

Survey on the Medical Use of Cannabis and THC in Germany

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ABSTRACT. In recent years, a number of open patient interviews and standardized surveys have been conducted to gain more information concerning subjective experiences with the use of cannabis products in a multitude of medical conditions. After a first effort in 1999 (Schnelle et al. 1999), a second anonymous survey was conducted among patients in the German speech area of Europe concerning use of natural illegal cannabis products and THC, a natural cannabinoid that may be prescribed by German doctors since 1998, and that is also manufactured synthetically.

Questionnaires were distributed to the members of the Association for Cannabis as Medicine (ACM) and additional persons interested in participating. One hundred eighty-two completed questionnaires were sent to the Institute for Oncological and Immunological Research and the ACM, of whom 17 were excluded because these participants apparently did not suffer from severe diseases. Of the 165 respondents included in the final analysis, 61.2% were male and 38.8% were female. Median age was 40.3 ± 12.4 years, with a range of 16 to 87 years.

Twenty-two participants did not use cannabis products for therapeutic purposes. The main reasons were fear of criminal prosecution, the assumption that their doctor will not prescribe THC or a refusal of the doctor to do so.

Among the 143 participants with cannabis or THC experience, the

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main diagnosis groups were neurological symptoms (28%) and painful conditions (25.3%), followed by diseases with mainly gastrointestinal symptoms, such as nausea and appetite loss (14%). The most frequent single diagnoses were multiple sclerosis (17.5%), Tourette syndrome (11.9%), HIV/AIDS (10.5%), migraine/headache (4.9%), chronic pain that was not described more precisely (4.2%), hepatitis C (3.5%), depression, sleep disorders, spinal cord injury, and back pain (2.8%, each), asthma, allergy, fibromyalgia, menstrual pain, and epilepsy (2.1%, each).

Average daily THC doses were 14.9 ± 9.5 mg, ranging from 4 to 35 mg. Doses of natural cannabis products (marijuana, hashish) were 1.3 ± 0.9 grams on average (range: 0.02-3.5 g). The drugs were inhaled by 55.9%, employed orally by 16.8%, and 23.1% used both routes of administration.

The cited conditions were much improved by cannabis or THC in 74.8%. An additional 13.3% of patients noted a small improvement, and 2.1% noted no improvement. Others were unsure whether it improved their condition (7.0%), or did not answer this question (2.8%). High satisfaction was reported in 54.5%, 28.0% were satisfied, 14.0% were partly satisfied and 2.1% were not satisfied, while 1.4% did not answer. No side effects were experienced in 73.4%, while 22.4% reported moderate side effects, and 4.2% did not respond. About three-quarters made statements to the consequences of discontinuation of use with regard to withdrawal symptoms. Of these, 67.6% reported no withdrawal symptoms; in 17.6% these symptoms were mild, and in 2.8% they were more severe, while 12.0% reported that they could not evaluate the severity of withdrawal symptoms.

Fifty-three participants noted that they had asked their doctor to prescribe THC. In 54.8% the doctor was willing to do so, but in more than half of the cases (54.9%), the health insurance companies refused to pay for the treatment. There was no association between the reaction of the doctor or of the health insurance and the diagnosis. Most of the participants who reported a refusal by their doctor or the health insurance used illegal cannabis products in the previous month.

Experience with both the medical use of THC and natural cannabis products was reported by 16 participants. There were no clear differences between both drugs with regard to side effects and medicinal efficacy.

In conclusion, this survey adds to an increasing number of patient reports of successful and well-tolerated medical uses of cannabis products in a multitude of conditions. Furthermore, it reflects the division of German doctors and health insurances on the issue. *[Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <http://www.HaworthPress.com> © 2003 by The Haworth Press, Inc. All rights reserved.]*

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INTRODUCTION

Cannabis preparations have been used in the treatment of numerous diseases. Reliable data on the efficacy of single cannabinoids or whole plant cannabis in many of these conditions are not available since clinical studies meeting modern standards have only been conducted in a few illnesses for which cannabis products are used, among them side effects of cancer chemotherapy and anorexia associated with cachexia in HIV/AIDS. Additional sources of information of the medical value of cannabis are basic research explaining mechanisms of action, as well as small clinical studies and case reports, e.g., in chronic pain, spinal cord injury, multiple sclerosis, Tourette syndrome, Alzheimer's disease, asthma, and glaucoma.

There is also interest in collecting and utilizing the experience and subjective impressions of patients to provide a more complete picture of the topic. For this reason, surveys have been conducted in the past five years questioning individuals that use cannabis therapeutically. They were conducted either as oral non-standardized interviews in the course of investigations of state or scientific institutions (House of Lords Select Committee on Science and Technology in the UK, Institute of Medicine in the USA), on the therapeutic potential of cannabis (House of Lords 1998, Joy et al. 1999), or as anonymous surveys using standardized questionnaires (Barsch 1996, Consroe et al. 1997, Consroe et al. 1998, TNO 1998, Helliwell 1999, Müller-Vahl et al. 1999, Schnelle et al. 1999, Gieringer 2002).

Clinical studies employing single cannabinoids or, less often with whole plant preparations (smoked marijuana, encapsulated cannabis extract) have often been inspired by positive anecdotal experiences reported by patients employing crude cannabis products, to test whether anecdotal experiences in a certain disease were rare exceptions, or whether a considerable number of patients suffering from this ailment would profit from cannabinoid treatment. Thus, a survey in patients with Tourette syndrome about their use of nicotine, alcohol and cannabis and its effects on clinical symptoms (Müller-Vahl et al. 1997) initiated clinical studies with dronabinol (Δ^9 -THC) demonstrating that this

cannabinoid is an effective drug in the treatment of this movement disorder (Müller-Vahl et al. 1999, Müller-Vahl et al. 2002). Clinical studies to investigate anti-emetic, appetite enhancing, anti-spastic and analgesic effects have been inspired by anecdotal reports as well. Several clinical case reports were conducted with the intent to objectify the subjective experience of a patient, and were usually able to do so (e.g., Petro 1980, Meinck et al. 1989, Martyn et al. 1995, Maurer et al. 1990, Schon et al. 1999, Holdcroft et al. 1997, Müller-Vahl et al. 1999).

Anecdotal observations (Chatterjee et al. 2002) and surveys (Ware et al. 2002) remain an important source of knowledge for understanding the medicinal benefits of cannabis preparations and their possible side effects.

Following an initial survey that was conducted between April 1998 and April 1999 (Schnelle et al. 1999), the German Association for Cannabis as Medicine (ACM) in cooperation with the Institute for Oncological and Immunological Research in Berlin conducted a second survey in 2001 to question ACM members and others about their experiences with the medical use of cannabis products, comparisons between natural cannabis and THC, the attitude of their doctors and the reaction of their health insurances when asked to pay for a treatment with THC. At the time of the first survey, there was almost no experience with THC in Germany, as it has only been prescribed since February 1998.

METHODS

In July 2001 the ACM distributed a patient questionnaire to about 700 members in Germany and Switzerland, of whom more than 650 are Germans. An unknown percentage of ACM members are persons who use cannabis products for medical reasons. ACM members and others interested in participating in the survey were asked to complete the questionnaire and return it anonymously to the Institute for Oncological and Immunological Research before the end of December 2001. Additionally, the German organization of patients suffering from Tourette syndrome (Tourette Society Germany) put a HTML version of the questionnaire online on its homepage.

The questionnaire consisted of 26 questions divided into six sections with additional free space for comments. The first part dealt with demographic data (age and sex), diagnosis, reason for cannabis use (therapeutically or recreationally), and experience with cannabis before the onset of disease. The second part dealt with the access to cannabis products, in-

cluding the reaction of the doctor to a request for treatment with THC and the reaction of the health insurance. Health insurance agencies in Germany are not obliged to pay for a treatment with THC, since there is no pharmaceutically-approved preparation in Germany. German doctors are allowed to prescribe Marinol[®], a preparation of synthetically manufactured THC that is approved in the USA, and THC may also be bought by pharmacists from two German companies (THC Pharm and Delta 9 Pharma) to produce capsules or oily liquids for medical use according to formulas developed and issued by an institution of the German pharmacists association (N. N. Monographs 2001). It is up to the insurer whether to pay for a treatment or not. In Germany THC prescribed by a doctor is about ten times as expensive as THC in illegal cannabis products.

The remaining four parts of the questionnaire dealt with the kind of cannabis products used, the method of use, therapeutic effects and satisfaction, possible side effects, reasons for a possible change of dose, and a comparison between THC and natural cannabis preparations.

In all, 157 completed hard-copy questionnaires reached the Institute for Oncological and Immunological Research in Berlin or the Association for Cannabis as Medicine in Cologne. An additional 25 online questionnaires were sent to the ACM by the Tourette Society Germany. Of these 182 participants, 17 were excluded since they apparently did not suffer from severe conditions (“occasionally joint aches,” “indigestion,” etc.) or were apparently healthy (e.g., “prophylaxis against glaucoma”). Thus, 165 participants were included in the final analysis.

Many participants reported more than one diagnosis or symptom. Several diagnoses were given to describe the symptoms of the primary disease. For example, the diagnosis “multiple sclerosis” was supplemented by additional information, such as “spasticity” or “pain.” Psychiatric problems, such as depression or sleeping disorder, were often added to the somatic primary disease. A maximum of three diagnoses were taken into account, with one primary diagnosis. This main diagnosis was either the primary disease or the assumed most severe disease.

The diagnoses were divided according to their most important symptoms into nine groups, pain, neurological, neuropsychiatric, gastrointestinal, glaucoma, asthma, immunological, psychiatric, and miscellaneous.

RESULTS

About two-thirds (61.2%) of the 165 participants included in the final analysis were male and 38.8% were female. Their median age was 40.3 ± 12.4 years (range: 16-87 years).

Of these, 142 participants reported prior experience with the medical use of cannabis products, while 22 had none. Fifty-three participants had asked their doctors to prescribe THC, of whom 40 did not receive THC because their doctor dismissed their request, or because the health insurance agency would not assume the costs. Sixteen participants had both experience with THC and natural cannabis products.

Sub-Group with No Medical Use

Twenty-two participants (11 men and 11 women) did not use cannabis products for therapeutic purposes. Nearly half of them (N = 10) suffered from Tourette syndrome and had completed an online questionnaire on the web site of the Tourette Society. Others suffered from pain, multiple sclerosis, spinal cord injury, glaucoma, cancer chemotherapy, and cancer.

Two had had experience with the recreational use of cannabis before the onset of their disease. Both reported of fear of criminal prosecution and had tried, in vain, to get THC from their doctor.

Fear of criminal prosecution was the main reason why cannabis had not been used in the group of non-users (N = 9). Other reasons are listed in Table 1. Among the additional reasons provided were: "I fear meeting the wrong people when buying cannabis." "I have not had any opportunity." "No studies available on safety of use." "Because of the costs." or "No serious supply with constant quality."

Sub-Group with Medical Use

About one-third of the 143 participants who reported medical use of cannabis were female (37.1%). Among the age groups below the age of 30, and among the 40 to 50 year olds, considerably more men than women used cannabis for medical reasons, while among the 30 to 40 year olds and the elder participants there was a more balanced sex distribution (Figure 1).

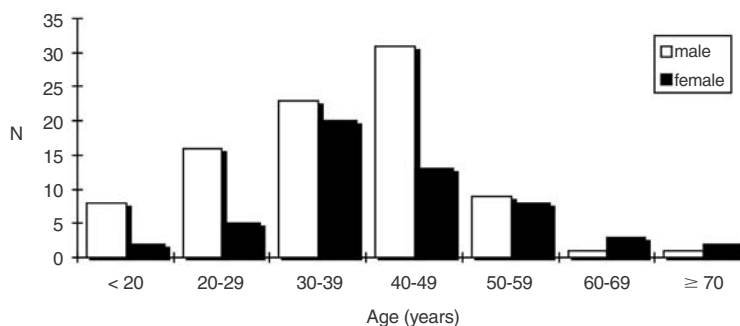
About half of the medical cannabis users (47.6%) had already had experience with the use of the drug before the onset of their disease.

One diagnosis was reported by 59.4%, two by 27.3% and three or more diagnoses by 13.3%. Among the primary diagnoses, we found a predominance of neurological symptoms or diseases (28.0%) and painful conditions (25.3%), followed by diseases with mainly gastrointestinal symptoms, such as nausea and appetite loss (14%). The most frequent

TABLE 1. Answers to the Question: Why Didn't You Use Cannabis Products Previously? (Multiple Answers Possible)

Given answers (N = 22)	N
I think that cannabis products do not help me.	1
I fear possible side effects.	1
I fear criminal procedures with use of natural cannabis products.	9
I think that my doctor will not prescribe dronabinol.	8
I have asked my doctor but he/she will not prescribe dronabinol to me.	5
My health insurance will not pay for the costs of dronabinol/Marinol.	4

FIGURE 1. Distribution of age according to gender (N = 143).



single diagnoses were multiple sclerosis (17.5%), Tourette syndrome (11.9%), HIV/AIDS (10.5%), migraine/headache (4.9%), chronic pain that was not more precisely described (4.2%), hepatitis C (3.5%), depression (2.8%), sleep disorders (2.8%), spinal cord injury (2.8%), back pain (2.8%), asthma (2.1%), allergy (2.1%), fibromyalgia (2.1%), menstrual pain (2.1%), and epilepsy (2.1%) (Table 2).

It is remarkable to note that many patients who used cannabis provided responses to a question that was only intended to be answered by participants who did not use the drug (Table 1). Some 21.7% said that they feared criminal involvement with use of natural cannabis products, 15.4% expressed their feeling that their doctor would not prescribe THC, and 9.1% answered that their doctor would not prescribe THC when they asked him. There was also some fear concerning discussion with doctors about self-medication with cannabis, expressed in their

TABLE 2. Primary or Main Diagnoses (N = 143)

Group	Diagnosis	N	%
Pain		36	25.2
	Arthritis	2	1.4
	Slipped disc	2	1.4
	Chronic pain	6	4.2
	Thalidomide consequences	1	0.7
	Fibromyalgia	3	2.1
	MCS (multiple chemical sensitivity)	1	0.7
	Menstrual pain	3	2.1
	Migraine/headache	7	4.9
	Werdnig-Hoffmann disease (spinal muscular atrophy)	1	0.7
	Neuralgia	1	0.7
	Neurofibromatosis	1	0.7
	Plexus damage	1	0.7
	Herpes zoster neuralgia	1	0.7
	Thalamic pain	1	0.7
Gastric volvulus	1	0.7	
Lumbosacral back pain	4	2.8	
Psychiatric		11	7.7
	Alcohol dependency	1	0.7
	Borderline syndrome	1	0.7
	Depression	4	2.8
	Drug dependency	1	0.7
Sleep disorders	4	2.8	
Neuropsychiatric		18	12.6
	Attention deficit disorder (ADD)	1	0.7
	Tourette syndrome	17	11.9
Neurological		40	28.0
	Borreliosis (Lyme disease)	2	1.4
	Epilepsy	3	2.1
	Friedreich's ataxia	1	0.7
	Multiple sclerosis	25	17.5
	Parkinson's disease	1	0.7
	Spinal cord injury	4	2.8
	Stroke	1	0.7
	Spasticity	1	0.7
	Spastic spinal paralysis	1	0.7
Syringomyelia	1	0.7	
Immunological		9	6.3
	Allergy	3	2.1
	Chronic bladder inflammation	1	0.7
	Crohn's disease	2	1.4
	Neurodermitis	1	0.7
Rheumatism	2	1.4	
Glaucoma		2	1.4
Gastrointestinal		20	14.0
	Hepatitis C	5	3.5
	HIV/AIDS	15	10.5

Group	Diagnosis	N	%
Asthma		3	2.1
Miscellaneous		4	2.8
	Alzheimer's disease	1	0.7
	Hypertension	1	0.7
	Cancer	1	0.7
	Menopausal discomfort	1	0.7

commentaries, e.g., “In my home town it is not possible to confide in the doctors.”

In 82.5% (N = 118), natural cannabis products were used in the month before the survey. Eight had used THC/Marinol and two had employed both natural cannabis and THC in the previous month. Three did not indicate what they had used, and 12 who had experience with the medical use of cannabis products said that they did not use them in the previous month.

The main reasons cited for the use of natural cannabis products were preference of natural products (71.3%), having objections to request the doctor to prescribe THC (19.5%), refusal of the doctor to prescribe THC (10.5%), and refusal of the health insurance to pay the costs of a treatment with THC. There were many additional answers offered to this question, among them: “Ignorance of the doctor.” “I grow my own.” “I did not ask my doctor until now.” “It is nonsense to manufacture synthetic THC,” etc.

Fourteen participants made utilizable statements as their THC doses, which were 14.9 ± 9.5 mg on average, with a range from 4 to 35 mg (Figure 2), and 109 participants made utilizable statements on the dose of natural cannabis products (marijuana, hashish), which was 1.3 ± 0.9 grams on average (range: 0.02-3.5 g) (Figure 3).

The various products were inhaled by 55.9% of the medical cannabis or THC users, while 16.8% took them orally and 23.1% used both routes.

About three-quarters (74.8%) of the 143 individuals said that their disease was much improved by cannabis products. Additionally, 13.3% noted a small improvement and 2.1% noted no improvement, while 7.0% were unsure whether it improved their condition, and 2.8% did not respond to this question. The percentage of respondents who noted much improvement varied between 60 and 100% depending on diagnosis group (Figure 4).

More than half (54.5%), were very satisfied with the effects of the cannabis products they used, 28.0% were satisfied, 14.0% were partly

FIGURE 2. Daily doses of dronabinol (THC) (N = 14).

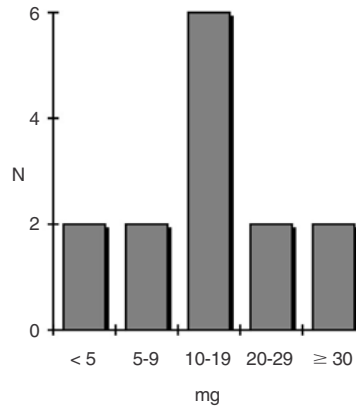
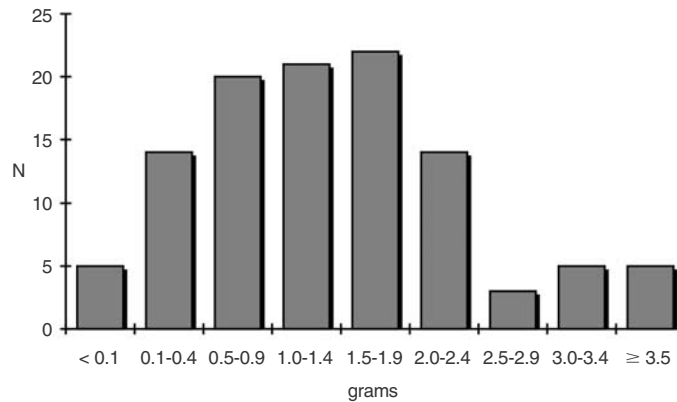


FIGURE 3. Daily doses of cannabis (N = 109).



satisfied, 2.1% were not satisfied, and 1.4% did not respond to this question (Figure 5).

More than two-thirds (69.2%) noted a significant improvement in their condition in comparison to other medical drugs, while 7.0% noted a small improvement and 2.8% no improvement, 17.5% said that they did not know or were not able to evaluate the amount of improvement, and 3.5% did not answer this question.

About three-quarters of participants (73.4%) answered “none” to the question on severity of side effects, while 22.4% reported that the side effects were “moderate” and 4.2% gave no answer (Figure 6).

FIGURE 4. Improvement of medical condition in dependency of disease group (N = 139). Number of respondents in diagnosis groups are given in parentheses. The bar representing “else” includes “little better,” “not better,” and “don’t know.” The 4 individuals with no answer were excluded from the graph.

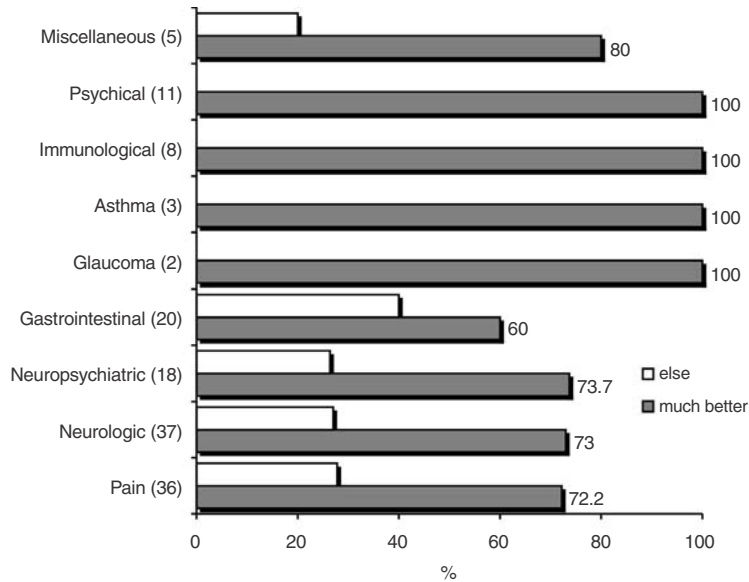
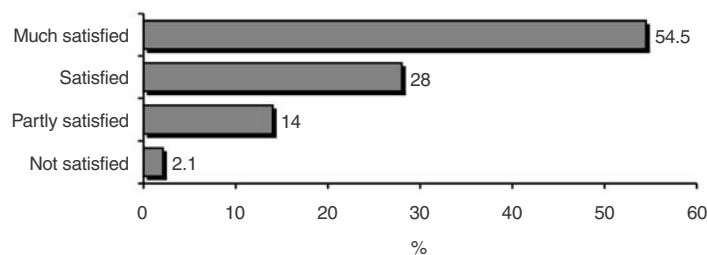


FIGURE 5. Satisfaction with cannabis products (N = 141).



Three-quarters (76.9%) reported no change in their dose during the previous three months, while 15.4% had reduced, and 3.5% had increased the dose. A few (4.2%) did not answer. The reason cited for dose increases was generally a reduced efficacy of the previous dose. One participant reported that he had stopped using opiates for pain therapy, and for this reason had increased the dose of cannabis. The main

reason for dose reduction (8.4%) was decrease in perceived disease severity. Among the written responses were: “Completely stopped, because of no positive effect.” “Variation of quality.” “Noted that a lower dose was equally effective.” “Financial reasons.” “Lack of money.” “Reduced since blood pressure decreased heavily.”

Three-quarters (75.5%) commented on results of discontinuation with regard to withdrawal symptoms. Of these 67.6% reported no withdrawal symptoms; in 17.6% these were mild, and in 2.8% they were more significant, while 12.0% reported that they could not evaluate the severity of withdrawal symptoms (Figure 7).

SUB-GROUP THAT REQUESTED THC

About one-third of the medical cannabis users (37.1%, N = 53) reported that they had asked their doctor to prescribe THC. In more than half of the cases the doctor was willing to do so, but in many instances the health insurer did not want to pay for the treatment. In 20.8%, THC was prescribed without difficulty. In an additional 28.3%, the doctor wished to prescribe THC, but the health insurance denied payment for

FIGURE 6. Severity of side effects (N = 137).

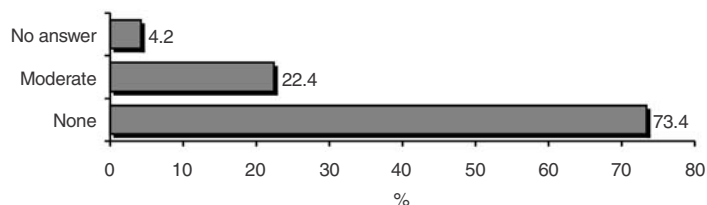
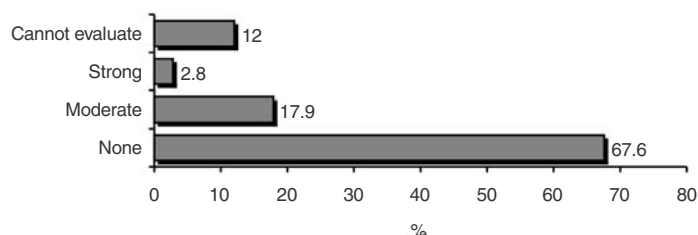


FIGURE 7. Severity of withdrawal (N = 108).



the treatment. In 3 cases (5.7%), the doctor was initially skeptical, but finally issued a prescription. In 37.7%, physicians refused and the patients did not receive a prescription. There was no answer in 4 cases (7.5%).

In some instances, the doctor's refusal to prescribe THC provoked further comments, ranging from the statement that the doctor was willing to issue a private prescription to a comment that the doctor got angry and wanted to escort the patient to the door. Among the responses were, "Doctor understood but did not react." "First doctor refused, second prescribed." "He refused and prescribed an opiate." "No experience with dronabinol." "Does not know the drug, thinks it is illegal."

Table 3 presents the reaction of the doctor according to the diagnosis. The range of diseases in which doctors were willing to prescribe THC was large. With multiple sclerosis, Tourette syndrome and a number of neurological syndromes, the willingness was high, in HIV/AIDS refusal and acceptance were equal.

More than half of the patients (31/53) who asked their doctor to prescribe THC made comments on the reaction of their health insurance. In 54.9%, the health insurance refused payment for a treatment. Table 4 presents the attitude of the health insurance according to the claimed condition.

Comparison of Natural Cannabis and THC

Sixteen participants reported experience with the medical use of THC as well as with natural cannabis products. Treatment tolerance was similar for both product groups, and there was a slight superiority in perceived efficacy for natural cannabis compared to THC/Marinol (Table 5). Side effects are compared in Table 6.

Sub-Group Without Prescription

A majority of participants (40/53) who solicited their doctor either failed to receive a prescription or a reimbursement of their treatment cost by health insurance. Six reported that they did not use cannabis products in the last month. Four had used THC (probably paid for on their own), 26 used natural cannabis products, and one had used both. Three did not respond to this question (Table 7).

TABLE 3. Willingness of the Doctor to Prescribe THC According to Diagnosis (N = 53)

Diagnosis	Willingness	Refusal	No answer	Total
Alzheimer's disease		1		1
Arthritis	1			1
Asthma		1	1	2
Attention deficit disorder (ADD)	1			1
Slipped disc	1			1
Borreliosis	1	1		2
Chronic pain		3		3
Depression	1		1	2
Epilepsy		1		1
Fibromyalgia	1			1
Friedreich's ataxia	1			1
Hepatitis C		1		1
HIV/AIDS	4	4	1	9
Menstrual pain		1		1
Migraine/headache	1			1
Multiple sclerosis	5	1	1	7
Neuralgia		1		1
Neurodermatitis		1		1
Plexus damage	1			1
Herpes zoster neuralgia		1		1
Spinal cord injury	1			1
Stroke	1			1
Spasticity	1			1
Spastic spinal paralysis	1			1
Syringomyelia	1			1
Thalamic pain	1			1
Tourette syndrome	5	2		7
Lumbosacral back pain		1		1
Total	29	20	4	53

Patient Advice to Lawmakers

All participants in the survey expressed advice to lawmakers with regard to cannabis legislation. Most (63.6%) marked two or more answers. General legalization of cannabis (74.1%) and legalization for medical use (e.g., by permission to cultivate the plant, 62.2%) received the greatest support (Table 8).

DISCUSSION

Fear of criminal sanctions with the use of illegal cannabis products, and the refusal of the doctor to prescribe THC, the pharmacologically

TABLE 4. Willingness of the Health Insurances to Pay for a Treatment with THC According to Diagnosis (N = 31)

Diagnosis	Agreed to pay	Refused to pay	Total
Asthma		1	1
Attention deficit disorder (ADD)		1	1
Slipped disc		1	1
Borreliosis	1		1
Fibromyalgia		1	1
Friedreich's ataxia		1	1
HIV/AIDS	2	2	4
Hepatitis C	1		1
Migraine/headache		1	1
Multiple sclerosis	3	2	5
Neuralgia		1	1
Plexus damage		1	1
Herpes zoster neuralgia		1	1
Spinal cord injury	1		1
Stroke		1	1
Spasticity	1		1
Spastic spinal paralysis		1	1
Syringomyelia	1		1
Thalamic pain	1		1
Tourette syndrome	3	1	4
Lumbosacral back pain		1	1
Total	14	17	31

TABLE 5. Answers to the Question: What Is Your General Impression of the Different Products with Regard to Effects on Your Disease?

Given answers (N = 16)	N	%
Cannabis and Marinol/dronabinol were about equally effective in my disease.	4	25.0
Cannabis was more effective than Marinol/dronabinol.	8	50.0
Marinol/dronabinol was more effective than cannabis.	3	18.8
No answer	1	6.3
Total	16	100.0

most active compound of cannabis, or the refusal of the health insurers to pay for a treatment with THC were the main reasons for not previously employing cannabis products in a small sub-group of the participants of this survey. The fear of criminal sanctions was also prevalent in the larger sub-group of patients who used cannabis medicinally. The illegal status of natural cannabis products seems to be a major problem in cases where legal products were not available to patients. Illegal use of

TABLE 6. Answers to the Question: What Is Your General Impression with Regard to a Comparison of Side Effects?

Given answers (N = 16)	N	%
Cannabis and Marinol/dronabinol had about equal side effects.	4	25.0
Cannabis had stronger side effects than Marinol/dronabinol.	5	31.3
Marinol/dronabinol had stronger side effects than cannabis.	4	25.0
No answer	3	18.8
Total	16	100.0

TABLE 7. Answers to the Question: Which Cannabis Products Did You Use Last Month?

Given answers (N = 40)	N	%
None	6	15.0
Natural cannabis products	26	65.0
Dronabinol	4	10.0
Cannabis + dronabinol	1	2.5
No answer	3	7.5
Total	40	100.0

TABLE 8. Answers to the Question: Which Advice Do You Have for Your Lawmaker with Regard to Regulation of the Access to Cannabis Products?

Given answers (N = 143)	N	%
I do not wish for change.	0	0.0
Natural cannabis products should be made available as medical drugs on a special prescription for narcotics.	25	17.5
Cannabis products should be made available on a normal prescription.	74	51.7
The medical use of cannabis products should be legalized (e.g., permission for cultivation for patients).	89	62.2
Cannabis should be legalized in general.	106	74.1

cannabis may result in criminal prosecution or fear thereof, a high price for an illegal drug, exposure to possible contamination, and other undesirable consequences (Grotenhermen 2002). Criminal sanctions must be regarded as one of the major side effects of medical cannabis use as long as it remains illegal.

The average age of 40 years in the medical cannabis users in this survey is high compared to recreational users in the general population.

The prevalence of recreational users in Germany is reported to be highest below the age of 30 (DHS 1998) or among young adults (EMCDDA 2001). This difference in age distribution between recreational and medical users can be explained by the different reasons and motivations for cannabis use. Chronic diseases for which cannabis products are used medicinally are more prevalent in older age groups.

The two main diagnosis groups among medical cannabis users were chronic pain and neurological disorders, and there was a wide range of medical conditions reflecting the multitude of drug effects that may be of therapeutic value, among them analgesia, muscle relaxation, anti-convulsant effects, appetite enhancement, anti-emesis, lowering of intra-ocular pressure, mood enhancement, sedation, anxiolytic properties, anti-inflammatory and anti-allergic effects, and bronchodilation. Often several diagnoses or symptoms were reported in which cannabis products were used.

Sometimes a combination of physical symptoms, e.g., pain and spasticity, were reported together with secondary psychiatric complaints, e.g., depression and sleeping disorders. These multifaceted effects on body and soul are well described in earlier surveys (TNO 1998, Barsch 1996, Consroe et al. 1997, Schnelle 1999) and clinical studies (Beal et al. 1995, Regelson et al. 1976). In a survey on the medical use of cannabis products among multiple sclerosis patients in the Netherlands, most patients reported that they used cannabis both for physical and psychic reasons (TNO 1998). In a survey among 106 AIDS patients in Germany 61.5% reported that they used the drug often or chronically “for general well-being,” compared to 41.1% “against physical complaints” (Barsch 1996). In a survey by Consroe et al. (1997) in 92 MS patients, cannabis not only reduced spasticity, pain and tremor, but also anxiety and depression. Regelson et al. (1976), in their article on a clinical study with cancer patients, noted that THC was not only appetite, but also mood enhancing, an effect that was also found in a clinical study with AIDS patients twenty years later (Beal et al. 1995). According to some case reports, cannabis is even used successfully in endogenous depression (Grinspoon and Bakalar 1998), and in 2,480 patients interviewed by Mikuriya, mood disorders represented a major group of primary reasons for cannabis use, among them post-traumatic stress disorder, depression, dysthymia, bipolar syndrome and schizophrenia (Gieringer 2002).

The sedation of cannabis products is generally regarded as a side effect. For example, in a Californian study conducted in the 1980s that compared the efficacy of oral THC with smoked marijuana in patients

undergoing chemotherapy, 52% of patients who had employed marijuana and 64% of patients who had used oral THC reported symptoms of sedation (Musty and Rossi 2001). In a recent review of controlled clinical studies which had investigated the anti-emetic efficacy of cannabinoids, the authors noted “some potentially beneficial side effects” that occurred more often with cannabinoids than with other anti-emetics, namely “high,” sedation or drowsiness and euphoria, and concluded: “In selected patients, the cannabinoids tested in these trials may be useful as mood enhancing adjuvants for controlling chemotherapy related sickness” (Tramèr et al. 2001, p. 16).

In its 1999 report the US Institute of Medicine also pointed to this combination therapy that may be gained by cannabinoid application and noted that “in cases where symptoms are multifaceted, the combination of THC effects might provide a form of adjunctive therapy; for example, AIDS wasting patients would likely benefit from a medication that simultaneously reduces anxiety, pain, and nausea while stimulating appetite” (Joy and Watson 1999).

Occasionally the subjective medical benefits of cannabis on physical symptoms are attributed to such psychological effects. In a trial of a cannabis user who suffered from hepatitis C, a professor for forensic toxicology was cited in a German newspaper as saying that although THC is used for some indications, among them glaucoma and AIDS, it was not an analgesic and that the user would only feel better and feel less pain due to the psychic effects (*Main Rheiner* of September 12, 2002).

In this survey physical complaints play the major role, and chronic pain accounts for about one quarter of the primary indications. With regard to the therapeutic physical effects of cannabis products, it appears that the quantitative distribution of indications in different surveys did not depend solely on the efficacy of the plant itself, since this distribution varied considerably, perhaps reflecting the knowledge of the therapeutic value of cannabis in certain patient groups (AIDS patients, MS patients). Thus, in the early 1990s Californian cannabis distribution centers (Cannabis Buyer’s Clubs) showed a preponderance of people with AIDS. A 1993-1995 survey of 351 randomly-selected members of the San Francisco Cannabis Buyers Club found that 87% had a medically verified illness, of whom fully 84.5% were HIV positive (Brown et al. 1996). Only approximately 2% were diagnosed with multiple sclerosis or severe musculoskeletal disorders. Similarly 71% of the 739 members of the Los Angeles Cannabis Resource Center were HIV positive (Joy and Watson 1999).

In contrast, only 1.5% of the participants in an Australian survey stated that HIV/AIDS was their main reason to self-medicate with cannabis (Helliwell 1999), and in the UK the discussion on the medical use of cannabis has centered primarily around multiple sclerosis and chronic pain (House of Lords 1998). One reason might be the activities of the Alliance for Cannabis Therapeutics, founded by MS patients in 1992, spread the word of the benefits of cannabis among MS patients in that country. In the Australian survey, 51% of women said that they used the drug for premenstrual complaints and dysmenorrhea (Helliwell 1999), while in our survey only three participants used cannabis products for this indication. About 12% in this group used cannabis products to treat symptoms of Tourette syndrome, which is a rare diagnosis in other surveys, reflecting clinical research in this indication at the Medical School of Hannover, Germany, knowledge that quickly spread to the German self-help groups.

Such regional differences may also affect expert opinions. While the authors of the Institute of Medicine see “a potential therapeutic value for cannabinoid drugs, particularly for symptoms such as pain relief, control of nausea and vomiting, and appetite stimulation” (Joy and Watson 1999), the report of the British House of Lords emphasized the use in multiple sclerosis (House of Lords 1998).

In recent years, there seems to be a world wide trend for a use of cannabis products in chronic pain and neurological disorders, which was also seen in changes in the membership profiles of Californian cannabis buyers clubs (Gieringer 2002). These indications are major foci of ongoing or planned clinical research with natural cannabis in the UK, Canada, and the US.

About 75% of the 143 individuals who used cannabis or THC medicinally in this survey said that their disease was much improved by cannabis products, and very few failed to note improvement. Satisfaction was high, with about 55% being very satisfied, and an additional 28% being somewhat satisfied. Side effects were usually regarded as infrequent, and withdrawal was generally not regarded as a major problem. However, it can be assumed that this is a highly selected group of medical cannabis users. Unsatisfied patients that found cannabis useless or experienced intolerable side effects and therefore stopped using it, are likely underrepresented. Therefore, this survey does not allow any conclusions on the percentage of patients who might benefit in unselected cohorts suffering from similar symptoms and diseases for which benefits were reported in this survey. It can be concluded, however, that cannabis products are very effective in at least some patients in a great

number of different conditions, in agreement with prior surveys, case reports and clinical studies in a wide range of indications.

Until recently, there have been very few representative surveys on the medical use of cannabis products, the largest being the survey of the Dutch institute TNO Preventie en Gezondheid among members of the Dutch Multiple Sclerosis Society (TNO 1998). About one-third of all members participated, of whom 13% reported use of cannabis at least once in their life, with 5% continuing its use. Since many ceased its employment, it could be assumed that a large percentage did not experience significant improvement of their condition, but there may have been additional reasons for stopping, e.g., the pressure of peers not to use a recreational drug. In the TNO survey, MS patients did not use cannabis more often than the general Dutch population. However, women above the age of 40 years were over-represented. In a more recent survey among 300 British MS patients presented at the 10th World Congress on Pain in 2002, the use rate was much higher. According to this investigation, about 45% of multiple sclerosis patients living in England used the drug, of whom 74% either eliminated or controlled spasticity, and 54% indicated that they used cannabis mainly for pain relief (*United Press International* of 18 August 2002). Patients who reported more severe symptoms were more likely to use cannabis than patients who had mild or moderate symptoms. The increasing number of patients using the drug may be due to a greater acceptance of medical cannabis among patients and the general population in several European countries.

Similar to the attitudes in the general population, doctors are divided on the issue. Skepticism applies not only to natural cannabis products (which remain illegal in Germany), but also to THC. There is ongoing scientific debate as to whether cannabis has medical value, or whether the benefits outweigh the side effects, e.g., in the *British Medical Journal* (Tramer et al. 2001, Campbell et al. 2001, Kalso 2001, Petro 2001, Iversen 2001, Grotenhermen 2001, Russo 2001), and in the *Journal of the German Medical Association* (Nedelmann 2000, Rommelspacher 2000, Flenker and Möller 2001). This controversy may influence the willingness of doctors to prescribe THC and their open mindedness to talk with their patients if they self-medicate with illegal cannabis preparations.

Results of this survey also show that German health insurers come to very different conclusions on the efficacy of a treatment with THC in many indications, resulting in contrasting attitudes towards reimburse-

ment. It seems that such decisions do not merely depend on the symptom or disease, i.e., medical considerations on the efficacy in a certain indication, but more on general attitudes about cannabis products, their medical usefulness and side effects.

In an Australian survey, 56% of patients said that they had talked to their doctor about their cannabis use while others hide this fact (Helliwell 1999). This may reflect fear that the doctor could condemn cannabis usage, resulting in a compromise of patient-doctor-relationship. In our first patient survey published in 1999 that included some questions to be answered by doctors only, only 11 doctors of the 128 participants (8.6%) responded (Schnelle 1999). We surmised that many patients did not dare to ask their doctor to participate in the survey, while others might have asked and were refused.

There is an ongoing debate as to the relative therapeutic value and side effects of whole plant preparations and isolated THC (dronabinol) (Grotenhermen 2002b), that is to say whether other compounds of the cannabis plant (other cannabinoids, terpenes, flavonoids, etc.) add to the primarily effects of THC (McPartland 2002, McPartland and Russo 2001). Only 16 participants in this survey had experience with both THC and natural cannabis (marijuana, hashish). This small number does not allow strong conclusions, as the results did not clearly favor one of the two alternatives. Side effects were regarded as similar for THC and natural cannabis, while efficacy was reported to be slightly superior for the whole plant. It is remarkable to note that both superiority of THC and superiority of cannabis were claimed by certain patients. Future research will help to give more definite answers to this question.

In conclusion, this survey adds to an increasing number of patient reports of successful and well-tolerated medical uses of cannabis products in a multitude of conditions, and provides some detailed information on dosing of THC and cannabis, methods of administration, or reasons for abstaining from such use. Since this is a selected group of patients with satisfied persons probably over-represented, no conclusions can be drawn with regard to experienced therapeutic and side effects in an unselected population. Furthermore, the results reflects the division of German doctors and health insurers on the issue, a division that does not seem to be based on medical considerations of efficacy for a certain indication, but more generally on attitudes towards cannabis products and their role in modern medicine.

REFERENCES

- Barsch, G. 1996. Zur therapeutischen Anwendung von Cannabis: Ergebnisse einer Pilotstudie unter HIV-positiven und Aids-kranken Männern und Frauen [On the medical use of cannabis: Results of a pilot study among HIV positives and men and women with AIDS]. In *Cannabis als Medizin. Beiträge auf einer Fachtagung zu einem drängenden Thema* [Cannabis as Medicine. Contributions on a Conference to an Urgent Issue], edited by Deutsche Aids Hilfe. Berlin: Aids-Forum D.A.H.
- Beal, J.E., R. Olson, L. Laubenstein, J.O. Morales, P. Bellman, B. Yangco, L. Lefkowitz, T.F. Plasse, and K.V. Shepard. 1995. Dronabinol as a treatment for anorexia associated with weight loss in patients with AIDS. *J Pain Symptom Manage* 10(2):89-97.
- Brown, J., J. Beck, J. Mandel, H. Feldman, M. Apostolides, T. Mikuriya, and V. Hernandez. Unpublished letter, 1996. (Cited in: Gieringer D. 2002. Medical use of cannabis: experience in California. In *Cannabis and cannabinoids. Pharmacology, toxicology, and therapeutic potential*, edited by F. Grotenhermen and E. Russo. Binghamton, NY: The Haworth Press, Inc.)
- Campbell, F.A., M.R. Tramer, D. Carroll, D.J. Reynolds, R.A. Moore, and H.J. McQuay. 2001. Are cannabinoids an effective and safe treatment option in the management of pain? A qualitative systematic review. *Brit Med J* 323(7303):13-16.
- Chatterjee, A., A. Almahrezi, M. Ware, and M.-A. Fitzcharles. 2002. A dramatic response to inhaled cannabis in a woman with central thalamic pain and dystonia. *J Pain Symptom Manage* 24(1):4.
- Consroe, P., R.E. Musty, J. Rein, W. Tillery, and R. Pertwee. 1997. The perceived effects of smoked cannabis on patients with multiple sclerosis. *Europ Neurol* 38(1): 44-48.
- Consroe, P., W. Tillery, J. Rein, and R.E. Musty. 1998. Reported marijuana effects in patients with spinal cord injury. In *1998 Symposium on the Cannabinoids*. Burlington: International Cannabinoid Research Society.
- DHS. 1998. (Deutsche Hauptstelle gegen die Suchtgefahren e.V. [German Federal Office against Dangers of Addiction]). *Repräsentativerhebung zum Gebrauch psychoaktiver Substanzen bei Erwachsenen in Deutschland* [Representative survey on the use of psychoactive substances in German adults]. Sucht 44 (Supplement 1).
- EMCDDA (European Monitoring Centre for Drugs and Drug Addiction). 2001. *Annual report on the state of the drugs problem in the European Union*. Available from URL: <http://www.emcdda.org/publications>.
- Flenker, I., and H. Möller. 2001. Drogen: Cannabis als Arzneimittel [Drugs: Cannabis as a remedy]. *Deutsches Ärzteblatt* 98(17):A-1104-1106.
- Gieringer, D. 2002. Medical use of cannabis: Experience in California. In *Cannabis and cannabinoids. Pharmacology, toxicology, and therapeutic potential*, edited by F. Grotenhermen and E. Russo. Binghamton, NY: The Haworth Press, Inc.
- Grinspoon, L., and J.B. Bakalar. 1998. The use of cannabis as a mood stabilizer in bipolar disorder: anecdotal evidence and the need for clinical research. *J Psychoactive Drugs* 30(2):171-177.

- Grotenhermen, F. 2001. Cannabinoids in pain management. Cannabinoid receptor agonists will soon find their place in modern medicine. *Brit Med J* 323(7323): 1250-1251.
- Grotenhermen, F. 2002. Review of unwanted actions of cannabis and THC. In *Cannabis and cannabinoids. Pharmacology, toxicology, and therapeutic potential*, edited by F. Grotenhermen and E. Russo. Binghamton, NY: The Haworth Press, Inc.
- Grotenhermen, F. 2002b. Practical hints. In *Cannabis and cannabinoids. Pharmacology, toxicology, and therapeutic potential*, edited by F. Grotenhermen and E. Russo. Binghamton, NY: The Haworth Press, Inc.
- Helliwell, D. 1999. GPs are key informants in medicinal cannabis survey. *GP Speak, Newsletter of the Northern Rivers Division of General Practice*, April: 4.
- Holdcroft, A., M. Smith, A. Jacklin, H. Hodgson, B. Smith, M. Newton, and F. Evans. 1997. Pain relief with oral cannabinoids in familial Mediterranean fever. *Anaesthesia* 52(5): 483-486.
- House of Lords Select Committee on Science and Technology. 1998. *Cannabis. the scientific and medical evidence*. London: The Stationery Office.
- Iversen, L. 2001. Cannabinoids in pain management. Few well controlled trials of cannabis exist for systemic review. *Brit Med J* 323(7323):1250.
- Joy, J.E., S.J. Watson, and J.A. Benson, eds. 1999. *Marijuana and medicine: Assessing the science base*. Washington, DC: Institute of Medicine, National Academy Press.
- Kalso, E. 2001. Cannabinoids for pain and nausea. *Brit Med J* 323(7303):2-3.
- Martyn, C.N., L.S. Illis, and J. Thom. 1995. Nabilone in the treatment of multiple sclerosis. *Lancet* 345(8949):579.
- Maurer, M., V. Henn, A. Dittrich, and A. Hofmann. 1990. Delta-9-tetrahydrocannabinol shows antispastic and analgesic effects in a single case double-blind trial. *Eur Arch Psychiatry Neurol Sci* 240(1):1-4.
- McPartland, J., and Russo, E. 2001. Cannabis and cannabis extracts: Greater than the sum of their parts? *J Cannabis Ther* 1(3/4):103-132.
- McPartland, J.M., and V. Mediavilla. 2002. Non-cannabinoid components. In *Cannabis and cannabinoids. Pharmacology, toxicology, and therapeutic potential*, edited by F. Grotenhermen and E. Russo. Binghamton, NY: The Haworth Press, Inc.
- Meinck, H.M., P.W. Schonle, and B. Conrad. 1989. Effect of cannabinoids on spasticity and ataxia in multiple sclerosis. *J Neurol* 236(2):120-122.
- Müller-Vahl, K.R., H. Kolbe, and R. Dengler. 1997. Gilles de la Tourette-Syndrom. Einfluß von Nikotin, Alkohol und Marihuana auf die klinische Symptomatik. *Nervenarzt* 68:985-989.
- Müller-Vahl, K.R., U. Schneider, H. Prevedel, K. Theloe, H. Kolbe, T. Daldrup, and H.M. Emrich. 2002. Tetrahydrocannabinol (THC) is effective in the treatment of tics in Tourette-Syndrome: a 6-week randomized trial. *J Clin Psychiatr* (in press).
- Müller-Vahl, K.R., U. Schneider, H. Kolbe, and H.M. Emrich. 1999. Treatment of Tourette-syndrome with delta-9-tetrahydrocannabinol. *Am J Psychiatry* 156:495.
- Musty, R.E., and R. Rossi. 2001. Effects of smoked cannabis and oral Δ 9-tetrahydrocannabinol on nausea and emesis after cancer chemotherapy: a review of state clinical trials. *J Cannabis Ther* 1(1):29-42.
- N. N. Monographs. 2001. Dronabinol capsules 2.5/5 or 10 mg (NRF 22.7.); oily dronabinol drops 2.5% (NRF 22.8). In *Neues Rezepturformularium (NRF), Lose-*

- Leaf Collection of 2001*, edited by Bundesvereinigung Deutscher Apothekerverbände. Eschborn, Germany: Govi-Verlag Pharmazeutischer Verlag/Stuttgart, Germany: Deutscher Apotheker-Verlag.
- Nedelmann, C. 2000. Das Verbot von Cannabis ist ein "kollektiver Irrweg" [The prohibition of cannabis is a "collective wrong way"]. *Deutsches Ärzteblatt* 97(43): A-2833-A2837.
- Petro, D.J. 1980. Marihuana as a therapeutic agent for muscle spasm or spasticity. *Psychosomatics* 21(1):81, 85.
- Petro, D.J. 2001. Cannabinoids in pain management. Spasticity is not the same as pain. *Brit Med J* 323(7323):1250.
- Regelson, W., J.R. Butler, J. Schulz, T. Kirk, L. Peek, M.L. Green, and M.O. Zalis. 1976. Delta-9-tetrahydrocannabinol as an effective antidepressant and appetite-stimulating agent in advanced cancer patients. In *Pharmacology of marihuana*, edited by M.C. Braude and S. Szara. Vol 2, New York: Raven Press.
- Rommelspacher, H. 2000. Cannabis: Als Arzneimittel nur von geringem therapeutischen Nutzen [Cannabis: as a medical drug only of low value]. *Deutsches Ärzteblatt* 97(51-52):A-3473-3475.
- Russo, E. 2001. Cannabinoids in pain management. Study was bound to conclude that cannabinoids had limited efficacy. *Brit Med J* 323(7323):1249-1250.
- Schnelle, M., F. Grotenhermen, M. Reif, and R.W. Gorter. 1999. Ergebnisse einer standardisierten Umfrage zur medizinischen Verwendung von Cannabisprodukten im deutschen Sprachraum, [Results of a standardized survey on the medical use of cannabis products in the German-speaking area]. *Forschende Komplementärmedizin* [Research in Complementary Medicine] (Suppl 3): 28-36.
- Schon, F., P.E. Hart, T.L. Hodgson, A.L. Pambakian, M. Ruprah, E.M. Williamson et al. 1999. Suppression of pendular nystagmus by smoking cannabis in a patient with multiple sclerosis. *Neurol* 53(9):2209-2210.
- TNO Preventie en Gezondheid. 1998. *Aard en omvang van Cannabis gebruik bij mensen met Multiple Sclerose*. ISBN 9067435171.
- Tramer, M.R., D. Carroll, F.A. Campbell, D.J. Reynolds, R.A. Moore, and H.J. McQuay. 2001. Cannabinoids for control of chemotherapy induced nausea and vomiting: quantitative systematic review. *Brit Med J* 323(7303):16-21.
- Ware, M.A., A. Gamsa, J. Persson, and M.A. Fitzcharles. 2002. Cannabis for chronic pain: case series and implications for clinicians. *Pain Res Manag* 7(2):95-99.

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