



Review

Cannabis for Therapeutic Purposes and public health and safety: A systematic and critical review



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ABSTRACT

Background: The use of Cannabis for Therapeutic Purposes (CTP) has recently become legal in many places. These policy and legal modifications may be related to changes in cannabis perceptions, availability and use and in the way cannabis is grown and sold. This may in turn have effects on public health and safety. To better understand the potential effects of CTP legalization on public health and safety, the current paper synthesizes and critically discusses the relevant literature.

Methods: Twenty-eight studies were identified by a comprehensive search strategy, and their characteristics and main findings were systematically reviewed according to the following content themes: CTP and illegal cannabis use; CTP and other public health issues; CTP, crime and neighbourhood disadvantage. **Results:** The research field is currently limited by a lack of theoretical and methodological rigorous studies. The review shows that the most prevalent theme of investigation so far has been the relation between CTP and illegal cannabis use. In addition, the literature review shows that there is an absence of evidence to support many common concerns related to detrimental public health and safety effects of CTP legalization.

Conclusion: Although lack of evidence provides some reassurance that CTP legalization may not have posed a substantial threat to public health and safety, this conclusion needs to be examined in light of the limitations of studies conducted so far. Furthermore, as CTP policy continues to evolve, including incorporation of greater commercialization, it is possible that the full effects of CTP legalization have yet to take place. Ensuring study quality will allow future research to better investigate the complex role that CTP plays in relation to society at large, and public health and safety in particular.

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Introduction

Although Cannabis for Therapeutic Purposes (CTP) played a significant role in western medicine towards the end of the 19th century (Bostwick, 2012; Grinspoon, 2005; Mikuriya, 1969), around the turn of the century and onwards its use has gradually vanished. One major force in this development was that CTP use and research was made increasingly difficult by the 1961 UN Convention on Narcotic Drugs which classified cannabis as a Schedule I drug, meaning no accepted medical use and high potential for abuse (Ballotta, Bergeron, & Hughes, 2008; Bostwick, 2012; UN, 1961). Medical developments also contributed to the decline of CTP as new medicines that were deemed safer and more predictable were developed and took CTP out of favour (Grinspoon, 2005; Kalant, 2001; Zuardi, 2006). Furthermore, other social, economic and legal

factors contributed to the decline of CTP. For instance, import to Europe and the U.S. of high quality Indian hemp became increasingly difficult due to constraints in India and the influence of the two world wars (Fankhauser, 2008).

Novel pharmacological developments of the past few decades have brought a new wave of interest into the structural and physiological properties of cannabis. Furthermore, recent clinical trials have improved the evidence-base for the medical benefits of CTP (Campbell et al., 2001; Gates, Albertella, & Copeland, 2014; Lynch & Campbell, 2011; Machado Rocha, Stéfano, De Cássia Haiek, Rosa Oliveira, & Da Silveira, 2008; Martín-Sánchez, Furukawa, Taylor, & Martin, 2009; Tramer et al., 2001), indicating that cannabis may be a promising therapeutic agent.

The increased clinical evidence-base for CTP has been accompanied with expanding social and political pressures in many places to change regulatory frameworks to enable legal use of CTP. Hitherto, 23 states in the U.S. have legalized CTP (NCSL, 2014), as well as other countries, including Israel, Canada and the Netherlands (Belle-Isle et al., 2014). Additional states and countries are currently

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considering CTP legalization, including New Zealand and Australia (NCSL, 2014; Shipton & Shipton, 2014). These legal changes have brought about scientific and political debates regarding the possible detrimental and positive effects of CTP legalization on society (Levinthal, 2008). Concerns have, for instance, been raised that legalizing CTP may increase illegal cannabis use and may harm adolescents in particular (Joffe & Yancy, 2004). Others have pointed out that CTP legalization may be related to a substitution effect, where people move from alcohol use to cannabis use, which in turn may reduce alcohol-related harm in society (Lucas et al., 2013). From a different perspective, concerns have also been raised that cannabis dispensaries may cause crime in already disadvantaged communities (City of La Puente, 2008; The Denver Post, 2011).

Clearly, aside from strictly pertaining to clinical and medical issues, CTP is essentially a social matter, as it integrates cultural, legal, economic and political concerns. Social sciences have the potential to play a substantial role in developing our understanding of CTP, particularly at this point in time when CTP legal frameworks are changing (Holland, 2010; NCSL, 2014). In particular, social science research is essential in order to reach an understanding of the ways in which CTP use and policies are associated with public health and safety. Furthermore, social CTP research may inform the development of evidence-based CTP policies.

The current paper is the first to critically synthesize studies related to CTP policy and public health and safety. The review was guided by the following objectives: (1) to describe the nature and characteristics of CTP research related to public health and safety and thereby to identify trends in the research area; (2) to highlight the significant contributions in the field of CTP/public health and safety research; and (3) to identify gaps in the literature in order to point out directions for future research.

Methods

Search strategy

A search on PubMed, Sociological Abstracts, Social Citation Index, and PsychINFO, was conducted to identify relevant keywords in titles, abstracts and subject descriptors. Searches included combinations of the following terms: “medical cannabis”, “medical marijuana”, “cannabis dispensaries”, “medical cannabis legalization”, “medical marijuana legislation”, “Cannabis for Therapeutic Purposes”. Searches included all literature that was published before June 2014 and the total number of papers found through all search combinations was 5667.

Selection of papers identified through the initial database search was conducted by independent review of all identified papers by the two authors based on titles and abstracts of the papers and the inclusion and exclusion criteria outlined in Table 1. The process resulted in the exclusion of 5643 papers, and the inclusion of 24 papers. Next, backward and forward searches were performed to identify any studies that the initial search might have

missed (Greenhalgh, 2005). For backward searching, bibliographies of identified studies were checked, while for forward searching, Science Citation Index was used to identify subsequent citations of the identified studies. The five journals with the highest yield of references were additionally hand searched for further relevant references. Four additional papers were included through these search strategies, leading to 28 studies being finally included in this review.

Data extraction

Identified papers were organized into content areas and coded according to seven different variables. Firstly, studies were coded for type of study population (children/adolescents, adults or other) and type of data (primary or secondary data). Studies were also coded for data collection period and CTP policy change focus. In the U.S. (which is the location of all studies reviewed but one), individual states have legalized CTP at various time points since 1996. However, these states were acting under federal prohibitionist policy until 2009 when the federal government released a memo stating that federal resources should not focus on prosecuting CTP patients or caregivers who act according to state laws (Ogden, 2009). This shift sparked commercialization of CTP at the state level, including large scale retail sale and increasing levels of promotion (Salomonsen-Sautel, Min, Sakai, Thurstone, & Hopfer, 2014; Schuermeyer et al., 2014). Effectively, studies using data prior to 2009 examine state CTP legalization under enforced federal prohibition, whilst studies that use data after 2009 have the opportunity to examine state legalization in an environment where these changes would likely have much more of an effect. In order to incorporate these nuances in the literature review, all articles reviewed were coded for data collection period and whether or not the analyses took the state and/or federal CTP policy changes into account in their analyses.

Studies were also coded according to research design quality. Lower quality studies are defined as studies using cross sectional (one time point) observations only, whereas higher quality studies are defined as those that used pre-post design (using observations from before and after a policy change). Another quality indicator is whether some form of comparison group was used; studies with no comparison groups are of lower quality. Lastly, studies were coded for whether analysis was guided by specific theoretical frameworks or not.

Results

Details of the studies reviewed are summarized in Table 2. During the literature search, three content areas were identified: (1) CTP and illegal cannabis use, (2) CTP and other public health issues, and (3) CTP, crime and neighbourhood disadvantage. The majority of studies were published in the last 4 years (86%, $n = 24$), and all studies but one were conducted in the U.S. (96%, $n = 27$). The area of research that has received most attention by researchers is CTP and illegal cannabis use, representing 57% of all studies reviewed.

Although 10 studies (36%) used data before and after 2009, only three studies focused specifically on the 2009 federal policy change towards relaxed prohibition of CTP. All other studies focused on state CTP legalization only. As shown in Table 2, the vast majority of studies used secondary data (75%, $n = 21$). Many studies (61%, $n = 17$) included control groups by utilizing the opportunity to compare data across states or locations with different CTP policies. Fewer studies used pre-post CTP policy change designs (39%, $n = 11$). Furthermore, very few studies were guided by a specific theoretical framework (21%, $n = 6$).

Table 1
Exclusion and inclusion criteria.

Exclusion criteria	Inclusion criteria
Study design based on commentaries of the literature	Focus on association between CTP and public health and safety
Abstracts, dissertations, government or other non-peer reviewed reports, conference proceedings	Scholarly literature (peer reviewed journal articles)
Main focus on medical/pharmaceutical properties of CTP, patients or physicians	Presentation of empirical analysis
Published in language other than English	

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