ORIGINAL

The relevance of patterns of use: A survey to assess cannabis use related harm

La importancia de los patrones de consumo: Diseño de una encuesta que permita evaluar daño relacionado al consumo de cannabis

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Abstract

Lifetime prevalence of cannabis use is estimated 192 million adults worldwide (2017) and has increased by 16% in the last decade. However, data on quantity and frequency of use that can lead to harm is lacking. We have developed a survey to assess patterns of cannabis use and related harms in a sample of cannabis users. This paper focuses on evaluating the feasibility of the survey and the users' satisfaction in a pilot sample. Forty cannabis users were recruited (>18 years old, living in Spain, cannabis use at least once during the last 12 months) between December 2018 and January 2019. Participants answered an online survey (mental health, organic harm and injury) and an ad hoc questionnaire to assess accessibility, feasibility, satisfaction, design and content appropriateness. Of the participants, 93.23% (n = 37.3) were satisfied with the design, 94.92% (n = 38.2) were satisfied with the content, and 94.73% (n = 37.0) were satisfied with the accessibility of the survey; only minor changes were required to improve feasibility and accessibility. Participants used a median of 1.0 Standard Joint Unit per day (Interquartile Range [IQR] 1.0-2.0). Of the sample, 92.5% reported at least one related harm and suffers a median of 4.0 disorders (IQR, 1.25-5.0). The present study allows for designing a feasible online survey to conduct a cross-sectional study with a larger sample.

Keywords: cannabis, risk, harm, THC, survey, online

Resumen

Globalmente, 192 millones de adultos han consumido cannabis alguna vez en su vida (2017), un consumo que se ha incrementado en un 16% en la última década. Sin embargo, seguimos sin tener información clara sobre qué cantidad y qué frecuencia de consumo va a causar daño. Por tanto, este proyecto desarrolla una encuesta para evaluar los patrones de consumo de cannabis y los daños relacionados en una muestra de consumidores. Este artículo se centra en mostrar la factibilidad de la encuesta y la satisfacción de los usuarios en una muestra piloto. Cuarenta usuarios de cannabis fueron reclutados (> 18 años, viviendo en España, consumo de cannabis mínimo una vez en los últimos 12 meses) entre diciembre de 2018 y enero de 2019. Los participantes respondieron una encuesta en línea (consumo cannábico, salud mental, organicidad y lesiones) y un cuestionario ad hoc para evaluar la accesibilidad, factibilidad, satisfacción, diseño y contenido. El 93,23% de participantes estaba satisfecho con el diseño; el 94,92% estaba satisfecho con el contenido y el 94,73% estaba satisfecho con la accesibilidad de la encuesta, y fueron necesarios solo cambios menores para mejorar la factibilidad y la accesibilidad de algunos ítems. Los participantes consumieron una mediana de 1,0 Unidades de Porro Estándar por día (Rango Intercuartílico [RIQ] 1,0-2,0). El 92,5% de la muestra puntuó como mínimo en un daño relacionado y con una mediana de 4,0 patologías (RIQ 1,25-5,0). El presente estudio nos permite diseñar una encuesta en línea con determinada factibilidad que pueda ser usada en un estudio transversal a gran escala.

Palabras clave: cannabis, riesgo, daño, THC, encuesta, en línea

Cannabis is the third most used psychoactive substance worldwide, after alcohol and tobacco. The annual global estimated prevalence of cannabis during 2017 was about 3.8%, meaning 192 million people, aged between 15-64 years, used cannabis at least once (16% of increase in the last decade) (United Nations Office on Drugs and Crime, 2019).

Since 2017 non-medical use of cannabis has been allowed in different countries worldwide (ten states of the USA, District of Columbia, Uruguay and Canada). After legalization, cannabis use in Colorado (the first state in the US that legalized cannabis) has significantly increased (European Monitoring Centre of Drugs and Drug Addiction, 2020). Cannabis-related injuries (i.e. emergency room visits, traffic deaths, hospital admissions or driving under the influence of cannabis) have also increased significantly (United Nations Office on Drugs and Crime, 2019). When cannabis availability increases and, at the same time, the population has a low perception of harm risks, cannabis use increases in early ages, and could contribute to higher cannabis use prevalence in the future (Parker & Anthony, 2018; United Nations Office on Drugs and Crime, 2018).

Experience regarding tobacco or alcohol prevention allows us to learn that easy accessibility to the substance causes a high impact on both health and social functions (Montes, Pérez & Gestal, 2004; Villalbí, 2002). However, when prevention policies are implemented, including frequency and quantity of use (e.g., Standard Drink Unit for alcohol), which allow identifying risky use, social and health costs are reduced and improved (Montes et al., 2004; Villalbí, 2002). Risky use is defined as "a pattern of substance use that increases the risk of harmful consequences for the user", that also "are of public health significance despite the absence of any current disorder in the individual user" (World Health Organization, 2010b).

Hence, prevention strategies and interventions for cannabis harmful use must be implemented in a controlled manner that allows validation and measures of efficacy (Chapman, 1993; Karlsson & Österberg, 2004), but a consensus for risky use that include standard measures of frequency and quantity is still lacking (Casajuana et al., 2016).

A systematic review of screening and diagnostic instruments to assess cannabis use disorders found that even those instruments with the best performance (CAST, CUDIT, DUDIT and ASSIST) were difficult to implement. In fact, current instruments do not take into account frequency and amount of cannabis used, leading to confusing interpretations of patterns of use. In addition, authors conclude that new designed instruments should include "cannabis potency, dose, patterns of use and health consequences"(López-Pelayo, Batalla, Balcells, Colom & Gual, 2015).

In order to establish a consensus of what can be considered risky use of cannabis there must be: a) evidence-based data including all dimensions of harm; b) an instrument that measures cannabis use associated harm, which includes frequency and quantity.

However, those two items are still missing in the cannabis field, which in fact are essential (Campeny et al., 2020; Casajuana et al., 2018). As a first step, a "Standard Joint Unit" (SJU) based on 9-delta-THC cannabinoid quantity present in joints was established (Casajuana Kögel et al., 2017a). As a second step, the Spanish Ministry of Health, through its National Plan on Drugs, approved a project to define risky cannabis use. We have developed a tool to assess patterns of use and associated problems in a sample of cannabis users. This pilot study aims: 1) to assess the feasibility of an online survey for exploring risky cannabis use; 2) to assess satisfaction, accessibility, design and content appropriateness of the survey.

Methods

Participants and setting

The pilot study was designed according to the study protocol (under review). The pilot study was conducted in Spain from December 2018 to January 2019. A stratified random sample of 40 people was recruited during a three months period. Adults (>18 years old), living in Spain, that have used cannabis at least once during the last twelve months were eligible to participate. The exclusion criteria were: a) idiomatic barriers; b) incapacity to sign the informed consent; c) visual incapacity; d) no access to the Internet.

In order to recruit a sample of 40 users, an online survey (described below) was distributed via flyers and community advertisements among Spanish healthcare facilities, universities, websites, cannabis associations and internal networks.

Instruments

An online survey was designed based on the results obtained on a systematic review of cannabis use related psychological and physical harm (Campeny et al., 2020). The survey was formed by a combination of validated instruments in the local language (when available in the literature) and an ad hoc questionnaire, and resulted in 55 questions that can be divided into four groups: a) socio-demographics (gender, age, civil status, education and working status); b) other substance use (alcohol, tobacco, cocaine, opioids, amphetamines, LSD, benzodiazepines without prescription); c) patterns of cannabis use (the type of cannabis derivate used, administration via, frequency of cannabis use during the last 30 days, Standard Joint Unit [Casajuana Kögel et al., 2017a; Freeman & Lorenzetti, 2019] per occasion, the proportion of tobacco used in the joints, age at first use, age at regular use); d) health status

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Table 1. *Survey instruments.*

	Validated instruments	Ad-hoc instruments
Socio-demographic		Study Working status Civil status Age Gender Residence
Pattern of other drugs use	Audit-C (García Carretero, Novalbos Ruiz, Martínez Delgado & O'Ferrall González, 2016)	Tobacco use Other drugs use
Pattern of cannabis use	SJU (Casajuana Kögel et al., 2017a)	Type of cannabis used Tobacco percentage Cannabis precedence Age at first use Age at regular use
Mental Health	PHQ-9 (Diez-Quevedo, Rangil, Sanchez-Planell, Kroenke & Spitzer, 2001) GAD-7 (Garcia-Campayo et al., 2010) CAD-4 (Pedrero Pérez et al., 2007)	Mental health diagnosis
Organic	The WHO health and health response capacity questionnaire (World Health Organization, 2000)	Organic affectations
Injury		Motor vehicle collision Suicidal behavior Violence

Table 2. *Ad-hoc questionnaire to assess feasibility, design, content and accessibility of the survey.*

	Ad-hoc questions (original language: Spanish)
Design	Q1. ¿Qué aspectos del diseño modificarías?
	Q2. ¿Qué opinas de los colores utilizados? (el color del fondo, el de las letras, la combinación…)
	Q3. ¿Y del diseño de las preguntas? (formulación de las preguntas, claridad, largas/cortas…)
	Q4. ¿El diseño de las preguntas ayudaba a responder de manera rápida?
Content	Q5. ¿Qué aspectos del contenido del cuestionario cambiarías?
	Q6. ¿Te ha parecido aburrido? ¿Por qué?
	Q7. ¿Te ha parecido denso? ¿Por qué?
	Q8. ¿Echas en falta alguna pregunta?
	Q9. ¿Qué dificultades te has encontrado a lo largo del cuestionario?
	Q10. ¿Preguntarías algo de manera diferente?
	Q11. ¿Te sobra alguna pregunta del cuestionario?
Accessibility	Q12. ¿Desde qué dispositivo has respondido el cuestionario?
	Q13. ¿Crees que no estaba adaptado al dispositivo con el cual has respondido?
	Q14. ¿Te ha sido difícil acceder al cuestionario? ¿Por qué?
	Q15. Al entrar a la web, ¿has tenido dificultades para encontrar el enlace?

(mental and organic) and injury background. For more information about the survey instruments see table 1.

Since the main objective of the survey is to define the cannabis use related harm, health status and injury background were given higher relevance. The questionnaire asked about:

- Mental health: gambling disorder (CAD-4 [Pedrero Pérez et al., 2007]), depressive disorder screening (PHQ-3 [Diez-Quevedo, Rangil, Sanchez-Planell, Kroenke & Spitzer, 2001]), anxiety disorder screening (GAD-3 [Garcia-Campayo et al., 2010]), psychotic disorders and bipolar disorder (ad hoc questions). Participants with depressive and/or anxiety symptoms were asked to answer the PHQ-9 (Diez-Quevedo et al., 2001) and GAD-7 (Garcia-Campayo et al., 2010) respectively.
- Organic/somatic affectation: heart diseases, bronchitis or emphysema, respiratory infections, migraine, sleep difficulties, COPC, gastritis or ulcer, vomits or diarrhea, cancer (ad hoc questions), comprehension, motor coordination and working difficulties (questions regarding cognitive impairment from the WHO

health and health response capacity questionnaire (World Health Organization, 2000)).
- Injury background: motor vehicle collisions, suicidal ideation, suicidal attempt, violence perpetration (ad hoc questions). Participants who reported suffering a motor vehicle collision were asked whether they had used cannabis during the previous six hours and whether they were held responsible of the collision.

After completing the online survey, the participants answered an ad-hoc questionnaire to assess accessibility, feasibility, satisfaction, design and content appropriateness through phone calls. Given that the aim of the present study is to define feasibility and satisfaction, the ad-hoc questionnaire is outlined in table 2.

Data analysis

Feasibility, satisfaction, design, content and accessibility were analyzed with frequencies and percentages (qualitative variables) or mean and Standard Deviations (SD). Users' comments and suggestions from the ad-hoc questionnaire were taken into account in order to improve the survey. Sociodemographic characteristics, pattern of use and other drugs use were analyzed with percentages (qualitative variables) or median and interquartile range (IQR) (quantitative variables). The results from the survey were analyzed with median and IQR (quantitative variables).

Ethical considerations

This study was conducted fulfilling the Helsinki Declaration (current version; Fortaleza, Brazil, October 2013) and according to the protocol and legal pertinent requirements (Law 14/2007 of July 3rd, of biomedical research). This study was approved by the ethics committee of the Hospital Clinic of Barcelona and Institut d'Investigacions Biomèdiques August Pi i Sunyer (HCB/2017/0795). An online informed consent was asked to accept to all users.

Results

Participants were mostly male (65%), young adults (median age 28 IQR 25.5-30.0) and single (57.5%) or married/ with a couple (42.5%). 40% had a university degree, and 65% were working. For more details on socio-demographic characteristics see supplementary material.

Satisfaction and accessibility

93.67% (SD 4.33) of participants were satisfied with design; 95.63% (SD 9.34) of participants were satisfied with the content; and 94.73% (SD 8.66) of participants were satisfied with the survey accessibility. The 10% of participants referred to have difficulties registering euros spent and grams used per day, as they do not use cannabis

daily. Hence, the question was reformulated resulting in a weekly registration instead of daily registration. For more details see table 3.

Content, design and feasibility

After conducting the online survey statistical analysis, two limitations arise: 1) Results regarding family violence were difficult to analyze and interpret by researchers as data was heterogeneous, and also specific information about violence perpetration was impossible to gather. Hence, questions were reformulated into structured questions and responses ("¿Ha tenido enfados en el ámbito familiar? Especifique qué tipo de enfados" to "¿Ha vivido alguna de las siguientes situaciones en su núcleo familiar? (Enfados con violencia verbal (insultos, alzar la voz, etc.); Enfados con violencia física; No; Otras, especificar) ¿Quién ha ejercido violencia física? (Padre/madre sobre usted; Pareja sobre usted; Hijo/s sobre usted; Usted sobre su padre/madre; Usted sobre su pareja; Usted sobre sus hijo/s; Otras, especificar)); 2) The registration of frequency of other drug use required modifications as the question's formulations were found confusing by users and could lead to incongruent responses difficult to analyze and interpret.

After the global analysis of the results, two new sections were added to the survey: 1) A new item that measures

Table 3. *Design, content and accessibility results.*

Dimension	Questions	Positive responses			Positive responses
		N (%)	Mean	Standard Deviation (SD)	
Design	Question 1 (Q1)	38(95)	93.67	4.33	The SJU daily registration and other drugs use questions were difficult to answer
	Question 2 (Q2)	39(97.5)			
	Question 3 (Q3)	35(87.5)			
	Question 4 (Q4)	38(95)			
Content	Question 5 (Q5)	40(100)	95.63	9.34	Users miss the following sections: sport, job, dependence, sociability, asking more about patterns of cannabis use.
	Question 6 (Q6)	39(97.5)			
	Question 7 (Q7)	30(75)			
	Question 8 (Q8)	40(100)			
	Question 9 (Q9)	40(100)			
	Question 10 (Q10)	40(100)			
	Question 11 (Q11)	40(100)			
Accessibility	Question 12 (Q12)	Mobile / Personal Computer			The page refreshes automatically, so they have to start again from the beginning
		36(90) 4(10)	N/A	N/A	
	Question 13 (Q13)	31(85)			
	Question 14 (Q14)	40(100)	94.73	8.66	
	Question 15 (Q15)	40(100)			

cannabis use dependence (through SDS interview (Vélez-Moreno et al., 2013)) in order to assess severity; 2) Information about existing public addiction services and specific counseling for participants with suicidal ideation and/or attempts at the end of the survey for ethical purposes.

For more details see table 3.

Preliminary data

Participants used a median of 1.0 Standard Joint Unit (SJU) per day (IQR 1.0-2.0). First use of cannabis was at 15.0 (median) years old (IQR 14.0-16.0). Age of regular use was at 18.0 (median; IQR 16.5-22.0). The sample used hashish (68%) or marihuana (35%). The use of cannabis in the last 30 days was 18.5 days (median; IQR 1.25-30.0). The median of tobacco in each joint was 75.0% (IQR 50.0-75.0) (see Table 3).

The 95.0% (38) of the sample reported at least one related harm, and suffers a median of 4.0 disorders (IQR, 2.0-6.0). For more details on description of cannabis-related harms see supplementary material.

Discussion

The present study aims to design a feasible survey that informs about cannabis use related harm. Based on the obtained results, the survey is accessible, and design and content are appropriate.

There is evidence regarding cannabis related harms (Hall, 2015; The National Academies of Sciences Engineering Medicine, 2017; World Health Organization, 2010a). However, current literature does not inform about a global view of harms and risks of using cannabis (Campeny et al., 2020; Fischer, Rehm & Hall, 2009).

This study aims to design a feasible survey that globally analyzes the consequences of cannabis use, taking into account all dimensions of human health (mental, organic and lesions). The difficulty that arises from this global view of harm is that an accurate design, including content and accessibility appropriateness, is required. As a response to this difficulty, a pilot study should be conducted (Van Teijlingen, Rennie, Hundley & Graham, 2001).

Results indicate that the instrument informs allows recruiting information about patterns of cannabis use (including frequency, quantity and amount), mental health, organic health and injury. Furthermore, in order to improve feasibility, to complete the global impact of cannabis use, information about the severity of cannabis use was obtained through the SDS interview (Vélez-Moreno et al., 2013).

The survey was accessible, and the content and design were appropriate based on participants' answers. Responders were satisfied with the survey. Only a specific question needed modifications, as some subjects referred incongruence to its formulation. In general, participants easily accessed the survey and did not differ with its content.

Information about the treatment source must be added due to ethical considerations. These results are consistent with current literature that supports that online surveys as an appropriate tool which allows collecting information from a larger sample of users via web (Matias et al., 2019). Furthermore, it can be a potent instrument to quickly and inexpensively collect information from drug use population (Matias et al., 2019).

However, some limitations arise. Our sample is mostly formed by male young adults and may not represent the totality of cannabis users, as, for instance, organic harm (i.e. respiratory diseases) may be incremented with age (Akgün, Crothers & Pisani, 2012; Rossi, Ganassini, Tantucci & Grassi, 1996). In addition, the use of other psychoactive substances is also related with burden disease (Karila, Petit, Lowenstein & Reynaud, 2012; Maritz & Mutemwa, 2012; Morris et al., 2018; World Health Organization, 2018). Hence, our results must be interpreted with caution, as for a small sample potential bias might be interfering results. The exposed potential bias must be taken into account in the main study and future research.

In conclusion, the present study allows us to move forward designing and conducting an improved survey, in order to conduct a cross-sectional study with a larger sample. This step is of great importance, as it will have further implications to prevention and treatment for cannabis users at risk.

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Conflict of interests

Authors declare that they have no competing interests related to this work.

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Supplementary material

Sociodemographic and clinical characteristics.

	n (40)	%	Median	IQR
Men	26	65.0		
Age			28.0	25.5-30.0
Civil Status				
Single	23	57.5		
Married/with a couple	17	42.5		
Education Level				
High school	16	40.0		
University	23	57.5		
Working status				
Working	26	65.0		
Unemployed	3	7.5		
Studying	1	2.5		
Working and studying	10	25.0		
Derivate of cannabis used				
Hashish	26	68.0		
Marihuana	14	35.0		
Days of cannabis use in the last 30 days			18.5	1.25-30.0
Standard Joint Unit			1	1.0-2.0
Grams/day of use			0.25	0.25-0.5
Joints/day of use			1	1.0-2.0
Euros/day of use			2	1.0-4.0
Percentage of tobacco in the joint			75.0	50.0-75.0
Age at first cannabis consumption			15.0	14.0-16.0
Age at regular cannabis use			18.0	16.5-22.0
Cannabis administration via				
Smoked	39	97.5		
Other drugs use in the past				
Cocaine	13	32.5		
Opioids	3	7.5		
Amphetamines	7	17.5		
LSD	4	10.0		
Benzodiazepines without a prescription	1	2.5		
Other drugs use in the present				
Cocaine	5	12.5		
Opioids	1	2.5		
Amphetamines	0	0.0		
LSD	1	2.5		
Benzodiazepines without a prescription	0	0.0		
At least one related disorder (CU at least once during the last 30 days)	38	95.0	4	2.0-6.0
Mental health dimension	36	90,0	2	1.0-2.0
Organic dimension	23	57.5	1	0.0-2.0
Injury dimension	29	72.5	1	0.0-2.0