



The medicinal use of cannabis in the UK: results of a nationwide survey

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SUMMARY

The use of cannabis for medical purposes is a controversial but an important topic of public and scientific interest. We report on the results of a self-administered questionnaire study conducted in the United Kingdom between 1998 and 2002. The questionnaire consisted of 34 items and included demographic data, disease and medication use patterns and cannabis use profiles. Subjects were self-selected; 3663 questionnaires were distributed and 2969 were returned [1805 (60.9%) women, mean age 52.7 years (SD 12.7)]. Medicinal cannabis use was

reported by patients with chronic pain (25%), multiple sclerosis and depression (22% each), arthritis (21%) and neuropathy (19%). Medicinal cannabis use was associated with younger age, male gender and previous recreational use ($p < 0.001$). While caution must be exercised in interpreting these data, they point to the need for clinical studies of cannabis and cannabinoids with standardised and quality-controlled products.

Keywords: Cannabis; chronic diseases; epidemiology; pain; therapeutics

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INTRODUCTION

The potential use of cannabis and related derivatives (cannabinoids) for medical purposes is currently under intense scientific investigation. Research efforts are predominantly focused on exploring the cellular and neurophysiological effects of agonists and antagonists on endogenous cannabinoid receptors in animal models, and a novel endogenous cannabinoid pathway is being described with roles in movement, pain, appetite and cardiovascular control. This scientific knowledge is emerging at the same time as increasing numbers of patients' reports of the effective use of herbal cannabis. It is therefore plausible that patients using cannabis as a medicine may be exploiting this novel neurophysiological signalling system. Further information on the alleged effects of cannabis may guide the development of cannabis-based medicines for symptoms of chronic diseases.

Few data are available on the patterns and prevalence of the medicinal use of cannabis. A large number of case reports of effective medicinal cannabis use have been published in peer-reviewed journals, including central thalamic pain and dys-

tonia (1), proximal myotonic myopathy (2), familial Mediterranean fever (3) and multiple sclerosis (MS) (4). In a telephone survey of adults in 2508 households in Ontario, Canada, 49 people (1.9%) reported using cannabis for a medical reason in the past year, mainly for pain or nausea (5). Wide-ranging effects of cannabis are noted in large case series: 50 self-selected medicinal cannabis users reported use for a variety of conditions including HIV/AIDS-related problems, chronic pain, depression, anxiety, menstrual cramps, migraine and narcotic addiction, as well as everyday aches, pains, stresses and sleeping difficulties (6). In a survey of 53 UK and 59 US patients with MS, cannabis was reported to affect spasticity, chronic pain of extremities, acute paroxysmal phenomena, tremor, emotional dysfunction, anorexia/weight loss, fatigue states, double vision, sexual dysfunction, bowel and bladder dysfunctions, vision dimness, dysfunctions of walking and balance and memory loss (7). In a survey of 15 chronic pain patients who admitted to using cannabis medicinally, pain, sleep and mood were most frequently improved, while doses used were modest (8).

Several prospective studies among specific patient populations have now been published. In a survey of ambulatory patients with HIV/AIDS in three HIV clinics in eastern Canada, 35% reported current use of cannabis (9). This is higher than an estimated prevalence of 30% in British Columbia (10) and 15–23% in California (11,12). In a survey of 220 patients with chronic non-cancer pain, 10% reported continuing medicinal use (13). The prevalence of medical cannabis use among patients with MS has been estimated at 14% (14). Large population-based surveys are needed to further describe the characteristics of medicinal cannabis users and their reasons for use.

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The authors state that this work is their own and has not been submitted for publication elsewhere. This work is supported by a research agreement from GW Pharmaceuticals.

METHODS

A cross-sectional survey was conducted to collect data from self-selected medicinal cannabis users in the UK. Patients were identified by word of mouth and through patients' support groups. A questionnaire instrument was developed for postal distribution and self-administration. A stamped addressed envelope was provided to improve response rates. The questionnaire consisted of 34 items including binary (yes/no) responses, Likert scales and open-ended questions. Information collected included demographics (age and gender), disease and symptom status and patterns of cannabis use both medicinally and non-medicinally. Patients were asked to select their diseases and/or symptoms from a list, and space was provided for additional information. Disease and symptom information was accepted as reported by the patient in the questionnaire responses, and no attempt to validate these diagnoses was made.

Data were single-entered into a relational database (MICROSOFT ACCESS 2000). Missing data and outliers were excluded from the analysis; these accounted for less than 5% of the total responses for the variables of interest. Data were imported and analysed using a standard statistical package (STATA version 8, Houston, TX, USA). Categorical data were compared using Pearson's χ^2 -tests. Ordered categorical data were analysed using Mantel-Haenzel tests. Significance was set at the 95% level, and all tests were two sided. The database was registered with the Data Protection Act 1998.

RESULTS

Over the period 1998–2002, 3663 questionnaires were distributed, and 2969 were returned (81% response rate).

Demographic Information

The mean age of the 2969 subjects was 52.7 years (SD 12.7), of whom 1805 (60.7%) were female. MS was the most common disease, reported by 1753 subjects (59%), while 1280 reported neuropathy (43%), 1125 reported chronic pain (33%) and 777 reported arthritis (26%). There was considerable overlap among these conditions.

Cannabis Use Patterns

Ever Use of Cannabis for Medicinal Purposes. A total of 947 (31.9%) subjects reported ever having used cannabis for medical purposes. The remainder were assumed to be never users. The median duration of medicinal use among 616 subjects for whom the duration of use data were available was 4 years [interquartile range: (2–7)]. The demographic profile of medicinal cannabis users is summarised in Table 1, compared to the never users. Medical cannabis use was associated with male

Table 1 Characteristics of ever-medicinal cannabis users

Variable	Medicinal cannabis use				Total	p-Value
	Ever	%	Never	%		
Age (years)						<0.001
<45	395	55	325	45	720	
45–50	171	39	265	61	436	
50–59	274	30	643	70	917	
>60	104	14	620	86	724	
Gender						<0.001
Male	439	40	649	60	1088	
Female	508	30	1209	70	1717	
Non-medical cannabis use						<0.001
Yes	357	66	182	34	539	
No	575	28	1454	72	2029	

gender, younger age and non-medical use ($p < 0.001$ for all tests).

Continuing Use of Cannabis for Medicinal Purposes. Of those who had ever used cannabis medicinally, 543 (18.3% of total sample) persons reported continuing to use cannabis for medical purposes, while 403 (13.6%) said they no longer used it. The 30 diseases or symptoms for which continuing medical cannabis use was most common are summarised in Table 2, along with the median duration of use for each condition. As noted above, some subjects reported cannabis use for more than one purpose. Reasons given for no longer using cannabis for medical purposes are also summarised in Table 3.

Patterns of Cannabis Use

Frequency of Use. Patients were asked how many days per week they usually used cannabis for medicinal purposes. Of 946 responses, 333 (35%) used 6–7 days per week, 219 (23%) used 3–5 days per week, 139 (15%) used 1–2 days per week, 73 (8%) used less than 1 day per week and 182 (19%) reported 'other'.

Reasons for Trying Cannabis. When asked why they decided to try cannabis for medical purposes, 585 said it was because a friend, family member or acquaintance had suggested it, 519 said they read a book or article about cannabis, 177 said they had been prior users and found out 'by accident', 152 said their doctor had suggested it and 128 gave other reasons.

Modes of Administration. Smoking was the most common means of administration, reported by 777 (82%) of medical cannabis users. The modes of administration were: eating was reported by 406 (43%) subjects, tea by 267 (28%), sublingual spray by 20 (2%) and 118 (12%) used other means.

Amount of Cannabis Used. Nine hundred and sixteen subjects reported amounts of cannabis used for medical purposes. Of these, 18 used 10 or more grams per day, 60 used 5–9 g

Table 2 Thirty diseases and symptoms for which continuing cannabis use is most commonly reported

<i>Disease/symptom</i>	<i>Number</i>	<i>%</i>	<i>Median years of use (interquartile range)</i>
Multiple sclerosis	249	11.61	3 (2–6)
Neuropathy	239	11.14	4 (2–8)
Chronic pain	235	10.96	4 (2–9)
Depression	172	8.02	6 (3–10)
Arthritis	155	7.23	4 (2–8)
Gastrointestinal	84	3.92	5 (2–10)
Migraine	74	3.45	6 (3.5–15)
Allergy	62	2.89	3 (2–7)
Spinal pain	62	2.89	4 (2–9)
Asthma	53	2.47	4 (2–7)
Weight loss (unintended)	40	1.86	6 (2–13)
Spinal cord injury	39	1.82	7 (4–16)
Genitourinary	36	1.68	2 (2–5)
Chronic fatigue syndrome	27	1.26	4 (3–9)
Dystonia	27	1.26	2.5 (2–6)
Limited mobility	25	1.17	3 (2–6)
Epilepsy	24	1.12	4.5 (2.5–10)
Psychological	24	1.12	6.5 (3–17)
Fibromyalgia	23	1.07	5 (2–14)
Spinal disorder	22	1.03	5 (3–11)
Spinal surgery	22	1.03	6 (2–12)
Cardiovascular condition	21	0.98	4 (2–6)
Bone disorder	18	0.84	3 (2–6)
Spinal disc disorder	16	0.75	3 (2–10)
Spinal paralysis	16	0.75	9.5 (4.5–15)
Surgery	15	0.7	3.5 (2–16)
Visual impairment	15	0.7	5 (1–16)
Insomnia	14	0.65	4 (1–8)
Skin condition	14	0.65	3 (2–5)
Carcinoma	13	0.61	5 (4–6)
Other	309	14.4	n/a
Total	2145	100	

n/a, not applicable.

per day, 107 used 3–4 g per day, 249 used 1–2 g per day, 153 used several grams per week, 107 used several grams per month and 222 used only occasionally when needed.

Change in Amount Used. Seven hundred and seventy-seven subjects reported on whether the amounts of cannabis needed to control symptoms had changed over time since they had started; 54 said they needed much more, 171 needed a little more, 514 said it was about the same, 31 said they needed less and seven said they needed much less.

Table 3 Reasons for stopping medicinal cannabis

<i>Reason</i>	<i>Number of responses</i>	<i>% of number stopping</i>
Unable to find supply	207	7
Could not afford	169	5.7
Did not like side effects	40	1.3
Did not work	25	1
Did not like 'high'	20	0.7
Other	173	5.8

Perceived Effects of Cannabis

Overall Effectiveness. Of 948 reported users, 648 (68%) reported that cannabis made their symptoms overall much better, 256 (27%) said a little better, 36 (4%) said no difference and eight subjects said a little worse (four subjects) or much worse (four subjects).

Effectiveness Compared to Other Medications. When asked how cannabis compared to other medications overall, 412 of 916 subjects (45%) said it worked much better than prescribed medications, 261 (28%) said it was somewhat better and 45 (5%) said it was about the same; only 27 subjects said that prescription medicines worked better than cannabis (18 somewhat better and nine much better). One hundred and seventy-one (19%) subjects said it was impossible to tell.

Side Effects Compared to other Medications. When asked to compare the undesirable effects of cannabis to those of prescribed medicines, 872 subjects responded, of whom six found that cannabis produced much worse side effects, 23 found somewhat worse side effects and 54 said the side effects were about the same. Two hundred and sixty-four (30%) subjects stated that side effects of prescribed medicines were somewhat worse and 294 (34%) said they were much worse. Two hundred and thirty-one (26%) stated that it was impossible to tell.

Effects on Other Medication Use. Of the 909 subjects responding to this question, 374 stated that their use of cannabis had changed their use of other medications, while 521 said it had not. Fourteen were not coded.

Return of Symptoms on Stopping. Of the 876 subjects responding, 673 said their symptoms returned or got worse when they stopped using cannabis, and 203 denied any worsening on stopping cannabis.

Non-medicinal Cannabis Use. Five hundred and thirty-nine (18%) subjects reported ever having used cannabis for reasons not related to disease (assumed to mean non-medical use), while 2029 subjects stated that they had never used cannabis for non-medical purposes. Medicinal cannabis use was significantly associated with recreational use ($p < 0.001$) (Table 1).

DISCUSSION

To our knowledge, this is the most extensive survey of medical cannabis use among chronically ill patients conducted to date. Before any conclusions may be drawn, however, the potential limitations of the study must be addressed.

The sample of patients recruited for this study was not selected through any systematic procedure or by random recruitment. The questionnaire was distributed primarily by word of mouth to patients and patients' support groups, and

the high rate of response (81%) suggests that this was a highly motivated population. Therefore, there is potential for a strong selection bias to inflate the estimated of reported effectiveness of cannabis (assuming the responses reflect mainly 'successful' cannabis users) and to minimise the adverse effects. The subjects were chronically ill patients with a range of comorbid conditions, and the need for additional symptom relief may explain the self-reported on-going medical cannabis use prevalence of 18%. However, this is not out of the range of other prevalence surveys in MS (14%) (14) and chronic pain (10%) (13). However, because of the potential for bias, we caution against drawing any conclusions with respect to the efficacy of cannabis from this study. It is important, however, to recognise these results as contributing to our understanding of what the perceived effects of cannabis are among these subjects.

Most of the awareness of this study was achieved by word of mouth between patients, spread by patients putting notes about the project into their various newsletters/magazines, etc. MS patients have a large active patient support network in the UK and may have raised the awareness of this questionnaire study. This would have the effect of weighting the sample towards this population. There is a noticeable paucity of data from subjects with HIV/AIDS and cancer, populations which are also associated with therapeutic cannabis use. We believe that at the time of analysis, awareness of this questionnaire was not very high among the HIV/AIDS and cancer 'network groups'.

The presence of a significant selection bias may also have the effect of excluding cannabis non-responders, persons who have tried cannabis and for whom it has not been of any use. This is a difficult group to target, and only randomly selected large-scale surveys would be able to identify the extent of this. Such studies usually rely on postal distribution and often have low response rates. Detailed estimates of response to any medication are best captured in formal clinical trials.

In spite of these limitations, we believe that this survey is the best available assessment of current medical cannabis use in the UK. Some key messages emerge from the findings. Our study found that 68% of users had found cannabis to make symptoms overall much better and 27% a little better, suggesting that over 95% of the patients using cannabis had obtained some benefit from cannabis. In spite of this, about half of these subjects had not continued to use cannabis. The reasons for this are illuminating: the lack of supply or cost were more commonly reported as reasons for stopping compared to ineffectiveness or intolerable side effects. This lends support to ongoing efforts to make cannabis-based medicines available for research purposes and lends credence to changes in public policy on compassionate grounds.

The study has found that ever use of medicinal cannabis is significantly associated with young age, male gender and non-medical use. This relationship has been found in other surveys

(13) and may represent a general bias towards medical cannabis use in this population. Alternatively, the association may be explained by factors which make clinical response to cannabis more favourable in this population. It is known that males and females respond differently to cannabis (15), and younger age groups may be better able to find and use cannabis as more socially 'acceptable'. This may particularly be true of the recreational users who would more likely have discovered medical use by 'accident' (19% of ever-medical users).

Finally, recent randomised controlled clinical trials have pointed to potential therapeutic benefits of cannabinoids for patients with MS (16) and chronic neuropathic pain (17). This suggests that patients' reports of the effectiveness of cannabis should not be discounted as purely anecdotal, but rather could serve as a valid indicator of target diseases and symptoms for cannabinoid drug development.

In conclusion, we believe that this survey presents a broad picture of the current state of cannabis use for medical purposes in the UK. The extent of use and the reported effects lend support to the further development of safe and effective medicines based on cannabis.

Conflict of Interest Statements

MAW is conducting research on the safety and efficacy of cannabis for pain management and supported by the fonds de recherche en sante du Quebec and the Canadian Institutes of Health Research. GWG is the Chairman and CEO of GW Pharmaceuticals, a pharmaceutical company which is developing cannabis-based medicinal extracts. HAA is an employee of GW Pharmaceuticals.

Role of the Funding Source. GW Pharmaceuticals was responsible for designing and administering the questionnaire, setting up the database and entering the data. The extraction and analysis of data and the preliminary report were performed by the principal author (MAW) under a service agreement with GW Pharmaceuticals. This paper represents a final report on these data with the collaboration of all the authors.

ACKNOWLEDGEMENTS

The authors acknowledge the contributions of the patients who responded to this questionnaire and of the software team who developed and administered the database.

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Paper received March 2004, accepted May 2004