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Exclusive therapeutic use of cannabis in a large sample of daily cannabis users in France: a cross-sectional survey

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Abstract

Many cannabis users report therapeutic benefits from cannabis consumption, even when not recommended by a physician. To date, few data on therapeutic users of cannabis in France are available. Using a cross-sectional web-based survey held in 2020, we collected sociodemographic, health and substance use data from 4150 daily cannabis users in France. We performed a multivariable logistic regression model to assess factors associated with exclusive therapeutic use of cannabis. Approximately 10% (n=453) of the participants reported using cannabis exclusively for therapeutic purposes. Our results suggest that exclusive therapeutic users of cannabis constitute a different group from non-exclusive (i.e., recreational and mixed) users, especially regarding age (aOR [95%CI] = 1.01 [1.00-1.02]), employment (aOR [95%CI] = 0.61 [0.47-0.79]), urban area of residence (aOR [95%CI] = 0.75 [0.60-0.94]), physical (aOR [95%CI] = 2.95 [2.34-3.70]) and mental health condition (aOR [95%CI] = 2.63 [1.99-3.49]), mode of cannabis administration (non-smoked, aOR [95%CI] = 1.89 [1.22-2.95] ; smoked with little tobacco, aOR [95%CI] = 1.39 [1.09-1.76]), frequency of cannabis use (aOR [95%CI] = 1.04 [1.01-1.06]), home cultivation (aOR [95%CI] = 1.56 [1.13-2.15]), at-risk alcohol use (aOR [95%CI] = 0.68 [0.54-0.84]), and previous-month opiate use (aOR [95%CI] = 1.67 [1.22-2.30]). A greater understanding of the distinct profiles of regular cannabis users could provide a way to improve harm reduction strategies and care access for this population. However, no causal inference can be drawn from this cross-sectional design. Further studies are needed to better understand the boundaries between therapeutic and recreational use.

Keywords: therapeutic cannabis ; self-medication ; cannabis use pattern ; daily cannabis users ; online survey

Introduction

Cannabis is one of the most consumed psychoactive substances, with an estimated 188 million past-year users globally (World Drug Report 2019). It is mainly used for recreational purposes because of effects including euphoria and relaxation (Green, Kavanagh, and Young 2003). Although cannabis consumption leads to a higher risk of mental and physical health problems, including cognitive impairment, psychosis, anxiety disorders, respiratory and cardiovascular complications (Campeny et al. 2020), cannabis may also be used for therapeutic purposes (Ogborne et al. 2000).

Cannabis has a long history of medical use (Pisanti and Bifulco 2019). Current evidence suggests that cannabinoid-based medicines are effective for treating symptoms in several medical conditions (Whiting et al. 2015), the most cited being epilepsy (Stockings et al. 2018), pain (Aviram and Samuelli-Leichtag 2017), chemotherapy-induced nausea/vomiting (Smith et al. 2015), and spasticity in multiple-sclerosis patients (Nielsen et al. 2018).

Medical cannabis policies vary greatly between countries (Aguilar et al. 2018). Irrespective of the legal status of cannabis for medical use, many users report self-medication, even without physician recommendations (Hazekamp et al. 2013; Ogborne et al. 2000; Osborn et al. 2015; Sexton et al. 2016; Walsh et al. 2013). Besides the conditions cited above, therapeutic users report consuming cannabis to relieve anxiety and depression symptoms, sleeping disorders, headaches, craving for other drugs, and to improve appetite, energy and concentration (Hazekamp et al. 2013; Kosiba, Maisto, and Ditre 2019; Osborn et al. 2015; Reinerman et al. 2011). With respect to pain, cannabis self-medication has been reported as an alternative or a complement to classic pharmaceutical prescriptions (Sexton et al. 2016), and the medical use of cannabis has been associated with a reduction in prescribed opioid dosages (Okusanya et al. 2020).

In France, the law criminalizing drug use (31 December 1970) prohibits all use of substances classified as narcotics, including cannabis. In March 2021, a two-year medical cannabis pilot project was launched in the country. It aims to include up to 3000 patients concerned by one the five following conditions: spasticity in multiple sclerosis, palliative care, cancer-associated symptoms, drug-resistant epilepsies and drug-resistant neuropathic pain. Before the pilot project began, only cannabis-based medicines, such as Sativex and Dronabinol, were allowed under restricted medical prescription. Cannabis is the most prevalent illicit drug in the general population in France (Spilka et al. 2018). A French national survey conducted in 2020 revealed that among the 10 879 respondents aged between 18 and 64 years old who filled out the questionnaire's section on cannabis, 11.3% reported using cannabis at least once in the previous year, and 2.1% reported daily use (Le Nézet et al. 2021). To our knowledge, few scientific data are currently available on the therapeutic use of cannabis outside of the regulatory framework in France. The only related data we identified come from a cross-sectional survey which found that 19.4% of a sample of 139 patients in France suffering from cluster headaches reported trying to manage attacks by using cannabis, with very contrasting results (Leroux et al. 2013).

In a context of increasing debate on cannabis regulation in France and of the experimentation with medical cannabis mentioned above, examining the boundaries between therapeutic and recreational uses could be relevant to adapt health policies to specific needs. Using a large web-based survey of daily cannabis users, we aimed to characterize exclusive therapeutic cannabis users in France, and to identify their drug use patterns.

Method

Survey and population

CANNAVID is a French national cross-sectional survey conducted in collaboration with the harm reduction association Bus 31/32. Its primary objective was to investigate the impact of the COVID-19-associated lockdown on daily cannabis users in France (Mezaache et al. 2022). Participants completed a web-based self-administered questionnaire between 17 March and 11 May 2020, during the country's first lockdown. The study sample was recruited through social media and psychoactive drug user community websites. All participants received information about the study's aims and about data protection before they accessed the questionnaire. The time for questionnaire completion was approximatively 15 minutes. No personal data that could identify participants were collected. Inclusion criteria were being aged 18 years or over, living in France, and using cannabis daily before the lockdown. We assumed that frequent users have a different profile than casual users. Accordingly, we adopted a conservative choice, and only recruited daily users. The French INSERM National Ethics Committee granted ethical approval for CANNAVID (N ° 20-676).

Measures

The questionnaire was self-administered by participants on the online survey platform Limesurvey.org. Sociodemographic data before the lockdown included age, gender, education level, professional activity, town of residence, type of housing, living with a partner, having children, receiving food aid during the previous month. Health-related data included chronic disorders from a set list, and chronic pain. Cannabis use pattern before the lockdown included number of daily intakes, form of cannabis used, mode of administration, supply source and therapeutic use. A measure of other psychoactive substance use during a typical month before the lockdown asked about alcohol (using the Alcohol Use Disorders Identification Test (AUDIT-C)), tobacco, stimulants (cocaine, amphetamine), opioids, benzodiazepines, and other substances (e.g., ecstasy, ketamine, hallucinogenic drugs, and other designer drugs).

AUDIT-C is a validated instrument used to identify heavy alcohol users (Bush et al. 1998). To measure substance use, we adapted the drugs subscale of the Addiction Severity Index (McLellan et al. 1980), and more specifically the table where participants report how many days they have used each substance during the previous 30 days, how many times they use it during a typical day, and the main mode of administration. Participants also indicated their reasons for therapeutic cannabis use among a list of 12 items, and in an open answer field.

The outcome of the present study was “exclusive therapeutic cannabis use”. To build this dichotomous variable we used answers to the question: “Do you self-medicate with cannabis?”. Response codes included “never”, “sometimes”, “often”, “always”, or “don’t know”. To better discriminate the effect of therapeutic use on independent variables, participants who answered “always” were categorized as Exclusive Therapeutic Cannabis Users (ETCU). All others were categorized as Non-Exclusive Therapeutic Cannabis Users (NETCU). This categorization enabled us to integrate the “don’t know” responses into the NETCU category.

We converted the town of residence into a “type of residence area” variable based on the number of residents in an “urban unit”, a classification created by the French national institute of statistics and economics (INSEE) to define the degree of urbanicity of a town (Rey et al. 2009). More specifically, participants were categorized as “living in an urban area (urban unit > 100,000 residents) or in a semi-urban area (10,000 to 100,000 residents)”, vs. “living in a rural area (<10,000 residents)”. A “physical health condition” variable was built by combining a “yes” answer to the chronic pain questionnaire item with the list of conditions checked in the chronic pathology questionnaire item (which included both physical and mental elements). These conditions included neurologic, inflammatory, autoimmune, metabolic, respiratory and cardiovascular pathologies. Using the same chronic pathology questionnaire item, a “mental health condition” variable was built by combining the list of conditions checked referring to mood disorder, anxiety disorder, attention deficit disorder and psychosis. We used the combined score of the AUDIT-C scale to build an “at-risk alcohol use” categorical variable. At-risk use was defined by a score of 3 or more for women and of 4 or more for men (Bush et al. 1998).

We assumed that data missing in the study were missing not at random. We therefore dichotomized all categorical exploratory variables (except the “mode of administration” and the “supply source” variables), assigning missing data to one of the categories.

Statistical analyses

First, we performed descriptive statistics. Data on sociodemographic characteristics, health status, cannabis consumption and other substance use were compared between ETCU and NETCU using a Chi-squared test for categorical variables and the Wilcoxon rank-sum test for non-normally distributed continuous variables. We also described the benefits expected from therapeutic use reported by ETCU.

Second, we performed logistic regressions to identify factors associated with the outcome (i.e., exclusive therapeutic use of cannabis). All explanatory variables associated with the outcome at a threshold p-value <.10 in univariable analyses were eligible to enter the multivariable model. We estimated the final multivariable model using a backward selection procedure, keeping variables with a p-value <.05. Adjusted odds ratios (aOR) and 95% confidence intervals (CI) were estimated. Missing data from the variables “age”, “daily number of intakes” and “mode of administration” were not included in the regression analyses.

As collinearity between two or more independent variables may be a problem to adequately interpret results in regression analyses, we assessed collinearity using the Variable Inflated Factor (VIF). VIF values lower than 10 are considered acceptable.

To test whether the classification of the outcome categories affected results, we performed two sensitivity analyses. In the first, we tested the multivariable regression model again but this time excluding data from participants who answered “don’t know” to the outcome question. In the second analysis, in addition to excluding the “don’t know” participants, we recoded the outcome question into “therapeutic use: never/sometimes” vs. “therapeutic use: often/always”. All analyses were performed with STATA-17 (64bit).

Results

Study sample characteristics

A total of 4150 participants completed the questionnaire and were included in analyses. Characteristics of participants according to cannabis use type (i.e., ETCU and NETCU) are given in Table 1. Median age [interquartile

range (IQR)] was 27 [22–37] years old. Most participants were men (73.0%) and lived in an urban area (65.3%). Cannabis was mainly used in herbal form (62.5%). Most of the participants (81.9%) reported that they mainly obtained cannabis on the illegal market, while 9.9% reported cultivating cannabis at home. Median [IQR] consumption frequency was 4 [3–6] intakes per day, and the mode of administration was almost exclusively through smoking joints (93.3%). Four hundred and fifty-three participants were self-reported ETCU (10.9%). In the NETCU group, 29.4%, 25%, 14.7% and 20% answered “never,” “sometimes,” “often” and “don’t know,” respectively, to the therapeutic use questionnaire item.

Among ETCU, almost three quarters (72.2%) were men, with a median [IQR] age of 33 [25–43] years old. Over three quarters (77.7%) had at least an upper secondary school certificate and 67.5% were actively employed or students. About half (54%) reported living in an urban area, and 77.7% had their own home. Forty-two percent reported living with their partner and one third had children (33.6%). A minority (6%) received food aid during the month prior to the start of the first COVID–19 lockdown.

With regard to health data, over half (59.8%) of the ETCU reported chronic pain or a chronic neurologic, inflammatory, autoimmune, metabolic, respiratory or cardiovascular disorder. Over a quarter (26.9%) reported a chronic mental health condition (mood disorders, anxiety disorders, attention deficit disorder or psychosis). In addition, 8.6% reported substance use disorder (alcohol, opioids, stimulants).

In terms of cannabis use pattern, almost two-thirds of ETCU (62.9%) reported using it mostly in herbal form. Median [IQR] frequency of use in this group was 5 [3–7] intakes per day. Most (87.7%) reported smoking joints as their most common mode of administration. Of these, 48.6% and 39.1% reported joints with a lower and a higher proportion of cannabis than tobacco, respectively. Just under one in ten (9.1%) ETCU reported vaporization or ingestion. The main supply source was the illegal market (69.1%), and 19.2% reported home cultivation.

Finally, concerning other psychoactive substance use, 58.5% of ETCU were daily tobacco smokers, and 48.1% were at-risk alcohol users. Moreover, 17.4% reported having used opioids (prescribed or not) at least once during the month prior to the first COVID–19 lockdown, 18.1% stimulants, 12.8% benzodiazepines, and 24.1% other psychoactive substances.

Reasons for therapeutic use

The benefits that ETCU expected from therapeutic use of cannabis are shown in Table 2. The most frequently reported expected benefits were pain management (90.1%), anxiety and depressive symptoms management (82.1%), and improved quality of sleep (74.6%). Improved appetite, reduced alcohol and other psychoactive drug use, increased concentration and increased energy were expected by less than 30% of ETCU. The majority (89.6%) of ETCU reported two or more expected benefits, with 19.2% reporting five or more.

Factors associated with therapeutic use of cannabis

Results of the univariable and multivariable regression analyses are presented in Figure 1 and Table 3. After adjustment, exclusive therapeutic use of cannabis was positively associated with older age (aOR [95%CI] = 1.01 [1.00–1.02]), but negatively associated with being actively employed or a student (aOR = 0.61 [0.47–0.79]) and with living in an urban area (aOR = 0.75 [0.60–0.94]). It was also positively associated with reporting a physical health condition (aOR = 2.95 [2.34–3.70]) and with reporting a mental health condition (aOR = 2.63 [1.99–3.49]). Compared to NETCU, ETCU were more likely to smoke joints with a higher proportion of cannabis than tobacco (aOR = 1.39 [1.09–1.76]), to administer cannabis by a route other than smoking (aOR = 1.89 [1.22–2.95]), to use it more frequently (aOR = 1.04 [1.01–1.06]), and to cultivate it at home (aOR = 1.56 [1.13–2.15]). Finally, they were more likely to use opioids (prescribed or not) during the previous month (aOR = 1.67 [1.22–2.30]), but less likely to have at-risk alcohol use (aOR = 0.68 [0.54–0.84]) than NETCU. All covariate VIF values ranged between 1.02 and 1.23, suggesting no collinearity problem in the logistic regression model.

In the first sensitivity analysis, excluding participants who answered “don’t know” to the outcome question did not change the final model estimates. In the second sensitivity analysis, after excluding “don’t know” respondents and recoding the outcome question (“therapeutic use: never/sometimes” vs. “therapeutic use: often/always”), age was no longer associated with therapeutic use.

Discussion

To our knowledge, this is the first study to investigate the characteristics and drug use patterns of therapeutic cannabis users in France. In this cross-sectional survey of 4150 daily cannabis users in France, one in ten were exclusive therapeutic users (ETCU). This group was distinct from non-exclusive therapeutic cannabis users (NETCU) in terms of sociodemographic characteristics, health status, cannabis use pattern, and consumption of other substances. Most previous studies characterizing therapeutic cannabis users were conducted in countries where, unlike France, medical cannabis is already legal, such as in Canada, Israel and the United States. Despite these socio-political differences, our findings corroborate those from previous studies in legalized settings. Specifically, with respect to other cannabis users, ETCU were older (Choi, DiNitto, and Marti 2017; Lin et al. 2016; Turna et al. 2020), had poorer physical and mental health (Choi, DiNitto, and Marti 2017; Goulet-Stock et al. 2017; Lin et al. 2016; Rotermann and Pagé 2018; Roy-Byrne et al. 2015; Turna et al. 2020; Wall et al. 2019), more frequent cannabis use (Choi, DiNitto, and Marti 2017; Lin et al. 2016; Rotermann and Pagé 2018; Roy-Byrne et al. 2015; Sznitman 2017; Turna et al. 2020), a lower prevalence of at-risk alcohol use (Choi, DiNitto, and Marti 2017; Goulet-Stock et al. 2017; Lin et al. 2016; Roy-Byrne et al. 2015; Turna et al. 2020), a lower likelihood of being employed (Choi, DiNitto, and Marti 2017; Lin et al. 2016), higher consumption of prescribed opioids (Rotermann and Pagé 2018; Roy-Byrne et al. 2015), and a greater tendency to administer cannabis by routes other than smoking (vaporization, ingestion) (Sznitman 2017).

Ageing is associated with a higher prevalence of chronic pain and psychiatric comorbidities such as anxiety and depression (Tunks, Crook, and Weir 2008). Unemployment and retirement are strongly related to chronic medical conditions and to poor overall health status (Alavinia and Burdorf 2008). Older and unemployed participants in our study were therefore more likely to be therapeutic cannabis users. Using cannabis for exclusive therapeutic purposes was associated with living in a rural or semi-urban area. In these areas, individuals have potentially less access to health information and to advanced care (Chen et al. 2019; Johnston, Wen, and Joynt Maddox 2019).

Consistent with data found in the literature, relief from pain, anxiety, depression, and sleep disturbances were the most common reported reasons for therapeutic use (Kosiba, Maisto, and Ditre 2019; Park and Wu 2017). There is some evidence for the efficacy of cannabis for neuropathic pain (Aviram and Samuelli-Leichtag 2017). Opioids are widely prescribed for chronic pain, and evidence suggests that cannabis could be used as a complement or a substitute for them in this context (Desroches and Beaulieu 2010; Lucas 2012). Despite the controversy as to whether cannabis is a suitable treatment for psychiatric comorbidities (Sarris et al. 2020), in countries where therapeutic cannabis is legal, some physicians prescribe it to treat anxiety and depressive symptoms (Reinarman et al. 2011). Cannabis seems to have an immediate perceived effect on depressive symptoms (Li et al. 2020) but its long-term impact on mental illness progression is unclear (Botsford, Yang, and George 2020). This highlights the importance of clinical follow-up for patients who self-medicate with cannabis. Although there is no conclusive data about the efficacy of cannabis on sleep outcomes (Babson, Sottile, and Morabito 2017), it is believed to improve sleep quality and reduce sleep

disorders. Nevertheless, long-term use may diminish the perceived beneficial effect on sleep quality (Winiger et al. 2021). Reducing alcohol and other drug use was also a reason for therapeutic use of cannabis in our sample, and this is consistent with the lower prevalence of at-risk alcohol use reported. Therapeutic users often report using cannabis as a therapeutic substitute for alcohol and other non-prescribed drugs (Reiman 2009).

Considering the characteristics and motivations of individuals who use cannabis for therapeutic purposes in France, we hypothesize that they may have already unsuccessfully attempted other therapeutic approaches, and consequently decided to self-medicate with alternatives treatments such as cannabis. In addition, a study in Canada found that the main reasons which people reported for therapeutic cannabis use were higher effectiveness and fewer side effects than conventional medicines, as well as greater trust in natural substances (Ogborne et al. 2000). Further studies are needed to investigate previous healthcare experiences of therapeutic cannabis users in France and their beliefs about therapeutic cannabis (Kruger and Kruger 2019).

The lower likelihood of at-risk alcohol use and the less harmful routes of cannabis administration in ETCU than in other users may also be associated with a more health-conscious lifestyle in persons who perceive that cannabis is less harmful than alcohol (Lau et al. 2015b). In terms of administration route, vaporization and ingestion of cannabis are less detrimental to health than smoking (Russell et al. 2018). In a previous study, vaporizing users appeared to be aware of the harm associated with smoking cannabis (Malouff, Rooke, and Copeland 2014). Finally, with regard to cannabis sources, if we continue with the hypothesis of a more health-conscious lifestyle, home cultivation of cannabis may be interpreted as a choice to ensure safer product than that found on the illegal market, specifically in terms of limiting cannabis contaminants (Dryburgh et al. 2018) and setting cannabinoid levels.

Our results could be relevant for policymakers in terms of harm reduction interventions and improved access to care for therapeutic cannabis users. French healthcare professionals need to be better informed about the potential benefits and risks of cannabis use for patients who are therapeutic users in order to adapt their global care. Patients themselves need tailored information and advice to reduce harm and maximize benefits, especially regarding appropriate dosage, intake frequency, cannabinoid potency and administration routes. It would also be relevant to facilitate access to harm reduction services such as drug analysis devices, which are not currently adapted to people who use natural drugs in France.

From an epistemological perspective, this study contributes to the field of drug studies, and specifically to the understanding of drug use beyond the dominant pathological representations. Drug use cannot simply be reduced to issues of potential abuse or deleterious effects; it is regulated by a set of psychological dispositions and socio-cultural factors (Hartogsohn 2017; Zinberg and Harding 1979) allowing for some controlled and non-problematic patterns (Decorte 2001; Engel et al. 2021; Lau et al. 2015a). Understanding this behavior also implies considering the personal benefits associated with drug use (St Arnaud 2021), including pleasure (Moore 2008) and enhancement of health and cognitive abilities (Askew and Williams 2021). Furthermore, the acknowledgment of possible non-pathological uses of drugs could have implications for harm reduction strategies and drug policies (Engel et al. 2021; St Arnaud 2021).

This study has limitations. First, participants may not be representative of all cannabis users in France, and any generalization of our results must be made with caution. Participants were recruited online via drug user community-based social media, thus excluding possible participation of cannabis users who did not have access to the internet and those not involved in social media or community networks. The high proportion of participants who reported use of stimulants (19.5%) and/or other psychoactive

substances (27.7%) in the previous month highlights recruitment bias. Moreover, our selection criteria were restricted to daily cannabis users, and our results cannot be generalized to casual users. However, there is no reason to suppose that non-daily users do not also consume cannabis for therapeutic purposes. Larger studies in the general population should be conducted to estimate the percentage of individuals who self-medicate with cannabis.

Second, data were self-reported and therefore social desirability bias was possible. Nevertheless, the confidentiality of the online questionnaire may have limited this, and self-reports about drug use have been shown in the literature to be quite reliable when compared to objective data (Darke 1998). Third, some of the questions asked were retrospective in nature opening the possibility of recall bias. Fourth, we identified several factors associated with the outcome, but the cross-sectional nature of the study design did not allow us to investigate whether there was a causal relationship between them.

Finally, therapeutic and recreational motives for cannabis use may overlap (Turna et al. 2020). As illustrated by the responses to the outcome question in our study, most NECU were both therapeutic and recreational users. Therefore, the study outcome itself was partly subjective. Having said that, results from the two sensitivity analyses supported our choice to group participants who replied “don’t know” with the NETCU category, as well as our choice to group recreational and mixed users into the same category (contrasting them with the ETCU group). Only the “age” variable was no longer associated with the outcome after grouping participants who replied “often” with those who replied “always” to the therapeutic use question. Older cannabis users could indeed be more likely to consider their use as exclusively therapeutic than younger users (Choi, DiNitto, and Marti 2017). This would reflect the element of subjectivity when defining oneself as a cannabis user and characterizing one’s own use, which change notably with regard to age (Dahl and Demant 2017).

Further studies are needed, especially qualitative studies, to acquire a greater understanding of cannabis users’ attitudes about cannabis and their health, and to explore the boundaries between recreational and therapeutic use of cannabis.

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Conflicts of interest

The authors declare they have no conflict of interest.

Supplementary material

The full questionnaire (in French) is available at the following link:
<https://doi.org/10.6084/m9.figshare.22183525.v2>

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Table 1: Characteristics of Exclusive Therapeutic Cannabis Users (ETCU) (N=453) and Non-Exclusive Therapeutic Cannabis Users (NETCU) (N=3697), Chi-squared test or Wilcoxon rank-sum test

	Total N (%) Median [IQ]	ETCU N (%) Median [IQ]	NETCU N (%) Median [IQ]	P-value
Sociodemographics				
Age in years (continuous variable)	27 [22-37]	33 [25-44]	26 [22-36]	<.001
Gender				
Woman & other	1121 (27.0)	126 (27.8)	995 (26.9)	.684
Man	3029 (73.0)	327 (72.2)	2702 (73.1)	
Type of area of residence^{1,2}				
Rural, semi-urban & missing data	1441 (34.7)	207 (45.7)	1234 (33.4)	<.001
Urban	2709 (65.3)	246 (54.3)	2463 (66.6)	
Education level				
<Upper secondary school certificate & missing data	749 (18.0)	101 (22.3)	648 (17.5)	.013
≥ Upper secondary school certificate	3401 (82.0)	352 (77.7)	3049 (82.5)	
Housing¹				
Temporary or precarious housing, hosted & missing data	1020 (24.6)	101 (22.3)	919 (24.9)	.232
Permanent housing	3130 (75.4)	352 (77.7)	2778 (75.1)	
Employment status¹				
Unemployed, retired, disabled & missing data	662 (16.0)	147 (32.5)	515 (13.9)	<.001
Actively employed or student	3488 (84.0)	306 (67.5)	3182 (86.1)	
Lived with a partner				
No & missing data	2381 (57.4)	261 (57.6)	2120 (57.3)	.912
Yes	1769 (42.6)	192 (42.4)	1577 (42.7)	
Had children				
No & missing data	3158 (76.1)	301 (66.4)	2857 (77.3)	<.001
Yes	992 (23.9)	152 (33.6)	840 (22.7)	
Received food aid during previous month¹				
No & missing data	4051 (97.6)	426 (94.0)	3625 (98.1)	<.001
Yes	99 (2.4)	27 (6.0)	72 (1.9)	
Health status				
Physical health condition³				
No & missing data	3018 (72.7)	182 (40.2)	2836 (76.7)	<.001
Yes	1132 (27.3)	271 (59.8)	861 (23.3)	
Mental health condition⁴				
No & missing data	3792 (91.4)	331 (73.1)	3461 (93.6)	<.001
Yes	358 (8.6)	122 (26.9)	236 (6.4)	
Drug dependence (alcohol, opioids, stimulants)				
No & missing data	4038 (97.3)	414 (91.4)	3624 (98.0)	<.001
Yes	112 (2.7)	39 (8.6)	73 (2.0)	
Cannabis use patterns				
Cannabis form¹				
Resin, other (oil, concentrates, etc.) & missing data	1556 (37.5)	168 (37.1)	1388 (37.5)	.849
Herbal	2594 (62.5)	285 (62.9)	2309 (62.5)	
Mode of administration^{1,5}				
Smoked (joint) with a lower proportion of cannabis than tobacco	2542 (61.3)	220 (48.6)	2322 (62.8)	
Smoked (joint) with a higher proportion of cannabis than tobacco	1328 (32.0)	177 (39.1)	1151 (31.1)	<.001
Smoked (bong)	97 (2.3)	13 (2.9)	84 (2.3)	
Not smoked (i.e., vaporization or ingestion)	172 (4.1)	41 (9.1)	131 (3.5)	
Daily number of intakes¹ (continuous variable)	4 [3-6]	5 [3-7]	4 [2-6]	<.001
Supply source¹				
Illegal market	3429 (82.6)	320 (70.6)	3109 (84.1)	<.001
Home cultivation	411 (9.9)	87 (19.2)	324 (8.8)	
Missing data	310 (7.5)	46 (10.2)	264 (7.1)	
Other drug use				
At-risk alcohol use (AUDIT-C form)^{1,6}				
No & missing data	1532 (36.9)	235 (51.9)	1297 (35.1)	<.001
Yes	2618 (63.1)	218 (48.1)	2400 (64.9)	
Daily tobacco use^{1,7}				
No & missing data	1664 (40.1)	188 (41.5)	1476 (39.9)	.518
Yes	2486 (59.9)	265 (58.5)	2221 (60.1)	
Opioid use^{1,7}				
No & missing data	3844 (92.6)	374 (82.6)	3470 (93.9)	<.001
Yes	306 (7.4)	79 (17.4)	227 (6.1)	
Stimulant use^{1,7}				
No & missing data	3341 (80.5)	371 (81.9)	2970 (80.3)	.428
Yes	809 (19.5)	82 (18.1)	727 (19.7)	

Benzodiazepine use^{1,7}				
No & missing data	3887 (93.7)	395 (87.2)	3492 (94.5)	<.001
Yes	263 (6.3)	58 (12.8)	205 (5.5)	
Other psychoactive substance use^{7,8}				
No & missing data	3001 (72.3)	344 (75.9)	2657 (71.9)	.068
Yes	1149 (27.7)	109 (24.1)	1040 (28.1)	

¹ : Before France's first COVID-19-related lockdown (17 March to 03 May 2020) .

² : Rural & semi-urban area corresponds to the INSEE 'urban unit' categorization, specifically urban units with fewer than 100,000 residents ; Urban area corresponds to urban units with over 100,000 residents.

³ : Self-reported chronic pain; neurologic, inflammatory, autoimmune, metabolic, respiratory or cardiovascular disorders.

⁴ : Self-reported mood disorder, anxiety disorder, attention deficit disorder or psychosis.

⁵ : Missing data for this variable (n=11) are not shown.

⁶ : At-risk use of alcohol is defined as an AUDIT-C score ≥ 3 for women and ≥ 4 for men.

⁷ : At least once in the previous month.

⁸ : Other psychoactive substances were ecstasy, ketamine, hallucinogenic drugs and other designer drugs.

Acronyms : N = Number ; IQ = Inter-Quartile

Table 2: Expected benefits of exclusive therapeutic use of cannabis (N=453)

Pain management (including headaches)	408 (90.1%)
Relief from stress, anxiety or depressive symptoms	372 (82.1%)
Improved quality of sleep	338 (74.6%)
Improved appetite	135 (29.8%)
Reduced alcohol and other drug use	97 (21.4%)
Increased concentration	93 (20.5%)
Increased energy	53 (11.7%)

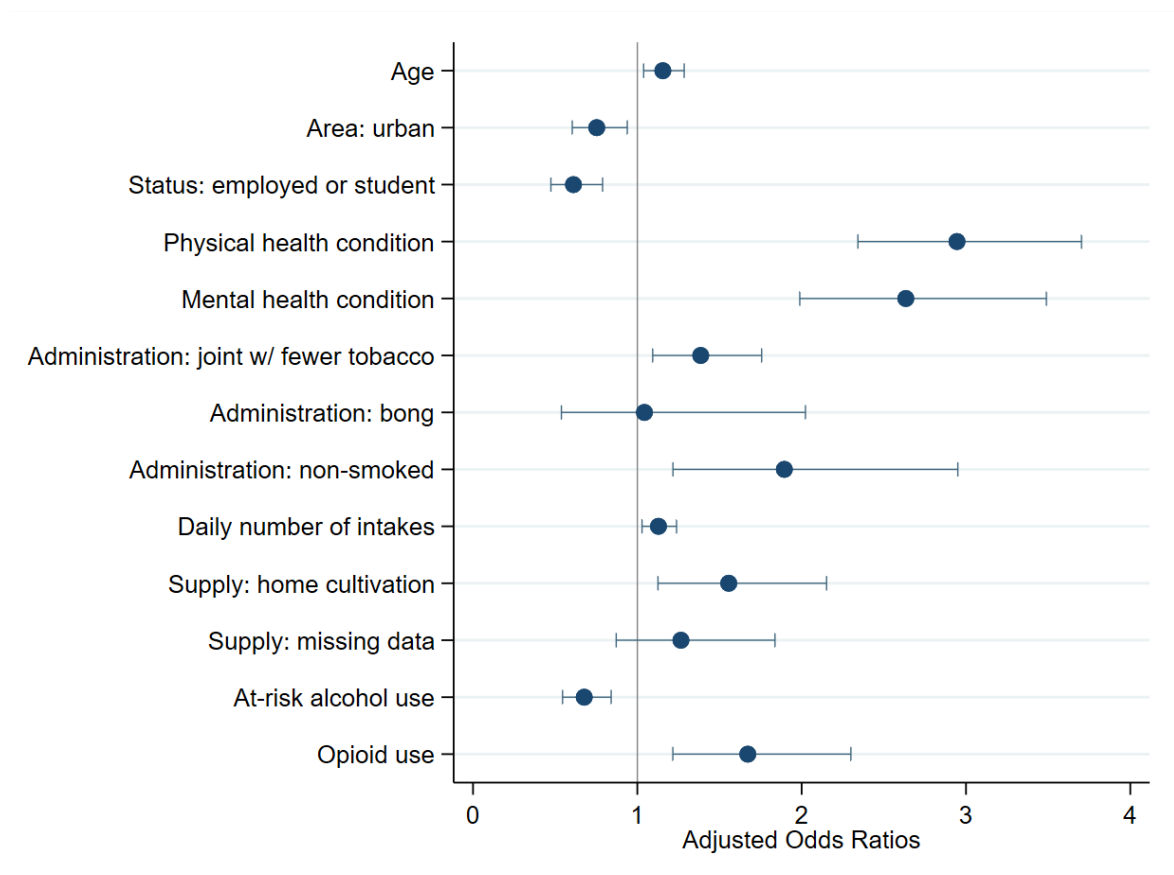


Figure 1: Factors associated with ETCU (vs. NETCU), multivariable logistic regression model (N=4099). 'Age' and 'Daily number of intakes' are continuous variables (standardized).

Table 3 Factors associated with Exclusive Therapeutic Cannabis Users (vs. NETCU), univariable (N=4150) and multivariable (N=4099) logistic regression models

Factors	Univariable regression		Multivariable regression	
	OR [95%CI]	P	aOR [95%CI]	P
Age in years (continuous)	1.04 [1.03 - 1.05]	<.001	1.01 [1.00 - 1.02]	.008
Gender: Women and other (vs. Men)	1.05 [.84 - 1.30]	.684		
Type of area of residence^{1,2}: Urban (vs. Rural, semi-urban & missing data)	.60 [.49 - .73]	<.001	.75 [.60 - .94]	.012
Education level: ≥ Upper secondary school certificate (vs. <Upper secondary school certificate & missing data)	.74 [.58 - .94]	.013		
Housing¹: Permanent housing (vs. Temporary or precarious housing, hosted & missing data)	1.15 [.91 - 1.46]	.232		
Employment status¹: Actively employed or student (vs. Unemployed, retired, disabled & missing data)	.34 [.27 - .42]	<.001	.61 [.47 - .79]	<.001
Lived with a partner: Yes (vs. No & missing data)	.99 [.81 - 1.20]	.912		
Had children: Yes (vs. No & missing data)	1.72 [1.39 - 2.12]	<.001		
Received food aid during previous month¹: Yes (vs. No & missing data)	3.19 [2.03 - 5.02]	<.001		
Physical health condition³: Yes (vs. No & missing data)	4.90 [4.00 - 6.01]	<.001	2.95 [2.34 - 3.70]	<.001
Mental health condition⁴: Yes (vs. No & missing data)	5.41 [4.23 - 6.91]	<.001	2.63 [1.99 - 3.49]	<.001
Drug dependence (alcohol, opioids, stimulants): Yes (vs. No & missing data)	4.68 [3.13 - 6.99]	<.001		
Cannabis form¹: Herbal (vs. Resin, other (oil, concentrates, etc.) & missing data)	1.02 [.83 - 1.25]	.849		
Mode of administration^{1,5}				
Smoked (joint) with a lower proportion of cannabis than tobacco	Ref	-	Ref	-
Smoked (joint) with a higher proportion of cannabis than tobacco	1.62 [1.32 - 2.00]	<.001	1.39 [1.09 - 1.76]	.007
Smoked (bong)	1.63 [.90 - 2.98]	.109	1.04 [.54 - 2.02]	.901
Not smoked (vaporization or ingestion)	3.30 [2.27 - 4.82]	<.001	1.89 [1.22 - 2.95]	.005
Daily number of intakes¹ (continuous)	1.07 [1.05 - 1.10]	<.001	1.04 [1.01 - 1.06]	.011
Supply source¹				
Illegal market	Ref	-	Ref	-
Home cultivation	2.61[2.01 - 3.39]	<.001	1.56 [1.13 - 2.15]	.007
Missing data	1.69 [1.21 - 2.36]	.002	1.26 [.87 - 1.84]	.216
At-risk alcohol use^{1,5}: Yes (vs. No & missing data)	.50 [.41 - .61]	<.001	.68 [.54 - .84]	<.001
Daily tobacco use^{1,7}: Yes (vs. No & missing data)	.94 [.77 - 1.14]	.518		
Opioid use^{1,7}: Yes (vs. No & missing data)	3.23 [2.45 - 4.26]	<.001	1.67 [1.22 - 2.30]	.002
Stimulant use^{1,7}: Yes (vs. No & missing data)	.90 [.70 - 1.16]	.428		
Benzodiazepine use^{1,7}: Yes (vs. No & missing data)	2.5 [1.84 - 3.41]	<.001		
Other psychoactive substance use^{1,7,8}: Yes (vs. No & missing data)	.81 [.65 - 1.02]	.068		

¹ : Before France's first COVID-19-related lockdown (17 March to 03 May 2020) .

² : Rural & semi-urban area corresponds to the INSEE 'urban unit' categorization, specifically urban units with fewer than 100,000 residents ; Urban area corresponds to urban units with over 100,000 residents.

³ : Self-reported chronic pain; neurologic, inflammatory, autoimmune, metabolic, respiratory or cardiovascular disorders.

⁴ : Self-reported mood disorder, anxiety disorder, attention deficit disorder or psychosis.

⁵ : Missing data for this variable (n=11) are excluded from regression analyses.

⁶ : At-risk use of alcohol is defined as an AUDIT-C score ≥3 for women and ≥4 for men.

⁷ : At least once in the previous month.

⁸ : Other psychoactive substances were ecstasy, ketamine, hallucinogenic drugs and other designer drugs.

Acronyms : OR = Odds Ratio ; aOR = adjusted Odds Ratio ; CI = Confidence Interval