Accident Analysis and Prevention 47 (2012) 172–176

Contents lists available at SciVerse ScienceDirect

Accident Analysis and Prevention

journal homepage: www.elsevier.com/locate/aap

Short communication

Association between cannabis use and non-traffic injuries

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ARTICLE INFO

Article history:
Received 5 October 2011
Received in revised form
28 November 2011
Accepted 4 January 2012

Keywords:
Cannabis
Non-traffic accidents
Occupational accidents
Falls
Population survey

ABSTRACT

Background: This study aimed to assess the association between cannabis use and unintended non-fatal injuries other than those caused by road crashes.
Methods: Cross-sectional data were collected from a nationwide sample of 27,934 subjects surveyed in 2005 in Spain: 14,699 persons aged 15–34 years and 13,235 aged 35–64 years. Logistic regression was used to obtain odds ratios (OR) between patterns of cannabis use and frequency of non-traffic injuries, adjusted for sociodemographic factors and for the use of alcohol, tobacco and other drugs.
Results: Cannabis use in the last 12 months was associated with a higher frequency of injuries (OR = 1.4; 95% CI: 1.2–1.7). The OR in older adults (35–64 year age group) was 1.8 and 1.3 in younger people (15–34 year age group). The strongest associations found were between weekly use of cannabis and injuries from knocks and bumps (OR = 5.1; 95% CI 2.9–8.9) and those occurring outside work (OR = 3.0; 95% CI 1.8–4.9) in the older adult population.
Conclusion: Although our analysis did not control for behavioural factors, cannabis use is independently associated with an increased frequency of non-traffic injuries, especially in the older adult population. These associations emphasise the need to carry out longitudinal studies addressing the causal links between cannabis use and unintended injuries.

1. Introduction

Cannabis is the most widely consumed illegal drug in Western countries (European Monitoring Center for Drugs and Drug Addiction, 2010). In 2008, 23 million Europeans aged 15–64 years (6.8%) had used cannabis in the last year, with the highest prevalence reported among young people (16% in the 15–24 age group) (European Monitoring Center for Drugs and Drug Addiction, 2010). The same as occurs for alcohol consumption, impairment related with cannabis use could be expected to be related to a higher risk of injuries (Macdonald et al., 2006; Wells and Macdonald, 1999). In experimental studies, cannabis produces dose-related impairment in reaction time, information processing, perceptual-motor coordination, motor performance, attention, and tracking behaviour (European Monitoring Center for Drugs and Drug Addiction, 2008; Hall and Degenhardt, 2009; Ramaekers et al., 2004, 2006). However, these effects vary with dose, mode of administration, the user's previous experience, vulnerability to psychoactive effects, and use setting (Hall and Degenhardt, 2009).

Most previous studies have explored the association between cannabis use and all types of injuries, including traffic-related ones (Cherpitel, 1999; Gmel et al., 2009; Macdonald et al., 1999; Polen et al., 1993; Regidor et al., 1996; Vinson, 2006; Wadsworth et al., 2006). However, to our knowledge, the association between cannabis use and the frequency of unintended non-fatal injuries other than those caused by road crashes (i.e. non-traffic injuries, NTIs), has not been addressed in previous studies and to date remains unclear. The first approach in assessing this association should undoubtedly be the use of a cross-sectional study. Although this design has been widely used in previous studies to explore the relationship between alcohol and injuries, this has not been the case with illicit drugs. In these studies subjects self-report exposure (drug use) and effect (accident); thus, they provide clear advantages because they allow the control group to be selected using the same criteria as the cases, and especially because many confounders can be considered simultaneously.

Accordingly, the present study aimed to assess the association between patterns of cannabis use and the frequency of NTIs

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doi:10.1016/j.aap.2012.01.002

Table 1
Sociodemographic characteristics and drug use among people aged 15–64, Spain, 2005.

	Age 15–34 years (n = 12,365)		Age 35–64 years (n = 15,959)		Age 15–64 years (n = 28,324)		
	n	%	n	%	n	%	p value
Sociodemographic characteristics							
Sex[a]							1.000
Female	6182	50.0	7980	50.0	14,162	50.0	
Male	6182	50.0	7980	50.0	14,162	50.0	
Level of education completed							<0.001
Primary studies or less	1613	13.1	3941	25.5	5553	20.0	
1st level secondary education	4743	38.6	5786	37.4	10,530	37.9	
2nd level secondary education	3102	25.2	3181	20.5	6283	22.6	
University studies	2831	23.0	2575	16.6	5407	19.5	
Marital status							<0.001
Married	3387	27.4	11,914	74.7	15,301	54.1	
Single	8729	70.7	2256	14.2	10,985	38.8	
Other	225	1.8	1771	11.1	1996	7.1	
Country of birth							<0.001
Spain	10,743	87.1	14,760	92.7	25,503	90.3	
Other	1588	12.9	1161	7.3	2750	9.7	
Employment status							<0.001
Unemployed	1208	9.8	952	6.0	2160	7.6	
Employed	7525	61.0	10,122	63.5	17,647	62.4	
Retired	27	0.2	1442	9.1	1470	5.2	
Student	2731	22.1	29	0.2	2761	9.8	
Housewife	851	6.9	3386	21.3	4237	15.0	
Type of work[b]							<0.001
Non-manual job	5656	67.1	8561	69.5	14,217	68.5	
Manual job	2778	32.9	3754	30.5	6532	31.5	
Drug use							
Average tobacco consumption							<0.001
None	7158	59.1	10,433	66.3	17,591	63.2	
1–20 cigarettes/day	4623	38.2	4489	28.5	9112	32.7	
>20 cigarettes/day	323	2.7	805	5.1	1128	4.1	
Alcohol consumption							0.057
≥Risk threshold	474	3.8	544	3.4	1017	3.6	
<Risk threshold	11,883	96.2	15,403	96.6	27,286	96.4	
Antidepressant use							<0.001
No	12,188	98.6	15,429	96.8	27,618	97.6	
Yes	168	1.4	510	3.2	677	2.4	
Frequency of cannabis use							<0.001
No use	9929	80.4	15,188	95.3	25,116	88.8	
<Weekly use	1271	10.3	369	2.3	1640	5.8	
Weekly use	1155	9.3	380	2.4	1535	5.4	
Use of stimulants							<0.001
No	11,598	94.0	15,699	98.5	27,297	96.5	
Yes	744	6.0	240	1.5	984	3.5	
Use of opiates or inhalables							<0.001
No	12,300	99.6	15,928	99.8	28,228	99.7	
Yes	50	0.4	25	0.2	75	0.3	

[a] The number of men and women is the same because the original sample (n_0 = 27,934) was weighted to correct for the disproportionate distribution of the original sample by age, sex and region of recruitment (n_1 = 28,324).
[b] Calculated over the total number of persons who were employed, unemployed but had worked previously, or were retired at the time of the interview.

based on a cross-sectional design using data from the 2005 Spanish Household Survey on Alcohol and Drugs (SHSAD).

2. Methods

The 2005 SHSAD is a national survey of 27,934 persons aged 15–64 years resident in households in Spain, obtained through a probabilistic three-stage sampling procedure. The response rate was 49.9%. The questionnaire included items about sociodemographic characteristics, psychoactive drug use, risk perception, and perceived availability and visibility of drugs. It also included several questions regarding injuries, including their cause, type and place of occurrence. Further methodological details can be found elsewhere (Delegación del Gobierno para el Plan Nacional sobre Drogas, 2008).

The outcome variable was occurrence of any NTI in the 12 months before the interview (excluding injuries caused in a road crash, self-inflicted injuries, and injuries caused by another person in a fight, assault or violent act). NTIs were classified according to both their type (falls, knocks and bumps, other) and place of occurrence: at work or outside work (at home, walking, playing a sport, other). Information on place of occurrence could only be obtained for the most recent injury in the last year. Cannabis use in the last year was originally considered as a dichotomous variable (no/yes), and was later stratified in three categories (none, occasional – less than weekly, and frequent – weekly). We also collected information on sex, age, level of education (primary studies or less, 1st and 2nd level secondary education and university studies), country of birth (Spain, other), type of work (manual vs. non-manual labour), and patterns of alcohol and tobacco use (in the last 30 days) and other drugs (in the last 12 months). Information about the type and number of standard alcoholic drinks consumed during weekdays and on the weekend was converted into cm^3 of pure alcohol per day. The latter variable was recoded in two categories: consumption below the risk threshold (<50 cm^3/day for men and <30 cm^3/day for women) and consumption equal to or above the risk threshold.

Table 2
Prevalence of non-traffic injuries in the past 12 months among people aged 15–64, Spain, 2005.

	Age 15–34 years (n = 12,365)		Age 35–64 years (n = 15,959)		Age 15–64 years (n = 28,324)		
	n	%	n	%	n	%	p value
Any non-traffic injury							<0.001
No	11,560	93.5	15,136	94.9	26,696	94.3	
Yes	797	6.5	809	5.1	1606	5.7	
Injuries caused by fall							0.275
No	11,969	96.9	15,480	97.1	27,449	97.0	
Yes	388	3.1	465	2.9	853	3.0	
Injuries caused by knocks and bumps							<0.001
No	12,074	97.7	15,733	98.7	27,807	98.3	
Yes	283	2.3	212	1.3	495	1.7	
Injuries from other causes[a]							0.014
No	12,197	98.7	15,788	99.0	27,985	98.9	
Yes	160	1.3	157	1.0	317	1.1	
Injuries occurring at work[b]							0.330
No	12,080	97.8	15,626	98.0	27,706	97.9	
Yes	270	2.2	322	2.0	593	2.1	
Injuries occurring outside work[b]							<0.001
No	11,831	95.8	15,431	96.8	27,262	96.3	
Yes	519	4.2	517	3.2	1037	3.7	

[a] Cuts, burns or poisoning.
[b] Refers to most recent injury in the last 12 months.

Tobacco use was classified in three categories: "0 cigarettes/day", "1–20 cigarettes/day" and ">20 cigarettes/day". Regarding other psychoactive drugs, we collected information on the use of central nervous system stimulants (cocaine, amphetamines and ecstasy), opiates and/or inhalable substances, and antidepressants, considered as dichotomous variables (no/yes).

The analysis was stratified by age, after eliminating cases with unknown values from the denominator. The statistical significance of differences between proportions was established using the chi-square test, rejecting the null hypothesis when $p < 0.05$. We evaluated the differences between two age subgroups (15–34 years and 35–64 years) with regard to selected sociodemographic characteristics, alcohol consumption and use of other illegal drugs. The reported prevalence of NTIs in the last 12 months was also examined.

We also applied logistic regression to obtain adjusted odds ratio (OR) estimates (and their 95% confidence intervals), to assess the strength of the association between the use of cannabis (taken as an independent variable) and the occurrence of any NTI from falls or from knocks and bumps, and NTIs outside work (taken alternatively as the dependent variables of each model), in the population aged 15–64 years. Separate models were later obtained for the two age subgroups, 15–34 and 35–64 years, as these are the age strata routinely used in all reports of the European Monitoring Center for Drugs and Drug Addiction. In the model constructed for NTIs occurring at work, the lower age limit was raised to 16 years (the minimum age for working in Spain).

All prevalence and OR estimates were weighted to correct for the disproportionate distribution of the original sample by age, sex and region of recruitment. All analyses were performed with the statistical package PASW Statistics 18.

3. Results

Table 1 describes the sociodemographic characteristics and drug use in the sample population. Some 20% of those aged 15–64 years old had completed primary education or less (13.1% in the 15–34 age group and 25.5% in the 35–64 age group) and 90.3% (87.1% and 92.7%, respectively) had been born in Spain. The prevalence of employed persons and of manual and non-manual workers at the time of the interview was similar in the two age groups studied. However, the prevalence of reported drug and alcohol use in the younger age group was higher than in the older one for all substances except antidepressants. The proportion of persons who reported cannabis use in the last 12 months was 11.2% (19.6% in the 15–34 age group and 4.7% in the 35–64 age group).

The prevalence of different types of NTI is presented in Table 2. Overall, 5.7% of the population aged 15–64 years old reported having suffered an NTI in the year before the interview (6.5% in the 15–34 age group and 5.1% in the 35–64 age group). Falls were reported by 3% of the population (3.1% and 2.9%, respectively) and knocks and bumps were reported by 1.7% (2.3% and 1.3%, respectively). The most recent injury in the last 12 months was at work in 2.1% of those aged 15–64 years old (2.2% and 2%) and outside work in 3.7% (4.2% and 3.2%).

Table 3 shows the adjusted associations between cannabis use and NTI (the complete models can be consulted in Supplementary data). An increased reporting of NTI was observed for cannabis users in the past 12 months (OR = 1.4; 95% CI: 1.2–1.7). The magnitude of this association did not change depending on the frequency of consumption. It was higher in the older adult population (OR = 1.8, 95% CI: 1.3–2.4) than in younger people (OR = 1.3; 95% CI: 1.1–1.5), although this difference was not statistically significant due to overlapping confidence intervals of the ORs. Separate analyses by type of NTI revealed a strong association between cannabis use and NTIs due to knocks and bumps, especially in persons aged 35–64 who were weekly users (OR = 5.1; 95% CI: 2.9–8.9). The association with falls was weaker (OR = 1.2; 95% CI: 1.0–1.6). Finally, with regard to the place where the injury occurred, an increase of NTI reports occurring at work was observed for cannabis users. However, the association with NTI occurring outside work was more clear (OR = 1.4; 95% CI: 1.2–1.7), being especially high among weekly cannabis users in the older adult population (OR = 3.0; 95% CI: 1.8–4.9).

4. Discussion

After adjusting for other drug use and for several sociodemographic factors, cannabis users showed a higher frequency of reporting NTIs, especially for those due to knocks and bumps in the older adult population and for NTIs occurring outside work.

Very few studies have examined the relationship between cannabis use and NTIs, and most of them do not support this

Table 3
Association between cannabis use and prevalence of non-traffic injuries requiring medical care in last 12 months among people aged 15–64, Spain, 2005.

	n	Total non-traffic injuries				Falls				Knocks and bumps				At work				Not at work[a]			
		Injury (%)	OR (95% CI)[b]			Injury (%)	OR (95% CI)[b]			Injury (%)	OR (95% CI)[b]			Injury (%)	OR (95% CI)[b]			Injury (%)	OR (95% CI)[b]		
15–64 years old[c]																					
Cannabis use																					
No	25,116	5.3	1.0			2.9	1.0			1.5	1.0			2.0	1.0			3.4	1.0		
Yes	3175	9.0	1.4	1.2	1.7	4.1	1.2	1.0	1.6	3.7	2.0	1.5	2.5	3.3	1.3	1.0	1.7	5.8	1.7	1.4	2.1
Frequency of cannabis use																					
No use	25,116	5.3	1.0			2.9	1.0			1.5	1.0			2.0	1.0			3.4	1.0		
<Weekly use	1640	8.7	1.5	1.2	1.8	4.5	1.4	1.1	1.8	3.5	1.9	1.4	2.6	3.1	1.4	1.0	1.9	6.2	1.7	1.4	2.2
Weekly use	1535	9.3	1.4	1.1	1.8	3.7	1.0	0.7	1.4	4.0	2.1	1.5	2.9	3.5	1.2	0.8	1.7	5.3	1.7	1.3	2.2
15–34 years old[c]																					
Cannabis use																					
No	9929	5.9	1.0			2.9				2.0				2.0				3.8			
Yes	2426	8.8	1.3	1.1	1.5	4.2	1.2	0.9	1.5	3.6	1.6	1.2	2.1	3.2	1.3	0.9	1.8	5.9	1.7	1.3	2.1
Frequency of cannabis use																					
No use	9929	5.9	1.0			2.9				2.0				2.0				3.8			
<Weekly use	1271	8.8	1.3	1.1	1.7	4.6	1.3	1.0	1.8	3.7	1.7	1.2	2.4	2.7	1.3	0.8	1.9	7.2	1.9	1.4	2.4
Weekly use	1155	8.7	1.2	0.9	1.5	3.7	1.0	0.7	1.4	3.4	1.4	0.9	2.1	3.8	1.3	0.9	2.0	4.6	1.3	0.9	1.9
35–64 years old																					
Cannabis use																					
No	15,188	4.8	1.0			2.8				1.2				1.9				3.1			
Yes	749	9.6	1.8	1.3	2.4	4.1	1.3	0.8	2.0	4.1	3.3	2.1	5.2	3.6	1.2	0.7	1.9	5.3	1.9	1.2	2.8
Frequency of cannabis use																					
No use	15,188	4.8	1.0			2.8				1.2				1.9				3.1			
<Weekly use	369	8.2	1.6	1.1	2.4	4.4	1.5	0.9	2.6	2.6	2.0	1.0	4.0	4.7	1.6	1.0	2.8	2.9	1.1	0.6	2.0
Weekly use	380	11.0	1.9	1.3	2.9	3.9	1.0	0.5	2.0	5.7	5.1	2.9	8.9	2.5	0.6	0.3	1.4	7.6	3.0	1.8	4.9

[a] Non-fatal injuries during a sports activity, during play or leisure activity, while walking, doing homework or having fun or dancing.

[b] ORs adjusted for sex, age, level of education, country of birth, professional status (manual or non-manual work), tobacco consumption, and use of alcohol, anti-depressants, stimulants (cocaine, amphetamines or ecstasy) and opiates.

[c] For injuries at work, we selected the population aged 16–64 years ($n = 27,852$) and 16–34 years ($n = 11,915$). In the first group, 24,719 subjects did not use cannabis in the past 12 months, 1606 subjects used cannabis <weekly and 1526 subjects used cannabis weekly. In the second group, 11,915 subjects did not use cannabis in the past 12 months, 1238 subjects used cannabis <weekly and 1146 subjects used cannabis weekly.

hypothesis. Braun et al. (1998), in a retrospective cohort study of adults aged 15–49 years, found only a slight association between cannabis use and a higher risk of injuries in women due to being struck by an object. Based on the same cohort, Gerberich et al. (2003) found an increased incidence of injury-related hospitalisations in cannabis users only for assaults. However, these studies did not include persons over age 49, for whom our data reveal the strongest association with cannabis use. Several additional studies (Bogstrand et al., 2011; Vitale and van de Mheen, 2006), based on blood and urine samples collected from injured patients at emergency rooms and trauma centers, showed a high prevalence of recent cannabis use (ranging between 6.2% and 34.2%), but none have examined the risk of NTI among drugged subjects.

Several methodological drawbacks should be taken into account in interpreting our results. The most important one refers to the cross-sectional nature of the study design, which does not permit inference of a causal link between cannabis use and NTIs. Regarding data collection, self-reported drug use may have led to an underestimation of cannabis consumption (Brookoff et al., 1993; McNagny and Parker, 1992), although the answers to these questions had no legal implications. This bias may have produced an underestimation of the association between cannabis and NTIs, because there was no link between self-reports of drug use and interviewer-administered questions on injuries. However, the interviewers explored only those injuries requiring medical assistance, thus excluding all minor injuries and some major injuries not attended in health care facilities. This could also bias the associations found between cannabis and NTI, if the probability of being attended by health care providers was also independently associated with cannabis use.

Although the analysis controlled for use of alcohol and other drugs, this was not the case for some other potential confounders related with behaviours, risk attitudes, or the presence of other people at the scene of the accident among others. Behavioural factors influencing road traffic accidents (with long-term and short-term impact) have been previously described (Petridou and Moustaki, 2000). Some of them (i.e. inexperience, fatigue, stress, overestimation of capabilities, among others) may also explain a great part of the risk of NTI injuries observed in this study. Finally, the sample size was not large enough to detect some weak associations, especially for NTIs at work.

5. Conclusions

Although our results should be interpreted cautiously given the study limitations described, they clearly suggest that cannabis use may be independently associated with an increased frequency of NTI, especially in older adults over age 34. Further longitudinal studies addressing causation are strongly recommended.

Conflicts of interest

None declared.

Funding

This work was supported mainly by Fundación Mutua Madrileña (AP75642010). A supplemental grant by the National Plan on Drugs (PR153/03–12281) and RTA (RD06/0001/1018) made it possible to write the paper.

Acknowledgements

Our thanks to the National Plan on Drugs for providing data from the 2005 Spanish Household Survey on Alcohol and Drugs and to Kathryn M. Fitch for translation and suggestions.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.aap.2012.01.002.

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