Polydrug use of Tobacco and Cannabis in a Cohort of Young People from Central Catalonia (2012-2020)

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Abstract

Background: The aim was to estimate the prevalence of tobacco and cannabis use and the relationship between these two substances in a cohort of young people from Central Catalonia in the period 2012-2020 according to sex and year of follow-up.

Methods: Prospective longitudinal study with 828 students in 4th year of Compulsory Secondary Education (ESO) in Central Catalonia, who answered a survey on health behaviour in 2012 (828 young people), 2016 (342 young people) and in 2020 (271 young people). The dependent variables were traditional tobacco use, cannabis use in the last month and polydrug use of both substances. The independent variables were sex and year of follow-up. For the prevalence analysis, frequencies and percentages were analysed with their respective 95% confidence intervals. Chi-Square and Cochran's Q contrast were used to test the relationship between independent and paired qualitative variables. A significance level of 0.05 was set.

Results: There are significant differences between the prevalence of smoking cannabis in the last month in boys and girls aged 19-20 years and 23-24 years. Girls who did not use traditional tobacco in 2012, 0.9% (0.1-6.5), 1.9% (0.4-7.5) and 7.5% (3.8-14.5) did use cannabis in 2012, 2016 and 2020 respectively, with a significant increase over the period analysed (p-value = 0.014). Boys who did not smoke traditional tobacco in 2012, 3.5% (1.1-10.6), 14.4% (8.3-23.9) and 14.3% (8.2-23.6) did smoke cannabis in 2012, 2016 and 2020 respectively, with a significant change between 2012 and 2020 (p-value = 0.006).

Conclusions: There is a strong association between tobacco use and cannabis use, with those young people who smoke tobacco regularly having the highest prevalence of cannabis use. There is a significant percentage of young people where the gateway to smoked drugs is no longer tobacco but cannabis itself.

Background

Tobacco and cannabis use is considered a major public health problem (1). Both are very high among the general population, and especially among young people (2). Tobacco is the second most widespread drug among students between 14 and 18 years of age in Secondary Education in Spain. Some 26.7% of students aged 14-18 years admitted to having smoked tobacco in the last 30 days (3). Tobacco consumption is more frequent among women (10.3%, compared to 9.4% among men). Cannabis is the most prevalent illegal psychoactive substance used among students aged 14-18. In the time span of the last 30 days, students confirming cannabis use accounted for 19.3%.(3) Often we also find joint use of the two drugs (4), in this case we are talking about polydrug use. This is understood as the use of several substances during the same period of time (last month) regardless of whether they have been used simultaneously or alternately (5). The use of cannabis and tobacco simultaneously over time means adding to the risks of each substance in particular, those produced by mixing different drugs (6).

Epidemiological data on tobacco and cannabis use in Spain show that there is a strong relationship between the use of these substances (2,7−9). The likelihood of using tobacco, cannabis or even alcohol increases when one of the other two are also used (5). In this regard, several studies show that young people who smoke tobacco are more likely to use cannabis than those who do not smoke (10−12). This is due to the fact that tobacco consumption is one of the most common forms of consumption that starts at an early age and is considered a gateway to other substances. Typically, it was assumed that the onset of cannabis use followed the onset of tobacco use. Currently there are studies that show that the onset of the two consumptions can be simultaneous (13−15). Or it can even be the other way around, starting with cannabis use and then continuing with tobacco use, i.e. a "reverse" gateway from cannabis to tobacco. Therefore, cannabis users are also at greater risk of initiating tobacco use (16) and nicotine dependence (16,17).

The aim of this study is to estimate the prevalence of tobacco and cannabis use and the relationship between these two substances in a cohort of young people from Central Catalonia in the period 2012-2020 according to sex and year of follow-up.

Methods

Study design

Prospective longitudinal study based on a sample of 828 students in the 4th year of Compulsory Secondary Education (ESO) (15-16 years) in Central Catalonia (26 schools in the counties of Bages, Moianès, Anoia, Osona, Berguedà and Solsonès), who in the academic year 2011-2012 completed a computerised and self-administered questionnaire on health behaviour. In 2016, those who, in the initial study, gave their consent to continue participating in the study were contacted and invited to participate again in the new study. In 2016, 342 students (41.3% of the initial sample) (19-20 years old) were recruited and in 2020 they were contacted again (23-24 years old) and were invited again to answer the survey. In 2020, 271 students (32.75% of the initial sample) were recruited. Participants were contacted by email or telephone. They were sent the study information and informed consent by e-mail. The e-mail included the link to the questionnaire. If the participant didn't accept the informed consent, they could not begin the questionnaire. We would also like to notice that, on 2016 (19-20 years old) the students that accepted to participate again were asked to use their data from 2011-2012 (is the data shown on table 2) and to be followed in future studies. The data from other students who participated on 2011-2012 who did not accept to participate is not shown in the present study. In 2016 a specific informed consent was required. The questionnaire used in 2012 was created specifically for this study using previous validated questionnaires on various behaviours and lifestyles. This had a response time of about 40 minutes. The questionnaire was administered by staff from outside the school who provided the instructions for completing it and answering possible doubts. Subsequently, in 2016 and 2020, a reduced version of the same questionnaire was used, adapted online through the LimeSurvey tool, and self-administered.

Study variables

The dependent variables were traditional tobacco use, cannabis use in the last month and polydrug use of both substances.

The 'traditional tobacco' variable was constructed using the following question: How much have you smoked in the last 30 days? Four response options were offered: every day, once or more times a week, less than once a week, I have not smoked in the last 30 days. Those who answered that they smoked every day, once or more times a week or less than once a week were classified as regular tobacco smokers. The variable 'cannabis use in the past month' was constructed using the following question: Have you ever used hashish or marijuana (joints, cannabis, weed, chocolate, hash, reefer or joints)? Four possible answers were offered: never used, sometimes in your life, in the last 12 months or in the last 30 days. Those who responded that they had used hashish or marijuana in the past 30 days were classified as having used cannabis in the past month. The 'polydrug use of both substances' variable was constructed from smoking traditional tobacco and having used cannabis during the last month.

As independent variables, the following were taken into account sex (boy, girl) and year of follow-up (2012, 2016, 2020).

Statistical analysis

The prevalence of each of the dependent variables was compared with the independent variables using relative frequencies and percentages with their respective 95% confidence intervals. Chi-Square and Cochran's Q contrast were used to test the relationship between independent and paired qualitative variables. A significance level of 0.05 was set. Analyses were performed using STATA 16 software.

Results

Table 1shows the prevalence of traditional tobacco use, cannabis use in the last month and polydrug use of tobacco and cannabis. In 2012, 33.7% (95% CI: 26.8-41.5) among girls and 24.3% (95% CI: 17.1-33.3) among boys smoked tobacco

regularly, with this value remaining at 2020 among girls and increasing to 34.2% (95% CI: 25.9-43.7, p-value = 0.009) among boys. No differences between sexes were observed in any of the three years analysed.

Table 1
Prevalence of use according to substance consumed (traditional tobacco, cannabis in the last month and polydrug use of tobacco and cannabis), sex and year. Cohort 2012-2020

	Girls	Boys	P-value[d]	Total
	% [95% CI]	% [95% CI]		% [95% CI]
	N= 160	N= 111		N= 271
Traditional tobacco use[a]				
2012	33.7 (26.8-41.5)	24.3 (17.1-33.3)	0.125	29.9 (24.7-35.6)
2016	39.6 (32.2-47.5)	38.7 (30.0-48.2)	0.984	39.2 (33.6-45.2)
2020	33.7 (26.8-41.5)	34.2 (25.9-43.7)	1	33.9 (28.5-39.8)
P-value[e]	0.191	0.009		0.006
Last month cannabis use[b]				
2012	12.5 (8.2-18.7)	11.7 (6.9-19.3)	0.995	12.2 (8.8-16.7)
2016	8.3 (4.9-13.9)	18.3 (12.0-26.9)	0.025	12.4 (8.9-17.0)
2020	8.7 (5.2-14.3)	16.2 (10.4-24.4)	0.092	11.8 (8.4-16.2)
P-value[e]	0.379	0.135		0.949
Polydrug use of tobacco and cannabis[c]				
2012	11.9 (7.7-17.9)	9.0 (4.9-16)	0.582	10.7 (7.5-15.0)
2016	8.3 (4.8-13.8)	15.4 (9.7-23.6)	0.103	11.2 (7.9-15.6)
2020	6.9 (3.8-12.0)	13.5 (8.2-21.3)	0.106	9.6 (6.6-13.7)
P-value[e]	0.248	0.115		0.779
[a] Traditional tobacco: smoking every day, once or more times a week or less than once a week				
[b] Cannabis in the past month: use of cannabis in the past 30 days				
[c] Polydrug use of tobacco and cannabis: use of traditional tobacco and cannabis in the past month				
[d] Chi^2 Contrast				
[e] Q Conchran test				

Cannabis use increased from 12.5% (95% CI: 8.2-18.7) among girls and 11.7% (95% CI: 6.9-19.3) among boys who had used it in the past month in 2012 to 8.7% (95% CI: 5.2-14.3) among girls and 16.2% (95% CI: 10.4-24.4) among boys, at the end of follow-up (2020). The prevalence has been higher among boys in 2016 and 2020 (p-value = 0.025 and p-value = 0.092 respectively).

With regard to polydrug use of tobacco consumed regularly and cannabis in the last month, it went from 11.9% (95% CI: 7.7-17.9) among girls and 9% (95% CI: 4.9-16) among boys who did so in 2012 to 6.9% (95% CI: 3.8-12) among girls and 13.5% (95% CI: 8.2-21.3) among boys than in 2020 (Table 1), with no differences between sexes in any of the three periods.

Table 2 shows the prevalence of traditional tobacco use and cannabis use in the past 30 days in 2012, 2016 and 2020 by frequency of tobacco or cannabis use in the past 30 days in 2012. We observed that girls using traditional tobacco in 2012, 35.2% (23.4-49.0), 20.7% (11.7-34.1) and 11.1% (4.5-22.9) also use cannabis in 2012, 2016 and in 2020 respectively, with a significant reduction between the three periods (p-value = 0.007). Girls who did not use traditional tobacco in 2012, 0.9% (0.1-6.5), 1.9% (0.4-7.5) and 7.5% (3.8-14.5) did use cannabis in 2012, 2016 and 2020 respectively, with a significant increase over the period analysed (p-value = 0.014). Regarding boys who did not smoke traditional tobacco in 2012, 3.5% (1.1-10.6), 14.4% (8.3-23.9) and 14.3% (8.2-23.6) did smoke cannabis in 2012, 2016 and 2020 respectively, with a significant change between 2012 and 2020 (p-value = 0.006), and boys who had not used cannabis in the last month in 2012, 17.3% (11.0-26.3), 35.7% (26.7-45.8) and 28.6% (20.4-38.4), did smoke tobacco regularly in 2012, 2016 and 2020 respectively, with a significant difference between the three periods (p-value = 0.001) (Table 2).

Table 2

Prevalence of daily tobacco use and cannabis use in the past 30 days in 2012, 2016 and 2020 by frequency of tobacco or cannabis use in the past 30 days in 2012. Cohort 2012-2020

	Girls				Boys				Total			
	2012	2016	2020	p value	2012	2016	2020	p value	2012	2016	2020	p value
Cannabis	% (95% CI)	% (95% CI)	% (95% CI)		% (95% CI)	% (95% CI)	% (95% CI)		% (95% CI)	% (95% CI)	% (95% CI)	
Traditional tobacco use in 2012[a]												
Yes	35.2 (23.5-49.0)	20.7 (11.7-34.1)	11.1 (4.5-22.9)	0.007	37.0 (20.6-57.2)	30.1 (15.7-51.6)	22.2 (9.9-42.5)	0.496	35.8 (26.0-46.9)	24.0 (15.8-34.8)	14.8 (8.5-24.5)	0.005
No	0.9 (0.1-6.5)	1.9 (0.4-7.5)	7.5 (3.8-14.5)	0.014	3.5 (1.1-10.6)	14.4 (8.3-23.9)	14.3 (8.2-23.6)	0.006	2.1 (0.8-5.5)	7.5 (4.5-12.3)	10.5 (6.9-15.8)	<0.001
Tobacco	% [95% CI]	% [95% CI]	% [95% CI]		% [95% CI]	% [95% CI]	% [95% CI]		% [95% CI]	% [95% CI]	% [95% CI]	
Cannabis use in the past 30 days in 2012[b]												
Yes	95.0 (68.9-99.4)	85.0 (60.4-95.4)	70 (45.7-86.6)	0.223	76.9 (44.3-93.3)	61.5 (31.6-84.7)	76.9 (44.3-93.3)	0.606	87.9 (71.0-95.5)	75.8 (57.7-87.7)	72.7 (54.6-85.5)	0.042
No	25.0 (18.5-32.9)	33.1 (25.7-41.4)	28.6 (21.6-36.7)	0.164	17.3 (11.0-26.3)	35.7 (26.7-45.8)	28.6 (20.4-38.4)	0.001	21.8 (17.0-27.6)	34.2 (28.4-40.5)	28.6 (23.2-34.7)	<0.001

[a] Traditional tobacco: smoking every day, once or more times a week or less than once a week

[b] Cannabis in the past month: use of cannabis in the past 30 days

Discussion

The main results show that the substance that increases the most over the years is traditional tobacco. This consumption was higher among girls, although not significantly, but the most pronounced increase was found among boys, mainly between the ages of 15-16 and 19-20. Cannabis use and polydrug use remain stable over the years. The existence is corroborated of young people who initiate substance use from cannabis.

In line with studies carried out in similar environments, in our study we also found that tobacco consumption is more frequent in the female group; it seems that they use it to be more attractive and it provides them with a good image (19), although the greatest increase in consumption with age is found in the male group (3).

Regarding cannabis use and polydrug use, we found that in the group of girls there seems to be a decrease in use, although not significant, from 14-15 years old to 19-20 years old, which can be explained by the phenomenon of experimentation (20)

that occurs at school age but that we do not find among more adult ages. This could also be because girls have a greater perception of risk of drug use (21) and, consequently, greater concern about the negative impact caused by drugs on their own health (22), and could also be due to them taking on the roles and responsibilities of more adult ages (23). In the male group, consumption increases from 14-15 years old to 19-20 years old. The boys argue that consumption makes it easier for them to achieve an optimal emotional state and helps them to flirt or socialise (24).

The results of the study show that the majority of young people who smoked tobacco had smoked cannabis, but there is also a not insignificant percentage of young people who are initiated into the use of smoked drugs by the reverse entry i.e. who smoked cannabis and had not smoked tobacco, (2.1% [95% CI: 0.8-5.5], 7.5% [95% CI: 4.5-12.3] and 10.5% [95% CI: 6.9-15.8] in 2012 did not smoke tobacco but used cannabis in 2012, 2016 and 2020 respectively), reinforcing the theory that tobacco use no longer always precedes cannabis use. This reverse onset of use may also be explained by the fact that they are ex-smokers of tobacco and at the time of the survey only used cannabis. These results are in line with other studies which show that the age of initiation of both drugs or even initiation with cannabis is becoming more and more common as a consequence of the increasing availability of this drug (13–16).

The main limitation of this study is sample loss over the years, which is common in longitudinal studies. Another limitation to keep in mind is that the survey is self-reported and social desirability or difficulty in remembering one's own behaviour may have an impact on responses, however, there is evidence that the use of self-administered questionnaires is a viable method for measuring substance use variables among adolescents (25).

Conclusions

Among the main conclusions we observe, on the one hand, that there is a strong association between tobacco use and cannabis use, with young people who smoke tobacco regularly being those who have a higher prevalence of cannabis use. On the other hand, there is a significant percentage of young people whose gateway to smoked drugs is no longer tobacco but cannabis itself. Taking into account the change in the context of tobacco and cannabis use and its strong association, it is important to take into account that it is necessary to start with training programs at an early age directly with the prevention of polydrug use of tobacco and cannabis. For all these reasons it is very important to improve educational public health policies aimed at reducing the initiation and harm caused by the association of the use of these two substances (5).

Declarations

Ethics approval and consent to participate

In 2016, an email was sent informing each participant of the continuation of the study initiated in the 2011-2012 academic year. The students were contacted and informed that the current study was a follow-up of the data collected on 2011-2012, and the intention to contact them again in the future (2019-2020) with the objective to describe changes across the years. Only data from students who accepted to participate in the study was included in the current study. An informed consent was obtained from all of them. The e-mail also explained that participation was voluntary, that they could drop out whenever the participant wished without having to give any explanation. The data collected by the study were treated with complete confidentiality, were identified by a numerical code and only the study investigators could link these data to the participant. The study guaranteed the ethical and legal conditions specified in the Declaration of Helsinki (18). The project was approved by the ethics committee of the Fundació la Unió Catalana d'Hospitals (CEIC 16/31).

Consent for publication

Not applicable.

Availability of data and materials

Data is available from the corresponding author on a reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Author's contributions

EC-D is responsible for the study coordination, literature review, study design, collection, drafting, analysis and interpretation of data and revision of the manuscript. NO-R and AE: literature review, study design, drafting and reviewing the manuscript. HG-C and QMC: analysis and interpretation of data, drafting and reviewing the manuscript. MRC-G and JV-A: study design, drafting and revision of the manuscript. All authors have read and approved the final manuscript.

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