

Article Title: What are the Experiences of Patients Using Cannabis for pain? A Systematic Review of Qualitative Studies

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Abstract

Introduction: Cannabis is used by over 250 million individuals worldwide for a wide range of medical and recreational purposes. The most common health condition for which medicinal cannabis is used by patients is pain. To date, no review has summarized qualitative data from studies seeking to understand patients' subjective experiences with cannabis for pain management, thus making this the objective of this systematic review.

Methods: MEDLINE, EMBASE, AMED and CINAHL were systematically searched from database inception to May 15, 2020. English-language studies were eligible if they reported qualitative data surrounding patients' experiences with using cannabis for pain. Relevant data were extracted and a thematic analysis was conducted.

Results: Of 1741 titles and abstracts screened, 8 studies were included in this review. Four major themes emerged from our thematic analysis, as follows: (1) problems with cannabis use; (2) benefits of cannabis use; (3) patients' experimentation with and knowledge of cannabis; and 4) physicians' lack of experience with cannabis for pain therapy.

Conclusions: Patients using cannabis for pain reported experiencing several side effects, however, there were also numerous perceptions of benefits such as pain reduction. It is important that patients feel comfortable inquiring about medicinal cannabis should they choose to pursue it as a therapeutic option; healthcare providers should, therefore, be aware of the stigma that exists surrounding its use. Future qualitative research should aim to understand patients' experiences with using different strains, dosages, and methods of cannabis administration, as well as their attitudes and concerns associated with cannabis legalization.

Keywords: Cannabis; Marijuana; Pain; Patient experiences; Qualitative research; Systematic review

Abbreviations

CASP: Critical Appraisal Skills Programme

CBD: Cannabidiol

ENTREQ: Enhancing Transparency in Reporting the Synthesis of Qualitative Research

SPIDER: Sample, Phenomenon of Interest, Design, Evaluation, and Research type

THC: Tetrahydrocannabinol

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1. Introduction

The International Association for the Study of Pain defines pain as “an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage” [1]. Research has found that poorly managed pain is associated with functional impairment, including reduced mobility, sleep disturbance, decreased socialization, and slow rehabilitation [2]. Pain may be categorized as acute or chronic; the former is due to a specific cause (i.e. such as pain caused by surgery or dental work), is associated with sympathetic nervous system activation, and is self-limited [3]. Chronic pain, however, is characterized by pain that outlasts the normal time of healing, if associated with disease or injury [3]. Although chronic pain is often linked to conditions such as arthritis, cancer, and fibromyalgia, it can also be present when there is no apparent injury and has no recognizable endpoint [3]. In response to the increasing number of patients experiencing chronic and acute pain, attention to cannabis for the management of pain has increased tremendously [4,5]. A meta-analysis identified that 64% of patients who used medicinal cannabis stated that pain was the reason for their use [6]. As medicinal cannabis is garnering more interest from patients to provide therapeutic relief for pain conditions, it is of growing importance to better understand their experiences and perspectives.

A recent cross-sectional study found that many patients perceive cannabis to be beneficial, specifically noting improvements in sleep, focus, and relaxation [7]. Additionally, patients have reported that cannabis has allowed them to decrease or stop using pharmaceutical medications such as opioids for pain management, resulting in fewer drug-related side effects [8,9]. However, patients have also reported unpleasant experiences with cannabis use, including the high retail cost, discomforting smell, and increased respiratory problems and anxiety, along with the stigma surrounding its use [8,9]. Furthermore, patients have reported

experiencing adverse side effects from other medications which contraindicate with cannabis, sometimes due to their healthcare providers being unaware of their use [10,11].

The literature on cannabis use for pain has primarily revolved around statistical data using patients' pain scores [12,13], however, there is value in gaining insights into the complexities of patients' experiences and perspectives which are captured through qualitative analyses. A preliminary search indicated that a handful of qualitative studies on this topic existed, therefore, the objective of this systematic review was to assess patients' experiences with using cannabis for the management of chronic and acute pain. Knowledge on this topic may be beneficial for clinicians who wish to authorize cannabis for pain management and may help guide further research on this topic.

2. Methods

2.1. Approach

A systematic review of qualitative studies was conducted to examine patients' experiences with cannabis use for pain management using Enhancing Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) guidelines [14]. A systematic review of qualitative studies systematically searches for research on a topic and synthesizes the findings from individual studies together. By capturing the experiences, perspectives, and attitudes of participants across multiple studies, systematic reviews of qualitative studies can often help elucidate 'why', and lead to the development of theories that enable us to better understand complex issues surrounding participants' experiences and behaviors [15]. A protocol was not registered.

2.2. Eligibility criteria

The Sample, Phenomenon of Interest, Design, Evaluation, and Research type (SPIDER) framework for qualitative evidence synthesis was used to inform the development of our eligibility criteria [16]. The SPIDER framework is based on the same principles as the Population, Intervention, Comparison, Outcome (PICO) framework, however, the former defines key elements of non-quantitative research questions to offer a systematic strategy to search for qualitative and mixed-methods studies [16]. The present review's research question was as follows: “What are the experiences of patients using cannabis for pain management?” Eligible samples included patients aged 18 years or older who have used cannabis for pain management. The phenomenon of interest was patients’ reported experiences of using cannabis for pain management. The design was diverse, consisting of studies involving focus groups, interviews, and observations. With respect to evaluation, a thematic analysis was conducted to identify commonalities in patients’ experiences of using cannabis for pain. Finally, the research types included were any studies that reported qualitative data, inclusive of mixed method studies. While reviews (i.e. systematic or scoping) were not eligible, the reference lists of those pertinent to the topic area were reviewed to identify potential eligible primary studies. For the purpose of this review, we adopted the aforementioned definition of pain provided by the International Association for the Study of Pain [1], and no restrictions were imposed on the types of pain included. Only English-language publications were included. All studies not meeting the aforementioned eligibility criteria were excluded.

2.3. Searching and screening

JYN developed the search strategy and conducted searches on MEDLINE, EMBASE, AMED and CINAHL on May 16, 2020 from inception up to May 15, 2020. The keywords and indexed headings used relate to cannabis, pain, and qualitative research methods (Table 1).

All titles and abstracts were screened independently and in duplicate by AA and AP and then compared. AA, AP, and JYN met to resolve any discrepancies through discussion. An identical process was followed for full-text screening of eligible articles.

2.4. Data extraction and quality assessment

A data extraction form was created a priori to collect information from all eligible studies.

AA, AP, and JYN participated in a pilot data extraction exercise to standardize this process.

The following items were extracted and summarized: title; authors; abstracts; year published; country of first author; the study's definition of pain; type of pain; comorbid conditions; method of cannabis administration; whether the study included patient use of medicinal or recreational cannabis; study methodologies; theoretical underpinning; patient sample size; type of patients considered for the study; outcomes; themes; main findings; study limitations; and conclusions. As it is known that patients may have varying experiences depending on the cannabidiol (CBD):tetrahydrocannabinol (THC) ratio of their product, data on whether this was controlled for by eligible studies was also extracted [17,18].

The Critical Appraisal Skills Program (CASP) checklist for qualitative research was used to appraise the identified eligible studies for validity and robustness, along with assessing the reporting transparency, content, and utility of the findings [19]. A total of 10 items are included in the checklist, and nine out of 10 are scored with a “yes”, “no”, or “can't tell”; the highest quality studies would score 9 “yes”s. The last of the 10 items pertained to the utility of study, and was scored with a “very much”, “very little”, or “satisfactory”. The appraisal process was conducted independently and in duplicate by UT and JYN, and any discrepancies were resolved through discussion among all authors.

2.5. Thematic analysis

A thematic analysis of patients' experiences in using cannabis for pain management was conducted based on all of the extracted data shown in Table 3. A thematic analysis aims to identify patterns and integrate findings from multiple primary qualitative studies and has proven to be effective in synthesizing a range of experiences [20], [21], [22]. After summarizing the available qualitative data in tables, UT and JJ interpreted the findings from the studies to identify common key concepts. UT, JJ, and JYN then used an inductive, data-driven approach to create codes by using phrases that captured key concepts, rather than trying to fit the data into a pre-existing coding frame or researchers' theoretical interest as done in a deductive thematic analysis [20]. The codes were then thematically organized into groups, and were finally used to present a discussion based on the aforementioned research question. All authors then met to resolve any discrepancies via discussion.

3. Results

3.1. Search results

Searches identified a total of 1741 results; a total of 1303 titles/abstracts were unique, and 1249 were eliminated, leaving 54 full-text articles for further consideration. Forty-six articles were deemed ineligible for the following reasons: study did not focus on pain and cannabis (n = 30), did not report qualitative data (n = 13), and was a conference abstract (n = 3). Thus, 8 studies were deemed eligible and included in this review [4,8,11,[23], [24], [25], [26], [27]].

A PRISMA diagram is shown in Fig. 1.

3.2. Characteristics of included studies

Eligible studies were published between 2017 and 2020 and originated from the United States (n = 5), Israel (n = 1), New Zealand (n = 1), and the United Kingdom (n = 1). Included

studies utilized the following research methods: interview (n = 6), survey (n = 2), and focus group (n = 1). Eligible studies examined the impact of cannabis on chronic pain (n = 7) or acute pain (n = 1). Theoretical underpinnings described by eligible studies included grounded theory perspective (n = 1), modified grounded theory approach (n = 1), framework methodology (n = 1), and interpretative phenomenological analysis (n = 1), while the remaining 4 studies did not identify a theoretical underpinning. The cannabis types used by participants in the studies were: medicinal cannabis (n = 4), or both medicinal and recreational cannabis (n = 4). The types of diseases/conditions associated with pain examined by eligible studies included: cancer pain (n = 5), arthritis/rheumatoid arthritis (n = 4), spinal cord injury/disease (n = 4), chronic regional pain syndrome (n = 3), Crohn's disease (n = 3), fibromyalgia (n = 3), chronic pain from injury or trauma (n = 2), epilepsy (n = 2), hepatitis C (n = 2), human immunodeficiency virus (n = 2), migraines/chronic headaches (n = 2), multiple sclerosis (n = 2), neuropathic pain (n = 2), Parkinson's disease (n = 2), post-traumatic stress disorder (n = 2), abdominal pain (n = 1), back pain (n = 1), diabetes (n = 1), irritable bowel syndrome (n = 1), menstrual pain (n = 1), muscle spasms (n = 1), postoperative acute pain (n = 1), post-surgical chronic pain (n = 1), preoperative acute pain (n = 1), scleroderma (n = 1). Methods of administration of cannabis included: smoking (n = 7), edibles (n = 6), topical oil/dabs (n = 4), vaporizer (n = 3), tinctures (n = 2), bong (n = 1), CBD oil (n = 1), concentrates (n = 1), drinking teas (n = 1), drops (n = 1), joint (n = 1), lotions (n = 1), and tablet sublingual application (n = 1). CBD/THC ratios were not discussed nor identified across any eligible studies (n = 8). Across the eligible articles, sample sizes ranged from 1 to 29 participants (n = 2), 30–59 participants (n = 3), and greater or equal to 60 participants (n = 3). The details associated with all eligible article characteristics can be found in Table 2, and the outcomes and findings from eligible studies are summarized in Table 3.

3.3. Results from quality assessment

The CASP quality assessment tool was used to appraise studies containing qualitative data. All eight studies were included in the review, regardless of their quality rating [4,8,11,[23], [24], [25], [26], [27]]. Two studies scored 8/9 possible 'yes' responses [8,11]; three studies scored 7/9 possible 'yes' responses [4,23,27]; and three studies scored 6/9 possible 'yes' responses [24], [25], [26]. With respect to the last, open-ended question, the studies were very much valuable (n = 5) and satisfactory (n = 3) [4,8,11,[23], [24], [25], [26], [27]]. A common potential source of bias included studies in which the researchers did not critically examine their own role, potential bias, and influence on the design and execution of the study (n = 5) [8,11,[23], [24], [25]]. The quality of the studies was also impacted by the lack of acknowledgment of ethical standards (n = 3) [4,26,27] and the utility of the research (n = 3) [24], [25], [26]. The quality appraisals of included studies are provided in Table 4.

3.4. Findings from thematic analysis

Four main themes emerged from our analysis: 1) problems with cannabis usage; 2) benefits of cannabis usage; 3) patients' experimentation with and knowledge of cannabis; and 4) physicians' lack of experience with cannabis for pain therapy. Sub-themes were identified for most themes and are described below.

3.4.1. Theme 1: problems with cannabis usage

Subtheme 1.1 side effects

Patients across four studies reported that cannabis use resulted in unwanted side effects [4,8,24,25]. Some patients who smoked cannabis experienced negative effects on their respiratory and olfactory systems [4], while others experienced other physical effects such as weight gain and seizures [25]. Other symptoms such as a racing heart, nausea, dry mouth, and

burning red eyes were also reported [25]. In addition to physiological side effects, patients also experienced psychological effects such as sleepiness, poor memory, paranoia, and increased anxiety [24]. In one study, participants also reported disorientation, headaches, and an unpleasant smell or taste resulting from their cannabis use [8].

Subtheme 1.2 legal issues

Several patients highlighted concerns regarding the legality of cannabis across various jurisdictions [11,23,25,26]. Although some patients reported that the legalization of cannabis enabled them to access higher quality cannabis products [25], others reported needing assistance in navigating the legalization and policy changes, making it more challenging for them to access cannabis [26]. Moreover, due to the limited legal cannabis available in certain jurisdictions, the majority of participants relied on the illegal market, and reported that using illegal products increased their stress [11].

Subtheme 1.3 cost

Several patients expressed that it was financially burdensome to purchase cannabis [4,23,25]. Participants reported that cannabis was very expensive, costing them up to an average of \$2000 USD per year [4]. Additionally, patients noted that cannabis was not covered by their health insurance and thus may not be a feasible treatment option for individuals of low socioeconomic status [4]. Several patients expressed that they were reluctant to choose cannabis as a treatment due to its high cost, despite its utility for pain relief [25]. Furthermore, patients discussed how changes in cannabis legalization raised concerns about increased cost and inability to finance cannabis [23].

Subtheme 1.4 safety and potential addiction discussions

Patients had contrasting perspectives regarding the safety and addictiveness of cannabis [4,23,26]. Some participants disclosed that they believed cannabis to be a safer alternative for pain management in comparison to opioids, due to the lower risk of overdosing or developing an addiction [4]. In contrast, Erridge et al.'s study participants reported that the lack of government regulation for cannabis was concerning and thus, may not provide a safer alternative to other treatments [24]. Furthermore, some patients with substance use disorders expressed concerns about cannabis addiction and dependency, stating that its use could be a potential threat to their sobriety [26].

Subtheme 1.5 stigmatization of cannabis

Patients reported that their family and healthcare providers had negative perceptions of them when their use of cannabis was disclosed or discovered [4,27]. Some patients feared that their use of cannabis may be stigmatized by others in their religious community [23]. Judgement from others was a common reason why participants did not use cannabis, despite knowing that it may have the potential to relieve their pain [25,26]. Furthermore, some patients only sought out healthcare providers who they knew were open to discussing cannabis as a treatment for pain [23].

3.4.2. Theme 2: benefits of cannabis usage

Subtheme 2.1 cannabis characteristics & benefits

Patients reported that cannabis enhanced their quality of life, provided general pain relief, and helped manage pain caused by an existing disease/condition such as cancer, scleroderma, headaches, muscle spasms, and Crohn's disease [4,11,25]. Patients also noted that orally administered cannabis provided a longer and more stable pain relief, however, there was a

delay in receiving the relief compared to smoking [4]. According to some participants' reports, cannabis helped to improve sleep quality and manage insomnia, and consequently reduce fatigue, drowsiness, and restlessness [4,8,11,25]. In addition, patients reported that cannabis helped reduce nausea, increase appetite, increase focus, and reduce irritability [25,26]. Furthermore, participants also expressed that cannabis helped to reduce stress, depression, and anxiety [25,26].

Subtheme 2.2 cannabis as a good alternative to other medications

Patients reported that they had to frequently decide between cannabis and opioid use for pain management [26]. While some patients found cannabis to be more effective than opioids or other pharmaceuticals, other patients found the opposite to be true [26,27]. For patients who found opioids to be more effective, cannabis was able to provide momentary pain relief when opioids were unavailable [26]. Conversely, patients who favoured the use of cannabis stated that it acted quicker, lasted longer, managed symptoms well, and resulted in minimal harm and fewer side effects compared to opioids [27].

Patients reported that using cannabis decreased their reliance on other pain treatment medications such as opioids, specifically emphasizing how using cannabis in combination with opioids helped to mitigate medication side effects while decreasing the needed dosage of opioids to provide pain relief [4,26,27]. For participants who replaced opioids with cannabis, long term positive changes reported included reduced pain, improved sleep, less toxicity, reduced anxiety, fewer adverse reactions, improved appetite, and overall improved quality of life and management of symptoms [8,26].

3.4.3. Theme 3: patients' experimentation with and knowledge of cannabis

Subtheme 3.1 prior cannabis knowledge

Patients across three studies perceived that their knowledge about cannabis' medicinal properties was adequate [11,23,24]. Patients from the United Kingdom indicated that most of their prior cannabis knowledge could be attributed to media coverage on legal changes across the country [24]. Additionally, patients reported conducting their own research online to understand which strains of cannabis and dosages would provide the best treatment for their specific condition [11,23]. Furthermore, some patients from the United States sought advice from family or friends about using cannabis for pain and to determine where to purchase their supply [23].

Subtheme 3.2 experimentation

The majority of patients were unaware of which strain or dosage would be appropriate to manage their pain and thus, relied on trial and error [11,23,26]. Patients also reported experimenting with cannabis because they felt overwhelmed by the large number of dispensary and supplier options [23].

3.4.4. Theme 4: physicians' lack of experience with cannabis

Many patients felt that physicians may lack knowledge and experience about cannabis as a treatment option for pain, which resulted in their hesitancy to authorize it [11,23,24,26,27]. Several patients did not disclose their cannabis use to their physician due to the perception that their healthcare provider lacked sufficient knowledge about it [26]. Additionally, it was found during patient-physician consultations that cannabis was discussed less frequently than other medications [24]. Patients expressed that it was extremely difficult to find a healthcare provider who had sufficient knowledge about cannabis and listened to their concerns [23].

Additionally, some patients indicated that the lack of knowledge about cannabis among clinicians may be attributed to a lack of sufficient research evidence available surrounding the therapy's safety and effectiveness, leading to concerns of potentially compromised patient care [11]. Lastly, since many healthcare providers lacked knowledge about cannabis, patients often advocated for themselves by either bringing in information they had found or asking their care team to research its utility [27].

4. Discussion

Of 1741 unique search results, a total of 8 eligible studies were identified that provided qualitative data about patients' experiences with cannabis for pain management. Following data extraction and thematic analysis of the findings, four overarching themes emerged as follows: (1) problems with cannabis usage; (2) benefits of cannabis usage; (3) patients' experimentation with and knowledge of cannabis; and (4) physicians' lack of experience with cannabis for pain therapy.

4.1. Comparative literature

4.1.1. Problems with cannabis usage

Patients using cannabis for pain management can experience several side effects which primary care providers should be aware of in order to make informed decisions about prescribing cannabis [28]. Additionally, side effects are of increasing concern when cannabis is used for conditions such as chronic pain which may need to be managed over a long term [29]. A review of the adverse health effects of chronic cannabis use stated that the risk of developing psychosis among the general population is doubled for regular users of cannabis [30]. Furthermore, patients who use cannabis regularly are at risk of developing

cardiovascular disease, impaired respiratory function, dependence syndrome, and residual cognitive impairment [30].

In addition to side effects, another issue relating to cannabis use includes its legal status. Amlung et al. noted that cannabis users treat legal cannabis as a superior commodity compared to illegal cannabis [31]. It has been found that in jurisdictions where it is legal, patients are more comfortable talking to their physicians about cannabis as a treatment option, as opposed to jurisdictions where it remains illegal [32]. Legal cannabis is also perceived by patients to be safer and less risky due to government regulation [33]. However, following the legalization of medicinal cannabis in several U.S. states, there were significant increases in cardiac mortality rates and a greater prevalence of mental illnesses such as schizophrenia and bipolar disorder [34]. Therefore, it has been debated what approaches should be taken with respect to legalizing cannabis to ensure patients receive the greatest benefit.

The cost of cannabis presents a significant barrier to patients. An analysis of the cost of cannabis-based medicines reported that many patients avoid taking cannabis despite believing that it would benefit them, due to the high cost and lack of insurance coverage [35]. In the case of chronic pain, such a condition may require treatment over a period of multiple years; the cost of purchasing legal cannabis can be expensive and potentially result in patients opting to access cannabis illegally, grow their own plants, or forgo this treatment option altogether [35].

The clinical evidence surrounding the safety and dependency of medicinal cannabis is inconsistent across the scientific literature [36], [37], [38]. A systematic review from 2017

examining the effectiveness of medicinal cannabis for psychiatric, movement, and neurodegenerative disorders reported that due to a lack of controlled trials, no definitive conclusions could be made about the benefits and long-term safety of medicinal cannabis for the aforementioned disorder types [36]. Another systematic review published the same year found that medicinal cannabis may be problematic for individuals with existing psychotic disorders, also noting that acute cannabis intoxication may result in reversible deficits in short-term memory [37]. However, they suggested that the clinical implications of cannabis use among individuals with mood disorders remain unclear [37]. Regarding dependency, this same review suggested that cannabis used for therapeutic purposes may become problematic for patients with a history of depression and sleep disturbance [37], but also noted that in some circumstances, medicinal cannabis may be protective for the problematic use of other substances [37]. Furthermore, a more recent systematic review identified that evidence exists for the association between increased cannabis use and a diagnosis of schizophrenia, progression to developing addictions, potential respiratory infections/disorders, and in the case of smoking medicinal cannabis, unwanted cough and phlegm production [38]. The aforementioned reviews further suggest that physicians should carefully monitor patients using medicinal cannabis as many of the short-term and long-term effects remain unknown, and that robust clinical trials are required to strengthen and clarify the evidence in this area.

Studies show that the stigma associated with cannabis use is a barrier that prevents patients from seeking it as an option for pain management or divulging their usage to their healthcare providers [10,39]. Physicians should be aware of whether their patients use cannabis, as adverse drug interactions have been known to occur due to a lack of disclosure [40].

Additionally, a cross-sectional survey identified that some patients preferred not to use cannabis to avoid the stigma associated with being labelled an illicit drug user [41]. Patients

may be more likely to use cannabis for pain or other conditions if there was less stigma associated with its use [10,39]. This might be due to the fact that patients associate feelings of guilt and breaking moral boundaries with cannabis use, as reported by patients in Canada [42]. Moreover, patients in France, Germany, and Italy did not want to be perceived by others as unreliable, dangerous, or lazy due to the stigma associated with cannabis use [43]. The most common coping strategy to avoid social stigma reported by patients was keeping their cannabis use a secret [42]. Furthermore, fear of formal reprimand (i.e. “getting busted”, fired, evicted from their homes or deported) is also a reason some patients hide their use of cannabis [42].

4.1.2. Benefits of cannabis usage

Research has identified a wide range of benefits from cannabis use which include pain reduction, relief from stress, anxiety and insomnia, as well as improved sleep and overall quality of life [44], [45], [46]. Despite the safety of cannabis being inconclusive across the published literature, many studies report that cannabis is a safer substitute for other medications [44,45]. Kruger et al. found that patients reported a greater degree of use and higher level of trust in medicinal cannabis than other treatments such as opioids [44]. As a result of cannabis use, 35% of participants stopped their usage of at least one pharmaceutical drug (i.e. narcotics, non-opioid analgesics, benzodiazepines, antidepressants) [44]. Additionally, Haroutounian et al. found that chronic pain patients who replaced opioids with cannabis experienced improved pain and functional outcomes, as well as sleep [45]. Therefore, cannabis may be a viable alternative to other pharmaceuticals for pain management, necessitating studies to continue exploring this idea.

4.1.3. Patients' cannabis knowledge and experimentation

In a cross-sectional survey, 71.3% of patients were highly interested in learning and understanding more about cannabis [47]. Physicians also rarely provided their patients with reliable scientific evidence, leaving patients to rely on unreliable sources such as friends, family, social media and the internet [47], [48], [49]. Furthermore, it should be noted that the legal status of cannabis can impact patients' knowledge. A cross-sectional survey conducted in Arizona found that 80.3% of patients expressed that their knowledge on cannabis strains was much better after legalization [32].

The literature shows that patients' frequently experiment with different methods of cannabis administration, strains, and dosages. A review of the analgesic effects of cannabis found that while smoking cannabis is effective at providing immediate pain relief, a negative is the intake of toxic combustion by-products such as carbon monoxide [50]. Additionally, the appropriate dosage for smoking cannabis varies based on each individual's functional lung capacity [51]. Moreover, cannabis that is administered orally requires a minimum of two weeks following onset of treatment in order to provide a significant reduction in pain [50]. An analysis of 42 different cannabis strains for pain relief found that Indica, Sativa, Hybrid, 3:1 CBD:THC, and 1:1 CBD:THC were the five most preferred strains by patients [52]. Among these strains, the most suitable was the "Hybrid", although this varied based on the medical condition and type of pain experienced [52]. This same study also noted that the quantity and frequency of medicinal cannabis use by patients across all pain groups varied greatly [52]. Furthermore, another study found that cancer patients frequently alternated between tetrahydrocannabinol- and cannabidiol-rich strains to target their pain symptoms [53]. Due to the many methods of administration, strains, and dosages which can impact the

efficacy of cannabis for pain management, it is critical to determine what works best for patients on an individual basis [54].

4.1.4. Physicians' lack of experience with cannabis for pain therapy

Physicians' lack of experience with cannabis hinders their ability to provide patients with holistic therapeutic care for pain. One survey found that physicians in the United States are reluctant to prescribe cannabis due to concerns about adverse cannabis-drug interactions [9]. In Canada, physicians believed that neurocognitive development and exacerbation of mental illness are harms associated with cannabis use [55]. Additionally, stemming from concerns about limited evidence regarding the efficacy of cannabis for pain management, physicians are hesitant in prescribing it to their patients [9,40,48,55,56]. Furthermore, physicians in Canada, United States, and Norway recognize that their training in medical school and residency on cannabis was inadequate, and support the idea for continuing education on this topic [55,57,58]. Moreover, medical students in Serbia and Israel also believe that medical education on cannabis is lacking [59,60]. Currently, the Accreditation Council for Graduate Medical Education (ACGME) in the United States or equivalent regulatory bodies worldwide offer minimal to no guidance on how to address the educational gap on medicinal cannabis [61]. It is suggested that establishing a set of such competencies could facilitate the development of courses on medicinal cannabis to provide a structured curriculum in this area [61].

4.1.5. Implications and recommendations for future research

Our review identified the complex effects that legalizing cannabis has on patients, which is supported by a recently published review [62]. Multiple studies from the United States have found that following the legalization of cannabis, patients reported increased knowledge,

greater confidence in product safety and efficacy, and greater comfort in speaking to their physician about this treatment option [31], [32], [33]. Another study conducted in Israel noted that medicinal cannabis legalization increased patients' exposure to online media content and fostered a positive attitude towards this treatment option [63]. However, patients have also reported concern about the high cost of legal cannabis, encouraging them to forgo the treatment or access it illegally [35]. Additionally, a recent review examining the implications of cannabis legalization in Thailand found that adverse events associated with cannabis use rapidly spiked 4 months post-legalization, and further hypothesized that this was due to users' limited understanding and awareness of the benefits and harms of cannabis [64]. Thus, more qualitative studies on the attitudes of patients surrounding cannabis legalization would provide insight into their concerns to further inform legalization policies.

The findings from our review suggest physicians should be aware that patients may not disclose their cannabis use due to the stigma associated with it. Dubin et al. suggest that in Canadian medical education, there exists a disconnect between articulated institutional values in the formal curriculum, which emphasizes stigma reduction, and the less recognized hidden curriculum concerned with replicating the culture of medicine, which implicitly teaches anti-cannabis attitudes [65]. Both curricula should be targeted during medical school to dismantle any biases so that physicians do not perpetuate the stigma associated with medicinal cannabis [65].

Our review has found that patients are often unaware of which strains, dosages, and methods of cannabis administration would be most suitable for relieving their pain. A cross-sectional study conducted in the Netherlands examined the subjective effects of three different strains of medicinal cannabis and found that therapeutic effects did not vary between patients with

chronic pain [66]. However, research in this area is still emerging and further studies are required to inform the standardization of medicinal cannabis for the treatment of pain. Additionally, it has also been found that the quality of online patient information surrounding cannabis and pain is of variable quality [49]. Moreover, a review of issues related to medicinal cannabis use in Canada suggested that there is limited information on the efficacy of various cannabis strains for specific pain ailments, emphasizing the need to understand which strains and concentrations will work best with selected pain cohorts [67]. Our review also identified that some patients may experiment with different methods of cannabis administration, noting that oral cannabis intake provides a delayed, yet longer and more stable pain relief. A recent study which used a modified Delphi process can be referred to for global expert consensus-based recommendations on dosing and administration of oral medicinal cannabis for chronic pain [68]. Thus, further qualitative research examining patients' experiences with different cannabis strains for their management of pain may serve to inform the development of practice guidelines surrounding patient use of medicinal cannabis.

Lastly, our review identified that patients perceive physicians to lack adequate knowledge about medicinal cannabis. This does not come as a surprise, as multiple studies report that medical education on cannabis is lacking in various jurisdictions around the world, including but not limited to Canada, the United States, Russia, Spain, and Belarus [55,61]. Physicians in Canada reported that over 70% of conversations on medicinal cannabis were patient-initiated, and that training on these types of conversations are lacking [39]. This, combined with the lack of overall education on medicinal cannabis, results in physicians being uncomfortable and lacking the confidence to discuss it with their patients [39,69,70]. This further aligns with patients' perceptions from our findings, noting that many physicians seem

unknowledgeable about medicinal cannabis and are reluctant to discuss it as a therapeutic option. It is important that patients feel comfortable in asking their healthcare providers about medicinal cannabis should they choose to pursue it for pain management, therefore, physicians should be adequately educated in this area, and future qualitative studies should subsequently reassess patients' perceptions of physicians' knowledge.

4.1.6. Common limitations identified by authors of eligible studies

For seven of the eight included articles, results were not generalizable to other populations [4,8,[23], [24], [25], [26], [27]]. Piper et al. stated that the dispensaries included were located in areas populated majorly by ethnic minorities, leading to concerns about unrepresentative results [4]. Furthermore, both Piper et al. and Bigand et al. used open-ended questions that were at the end of a long survey [4,25]. In Bigand et al., this resulted in limited participant responses to open-ended questions due to participants being fatigued from answering prior closed-ended questions [25]. However, Piper et al. stated that this may have encouraged participants to think about some specific issues over others, therefore influencing the way participants answered open-ended questions [4].

4.1.7. Strengths and limitations of the present systematic review

One strength of this study included a literature search conducted systematically across multiple academic databases. With respect to data collection and analysis, title/abstract screening, data extraction, and thematic analysis, each were pilot tested and conducted independently and in duplicate; the authors met following each step to resolve any discrepancies through discussion. Additionally, our review was informed by the ENTREQ guidelines, and the quality of included studies was assessed through the CASP checklist for qualitative research. A limitation of this review included the fact that only articles published

in English were eligible, therefore allowing for publication bias by excluding studies from jurisdictions where English was not a primary language. A final limitation was that a protocol for this review was not registered.

5. Conclusion

This systematic review of qualitative studies identified four key themes across eight eligible studies which captured the experiences of patients using cannabis for pain management. In addition to pain relief, patients reported that cannabis use had many benefits including improvements in sleep, fatigue, drowsiness, and nausea, among many others. Common concerns raised by patients pertained to side-effects, legality issues, addiction, physicians' lack of experience with cannabis, and stigma associated with cannabis use. A greater understanding of patients' experiences with using different strains, dosages, and methods of cannabis administration, as well as their attitudes and concerns associated with cannabis legalization, would aid in the development of appropriate guidelines for prescribing practices, as well as informed policies surrounding cannabis legalization. Furthermore, following improvements in medical education, future qualitative studies should serve to reassess patients' perceptions of physicians' knowledge on cannabis.

Declarations

Author contributions

Jeremy Y. Ng: Conceptualization, Methodology, Formal analysis, Investigation, Writing original draft, Supervision, Project administration, Funding acquisition. Amanda Abrams: Investigation, Formal analysis, Writing review & editing. Ananya Pathak: Investigation, Formal analysis, Writing review & editing. Umair Tahir: Formal analysis, Writing review & editing. Jane Jomy: Formal analysis, Writing review & editing.

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Declaration of Competing Interest

JYN, AA, AP, UT and JJ declare that they have no competing interests.

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None.

Data availability

All relevant data are included in this manuscript.

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Figures Legend

Figure 1: PRISMA Diagram

Tables Legend

Table 1: MEDLINE Search Strategy for Studies Reporting Qualitative Data Regarding

Cannabis Use for Pain Executed May 16, 2020

Table 2: General Characteristics of Eligible Studies

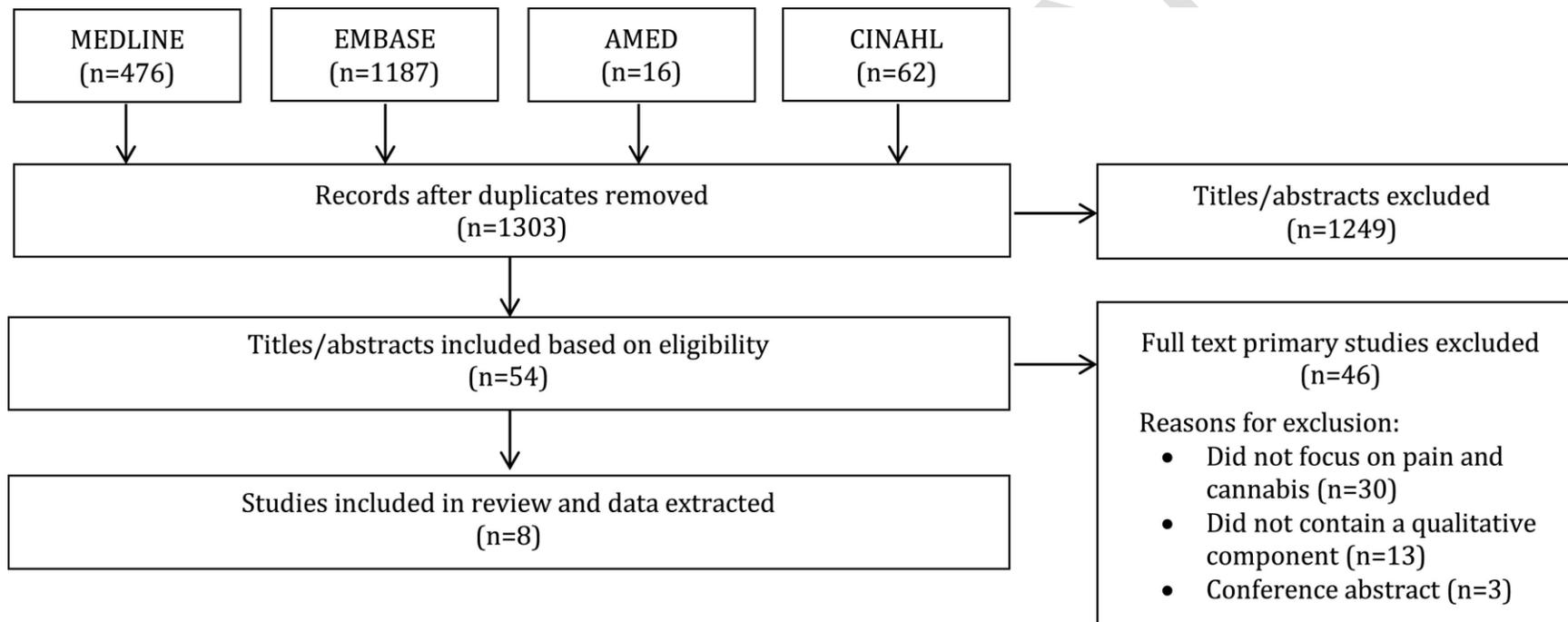
Table 3: Outcomes and Findings of Eligible Studies

Table 4: CASP Qualitative Research Checklist Quality Appraisal of Included Studies

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Figures

Fig. 1. PRISMA Diagram



Tables

Table 1. MEDLINE Search Strategy for Studies Reporting Qualitative Data Regarding Cannabis Use for Pain Executed May 16, 2020

<p>Database: Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Daily and Versions(R) <1946 to May 15, 2020></p>
<p>Search Strategy:</p> <hr/>
<p>1 exp Medical Marijuana/ (1184)</p>
<p>2 exp Cannabis/ (9043)</p>
<p>3 (marijuana or marihuana or cannabis or hemp or hashish).mp. (33,834)</p>
<p>4 exp Cannabinoids/ or exp Marijuana Smoking/ or exp Medical Marijuana/ or exp Marijuana Abuse/ (23,133)</p>
<p>5 exp Dronabinol/ (6933)</p>
<p>6 tetrahydrocannabinol.mp. (7113)</p>
<p>7 exp Cannabidiol/ (1570)</p>
<p>8 cannabidiol.mp. (3030)</p>
<p>9 (endocannabinoid* or cannabinoid*).mp. (25,509)</p>
<p>10 exp Endocannabinoids/ (5672)</p>
<p>11 or/1-10 (55,257)</p>
<p>12 pain*.mp. or exp Pain/ (856,526)</p>
<p>13 (qualitative* or survey* or focus group* or interview* or observational* or descriptive* or mixed method*).mp. (1,739,984)</p>
<p>14 11 and 12 and 13 (500)</p>

Database: Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Daily and Versions(R) <1946 to May 15, 2020>

15 limit 14 to english language (476)

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Table 2. General Characteristics of Eligible Studies

Title	Author and Year	Country of First Author	Pain Definition	Type of Pain	Is the pain associated with a disease/condition? *	Method of Administration	Control for CBD/THC Ratios?	Medicinal or Recreational Cannabis	Data collection Methods	Theoretical Underpinning	Types of Patients Considered	Number of Participants	Outcomes
Self-efficacy in researching and obtaining medical cannabis by patients with chronic conditions	Brady et al. 2020 [23]	United States	Not provided	Chronic pain from numerous injuries/diseases	Rheumatoid arthritis, spinal cord disease/injury, Crohn's disease, cancer, hepatitis C, PTSD, severe fibromyalgia, chronic regional pain, epilepsy, HIV, multiple sclerosis, Parkinson's disease	Smoking, edibles, vaping, oil use (dabs), tincture, lotions, drinking teas	No	Medicinal	Interview	Not stated	Adults using medical cannabis for at least 3 months who qualified for medical cannabis in Illinois by having a qualifying health condition.	30 participants (19 M, 11 F)	Behaviors associated with adult medical cannabis users' self-efficacy.
A comprehensive patient and public involvement program evaluating	Erridge et al. 2020 [24]	United Kingdom	Not provided	Acute surgical pain	Preoperative and postoperative acute pain	Smoking, tablet, sublingual application, and CBD oil	No	Both	Focus group and interview	Framework methodology	Preoperative and postoperative adult patients, as well as general	14 participants (7 M, 7 F) in focus groups and	Preoperative and postoperative patients' perspectives on

Title	Author and Year	Country of First Author	Pain Definition	Type of Pain	Is the pain associated with a disease/condition? *	Method of Administration	Control for CBD/THC Ratios?	Medicinal or Recreational Cannabis	Data collection Methods	Theoretical Underpinning	Types of Patients Considered	Number of Participants	Outcomes
perception of cannabis-derived medicinal products in the treatment of acute postoperative pain, nausea, and vomiting using a qualitative thematic framework											public adults.	interviews; 23 participants (Gender breakdown was not specified) in the community patient and public involvement group.	using cannabis to manage their acute pain.
Benefits and adverse effects of cannabis use among adults with persistent pain	Bigand et al. 2019 [25]	United States	Not provided	Persistent chronic pain	Cancer, scleroderma, headache, neuropathies, muscle spasms, and Crohn's disease	Edibles	No	Both	Survey (open-ended questions)	Not stated	Adults with persistent pain conditions that were prescribed opioids.	150 participants (103 F, 47 M)	Adults' perspectives on cannabis usage for persistent chronic pain management while

Title	Author and Year	Country of First Author	Pain Definition	Type of Pain	Is the pain associated with a disease/condition? *	Method of Administration	Control for CBD/THC Ratios?	Medicinal or Recreational Cannabis	Data collection Methods	Theoretical Underpinning	Types of Patients Considered	Number of Participants	Outcomes
													prescribed opioids.
Using cannabis for pain management after spinal cord injury: a qualitative study	Bourke et al. 2019 [11]	New Zealand	Not provided	Chronic pain from spinal cord injury (SCI)	Spinal cord injury	Smoking, edibles	No	Both	Interview	Not stated	Adults fluent in English and living in New Zealand while using cannabis for SCI pain.	8 participants (2 F, 6 M)	Adult patients' perspectives on cannabis usage for SCI pain management.
Patients' and clinicians' perspectives of co-use of cannabis and opioids for chronic non-cancer pain management in primary care	Cooke et al. 2019 [26]	United States	Defined CNCP as pain that persists beyond 3 months and is not caused by a malignancy or associated with	Chronic non-cancer pain (CNCP)	Not provided	Smoking, edibles	No	Both	Interview	Modified grounded theory approach	Adults with CNCP and substance abuse	23 primary care providers (Gender breakdown was not specified), 46 patients (21 M,	Adults' perspectives on CNCP management.

Title	Author and Year	Country of First Author	Pain Definition	Type of Pain	Is the pain associated with a disease/condition? *	Method of Administration	Control for CBD/THC Ratios?	Medicinal or Recreational Cannabis	Data collection Methods	Theoretical Underpinning	Types of Patients Considered	Number of Participants	Outcomes
			pain at the end of life.									25 F)	
Restored self: a phenomenological study of pain relief by cannabis	Lavie-Ajayi et al. 2019 [8]	Israel	“A life-changing illness that necessitates a re-examination of personal, family, and work-related issues and leads to a constant struggle to readjust one's life and identity.”	Chronic pain from numerous injuries/diseases	Arthritis, spinal cord injuries, injuries from accidents, CRPS, cancer	Smoking, drops, oil	No	Medicinal	Interview	Interpretative phenomenological analysis (IPA)	Adults using medicinal cannabis for at least 3 months and fluent in Hebrew	19 patients (9 F, 10 M)	Adults' experiences of medicinal cannabis usage for chronic pain management in Israel.
Preferences for medical	Bruce et al.	United States	Not provided	Chronic pain from	Rheumatoid arthritis,	Smoking, vaporization	No	Medicinal	Interview	Not stated	Adults with a	30 patients	Patients' perspectives

Title	Author and Year	Country of First Author	Pain Definition	Type of Pain	Is the pain associated with a disease/condition? *	Method of Administration	Control for CBD/THC Ratios?	Medicinal or Recreational Cannabis	Data collection Methods	Theoretical Underpinning	Types of Patients Considered	Number of Participants	Outcomes
marijuana over prescription medications among persons living with chronic conditions: alternative, complementary, and tapering uses	2018 [27]			numerous injuries/diseases	Crohn's disease, spinal cord injury/disease, cancer, hepatitis C, PTSD, severe fibromyalgia, CRPS, epilepsy, HIV, multiple sclerosis, Parkinson's disease	n, edibles, topical oil					qualifying health condition for medicinal cannabis (MC) in Illinois who had smoked MC in the last 3 months	(19 M, 11 F)	uses of MC use for chronic pain management of numerous conditions.
Chronic pain patients' perspectives of medical cannabis	Piper et al. 2017 [4]	United States	"Pain, and especially chronic pain, exists within a context of biological and psychological variables,	Chronic pain from numerous injuries/diseases	Back pain, arthritis, neuropathic pain, postsurgical pain, abdominal pain, cancer pain, menstrual pain, chronic pain from trauma or an injury,	Concentrates, joint, smoking, bong, vaporizer, edibles, tinctures, topicals	No	Medicinal	Survey (open-ended)	Grounded theory perspective	Adults that were legal members of MC dispensaries with chronic pain	984 participants (521 F, 463 M) – 607 participants completed the open-ended questions	Positives and negatives of MC from a patients' perspective and how it impacts the patient's chronic pain.

Title	Author and Year	Country of First Author	Pain Definition	Type of Pain	Is the pain associated with a disease/condition? *	Method of Administration	Control for CBD/THC Ratios?	Medicinal or Recreational Cannabis	Data collection Methods	Theoretical Underpinning	Types of Patients Considered	Number of Participants	Outcomes
			such as genetics, sex, sleep, stress, and others.”		migraines/chronic headaches, fibromyalgia, irritable bowel syndrome, diabetes								

*List of Abbreviations: CBD = Cannabidiol; CNCP = Chronic Non-Cancer Pain; CRPS = Complex Regional Pain Syndrome; HIV = Human Immunodeficiency Virus; IPA = Interpretative Phenomenological Analysis; MC = Medicinal Cannabis; PPI = Patient and Public Involvement; PTSD = Post Traumatic Stress Disorder; SCI = Spinal Cord Injury.

Table 3. Outcomes and Findings of Eligible Studies

Title	Author and Year	Themes Discussed	Main Findings*	Study Limitations	Conclusions
Self-efficacy in researching and obtaining medical cannabis by patients with chronic conditions	Brady et al. 2020 [23]	<p>(1) Self-directed experimentation with cannabis: -Strains -Dosages -Administration methods</p> <p>(2) Managing care by: - Selecting or seeking out a provider open to cannabis - Educating current providers</p> <p>(3) Information seeking and research behaviors - Gathering information on the medicinal effects of cannabis -Gathering information on dispensaries</p>	<p>(1) Self-directed experimentation with cannabis: -Participants reported feeling overwhelmed by the amount of choice in a dispensary and noted that it took a lot of experimentation to find the right strain. -Participants felt frustrated because they needed to experiment extensively to find the right dosage. -Self-efficacy was noted when a participant did not give up and kept trying new methods without expert guidance. - Participants mentioned that different methods of cannabis administration helped with different problems. Some methods are fast-acting, which helps when the pain is severe or sudden, opposed to slow-acting methods which give a longer-lasting effect that might be needed to keep the pain away all day. (2) Managing care by: -Self-</p>	<p>(1) Small sample size and the participants who did sign up for this study may not represent all medicinal cannabis users. (2) This study may not be generalizable in the fact that not all people with a chronic illness will show self-efficacy in the ways that the participants in this study did.</p>	<p>-Medicinal cannabis for chronic illnesses is hard to obtain and there is also a large stigma involved with using it. Therefore, the people that go through with this show more confidence and knowledge which translates to more self-efficacy. Primary care providers should be aware of this pattern since some people with a low self-efficacy may truly benefit from medicinal cannabis but are not asking for it. Providers need to have more knowledge about medicinal cannabis so that they can prescribe it to patients. They should also be aware of people with high self-efficacy who might experiment with different methods to manage chronic pain.</p>

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			<p>efficacy was seen when a patient sought out a care provider open to medicinal cannabis discussions or when they educated their provider on the benefits they were receiving from medicinal cannabis. - Patients' perspectives showed that providers did not discuss or prescribe medicinal cannabis with their patients because they believed the patient wanted pleasure, the provider was unfamiliar with the process or thought the program was too new, or that the provider did not believe that the patient could receive any beneficial effects. - Some participants brought information to their provider or asked them to research it since most providers seemed to lack knowledge about medicinal cannabis use for chronic pain management. (3) Information seeking and research behaviors - Participants did their own research online and through</p>		

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			<p>journal articles to investigate which strains and dosage types of medicinal cannabis would most help with their specific condition. -Some participants asked family or friends for advice on medicinal cannabis, however, this was sometimes met with a stigma. -Participants looked online and asked friends and family (stigma problem) about the best dispensaries to visit.</p>		
<p>A comprehensive patient and public involvement program evaluating perception of cannabis-derived medicinal products in the treatment of acute postoperative pain, nausea, and vomiting using a qualitative thematic framework</p>	<p>Erridge et al. 2020 [24]</p>	<p>(1) Cannabis-derived medicinal products (CDMP) perceptions - Licensed use -Medicinal benefits -Side effects of CDMPs -Safety -Production -Availability -Addiction of CDMPs -CDMPs and mental health -Cannabis laws -Cannabis and religion -CDMPs and the media - Personal CDMP use - Personal cannabis use - Medicinal administration of CDMPs (2) Opioid Perceptions -Medicinal</p>	<p>(1) CDMP perceptions - Patients had positive perceptions and prior knowledge of cannabis' medicinal properties. CDMPs were believed to be helpful in acute pain management as well as with other conditions. - Most prior cannabis knowledge stems from media coverage. -Negative perceptions on safety and cannabis usage lead to mental health problems or potential addictions. Concerns were</p>	<p>(1) A local population was interviewed; therefore, data might not be generalizable. (2) Participants were limited to only those with adequate English skills.</p>	<p>-Patients have an overall positive perception towards using cannabis for acute postoperative pain management. This study data has information that will help develop clinical trials to further investigate cannabis' antiemetic and analgesic efficacy.</p>

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		<p>benefits of opioids -Side effects of opioids -Opioid addiction (3) Trial perceptions -Consent -Pain -Nausea and vomiting - Postoperative side effects - Quality of life -Frequency of data collection - Nighttime data capture - Length of follow-up - Participation</p>	<p>also voiced about reliance on unregulated recreational cannabis. -Islam had negative views towards using the cannabis plant. - Due to the change in cannabis legalization in London, negative concerns arose concerning future finance and availability options. (2) Opioid perceptions -Positive perception of using opioids in the postoperative period. -Negative perceptions on the side effects that opioid usage causes. Some patients reported severe pain and nausea. -Negative perceptions on opioid usage leading to addictions. (3) Trial perceptions -Positive perceptions toward trial aim and placebo randomization. -Positive perceptions towards using scoring scales for pain along with a quality-of-life measure. - Positive perceptions towards recording patient's medication side effects. - Negative perceptions towards nighttime data</p>		

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			captures.		
Benefits and adverse effects of cannabis use among adults with persistent pain	Bigand et al. 2019 [25]	(1) Perceived benefits: - Physiological symptom management -Mental health symptom management (2) Adverse effects: - Physiological concerns - Mental health concerns - Social and economic concerns	(1) Perceived benefits - Cannabis had a positive effect by helping manage pain and insomnia. Aside from sleep issues, cannabis also helped with nausea, increasing appetite, and managing pain from numerous diseases. - Cannabis helped reduce stress, depression, and anxiety. -The legalization of cannabis helped some participants choose better quality cannabis and has positively influenced their decision towards purchasing. (2) Adverse effects -Negative physical effects such as weight gain and coughing (minor effect) to anaphylaxis and seizures (major effects). Other symptoms such as a racing heart, nausea, dry mouth and burning red eyes were also observed by participants. -Negative minor psychological effects such as sleepiness, poor memory and a lack of	(1) This study used self-report data so responses may not always be true. (2) The 2 open-ended questions came after a 30 min survey, therefore answers were very short with limited responses from participants. (3) Results may not be generalizable as the study took place in only one specific geographical area.	-Cannabis usage gave patients many benefits but also adverse effects. Legalization in the United States gives patients' perspectives on medicinal cannabis more value as new knowledge becomes available. -The patient perspectives in this study can help guide healthcare practices by increasing open communication and filling in knowledge gaps through research about pain management strategies with cannabis usage.

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			<p>concentration and motivation were observed by participants. Major psychological effects such as paranoia, rumination and increased anxiety were also observed. -Cannabis negatively impacted the participants' financial and social life. Other people's judgement and the high cost of cannabis were some reasons why people were reluctant to use cannabis despite its benefits.</p>		
<p>Using cannabis for pain management after spinal cord injury: a qualitative study</p>	<p>Bourke et al. 2019 [11]</p>	<p>(1) The prison of pain (2) The (prescribed) drugs do not work (3) Choosing to use cannabis (4) Negotiating an unfamiliar illegal context (5) Free to pursue meaningful outcomes (6) You cannot always get what you want</p>	<p>(1) The prison of pain - Participants felt trapped by their pain which impacted their daily life and their ability to interact with people. -Many participants tried a variety of methods for pain management without success. (2) The (prescribed) drugs do not work -Prescribed drugs had many side effects or did not work. -Participants were bothered by the side effects from prescribed drugs such as fatigue, drowsiness, and constipation. (3) Choosing</p>	<p>(1) It is possible that only people with positive experiences signed up for this study. (2) Participants were unsure of their THC/CBD ratios therefore the efficacy of each could not be determined in this study.</p>	<p>-Using cannabis to manage SCI pain allowed for participants to become involved in more social events. -Participants were very knowledgeable about cannabis and sought out the pain relief benefits while trying to avoid side effects. -More studies on patients' perspectives would be helpful as cannabis is becoming more popular for its medicinal use, instead of focusing on pain intensity measure scales.</p>

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			<p>to use cannabis - Participants reported being knowledgeable about cannabis since they did much research to find the appropriate strain for their pain. -Cannabis efficacy is subjective since the participants could not measure the amount of THC in their products. (4) Negotiating an unfamiliar illegal context -New Zealand has few legal cannabis products, therefore most participants were using illegal products since the legal medication was very costly with limited access. -Obtaining illegal cannabis plants to grow was cheaper, easier, and more effective. -Having an illegal product brought about a lot of stress to the participants. -Cannabis being illegal meant that providers were unaware about patients' cannabis usage. (5) Free to pursue meaningful outcomes -Patients experienced their pain becoming more tolerable or</p>		

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			<p>almost gone after their cannabis usage. -When using cannabis, patients did not feel drowsy or fatigued and had better sleep. -Cannabis usage improved the quality of life of the participants. (6) You cannot always get what you want - Since cannabis is illegal in New Zealand, there is a large information gap with cannabis along with unpredictability in the unregulated market where cannabis is obtained.</p>		
<p>Patients' and clinicians' perspectives of co-use of cannabis and opioids for chronic non-cancer pain management in primary care</p>	<p>Cooke et al. 2019 [26]</p>	<p>(1) Potential benefits of cannabis and opioid co-use for pain management (2) Concerns about potential consequences of cannabis use *Note: for the purpose of this study only the patients' perspectives were taken into account.</p>	<p>(1) Potential benefits of cannabis and opioid co-use for pain management - Some patients found cannabis had more effect whereas other patients found opioids had more effect at managing their pain. -Cannabis did not resolve pain, rather it provided patients with a momentary relief. -When patients' opioid prescriptions ran out and they had to wait for the refill, they used cannabis to</p>	<p>(1) This study interviewed patients with histories of substance abuse, so this data is not generalizable to other chronic non-cancer pain (CNCP) patients. (2) Both clinician and patient interviews might have led participants to answer questions in a more positive lighting.</p>	<p>-Patients co-use opioids and cannabis to manage their pain, however, clinicians are often kept in the dark. -No guidelines exist for clinicians; therefore, along with a lack of research on the topic, and lack of knowledge on the benefits and risks, clinicians do not prescribe opioid and cannabis co-use. This lack of knowledge puts the burden on the patient to learn about proper dosage</p>

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			<p>help manage their pain. - Cannabis is considered a medication and is not taken for recreational purposes by most patients. -Patients dislike when people do not take pain into account when judging them on their cannabis usage. (2) Concerns about potential consequences of cannabis use -Cannabis policy changes leave many patients confused about the cannabis they are taking. - None of the patients in this study told their clinicians about their cannabis usage for pain management. - Patients do not know which strain or dosage amount they should be taking to manage their pain so they rely on guessing. -Some patients were concerned that cannabis usage could lead to addiction or dependency.</p>		and cannabis usage for pain management.
Restored self: a phenomenological study of pain relief by cannabis	Lavie-Ajayi et al. 2019 [8]	(1) Sigh of relief (the corporal sensation of using cannabis) (2) A Return to normality (the	(1) Sigh of relief -Medicinal cannabis provides temporary pain relief. - Medicinal cannabis helps	(1) Participants were from a single pain clinic and consisted of mostly non-Hispanic White individuals.	-Cannabis helped many participants cope with chronic pain and return to their normal lives. -Future

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		comprehensive effect of using cannabis) (3) Side effects	patients relax, making the pain more tolerable. (2) A Return to normality - Cannabis helps with pain, sleep, appetite, irritability, restlessness, depression, and an inability to focus. - Cannabis helped patients become more proactive and involved in their life again. (3) Side effects -Negative effects from cannabis usage included disorientation, headaches, coughing, feeling stoned and the unpleasant smell or taste.	Thus, the results may not be generalizable. (2) Included participants had to undergo an extensive application process to participate in this study, therefore they might have more self-efficacy compared to people who did not complete the entire process. (3) The selection criteria of needing to have used cannabis for at least 3 months might have weeded out patients for whom cannabis did not benefit, therefore biasing these results.	studies should explore this topic in a variety of different jurisdictions to gage a more holistic understanding of patients' experiences with cannabis for pain management.
Preferences for medical marijuana over prescription medications among persons living with chronic conditions: alternative, complementary, and tapering uses	Bruce et al. 2018 [27]	(1) Medicinal cannabis (MC) as an alternative to prescription medications (2) MC as a means to taper off prescribed medications (3) MC as a complementary use with prescribed medications	(1) MC as an alternative to prescription medications - MC acts quicker, lasts longer, manages symptoms well, has minimal harm and has less side effects compared to opioids. - Compared to other medications, MC has less side effects and helps manage multiple sclerosis pain better. (2) MC as a means to taper off prescribed medications - MC helped participants	(1) Small sample size may have resulted in biased findings. (2) Limited geographical and demographical sample prevents generalizability. (3) No questions were included about MC side effects or costs to obtain MC.	-MC helped manage pain, inflammation, and seizures, along with side effects from other medications. -More research focusing on patients' perspectives is needed to examine costs and side effects of MC, appropriate dosing, along with longitudinal data assessing chronic disease outcomes.

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			<p>reduce their dosage of more harmful medications. (3) MC as a complementary use with prescribed medications -MC was shown to reduce pain, improve sleep, have less toxicity, reduce anxiety, reduce adverse reactions and improve appetite.</p>		
Chronic pain patients' perspectives of medical cannabis	Piper et al. 2017 [4]	<p>(1) "What do you like most about MC?": -Health benefits -Products -On-health benefits - Medications -Side effects - Access -Law -Effects (2) "What do you like least about MC?": -Money - Effects -View -Access - Method -Legal -Use -Travel -Limit -Job</p>	<p>(1) Positive: -MC enhanced quality of life and improved chronic pain along with improvements to sleep -MC was hard to overdose on and was believed to not be addictive, thus a safer alternative compared to opioids -MC decreased the need for other medications (2) Negative: -MC was very costly with an average of \$2000/year. MC was also not covered by insurance. - Negative effects such as smoking-caused respiratory and olfactory consequences. Oral administration provided a more stable yet delayed pain relief. Patients that were discovered using MC were negatively viewed</p>	<p>(1) Each state surveyed implemented their medicinal cannabis differently which may skew demographic data since dispensaries are located in minority populated areas. Therefore, the findings may not be generalizable to other states. (2) Open-ended questions were at the end of the long survey which may have influenced patients' train of thought. (3) Data was self-reported which may have led to errors and may not be generalizable to the overall views of the public.</p>	<p>-MC patients' had several positive and negative perceptions on using MC to manage chronic pain. - This study has information that will help increase open discussion between patients and primary care providers about the efficacy of MC and its use in a multimodal pain management.</p>

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			by other people including healthcare providers.		

*List of Abbreviations: CBD = Cannabidiol; CDMP = Cannabis-derived Medicinal Products; CNCP = Chronic Non-Cancer Pain; MC = Medicinal Cannabis; SCI = Spinal Cord Injury; THC = Tetrahydrocannabinol.

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Table 4. CASP Qualitative Research Checklist Quality Appraisal of Included Studies

Author and Year Published	Was there a clear statement of the aims of the research?	Is a qualitative methodology appropriate?	Was the research design appropriate to address the aims of the research?	Was the recruitment strategy appropriate to the aims of the research?	Was the data collected in a way that addressed the research issue?	Has the relationship between researcher and participants been adequately considered?	Have ethical issues been taken into consideration?	Was the data analysis sufficiently rigorous?	Is there a clear statement of findings?	How valuable is the research?
Brady et al. 2020 [23]	Yes	Yes	Yes	Can't tell	Yes	No	Yes	Yes	Yes	Very much
Erridge et al. 2020 [24]	Yes	Yes	Yes	Can't tell	Yes	No	Yes	Yes	Yes	Satisfactory
Bigand et al. 2019 [25]	Yes	Yes	Yes	Can't tell	Yes	No	Yes	Yes	Yes	Satisfactory
Bourke et al. 2019 [11]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Very much
Cooke et al. 2019 [26]	No	Yes	Yes	Yes	Yes	Yes	Can't tell	Yes	Yes	Satisfactory
Lavie-Ajayi et al. 2019 [8]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Very much
Bruce et al.	Yes	Yes	Yes	Can't tell	Yes	Yes	No	Yes	Yes	Very much

Author and Year Published	Was there a clear statement of the aims of the research?	Is a qualitative methodology appropriate?	Was the research design appropriate to address the aims of the research?	Was the recruitment strategy appropriate to the aims of the research?	Was the data collected in a way that addressed the research issue?	Has the relationship between researcher and participants been adequately considered?	Have ethical issues been taken into consideration?	Was the data analysis sufficiently rigorous?	Is there a clear statement of findings?	How valuable is the research?
2018 [27]										
Piper et al. 2017 [4]	Yes	Yes	Yes	Can't tell	Yes	Yes	No	Yes	Yes	Very much