# Reliability of a self-reported questionnaire assessing the use of cannabis products to treat chronic pain

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**Research Article**

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**Abstract**

**Background:** Cannabis-based products are increasingly used worldwide for chronic pain. However, there is a lack of reliable instruments assessing cannabis exposure.

**Objective:** To develop a questionnaire measuring the use of cannabis to manage chronic pain and assess its reliability.

**Method:** A 24-item questionnaire assessing pain conditions, the type of cannabis products that were used, the methods of use, the concentration of main cannabinoids, and the use of other pain therapies was developed. An expert committee was convened to enhance the content validity of the questionnaire, to improve it, and a longitudinal survey was conducted to test the test-retest reliability of the final version.

A two-round survey of 158 participants with chronic pain was conducted between November 2023 and January 2024. Kappa and weighted kappa coefficients were calculated to assess the agreement between the responses of the two rounds. According to the criteria of Landis and Koch, items with a kappa ≥ 0.61 were considered as having a high reliability.

**Results**: The average age of participants was 38 years and the proportion of females was 53.5%. Most of the items assessing the use of cannabis products yielded a high reliability (kappa ≥ 0.61). Items with moderate reliability (0.41 ≤ Kappa < 0.61) included the type of pain and the type of cannabinoids used.

**Conclusion:** The results suggest that the questionnaire developed in this study is a reliable tool for assessing cannabis use in patients with chronic pain in clinical or research settings.

**Key words**: chronic pain, medical cannabis, questionnaire, test-retest reliability

## Introduction

Chronic pain is a common disorder that significantly impacts the quality of life of those affected, as well as their physical and mental health [1-3]. Chronic pain is also associated with an important economic burden [4]. The management of chronic pain becomes a continuous challenge for patients when the use of non-opioid medications combined or not with non-pharmacological therapies result in an unsatisfactory control of pain and the associated conditions [3]. The use of opioid medications, usually prescribed as second- or third line treatment, can be associated with serious adverse events and their long-term benefit-risk profile is not always favorable [5, 6]. Patients facing this challenge in the management of their pain may opt for alternative therapies. Cannabis, currently legalized or authorized in over 40 countries for medical use [7], is one of these alternative therapies and is used to treat chronic pain [8, 9]. However, although legally authorised for medical care and used by a growing number of patients [10], no cannabis-based product is currently approved by pharmaceutical regulatory agencies as a treatment for pain [11].

The 2023 Canadian Cannabis Survey showed that 10% of Canadians aged 16 years and older had used cannabis for medical purposes in the 12 months prior to the survey [8]. The conditions most commonly treated with cannabis were chronic pain and mental health problems such as anxiety and depression [9, 10].

Since cannabis-based products are not yet approved as a treatment for chronic pain, there is a need to strengthen the evidence base to understand the benefits and risks associated with their use to treat health problems, particularly for chronic pain. However, cannabis is available in a wide variety of forms, doses, modes of delivery, and routes of use that pose challenges to measure [8]. Indeed, cannabis products may include whole dried parts of the cannabis plant (leaves and flowers), extracts of the plant (oil for example), purified cannabinoids, and synthetic cannabinoids [12]. Each of these cannabis products comes with various concentrations in cannabinoids (e.g., delta-9-tetrahydrocannabinol (THC), and cannabidiol (CBD)) [12]. Finally, the modes of use of cannabis and routes of administration are variable and include inhalation (smoking, vaping, vaporizing), ingestion (cannabis oil, edible products, beverages), and topical application [12]. This variety of products and methods of use poses some challenges for reliable assessments of cannabis exposure.

There is currently a lack of measurement instruments specifically designed and validated to assess cannabis use to treat chronic pain. Most of the available instruments are questionnaires that have been developed for the assessment of cannabis use disorders [13-15] and very few exist for the assessment of recreational and medical use of cannabis [16]. To address this gap, we developed a questionnaire and

tested its reliability in a sample of patients with chronic pain who use cannabis to manage their condition.

## Methods

### Development of the questionnaire

A preliminary version of a questionnaire was developed after reviewing existing literature on cannabis to treat chronic pain. This review of the literature on pain allowed to develop items for the description of pain (type of pain, duration, etc.) and the pharmacological and non-pharmacological treatments of pain. Within cannabis-related literature, a questionnaire assessing the recreational use of cannabis, the DFAQ-CU [16] was reviewed, as well as articles providing a description of cannabis products [9] and the websites of cannabis product sellers, notably the *Societé Quebecoise du Cannabis (SQDC*), a public company in charge of selling cannabis for non-medical use in the Province of Quebec [17]. This step allowed us to develop items assessing pain conditions, the use of cannabis to manage pain, i.e., the sources of cannabis products, the type of products, the methods of use, the doses of cannabinoids, etc., the use of cannabis for other reasons, as well as the use of other pharmacological and non-pharmacological treatment of pain. These items were integrated into a preliminary version of the questionnaire, which was then assessed by an expert committee for content validation [18].

### Expert panel

For this step, a group of medical cannabis experts (n=8) including four researchers (i.e., the research team), three pain physicians including two who already prescribed cannabis for pain management and a patient-partner (an individual who used cannabis to treat a chronic pain condition) composed the panel. Each of the experts received the preliminary version of the questionnaire by email and independently assessed the relevance and wording of each item. Experts were also invited to suggest new items if relevant. The assessment of the comments from the first round of the panel of experts showed only minor suggestions for change. For this reason, these changes were implemented and no other iteration was done. A questionnaire with 24 items resulted from the Expert panel.

### Reliability assessment

The reliability of the Expert-validated version of the questionnaire was tested in a sample of 158 patients with chronic pain who used cannabis to manage their pain. To this end, we conducted an online survey between November 2023 and January 2024 using LimeSurvey. Each participant

completed the questionnaire a first time and a second time two weeks later. This time interval is shown optimal to assess test-retest reliability for patients reported health measures [18].

**Study population**

Eligible participants had to be 18 years and older, speaking French, with chronic pain (i.e., pain lasting 3 months or more [19]) and using cannabis to treat their pain. No specific exclusion criteria were considered. They were approached by paid advertisement in social medias (Meta), advertisement in the Newsletter of Santé Cannabis (the largest cannabis clinic in the province of Quebec), the mailing list of Université Laval, and the Quebec Pain Research Network.

**Data collection**

The online survey was designed so that potential participants first had to reach the section assessing their eligibility for the study. Individuals who provided answers to each of the questions that qualified them for the study next reached the section on study information and consent. They were also asked if they consented to provide their email address or their phone number to be contacted for the second round of the survey. Those who consented to the study, then accessed the questionnaire on cannabis use and pain. During the completion of the survey, participants were allowed to quit the questionnaire and to complete it later. Data collected included socio-demographics (age, sex at birth, gender identity, annual family income, postal code (to assess the place of residence), etc.). Participants were also asked to provide their general impression of the cannabis questionnaire as well as comments they may have on specific items (content validation).

**Data analyses**

Participants' characteristics were analyzed using standard statistics (mean or median for continuous variables and proportion for categorical variables).

The proportion of participants who chose each response choice for each item of the questionnaire was calculated.

The reliability of the questionnaire was assessed using test-retest analyses for each item specifically [20]. For dichotomous items and unordered categorical variables (with three or more categories), the reliability was assessed with the Cohen's kappa coefficients [21], calculated between responses of the two rounds of the survey. For dichotomous items, kappa was calculated when a response category had more than five counts. For ordered categorical variables (comprising three or more categories), a weighted kappa was calculated [21].

The analyses were stratified according to sex, and according to the duration of cannabis use, to assess whether more established use of cannabis for chronic pain (12 months and more vs 0-11 months) was associated with a more reliable ability to report the use of cannabis products for pain management.

The Landis and Koch criteria were used to interpret the kappa coefficients [22]. Based on these criteria, kappa ≤0 was considered as poor agreement beyond chance (poor reliability), 0.01 to 0.20 as slight, 0.21 to 0.40 as fair, 0.41 to 0.60 as moderate, 0.61 to 0.80 as substantial, and 0.81 to 1 as almost perfect reliability. For the purpose of this questionnaire validation, **we considered items with a kappa ≥ 61 as having a high reliability.**

Data were analysed with SAS version 9.4 (SAS Institute, Cary, NC, USA).

## Results

In total, 182 individuals with chronic pain completed the first round of the survey. Of those participants, 158 (86.81%) completed the second round of the survey. Therefore, the analytic sample consisted of 158 participants.

The mean age of participants was 38 years (ranging from 20 to 73 years), 53.5% were female, and 42% had attended university (Table 1). The participants were mainly residing in 4 Canadian provinces: Québec (53.8%), Ontario (20.89%), Alberta (6.3%), and British Columbia (6.96%).

### *Reliability of items related to pain (Table 2)*

#### Items with high reliability (kappa ≥ 61)

Items on reporting pain-related conditions that included arthritis/rheumatism, fibromyalgia, and sleep disorders had kappas ranging from 0.65 to 0.85.

#### Items with moderate reliability (kappa between 41 and 60)

Items reporting conditions related to pain that included anxiety/stress, non-specific musculoskeletal pain, headache/migraines, muscular spasm/convulsion, and work-related pain, as well as the duration of pain, had kappas ranging from 0.44 to 0.60.

#### Items with low reliability (kappa ≤40)

No item with low reliability was identified.

### *Reliability of items related to cannabis use*

**Items with high reliability**

Items reporting the duration of cannabis use to treat chronic pain, the average frequency of cannabis use during the last week, the number of days of use during the last week, cannabis supply sources (except medical cannabis stores/sellers), times of cannabis consumption during the day, methods of cannabis consumption, cannabis products (except oil or powder concentrates), and the average concentration of THC and CBD had kappas ranging from 0.61 to 0.85.

**Items with moderate reliability (kappa between 0.41 and 0.60)**

Reporting of the time of last cannabis use, the composition of cannabinoids of the products (THC, CBD, etc.) and reporting of licensed medical stores as sources of cannabis supply had kappas ranging from 0.52 to 0.60.

***Reliability of items related to other pharmacological or non-pharmacological treatment of pain***

All items, except for reporting psychotherapy (kappa=0.39) had a high degree of reliability.

***Reliability of items related to other reasons of cannabis use***

All items, except reporting of the use of cannabis to increase sensory perception (kappa=0.52), had kappas ranging from 0.61 to 0.86).

In subgroup analyses, female participants, as compared to males, tended to respond with a higher degree of reliability for items related to the type of pain, the sources of cannabis supply, the methods of cannabis use, and the types of cannabis products. However, male participants as compared to females, more frequently report THC and CBD concentrations with a higher degree of reliability than female participants.

For most of the items specifically related to cannabis use, (type of contents, contents in cannabinoids, frequency of use, routes of use, etc.), participants with a duration of cannabis use of 12 months or more had a slightly higher agreement in their responses when compared to those with a duration of cannabis use of less than 12 months (Table 3).

Eleven participants (7%) provided specific comments on the questionnaire that were taken into account in the final version of the questionnaire. The suggestions were mainly to include additional choices of responses such as «other» and «none». The French and English versions of the questionnaire are presented in Supplemental materials.

## Discussion

This study was conducted to assess the reliability of a questionnaire built to measure the use of recreational cannabis to treat chronic pain. Given the large gap in knowledge about cannabis use to treat chronic pain in the context of limited pharmacological and non-pharmacological means to address this condition, and the many dimensions of cannabis use, such an instrument is essential to progress.

Overall, this reliability study showed that patients with chronic pain could accurately report their use of cannabis to treat their chronic pain (i.e., the type of products, dosing of cannabinoids, methods of use, frequency of use, etc.). Very few items had less than high reliability. Content validity of the questionnaire was also enhanced by the involvement of an expert panel and the comments of participants living with chronic pain. Therefore, we conclude that the developed questionnaire may be used as a reliable instrument to assess cannabis use in patients with chronic pain in clinical or research settings.

For items assessing the type of chronic pain treated with cannabis products, the moderate reliability to report certain types of pain or pain-related conditions, including musculoskeletal pain and muscular spasm/convulsion, suggests that some patients may have limited knowledge allowing them to categorize their pain within the set of broader categories of pain, or to less precise or absence of medical diagnoses for their conditions. However, when the pain categories were more specific and likely resulting from a formal medical diagnosis, such arthritis, fibromyalgia or sleeps disorders, a higher reliability was observed.

For items assessing specifically cannabis use, the observed high reliability for most of the items could be partly explained by the fact that information on the type of cannabis products, contents of cannabinoids, routes of use and concentration in cannabinoids must be provided for each product on the formal Canadian market in a mandatory fashion. These requirements for labeling information are issued by Health Canada [23]. A second reason that may explain the high reliability in reporting cannabis use for chronic pain may be related to the fact that most participants were established users of cannabis (95% had duration of use of four months or more). The medical use of cannabis starts with a dose titration in the first days and weeks of use, aiming to find the most suitable products in terms of cannabinoids combination, their dosing, and routes of use [24, 25]. Most patients in our sample had a duration of use that went far beyond the normal titration period, usually not exceeding one month [24]. Stratifying the analyses according to the duration of cannabis use ($<12$ months vs $\geq 12$ months) suggested a slightly higher reliability for reporting of cannabis use for participants with a duration of

use ≥ 12 months, compared to those with a duration of use <12 months. However, it was surprising that reporting of the specific type of cannabinoids participants had used (use of products with a) mainly THC, b) mainly CBD or c) THC+CBD) only had a moderate reliability, although this information is mandatory on the labeling of cannabis products on the formal Canadian market. Possibly, the use of different products with varying contents in cannabinoids within the same day or week [26] may contribute to explaining this observed result. For example, products with mainly CBD (that has a small or no psychoactive effect) could be preferred during daytime or working periods, while products which contain THC might be preferred at bedtime or during the weekends [26]. Our questionnaire did not ask to report the type of cannabinoids according to the moments of the day or the week. Specific instructions, asking patients to refer to their products when answering the questionnaire, or other relevant instructions may be considered to further improve the reliability of reporting of the type of cannabinoids used and other related information.

Except for the above-described small differences that were observed in the reliability for certain items between male and female participants, the results did not suggest that the reliability of the questionnaire is modified by sex.

Reporting of the use of other pharmacological and non-pharmacological treatments of pain was associated with a high reliability as well as of the use of cannabis for other reasons. This high reliability could be explained by the established use of cannabis by the majority of participants.

Although the study sample included participants from different provinces of Canada, which is a strength of the study, a limitation to note is that the survey was conducted only with the French version of the questionnaire. However, the final version of the questionnaire is translated in English.

Internal consistency and factors analysis were not conducted as there was no hypothesized specific relation between items of the questionnaire and as questionnaire items were not intended to form a composite score.

Future studies may assess other aspect of the validity of the questionnaire such as construct and criterion validities.

In conclusion, this validated questionnaire can be used as a reasonably reliable tool to assess cannabis use for medical purposes in patients with chronic pain, in clinical or research settings.

## Authors' Contribution

AZ, EK, CD, and AL designed the study and secured funding. AZ, EK, CD, AL and MA developed the questionnaire. AZ, CD, ED and ZCB collected the data. AZ analyzed the data. AZ and ZCB drafted the first version of the manuscript. All authors revised it critically for important intellectual content and approved the final version to be published. The corresponding author (AZ) attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.


## Acknowledgment:

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## Ethics

Research ethics approval was obtained from the CHU de Quebec Research Center Research Ethics Board (#CER: 2023-6274).

All participants provided an informed consent before taking part to the study.


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## Conflicts of Interest

The authors declared no conflict of interest.

## Data Access

Data are stored in a secured server at the CHU de Quebec Research Centre. Any data request should be addressed to the corresponding author (arsene.zongo@pha.ulaval.ca).

**Tableau 1. Sociodemographic characteristics of 158 participants who completed the survey at rounds 1 and 2**

| Characteristics | N total |
|---|---|
| Age (mean, SD) | 38.70 (11.61) |
| Age (Median, Q1, Q3) | 35 (32.0-42.5) |
| Age (min, max) | 20-73 |
| Age missing (n) | 2 |
| Sex at birth | |
| Male | 73 (46.50) |
| Female | 84 (53.50) |
| Gender Identity | |
| Men | 72 (45.57) |
| Women | 85 (53.80) |
| Other identity | Low count |
| Highest level of education | |
| Secondary (11 years) | 25 (15.82) |
| Collegial (pre-university, 13 years) | 20 (12.66) |
| Collegial (professional, 14 years) | 46 (29.11) |
| Undergraduate (Bachelor, 16 years) | 60 (37.97) |
| Graduate (MSc or doctorate, ≥18 years) | 7 (4.43) |
| Employment status | |
| On sick leave | 15 (9.49) |
| Active worker/employee | 102 (64.56) |
| Retired | 11 (6.96) |
| In studies | 18 (11.39) |
| Other | 11 (6.96) |
| Prefer not to respond | 1 (0.63) |
| Annual income | |
| < 30 000$ | 15 (9.49) |
| 30 000$ - 49 999$ | 24 (15.19) |
| 50 000$ - 69 999$ | 56 (35.44) |
| 70 000$ - 99 999$ | 53 (33.54) |
| ≥ 100 000$ | 9 (5.70) |
| Missing | 1 (0.63) |
| Marital status | |
| Single, never married | 46 (29.11) |
| Divorced or widower | 15 (9.49) |
| Married | 67 (42.41) |
| Common law union | 27 (17.09) |
| Missing | 3 (1.90) |
| Province of residence | |
| Quebec | 85 (53.80) |

| | |
|---|---|
| Ontario | 33 (20.89) |
| Alberta | 10 (6.33) |
| British Columbia | 11 (6.96) |
| Other provinces | 4 (2.53) |
| Missing | 15 (9.49) |
| Monthly spending on cannabis | |
| Less than 100$ | 38 (24.05) |
| 100$ to 159$ | 79 (50.00) |
| 160$ to 239$ | 21 (13.29) |
| 240$ or more | 18 (11.39) |
| Missing | 2 (1.27) |

**Table 2. Test-retest reliability of the medical cannabis questionnaire**

| Items | Total sample | | | Male | Female |
|---|---|---|---|---|---|
| | Measure at T1 | Measure at T2 | Kappa (95% CI) | Kappa¥ | Kappa¥ |
| **I - Chronic pain** | | | | | |
| **Duration of the pain (missing=1)** | | | 0.57 (0.45-0.69) | - | 0.54 |
| 3 - 12 months | 14 (8.92) | 12 (7.64) | | | |
| > 12 months to 5 years | 60 (38.22) | 64 (40.76) | | | |
| > 5 years | 83 (52.87) | 81 (51.59) | | | |
| **Pain-related conditions treated with cannabis** | | | | | |
| Anxiety/stress | 55 (34.81) | 67 (42.41) | 0.60 (0.47-0.72) | 0.53 | 0.64 |
| Arthritis/ osteoarthritis /rheumatism | 46 (29.11) | 47 (29.75) | 0.65 (0.52-0.78) | 0.59 | 0.72 |
| Non-specific chronic musculoskeletal pain | 69 (43.67) | 80 (50.63) | 0.53 (0.40-0.66) | 0.50 | 0.54 |
| Fibromyalgia/ chronic fatigue syndrome | 25 (15.82) | 21 (13.29) | 0.85 (0.73-0.97 | 0.86 | 0.84 |
| Headache/migraines | 30 (18.99) | 35 (22.15) | 0.48 (0.31-0.65) | 0.46 | 0.46 |
| Muscle spasms or convulsions | 17 (10.76) | 23 (14.56) | 0.54 (0.35-0.74) | 0.41 | 0.61 |
| Sleep disorders | 44 (27.85) | 46 (29.11) | 0.72 (0.60-0.84) | 0.69 | 0.76 |
| Work-related pain | 15 (9.49) | 10 (6.33) | 0.44 (0.18-0.69) | 0.63 | - |
| **II- Duration of cannabis use to treat chronic pain** | | | | | |
| **Duration of use (missing=1)** | | | 0.63 (0.51-0.74) | 0.62 | 0.61 |
| 0 – 3 months | 7 (4.46) | 7 (4.46) | | | |
| 4 - 6 months | 12 (7.64) | 13 (8.28) | | | |
| 7 - 9 months | 8 (5.10) | 13 (8.28) | | | |
| 10 - 12 months | 37 (23.57) | 39 (24.84) | | | |
| >12 months | 93 (59.24) | 85 (54.14) | | | |
| **Time of last use of cannabis for pain** | | | 0.44 (0.32-0.55) | -# | 0.46 |
| Today (day of completion of the survey) | 64 (40.51) | 42 (26.58) | | | |
| Yesterday | 64 (40.51) | 86 (54.43) | | | |
| 2 – 7 days ago | 25 (15.82) | 22 (13.92) | | | |
| 8 days to 4 weeks ago | 5 (3.16) | 8 (5.06) | | | |
| **Time of last use of cannabis for pain (new categories)** | | | 0.50 (0.29-0.63) | -# | 0.53 |
| Today or yesterday (combined) | 66 (78.57) | 67 (79.76) | | | |
| 2 – 7 days ago | 25 (15.82) | 22 (13.92) | | | |
| 8 days to 4 weeks ago | 5 (3.16) | 8 (5.06) | | | |
| **III- Sources for cannabis acquisition** | | | | | |
| **Sources of cannabis supply** | | | | | |
| Licensed medical cannabis store/seller | 104 (65.82) | 108 (68.35) | 0.60 (0.47-0.73) | 0.54 | 0.66 |

| | | | | | |
|---|---|---|---|---|---|
| Non-authorized seller (illegal market) | 18 (11.39) | 15 (9.49) | 0.70 (0.51-0.88) | 0.63 | 0.72 |
| Legal recreational cannabis store | 51 (32.28) | 52 (32.91) | 0.64 (0.51-.77) | 0.61 | 0.69 |
| Self-cultivation or cultivation by a designed person | 8 (5.06) | 11 (6.96) | 0.61 (0.34-0.87) | 0.71 | 0.48 |
| Internet ( from a legal producer or seller ) | 46 (29.11) | 43 (27.22) | 0.61 (0.47-0.75) | 0.56 | 0.64 |
| Other sources | - | - | | | |
| **Authorization (prescription) of a healthcare provider to use cannabis** | | | | | |
| Yes | 125 (79.11) | 123 (77.85) | 0.85 (0.75-0.95) | 0.90 | 0.81 |
| **Currently increasing cannabis dose** | | | | | |
| Yes | 90 (56.96) | 96 (60.76) | 0.69 (0.57-0.80) | 0.78 | 0.62 |
| **Currently decreasing cannabis dose** | | | | | |
| Not applicable | 90 (56.96) | 96 (60.76) | | | |
| Yes | Low count | 6 (3.80) | - | - | - |
| **IV- frequency of cannabis use** | | | | | |
| **Average frequency of cannabis use during the last 4 weeks** | | | 0.76 (0.69-0.83) | -# | 0.73 |
| Once/week or less | 9 (5.70) | 11 (6.96) | | | |
| Twice/week | 10 (6.33) | 7 (4.43) | | | |
| 3 to 4 times/week | 52 (32.91) | 57 (36.08) | | | |
| 5 to 6 times/week | 23 (14.56) | 20 (12.66) | | | |
| Once/day | 27 (17.09) | 30 (18.99) | | | |
| More than once/day | 37 (23.42) | 33 (20.89) | | | |
| **Number of days of use during the last week** | | | 0.72 (0.65-0.79) | 0.74 | 0.70 |
| 0 | Low count | Low count | | | |
| 1 | 6 (3.80) | 6 (3.80) | | | |
| 2 | 9 (5.70) | Low count | | | |
| 3 | 7 (4.43) | 20 (12.66) | | | |
| 4 | 41 (25.95) | 41 (25.95) | | | |
| 5 | 21 (13.29) | 21 (13.29) | | | |
| 6 | 9 (5.70) | 6 (3.80) | | | |
| 7 | 63 (39.87) | 57 (36.08) | | | |
| **Time of cannabis consumption during the day** | | | 0.61 (0.51-0.72) | 0.65 | 0.60 |
| Upon waking up | 13 (8.23) | 8 (5.06) | | | |
| Before noon | 18 (11.39) | 14 (8.86) | | | |
| At noon | 13 (8.23) | 15 (9.49) | | | |
| In the afternoon | 31 (19.62) | 30 (18.99) | | | |
| In the evening | 33 (20.89) | 42 (26.58) | | | |
| At bedtime | 11 (6.96) | 11 (6.96) | | | |
| As needed | 39 (24.68) | 38 (24.05) | | | |
| **V- type of cannabis products and methods of use** | | | | | |
| **Methods of cannabis use** | | | | | |
| Smoking | 67 (42.41) | 66 (41.77) | 0.70 (0.59-0.81) | 0.66 | 0.73 |
| Ingestion | 40 (25.32) | 31 (19.62) | 0.66 (0.52-0.80) | 0.57 | 0.76 |
| Sublingual | 14 (8.86) | 22 (13.92) | 0.56 (0.36-0.77) | 0.42 | 0.73 |
| Eating | 32 (20.25) | 30 (18.99) | 0.60 (0.44-0.76) | 0.60 | 0.58 |
| Drinking | 47 (29.75) | 52 (32.91) | 0.69 (0.57-0.81) | 0.73 | 0.65 |
| Vaping | 18 (11.39) | 15 (9.49) | 0.76 (0.60-0.93) | 0.75 | 0.77 |
| Vaporizing | 8 (5.06) | 10 (6.33) | 0.88 (0.72-1.00) | Low count | 0.93 |
| Topical | 12 (7.59) | 12 (7.59) | 0.72 (0.52-0.94) | Low count | 0.63 |
| Rectal route (Suppository) | Low count | Low count | - | - | - |
| **Methods of cannabis use (reclassified)** | | | | | |
| Smoking | 67 (42.41) | 66 (41.77) | 0.70 (0.59-0.81) | 0.66 | 0.73 |
| Oral route (ingestion, sublingual, eating, drinking) | 104 (65.82) | 109 (68.99) | 0.61 (0.48-0.74) | 0.55 | 0.66 |
| Vaping or vaporizing | 23 (14.56) | 21 (13.29) | 0.84 (0.72-0.96) | 0.72 | 0.91 |
| **Cannabis products** | | | | | |
| Dried or ground flowers/leaves | 62 (39.24) | 66 (41.77) | 0.69 (0.57-0.80) | 0.60 | 0.75 |
| Pre-rolled joints | 23 (14.56) | 20 (12.66) | 0.70 (0.54-0.87) | 0.70 | 0.71 |

| | | | | | |
|---|---|---|---|---|---|
| Hashish or kief | 19 (12.03) | 22 (13.92) | 0.75 (0.59-0.90) | 0.70 | 0.80 |
| Oil or powder concentrates | 28 (17.72) | 22 (13.92) | 0.53 (0.35-0.71) | 0.59 | 0.45 |
| Food or baverage | 72 (45.57) | 77 (48.73) | 0.63 (0.51-0.75) | 0.53 | 0.71 |
| Ready-to-eat food | 30 (18.99) | 28 (17.72) | 0.70 (0.56-0.85) | | |
| Ready-to-drink beverages | 47 (29.75) | 53 (33.54) | 0.65 (0.52-0.78) | | |
| Capsules, oral or sublingual drops, pharmaceutical cannabinoids | 30 (18.99) | 34 (21.52) | 0.73 (0.59-0.86) | 0.66 | 0.77 |
| **Types of cannabinoids in the cannabis products** | | | | | |
| Mainly CBD | 77 (48.73) | 90 (56.96) | 0.58 (0.46-0.71) | 0.57 | 0.57 |
| Mainly THC | 41 (25.95) | 53 (33.54) | 0.52 (0.36-0.66) | 0.50 | 0.49 |
| THC + CBD | 127 (80.38) | 132 (83.54) | 0.64 (0.47-0.79) | 0.70 | 0.59 |
| Other cannabinoids | 5 (3.16) | 5 (3.16) | 0.79 (0.51-1.00) | - | - |
| Unknown | Low count | Low count | - | - | - |
| **Average concentration (potency) of CBD during the last 4 weeks** | | | 0.61 (0.49-0.73) | 0.62 | - |
| Traces (< 1 mg/g or < 1 %) | 5 (3.65) | 8 (5.84) | | | |
| ≥ 1mg/g to < 50 mg/g (1 to 4.9%) | 15 (10.95) | 16 (11.68) | | | |
| 50 to 99 mg/g (5 to 9.9%) | 64 (46.72) | 56 (40.88) | | | |
| 100 to 149 mg/g (10 to 14.9%) | 35 (25.55) | 35 (25.55) | | | |
| 150 to 199 mg/g (15 to 19.9%) | 7 (5.11) | 12 (8.76) | | | |
| 200 to 249 mg/g (20 to 24.9%) | Low count | Low count | | | |
| ≥250 mg/g (≥25%) | 7 (5.11) | 9 (6.57) | | | |
| **Average concentration (potency) of CBD during the last 4 weeks (re-categorized)** | | | 0.59 (0.47-0.71) | 0.62 | 0.57 |
| Less than 50 mg/g (≤ 4.9%) | 20 (14.60) | 24 (17.52) | | | |
| 50 to 99 mg/g (5 to 9.9%) | 64 (46.72) | 56 (40.88) | | | |
| 100 to 149 mg/g (10 to 14.9%) | 35 (25.55) | 35 (25.55) | | | |
| ≥ 150 mg/g (≥ 15%) | 18 (13.14) | 22 (16.06) | | | |
| **Average concentration of THC during the last 4 weeks** | | | 0.69 (0.60-0.79) | 0.74 | 0.64 |
| traces (< 1 mg/g or < 1 %) | 14 (10.14) | 12 (8.70) | | | |
| ≥ 1mg/g to < 50 mg/g (1 to 4.9%) | 17 (12.32) | 19 (13.77) | | | |
| 50 to 99 mg/g (5 to 9.9%) | 35 (25.36) | 31 (22.46) | | | |
| 100 to 149 mg/g (10 to 14.9%) | 40 (28.99) | 38 (27.54) | | | |
| 150 to 199 mg/g (15 to 19.9%) | 12 (8.70) | 17 (12.32) | | | |
| 200 to 249 mg/g (20 to 24.9%) | 10 (7.25) | 13 (9.42) | | | |
| ≥250 mg/g (≥25%) | 10 (7.25) | 8 (5.80) | | | |
| **Average concentration of THC during the last 4 weeks (re-categorized)** | | | 0.68 (0.58-0.78) | 0.73 | 0.63 |
| ≤ 50 mg/g (≤ 4.9%) | 31 (22.46) | 31 (22.46) | | | |
| 50 to 99 mg/g (5 to 9.9%) | 35 (25.36) | 31 (22.46) | | | |
| 100 to 149 mg/g (10 to 14.9%) | 40 (28.99) | 38 (27.54) | | | |
| ≥ 150 mg/g (≥ 15%) | 32 (23.19) | 38 (27.54) | | | |
| **VI- Quantity of cannabis products : average daily quantity per route of use*** | | | | | |
| **Smoked (grams)** | N=67 | N=64 | 0.84 (0.75-0.92) (n for kappa=53, missing 25) | | |
| Unknown (I don't' know) | Low count | Low count | | | |
| 0.1 to 0.3 | 11 (16.42) | 12 (18.75) | | | |
| 0.4 to 0.5 | 20 (29.85) | 17 (26.56) | | | |
| 0.6 to 0.9 | 11 (16.42) | 11 (17.19) | | | |
| 1 to 2 | 13 (19.40) | 15 (23.44) | | | |
| > 2 | 12 (17.91) | 9 (14.06) | | | |
| | | | | | |
| **Ingested (milliliters)** | N=40 | N=31 | 0.84 (0.62-1.00) (n for kappa=22, missing 23) | | |
| Unknown (I don't' know) | Low count | Low count | | | |
| 0.1 to 0.9 | 17 (42.50) | 13 (41.94) | | | |
| 1 to 2 | 11 (27.5) | 8 (25.81) | | | |
| > 2 | 8 (20.00) | 6 (19.35) | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sublingual ( milliliters)** | N=13 | N= Low count (missing=19) | - | | |
| Unknown (I don't' know) | Low count | Low count | | | |
| ≤ 0.1 to 1 | 6 (46.15) | Low count | | | |
| > 1 | 6 (46.15) | Low count | | | |
| **Eating (grams)** | **N=32** | **N=29** | 0.58 (0.19-0.96) (n for kappa=18, missing 22) | | |
| Unknown (I don't' know) | Low count | Low count | | | |
| ≤0.1 to 0.9 | 20 (62.5) | 19 (65.52) | | | |
| 1 | Low count | Low count | | | |
| >1 | Low count | 5 (17.24) | | | |
| | | | | | |
| **Drinking (milliliters)** | N=47 | N=52 | 0.62 (0.43-0.80) (n for kappa=39; missing 21) | | |
| Unknown (I don't' know) | 0 | 0 | | | |
| ≤50 to 150 | 17 (36.17) | 28 (53.85) | | | |
| 151 to 200 | 13 (27.66) | 9 (17.31) | | | |
| 201 to 300 | 8 (17.02) | 7 (13.56) | | | |
| 301 to >1000 | 9 (19.15) | 8 (15.38) | | | |
| **Vaping (milliliters)** | N=18 | N=15 | 0.31 (-0.18; 0.80) (n for kappa=10, Missing 10) | | |
| Unknown (I don't' know) | Low count | Low count | | | |
| ≤0.5 to 0.9 | 5 (27.78) | 6 (40.00) | | | |
| 1 to 5 | 8 (44.44) | 4 (26.67) | | | |
| > 5 | Low count | Low count | | | |
| **Vaporizing (grams)** | N=8 | N=10 | - | | |
| Unknown (I don't' know) | 0 | Low count | | | |
| ≤0.1 to 1 | Low count | Low count | | | |
| 1 | 5 (62.50) | Low count | | | |
| >1 | 0 | Low count | | | |
| **VII- Other treatments used to manage chronic pain** | | | | | |
| **Use of pharmacological treatments to manage chronic pain (yes vs no)** | 54 (34.18) | 47 (29.75) | 0.78 (0.68-0.89) | 0.81 | 0.75 |
| **Type of pharmacological treatments** | | | | | |
| NSAID | 30 (18.99) | 27 (17.09) | 0.76 (0.63-0.90) | 0.67 | 0.80 |
| Acetaminophen | 32 (20.25) | 25 (15.82) | 0.72 (0.58-0.86) | 0.75 | 0.73 |
| Opioïds | 17 (10.76) | 13 (8.23) | 0.78 (0.61-0.95) | 0.71 | 0.88 |
| Antidepressants | 6 (3.80) | 6 (3.80) | 0.83 (0.59-1.00) | - | - |
| Anticonvulsants | 6 (3.80) | 6 (3.80) | 0.65 (0.34-0.97) | - | - |
| Myorelaxants | Low count | 5 (3.16) | - | - | |
| **Non-pharmacological treatments** | | | | | |
| Acupuncture | 6 (3.80) | 6 (3.80) | 0.83 (0.59-1.00) | - | - |
| Chiropractic | 9 (5.70) | 7 (4.43) | 0.87 (0.69-1.00) | - | 0.82 |
| Massotherapy (massage therapy) | 34 (21.52) | 27 (17.09) | 0.62 (0.46-0.77) | 0.53 | 0.66 |
| Ergo-therapy (Occupational Therapy) | Low count | 5 (3.16) | - | - | - |
| Osteopathy | 13 (8.23) | 12 (7.59) | 0.87 (0.72-1.00) | - | 0.94 |
| Physiotherapy (physical therapy) | 16 (10.13) | 15 (9.49) | 0.75 (0.57-0.93 | - | 0.84 |
| Hypnosis | Low count | Low count | - | - | - |
| Psychotherapy | 8 (5.06) | 11 (6.96) | 0.39 (0.10-0.67) | - | 0.49 |
| Other strategies to manage pain (yes vs no) | 42 (26.58) | 40 (25.32) | 0.84 (0.74-0.93) | 0.82 | 0.84 |
| Yoga | 13 (8.23) | 17 (10.76) | 0.63 (0.42-0.84) | - | 0.71 |
| Meditation | 14 (8.86) | 15 (9.49) | 0.81 (0.65-0.97) | - | - |
| Exercices | 14 (8.86) | 13 (8.23) | 0.47 (0.23-0.72) | - | - |
| **VIII- Use of cannabis for other purposes** | | | | | |
| **Other reasons to use cannabis products** | | | | | |
| To improve (stimulate) appetite | 16 (10.13) | 16 (10.13) | 0.86 (0.73-0.99) | 0.92 | 0.82 |
| To prevent/relieve nausea or vomiting | 7 (4.43) | 15 (9.49) | 0.61 (0.37-0.85) | 0.48 | 0.69 |
| To prevent/reduce anxiety or depression | 66 (41.77) | 70 (44.30) | 0.61 (0.49-0.74) | 0.62 | 0.60 |

| | | | | | |
|---|---|---|---|---|---|
| To favor relaxation and rest | 96 (60.76) | 95 (60.13) | 0.62 (0.49-0.74) | 0.61 | 0.62 |
| To increase (improve) sensory perception | 15 (9.49) | 20 (12.66) | 0.52 (0.31-0.73) | 0.54 | 0.50 |
| To improve the quality of sleep | 74 (46.84) | 72 (45.57) | 0.67 (0.55-0.79) | 0.69 | 0.64 |
| Other purposes | 6 (3.80) | Low count | - | - | - |
| **Average frequency of cannabis use for other reasons during the last 4 weeks** | | | 0.67 (0.57-0.76) | 0.63 | 0.70 |
| Once during the last 4 weeks | 10 (6.33) | 15 (9.49) | | | |
| 2 to 3 times during the last 4 weeks | 10 (6.33) | 9 (5.70) | | | |
| Once/week | 11 (6.96) | Low count | | | |
| Two times/weeks | 50 (31.65) | 46 (29.11) | | | |
| 3 to 4 times/weeks | 33 (20.89) | 34 (21.52) | | | |
| 5 to 6 times/weeks | 9 (5.70) | 16 (10.13) | | | |
| Once/day | 12 (7.59) | 13 (8.23) | | | |
| More than once/day | 23 (14.56) | 23 (14.56) | | | |

*¥ Confidence intervals are not presented for subgroup analyses to simplify the table.*

** For the quantity of cannabis, the Kappa was calculated for subjects who answered "yes" to each of the consumption methods and who had no missing data (for the quantity) between the two measurements (these Kappa's are possibly overestimated).*

*#not calculable as at least one category of response choices is missing*

**Table 3.** Reliability (Kappa) of the questionnaire assessing the use of cannabis for chronic pain according to the duration of cannabis use to treat pain

| Items | Total sample | Duration of cannabis use <12 months (n=64) | Duration of cannabis use ≥12 months (n=94) |
|---|---|---|---|
| **III- Sources for cannabis acquisition** | | | |
| **Sources of cannabis supply** | | | |
| Licensed medical cannabis store/seller | 0.60 | 0.65 | 0.57 |
| Non-authorized seller (illegal market) | 0.70 | 0.88 | 0.62 |
| Legal recreational cannabis seller/store | 0.64 | 0.65 | 0.63 |
| Self-cultivation or cultivation by a designed person | 0.61 | - | 0.64 |
| Internet ( from a legal producer or seller ) | 0.61 | **0.58** | **0.61** |
| **Authorization (prescription) of a healthcare provider to use cannabis (yes vs no)** | 0.85 | **0.80** | **0.88** |
| **Currently increasing cannabis dose (yes vs no)** | 0.69 | **0.67** | **0.70** |
| **IV- frequency of cannabis use** | | | |
| **Average frequency of cannabis use during the last week** | 0.76 | 0.76 | 0.75 |
| **Number of days of use during the last week (0 to 7 days)** | 0.72 | 0.76 | 0.69 |
| **Time of cannabis consumption during the day** | 0.61 | 0.61 | 0.60 |
| **V- type of cannabis products and methods of use** | | | |
| **Methods of use** | | | |
| Smoking | 0.70 | **0.61** | **0.74** |
| Ingestion | 0.66 | **0.65** | **0.66** |
| Sublingual | 0.56 | **0.42** | **0.61** |
| Eating | 0.60 | 0.69 | 0.54 |
| Drinking | 0.69 | 0.70 | 0.67 |
| Vaping | 0.76 | 0.84 | 0.71 |
| Vaporizing | 0.88 | **0.79** | **0.92** |
| topical | 0.72 | **0.65** | **0.75** |
| Rectal route (Suppository) | 1 | | |
| **Methods of cannabis use (reclassified)** | | | |
| Smoking | 0.70 | **0.61** | **0.74** |
| Oral route (ingestion, sublingual, eating, drinking) | 0.61 | **0.54** | **0.65** |
| Vaping or vaporizing | 0.84 | 0.86 | 0.83 |
| **Cannabis products** | | | |
| Dried or ground flowers/leaves | 0.69 | 0.55 | 0.74 |
| Pre-rolled joints | 0.70 | 0.82 | 0.65 |
| Hashish or kief | 0.75 | **0.68** | **0.78** |
| Oil or powder concentrates | 0.53 | **0.44** | **0.58** |
| Food or baverage | 0.63 | **0.62** | **0.63** |
| Capsules, oral or sublingual drops, pharmaceutical cannabinoids | 0.73 | 0.75 | 0.71 |
| **Types of cannabinoids in the cannabis products** | | | |
| Mainly CBD | 0.58 | 0.59 | 0.58 |
| Mainly THC | 0.52 | 0.56 | 0.48 |
| THC + CBD | 0.64 | 0.65 | 0.62 |
| Other cannabinoides | 0.79 | - | - |
| Unknown | 0.39 | - | - |
| **Average concentration (potency) of CBD during the last 4 weeks** | 0.61 | **0.54** | **0.63** |
| **Average concentration (potency) of CBD** (re-categorized as in Table 2) | 0.59 | **0.54** | **0.61** |
| **Average concentration of THC during the last 4 weeks** | 0.69 | **0.66** | **0.71** |
| **Average concentration of THC during the last 4 weeks** (re-categorized as in Table 2) | 0.68 | **0.66** | **0.69** |

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**Supplemental materials: French and English versions of the questionnaire assessing the use of cannabis in patients with chronic pain**

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- 2.CanQuestEN.pdf