	44	16.4	29	10.8		30	11.2	165	61.6	
Type of nursing school							< 0.001					< 0.001
Public	476	24.3	255	13.0	221	11.3		234	11.9	1249	63.8	
Private with public funding	272	32.9	178	21.5	94	11.4		133	16.1	422	51.0	
Private	540	34.7	364	23.4	176	11.3		200	12.9	813	52.4	

* Daily and occasional smokers.
** All smokers (a), former smokers (b) and never smokers (c).

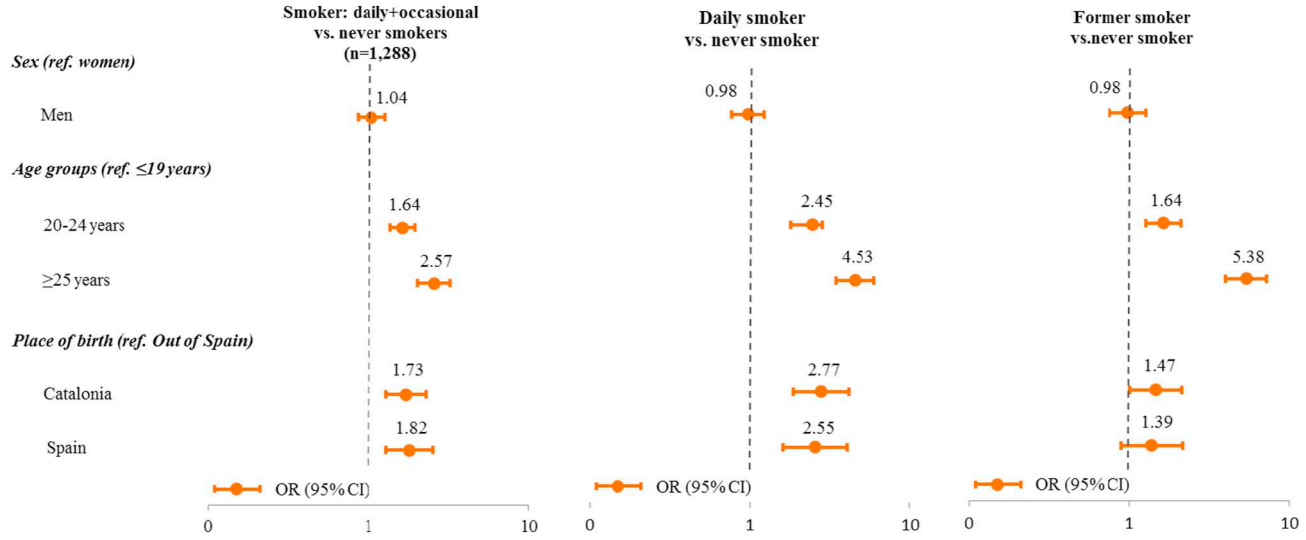

Fig. 1. Sociodemographic factors associated with being a smoker, daily smoker and former smoker. Adjusted for sex, age and place of birth by means of logistic regression.

(21.5%). After adjusting for age, place of birth and Nursing school, women reported some reasons for continuing smoking more frequently than men, including among others: controlling their stress (52.3% vs. 41.9%; p < 0.001), having a social environment that smokes (23.3% vs. 12.6%; p < 0.001), and using smoking as a method for controlling their weight (3.4% vs. 0.9%; p < 0.001) (Table 4).

5.4. Cannabis and Waterpipe Use

Overall, 11.5% (95%CI: 10.6-12-4) of students used cannabis (1.0% daily and 10.5% occasionally). Cannabis use was almost three times more likely among men than among women (OR = 2.81; 95%CI: 2.11–3.73; p = 0.001). The odds of cannabis use are gradually lower

Table 3
Tobacco products consumption patterns among smokers overall and according to sex and age groups (n = 1288).

	Total	Sex		p-Value	Age groups (years)			p-Value
		Men	Women		≤19	20–24	≥25	
	n (%)	n (%)	n (%)		n (%)	n (%)	n (%)	
Age of initiation				0.036				0.142
< 17 years	834 (65.2)	130 (59.1)	704 (66.5)		221 (69.3)	440 (63.0)	165 (66.3)	
≥17 years	445 (34.8)	90 (40.9)	355 (33.5)		98 (30.7)	258 (37.0)	84 (33.7)	
Type of tobacco product consumed*								
Manufactured cigarettes	855 (66.4)	145 (65.0)	710 (66.7)	0.624	203 (63.4)	469 (66.8)	174 (69.0)	0.349
Roll–your-own (RYO)	605 (47.0)	108 (48.4)	497 (46.8)	0.648	178 (55.6)	332 (47.4)	91 (36.1)	< 0.001
Cigars, cigarettes, pipe	44 (3.4)	8 (3.6)	36 (3.4)	0.883	13 (4.1)	26 (3.7)	5 (2.0)	0.345
Electronic cigarettes	15 (0.4)	5 (0.7)	10 (0.3)	0.063	5 (0.4)	6 (0.3)	4 (0.6)	0.515
Waterpipe	128 (10.0)	23 (10.3)	105 (9.9)	0.847	56 (17.5)	66 (9.4)	4 (1.6)	< 0.001
Combined use of tobacco products				0.724				< 0.001
Only manufactured cigarettes	634 (51.2)	104 (49.1)	530 (51.7)		126 (41.5)	351 (51.5)	150 (62.2)	
Only RYO cigarettes	385 (31.1)	67 (31.6)	318 (31.0)		101 (33.2)	215 (31.5)	67 (27.8)	
Manufactured and RYO cigarettes	219 (17.7)	41 (19.3)	178 (17.3)		77 (25.3)	116 (17.0)	24 (10.0)	
Number of cigarettes smoked (manufactured + RYO)				0.085				< 0.001
< 10 cigarettes/day	550 (42.7)	84 (37.7)	466 (43.8)		187 (58.4)	289 (41.1)	67 (26.6)	
10–19 cigarettes/day	385 (29.9)	65 (29.1)	320 (30.0)		88 (27.5)	216 (30.7)	79 (31.3)	
≥20 cigarettes/day	353 (27.4)	74 (33.2)	279 (26.2)		45 (14.1)	198 (28.2)	106 (42.1)	
Heavy smoking index				0.144				< 0.001
Low (0–2)	922 (71.5)	150 (67.3)	772 (72.5)		267 (83.4)	504 (71.7)	142 (56.3)	
Medium (3–4)	279 (21.7)	52 (23.3)	227 (21.3)		42 (13.2)	155 (22.0)	78 (31.0)	
High (5–6)	87 (6.8)	21 (9.4)	66 (6.2)		11 (3.4)	44 (6.3)	32 (12.7)	
Quit attempts in the last year				0.069				0.022
Yes	336 (26.2)	69 (31.1)	267 (25.2)		65 (20.5)	201 (28.7)	66 (26.2)	
No	946 (73.8)	153 (68.9)	793 (74.8)		252 (79.5)	499 (71.3)	186 (73.8)	
Number of quit attempts in the last year				0.067				0.203
1	152 (49.2)	38 (59.4)	114 (46.5)		27 (47.4)	86 (46.0)	36 (59.0)	
≥2	157 (50.8)	26 (40.6)	131 (53.5)		30 (52.6)	101 (54.0)	25 (41.0)	
Main reasons for continuing smoking*								
Abstinence symptoms	143 (42.6)	26 (37.7)	117 (43.8)	0.358	27 (41.5)	88 (43.8)	27 (40.9)	0.897
Concern about their weight	26 (7.7)	0 (0.0)	26 (9.7)	0.007	3 (4.6)	13 (6.5)	9 (13.6)	0.098
Belief in self-control	100 (29.8)	18 (26.1)	82 (30.7)	0.454	26 (40.0)	54 (26.9)	18 (27.3)	0.118
Lack of support from social network	167 (49.7)	30 (43.5)	137 (51.3)	0.246	38 (58.5)	100 (49.8)	26 (39.4)	0.091
Other reasons	62 (18.5)	17 (24.6)	45 (16.9)	0.137	12 (18.5)	33 (16.4)	16 (24.2)	0.363
thinking about quitting now				0.557				0.579
Yes**	214 (17.2)	40 (18.6)	174 (16.9)		52 (17)	123 (18.1)	37 (15.2)	
No	1028 (82.8)	175 (81.4)	853 (83.1)		254 (83)	557 (81.9)	207 (84.8)	
Thinking in reducing				0.826				0.503
Yes	710 (56.9)	122 (56.2)	588 (57.0)		182 (59.7)	382 (55.7)	140 (57.1)	
No	538 (43.1)	95 (43.8)	443 (43.0)		123 (40.3)	304 (44.3)	105 (42.9)	

* Multiple response.
** Now or a month ahead.

among older age groups. Furthermore, cannabis users were more likely to be former smokers and being born in Catalonia (Fig. 2).

Finally, 2.9% (95%CI: 2.0–3.8) of students used waterpipes at least once a week. The odds being a waterpipe user compared to the odds of use of other tobacco products were higher among men, among younger age groups and among those born abroad (Fig. 2).

6. Discussion

The overall prevalence of smoking among nursing students in Catalonia was 29.7%; 18.4% were daily smokers and 11.3% occasional smokers. The overall percentage of smokers in our sample was also higher than that reported among Catalan 15–24 years old females (21.5%, data from 2014 survey collapsed daily and occasional smokers) (Departament de Salut, 2013). Likewise the percentage of daily consumers in our sample was higher than females 15–24 years old from the general population of the majority of the European countries (except for Austria, Hungary, and Spain, data from 2014) (European Commission, 2015). Moreover, these figures are higher than the ones reported by surveys conducted among nursing students in Europe in the last five years (Lehmann et al., 2014; Ben Rejeb et al., 2016) and in Spain (between 16.0% to 18.2%) (Ordas et al., 2015; Fernandez et al., 2015; Lana et al., 2015), with the exception of Germany (Lehmann et al., 2014). In this sense, it is worth mentioning that the proportion of non-daily consumers in our sample is higher than reported in previous studies (in our study 38.1% of participants were occasional smokers). Furthermore, we found that the proportion of smokers is higher among students from private Universities while it is well described that adult populations from higher social classes smoke less in Spain (Bilal et al., 2016). The reasons for this high smoking consumption could be related to a low level of implementation of tobacco control policies in these campuses (Martinez et al., 2017) among other reasons related to social pressure, stress, etc. that need further investigation.

Although most students started to smoke before beginning their university studies, 34.8% of our sample started to smoke during their nursing studies. Moreover, we observed how the proportion of smokers increased with the year of school in the Nursing course, as reported in previous studies (Chandrakumar and Adams, 2015; Smith, 2007). It might be expected that nursing students would be more motivated to quit, given their knowledge of the health risks associated with smoking and their direct contact with patients that have smoking-related diseases; however, we did not observe this tendency. In this sense, we explored the main reasons for continuing smoking and relapsing, which include the lack of social support, stress, the presence of abstinence symptoms and the idea of having control over their smoking habit, as reported before among registered nurses in Australia (Berkelmans et al.,

Table 4
Reasons for having started smoking and continuing smoking among current smokers (n = 1288).

	Total	Sex		OR* (95%CI)	p-Value
		Men	Women		
	n (%)	n (%)	n (%)		
Reasons for having started smoking**					
Their friends or colleagues smoked	802 (62.3)	143 (64.1)	659 (61.9)	1.10 (0.80–1.50)	0.563
A member of their family smoked	172 (13.4)	27 (12.1)	145 (13.6)	0.85 (0.54–1.33)	0.471
Their teacher smoked	9 (0.7)	2 (0.9)	7 (0.7)	1.20 (0.24–5.95)	0.825
To taste something new	610 (47.4)	98 (43.9)	512 (48.1)	0.91 (0.67–1.22)	0.521
It was trendy, fashionable	111 (8.6)	21 (9.4)	90 (8.5)	0.99 (0.60–1.66)	0.978
They wanted to seem grown-ups	145 (11.3)	29 (13.0)	116 (10.9)	1.13 (0.72–1.77)	0.589
They wanted to meet or flirt with others	48 (3.7)	16 (7.2)	32 (3.0)	2.56 (1.36–4.80)	0.003
Other/s	199 (15.5)	30 (13.5)	169 (15.9)	0.82 (0.53–1.27)	0.375
Reasons for continuing smoking**					
To maintain their weight	38 (3.0)	2 (0.9)	36 (3.4)	0.23 (0.05–0.96)	0.044
To control stress	650 (50.5)	93 (41.9)	557 (52.3)	0.68 (0.50–0.92)	0.011
To meet people or flirt with others	13 (1.0)	3 (1.4)	10 (0.9)	1.16 (0.25–5.47)	0.854
There are smokers in their social network	276 (21.5)	28 (12.6)	248 (23.3)	0.52 (0.34–0.80)	0.003
It is trendy, fashionable	6 (0.5)	0 (–)	6 (0.6)	–	–
They smoke for pleasure	822 (64.0)	142 (64.0)	680 (64.0)	1.05 (0.76–1.43)	0.783
They can't quit smoking	322 (25.1)	55 (24.7)	267 (25.2)	0.89 (0.63–1.26)	0.497
Other/s	97 (7.6)	19 (8.6)	78 (7.4)	1.28 (0.75–2.18)	0.360

* Adjusted for age, place of birth and type of nursing school [category of reference: women].
** Multiple response.

2011). However, our sample had specific tobacco consumption patterns that could belong to young populations, such as the high proportion of occasional smokers, the high number of smokers with low nicotine dependence, and the high percentage of smokers with high nicotine dependence only among the oldest age group. One out of four smokers expressed they continued smoking because they could not quit, showing an important addiction component, despite their young age. These findings probably indicate that smoking consumption consolidates among nursing students as they progress in their school years, not only in terms of shifting from occasional to daily smokers, but also in terms of increasing their nicotine dependence that seems to be one of the most important reasons for continuing smoking.

Our study is the first to assess the consumption of other tobacco products (roll your own cigarettes and waterpipe), e-cigarettes, and cannabis among University students, and in particular among nursing students in Spain. We observed that six in ten smokers consumed manufactured cigarettes and nearly five in ten used roll your own cigarettes. We observed that the proportion of smokers using roll your own cigarettes was higher than in the general population in Spain (29%) (European Comission, 2017). Other studies conducted in Barcelona showed that younger smokers use roll your own cigarettes more frequently (Sureda et al., 2017a) mainly because they are cheaper than regular cigarettes.

With reference to e-cigarettes, we observed a lower percentage of users (0.4%) compared to the data reported by the recent Eurobarometer study (1.0%) (European Commission, 2017) and to the United States rates, where e-cigarette is common (35.8% among adults between 18 and 24 years old are users) (U.S. Department of Health and Human Services, 2016) and new forms of its use are emerging (ie. by mixing nicotine with flavors, marijuana, opium etc) (Wong et al.,

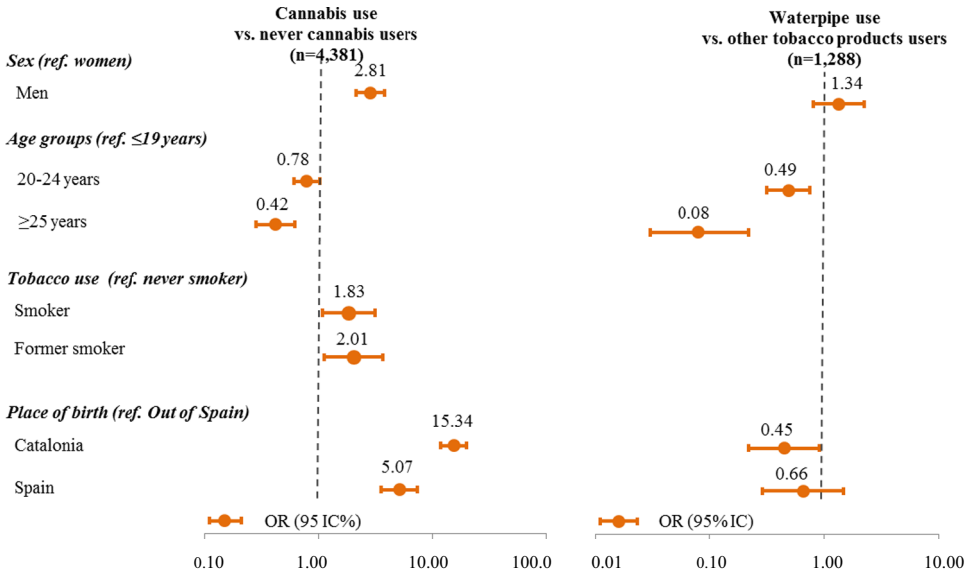

Fig. 2. Sociodemographic factors associated with being a cannabis and waterpipe user.
Adjusted for sex, age and place of birth by means of logistic regression.

2018).

However, about 3.0% of the Nursing students consumed waterpipe tobacco (daily or occasionally), a much lower proportion than reported in the Eurobarometer for the Spanish young population (10.8%) and reported in overseas studies in the States (14.1%–25.3%) (Goodwin et al., 2014; Kulak et al., 2018) and Middle East countries where this tobacco product is culturally penetrated (Tucktuck et al., 2017). This difference highlights that the use of waterpipe is higher among younger age groups (European Commission, 2017). It is known that the highe consumption of waterrpipe among the younger groups compared to adults it is related to the lack of regulation in many countries and the fact that waterpipes use in cafes are cheaper and accessible to the youth (Kulak et al., 2018).

Regarding cannabis, 11.5% of Nursing students consumed cannabis (daily or occasionally), a much lower prevalence than found among general University students in Spain (40.5% stated that consumed cannabis the last month) (Arias-De la Torre et al., 2017). However, cannabis use has so far been very little investigated among nursing students as a specific group population. Thus, the majority of international and national studies have described cannabis use among University students as a whole population (Riou Franca et al., 2009, Suerken et al., 2014). To our knowledge, only one study in France has described cannabis use including nursing students, reporting that 22% of them are occasional occasionally users and 7% regular (Riou Franca et al., 2009). However, rates provided in this work were no broken into students-degree (Riou Franca et al., 2009). Although cannabis consumption among our sample is lower than reported by the general community of University students in Spain (Arias-De la Torre et al., 2017), this consumption is of concern due to future exemplary role that nursing students should provide to the rest of the society.

In the light of the results obtained, it is necessary to carry out early tobacco and cannabis cessation programs among nursing students due to taking into account that their prevalence and addiction consolidate throughout their university years. Thus, specific tailored cessation programs and campaigns targeted to this group are needed. Previous smoking cessation interventions addressed to health students have shown that multi-component interventions are effective (Vitzthum et al., 2013; Pardavila-Belio et al., 2015). These programs should include tobacco cessation treatments (nicotine replacement therapy, bupropion and/or varenicline) to prevent withdrawal symptoms and strategies for coping with stress. In addition, campaigns to promote non-smoker and smoker peer support are necessary because the lack of support has been detected as one of the main reasons of relapsing.

Nurses, and nursing students, have a clear role as models in tobacco control among the general population (Sarna et al., 2010); however, their attitude towards tobacco control is affected by their tobacco use as smokers so that they are less motivated to promote and assist in tobacco cessation (Chandrakumar and Adams, 2015; Tong et al., 2010). A recent review aimed to examine the association between nurses' tobacco consumption and their professional smoking cessation practices indicated that nurses who smoked are 13% less likely to always or frequently advise their patients to stop smoking and 25% less likely to arrange a follow-up visit either in person or over the telephone (Duaso et al., 2017). Some studies have indicated that nurses who smoke may feel conflicted about their ability to intervene (Radsma and Bottorff, 2009). For this reason, it is important to help nursing students quit during their years of nursing education.

6.1. Limitations and Strengths

Some limitations of this study should be noted. First, this is a cross-sectional self-reported survey; therefore, due to the nature of the design we are not able to reach direct causal conclusions about our results, only associations. Besides, we did not validate tobacco use by using objective makers such as carbon monoxide testing. Second, this study relies on self-reported responses that might be affected by information bias, thus participant might have had a tendency to underreport any of their smoking habits; however, self-reported information has been demonstrated to be an adequate form of classifying smokers in observational studies (Wong et al., 2012). Third, our data did not include all the population of nursing students in Catalonia, as not all the students were present in classes at the time of the survey. However, we were able to reach nearly 60% of the students' population, and 98.5% of those who were invited to participate agreed to take part in the study. Fourth, due to the voluntary nature of the participation, we could have introduced a selection bias as those accepting could be the ones having more interest in smoking cessation practices; although 98.5% agreed to participate. And finally, reporting tobacco and cannabis use could be a sensible area in nursing students, so we cannot rule out certain self-complacency bias among students.

7. Conclusions

Tobacco and cannabis use is frequent among nursing students in Catalonia. Tobacco smoking prevalence among students who are in the last years of their nursing education is higher with a higher representation of daily smokers; in consequence, the higher the school year, the higher dependence to nicotine. Therefore, it is necessary to carry out early tobacco and cannabis cessation programs among young nursing students due to taking into account that their prevalence and addiction level may consolidate along their Nursing education. These programs should include psychological and pharmacological treatment, strategies to manage stress, and peer-support initiatives.

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Contributors

The authors of the manuscript were directly involved in the planning, analysis and writing of the paper, approved the final version being submitted, and accept full responsibility for the content of the paper.

CMM and EF conceived and designed the study, and OT, AF and KL contributed to the final design and implementation. MF, MM, AB and AL supervised the field work. CMM and YC were responsible for the analysis and interpretation of data. CM AND AB wrote the first draft of the manuscript. All authors read and approved the final version of the manuscript.

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Conflict of Interest

None.

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