Physicians’ Perspectives on Medical Cannabis in Norway: A Cross-Sectional Study

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Abbreviations

CBD – Cannabidiol

ECS – Endocannabinoid system

EMCDDA – European Monitoring Centre for Drugs and Drug Addiction

ICSDP – International Centre for Science in Drug Policy

IOM – Institute of Medicine

MS – Multiple sclerosis

OUS – Oslo Universitetssykehus

SPSS – Statistical package for social sciences

THC – Trans-Δ⁹-tetrahydrocannabinol

UN – United Nations

UNODC – United Nations Office on Drugs and Crime

U.S – United States
Abstract

**Background:** The medicinal use of cannabis is extensive throughout world history but was criminalised in the United States in 1937, which spurred the international community and most countries across the globe to follow suit, including Norway. Despite in recent years being reintroduced as a medical treatment in many countries, the use of cannabis in Norway is confined to a select few patient groups whereby medical specialists must formally apply for authorisation from the Norwegian Medicines Agency and the Norwegian Directorate of Health in order to prescribe the drug, and remains a controversial and heated topic of debate. The majority of available published studies examining the perspectives of physicians’ towards medical cannabis display positive attitudes towards the therapeutic potential of cannabis and it being available by prescription.

**Objective:** To uncover, for the first time, the knowledge, experiences and attitudes of physicians’ in Norway towards medical cannabis.

**Methods:** A cross-sectional survey consisting of 31 close-ended items that capture the demographics of respondents as well as knowledge on central cannabis-related themes, experience with cannabis in a clinical setting and attitudes on cannabis in medicine.

**Results:** 102 physicians’ participated in this study (34% response rate). A majority of those with an opinion agreed that cannabis is a legitimate treatment option (n = 45, 62%), and the vast majority indicated that medical cannabis is a therapeutic agent for treating cancer and chemotherapy induced side effects (n = 88, 86%) as well as have the potential to reduce unnecessary opioid use in patients with chronic pain (n = 45, 75%). Of those with an opinion, acceptance was found towards medical cannabis being available by prescription (n = 32, 52%) and a slight majority of physicians’ would prescribe cannabis if they were eligible to do so (n = 29, 51%). Statistically significant differences were found between subgroups in the sample such as: years of practice, gender, specialty, age, place of obtaining medical diploma and practice type.

**Conclusions:** As the majority of studies assessing medical cannabis this study found acceptance of cannabis as a therapeutic agent as well as acceptance towards medical cannabis being introduced by prescription in Norway. Further large-scale in-depth studies are warranted on provider perspectives towards medical cannabis.

**Key words:** medical cannabis, physicians’ perspectives, attitudes, experiences, knowledge, drug policy.
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1 Introduction

The use of cannabis in world history is extensive, firmly predating the written and historical record (Pisanti, 2016). Medical cannabis is a treatment option that has become a hot topic of debate within academia, medicine and policymakers in Norway (Kristensen and Mlodozeniec, 2017). Controversies relating to its legal status, ethical- and societal implications associated with its consumption, ill effects on health attributed to cannabis intoxication as well as a myriad of calls for its therapeutic properties partially represents some of the complexities surrounding medical cannabis. The drug, once frequently utilised by physicians’ for an array of medical conditions, has undertaken a course as a commodity widely used across the globe for a wide range of purposes (e.g., rope, fibre, food and medicine), to being subject to prohibitionist international laws in which spurred governments all over the world to criminalise cannabis (Pertwee, 2014). Despite widespread prohibition, numerous patient groups have reported using cannabis for analgesia and psychological relief (Clarke et al., 2004). To date, 29 states in the U.S have introduced cannabis for medicinal purposes with several states expecting to follow (EMCDDA, 2016). Moreover, more than 20 countries in Europe and several countries in Latin American have granted regulatory approval for cannabis-based formulations for medicinal purposes.

The debate surrounding medical cannabis contains polarising views and centres around the notion that cannabis possesses significant therapeutic properties, the notion that cannabis is addictive and associated with physical- and cognitive impairment as well as concerns related to spill over effects (i.e., increased recreational use) if made available to patients (Sznitman and Bretteville-Jensen, 2015). Reports indicating the potential therapeutic effects and values of cannabis constitute a formidable body of literature (Joey et al., 1999; Abrams et al., 2007; Wilsey et al., 2008; Elis et al., 2009; Bushlin and Rozenfeld, 2010; Ware et al., 2010; Whiting et al., 2015; Abrams et al., 2007; Blake et al., 2006; Robson, 2013). Likewise, there are plentiful of concerns posed towards the potential addictive nature of cannabis (Schlossarek et al., 2016; Hall, 2015; Budney et al., 2004), yet such evidence remains weak and suggests cannabis to hold lower probability of dependence compared with traditional opioid medications (ICSDP, 2015). Moreover, some scientific research point towards that the legalisation of medical cannabis has had no significant impact on public health and safety,
consumption or related adverse effects (Nussbaum et al., 2011; Hall and Weier, 2015; Sznitman and Zolotov, 2015; Ziemianski et al., 2015). Moreover, the legal introduction of medical cannabis has reported to increase safety and awareness of patients as users are no longer breaking the law (Troutt and DiDonato, 2015). Such findings partially provide the basis for the ongoing shift in attitudes towards re-introducing medical cannabis by governments worldwide. In 2016 the Norwegian Medicines Agency in conjunction with the Norwegian Directorate of Health formalised new guidelines in which enables specialists to apply for permission to prescribe cannabis to patients. This application process is strictly regulated and there is only one reported incident by which a patient has been granted approval to receive cannabis as medical treatment in Norway (Statens Legemiddelverk, 2018). Furthermore, this particular study was conducted on foot of regulatory developments and debates in Norway whereby the parliament passed a majority vote towards decriminalising drugs (Stortinget, 2017). It is fair to assume that the unravelling of prohibitionist drug laws represents a key milestone for proponents of medical cannabis being re-introduced into the armamentarium of physicians’ in Norway. Consequently, a calmer, more balanced assessment of the key components surrounding medical cannabis is needed in order to guide policy debates.

1.1 Rationale and research objective

In recent years increased attention has been placed towards assessing the knowledge, experiences and attitudes of physicians’ on the matter. Scholars have inferred that knowledge, socio-political factors, and legislation are components of utmost significance in any discussion surrounding the legalisation of medical cannabis (Rubens, 2014). As medical expert’s physicians’ are key agents on any issue surrounding the delivery of healthcare services, and are thus key agents for change. Consequently, it is essential to obtain the perspectives of physicians’ on any issue surrounding new or alternative ways of delivering healthcare services. Despite increased interest in physicians’ perspectives on medical cannabis such research studies are still scant, and are predominantly conducted in countries by which have already made medical cannabis readily available as a treatment option. Moreover, no such studies have ever been conducted in Scandinavia, let alone in Norway. The main aim of this thesis is to uncover the knowledge, experiences and attitudes of physicians’ in Norway towards medical cannabis, and hence, contribute towards filling the current void in the
literature on the perspectives of physicians’ towards medical cannabis in healthcare systems where medical cannabis is not readily available as a treatment option. Furthermore, the thesis will provide particular attention to subgroups of physicians’ such as: age, years in practice, gender, place of obtaining medical diploma and practice type in order to answer the following research questions:

1) Do physicians’ in Norway view cannabis as a legitimate treatment option, and, for what medical conditions may cannabis hold therapeutic value?

2) What is the position of physicians’ in Norway towards introducing medical cannabis by prescription in Norway, and, what are the justifications for their stance?

Empirical evidence on the perspectives of physicians’ in Norway towards medical cannabis is essential in order to determine whether or not the government authorities and the Norwegian Medicines agency should revise current policies and guidelines surrounding medical cannabis. Moreover, the study will yield unique information for other countries debating the future role of medical cannabis within their respective healthcare systems.

1.2 Structure of the thesis

Chapter 1 provides a brief introduction to the general field of study in which this thesis is placed as well as outlining the overall aim, rationale and research questions of the current study.

Chapter 2 elaborates on the general field of study whereby providing important background information on cannabis, its history, the current state of medical cannabis worldwide and in Norway, the pharmacological- and adverse effects of cannabis as well as a thorough literature review of previous research studies conducted on physicians’ perspectives towards medical cannabis.

Chapter 3 provides details surrounding the methodological approach of the current cross-sectional study.
Chapter 4 presents the results of the overall study and statistical analysis.

Chapter 5 sets out to discuss the results of the current study as well as identify similar and diverging findings within previous research studies on provider perspectives towards medical cannabis.

Chapter 6 summarises the entire thesis and provide concluding remarks of the current study. The chapter elaborates on the implications of the study, its limitations as well as provide suggestions for future research.
2 Background

The main purpose of this chapter is to establish the significance of the general field of study of this thesis as well as identify gaps in the current available literature in order to pinpoint where new contributions can be made. This chapter will encompass key components related to medical cannabis and, thus provide the reader with the necessary background information on the context by which this thesis is placed. More specifically the chapter will, firstly, define cannabis and its pharmacology. Secondly, the chapter will provide an account of the history of cannabis including its legal status both internationally and in Norway as well as outlining the current state of medical cannabis worldwide to date. Thirdly, a brief summary of adverse- and therapeutic effects associated with cannabis will be presented. Lastly, the chapter will elaborate upon previous research conducted on the perspectives of healthcare providers towards medical cannabis.

2.1 Defining cannabis

Cannabis is the most popular psychoactive drug worldwide with approximately 183 million people (2.5% of the world population) consuming it annually (UNODC, 2017). Due to its high demand all over the world a large variety of names have emerged. Some of the most widely used names are described here. The term Marijuana or “Marihuana” is traditionally applied to the recreational use of the drug. Another much used term for its recreational use is “Weed”. The term “Hemp” usually refers to the cannabis plant when it is used as a source of fibre for rope or textiles. These terms are by and large inexact and unscientific, thus they will not be chosen to describe the drug in this thesis. Instead, the scientific name “Cannabis” will be persistently be used in order to describe the Cannabis Sativa and Cannabis Indica plant, except for if there is need to specify certain phrases (e.g., Marijuana tax act).

Among studies on cannabis it is common to set off by defining the drug as a substance in which its material is derived from the female hemp plant Cannabis sativa or Cannabis indica (Inverson, 2007; Room et al., 2010; Corrigan, 2008; Russo, 2007 and Mclaren et al., 2008). Medical cannabis refers to the use of herbal cannabis or cannabinoids as medical therapy in order to treat disease or provide symptom relief (Amato et al., 2017). Cannabinoids are considered to be the main biologically active compounds of the cannabis plant. Cannabis
contains over 750 different chemical compounds by which 104 are pharmacologically active cannabinoids (Corrigan, 2008). The two most prominent compounds are known as Trans-$\Delta^9$-tetrahydrocannabinol (THC) and Cannabidiol (CBD). Although progress is being made, the majority of the remaining compounds are not yet fully understood (Obberbarscheidt, 2016). THC is the primary psychoactive constituent of cannabis whereas CBD has no such effects. Rather CBD is said to be antagonistic to THC (Bergamaschi et al., 2011). The potency and properties of all the pharmacological active compounds in cannabis vary depending on growing conditions and strand, and the level of THC is said to be increasingly concentrated over the years due to new breeding practices (Corrigan, 2008; Mclaren et al., 2008).

There are numerous of different formulations of cannabinoid-based drugs used for medical purposes. The material of herbal cannabis stems from the dried leaves, stems and flower buds of the *cannabis sativa* plant and is, essentially, the same form that is sold illicitly (Iverson, 2007). During the last decades pharmaceutical companies have developed numerous of synthetic versions of cannabis (e.g., Nabilone, Marinol, Dronabidiol, Sativex) which are, to a varying extent, utilised in many healthcare systems across the world as medicine for symptom relief for a wide range medical conditions (NASEM, 2017).

### 2.1.1 Mechanism of action: The Endocannabinoid system

The Endocannabinoid system (ECS) was discovered in 1992 and is, in layman’s terms, a biological system located in the central nervous system in which constitutes the mode of action by which cannabinoids elicits its pharmacological effects (Aizpurua-Olaizola et al., 2016; Donvite et al., 2017). The regulatory properties of the ECS involves a wide range of physiological and cognitive processes including fertility (Klein et al., 2012), pregnancy (Wang et al., 2006), pre- and postnatal development (Fride, 2004), appetite, pain-sensation, mood and memory (Donvite et al., 2017) among others (Lee, 2012; IOM, 1999). The discovery of the ECS has spurred interest in medical cannabis and has emerged as a relevant pharmacological target for the management medical conditions in which affect the regulatory physiological- and cognitive processes mentioned above.
2.2 History of cannabis

There are plenty of examples within the history of pharmacology of different drugs being administered by physicians’ as a sort of panacea, which later became neglected and even forgotten following clinical observations. This is certainly true in relation to cannabis, which was a popular treatment option for a multitude of diseases during the 19th century until being completely removed from the official pharmacopoeia during the 20th century and subsequently partially reviving close to the new millennium (Pisanti, 2016). The modern history of cannabis is unique as its medical applications have been intensely affected by economic, social- and ethical issues. However, attitudes are changing in light of the discovery of the ECS and recent scientific evidence about the safety and efficacy of cannabinoid-based drugs (IOM, 1999). During the 20th century the destiny of cannabis was deemed to be that of a substance of misuse and abuse, which in turn led to it being demonised by the public, neglected by governments and the medical community altogether. This has not always been the case and therefore knowing the history of cannabis is beneficial in order to fathom its contorted course in medicine.

2.2.1 A brief history of medical cannabis

The earliest recorded usage of cannabis for medicinal purposes dates back to 2700 BCE in China from the Pen-‐ts’ao Ching, which is the world’s oldest pharmacopoeia (Russo, 2007). The pen-‐ts’a Ching acknowledged cannabis as a therapeutic agent for well over 100 ailments, including rheumatic pain, malaria and constipation (Robson, 2001). As use of cannabis increased in China, it spread westward reaching India by 1000 BCE (Touw, 1981). In India cannabis use became widespread both recreationally and medically. Cannabis became introduced into religious practices and is mentioned in the Holy Scripture Atharva Veda as a sacred plant of Hinduism (Zuardi, 2006). Due to its use in religious contexts, it became possible to explore medicinal purposes for the plant, which in turn led to the discovery of a multitude of potential usages of cannabis such as an analgesic, anesthetic, anti-inflammatory, anticonvulsant and an antibiotic (Zuardi, 2006). Such properties enabled the application of cannabis to remedy several diseases including rabies, anxiety, rheumatism, epilepsy and various respiratory conditions. Cannabis use continued to spread and there are subsequent
records of its use throughout the world as well as in all the ancient cultures including: Scythian, Egyptian, Greek, Latin and Arabic civilisations (Russo, 2007). In Europe accounts of the therapeutic use of cannabis were manifested by the works of Galen, Pliny and Dioscorides and remained influential for over 16 centuries (Robson, 2001).

Irish physician William O’Shaughnessy provided the first modern account of the therapeutic properties of cannabis during the mid-19th century (MacGillivray, 2015). O’Shaughnessy had, through his practice in India, been dedicated to studying the properties of cannabis by conducting experimental research on animals and subsequently on patients who suffered from conditions such as epilepsy, cholera, tetanus or rheumatic disorders. Based on his observations O’Shaughnessy found cannabis to have both analgesic and sedative properties (Russo, 2007). Although cannabis had no curative properties in relation to tetanus and rabies, he observed it to be a powerful remedy for its symptoms, thus suggesting that it could be utilised as an adjuvant.

At approximately the same time, French psychiatrist Jacques-Joseph Moreau, considered the father of modern psychopharmacology, conducted extensive experimental research on cannabis during the mid-19th century (Pisanti and Bifulco, 2016). By self-administering cannabis to himself and his students Moreau rigorously described the acute psychoactive effects, which correlated with previous observations from Arabic countries by which cannabis use was custom. Following his observations Moreau administered moderate doses of cannabis to his mental patients at the Hôpital de Bicêtre, whereby discovering its efficacy in calming patients, suppressing headaches and increasing the appetite of patients (Pisanti and Bifulco, 2016). These discoveries, which were followed by other physicians’, provided the basis for cannabis being widely spread throughout Europe and Northern America. The Ohio State Medical Society reported in 1860 a wide range of therapeutic applications of cannabis, which in turn spiked cannabis consumption for medical purposes across the western hemisphere (Hand et al., 2016). Its consumption peaked during the mid-nineteenth century and was readily available over the counter in pharmacies as a “one day cough cure” (Mikuriya, 1969).

During the twentieth century cannabis consumption for medical purposes declined due to several factors. The development of synthetic analgesics such as aspirin and chloral hydrate
and the development of the hypodermic needle in conjunction with the application of opiates rapidly became a popular in pain management due to its water solubility, injectability and quicker effects, which in turn reduced the demand for cannabis as a remedy for pain (Zuardi, 2006). Moreover, a lack of standardised guidelines in dosing cannabis as well as significantly stricter quality controls on commodities imported from India, a large producer of cannabis at the time, diminished its popularity as medicine (Pisanti and Bifulco, 2016), which in turn arguably made the drug more susceptible to the later political influences throughout the 20th century (Hand et al., 2016). During the 1930s there was an overall increase in recreational use of cannabis in the United States, which in turn spiked political interest to criminalise its use. Cannabis became illegal in the U.S following the Marijuana Tax Act in 1937, which became a highly influential piece of legislation in which spurred governments all over the world to adapt similar laws (Musto, 1991). In 1941 cannabis was removed from the American Pharmacopeia, which effectively made the medicinal use of cannabis non-existent (Mikuriya, 1969).

During the early 1970s recreational use of cannabis increased rapidly as it became a symbol for peace within hippie movements across the world protesting against the Vietnam War (James, 1989). This brought cannabis into the public- and political limelight and, in conjunction with, the discovery of the main pharmacological active component Trans-$\Delta^9$-tetrahydrocannabinol (THC) by Gaoni and Mechoulam in 1964 interest in the therapeutic properties of cannabis was once again sparked (Zuardi, 2006). In 1985 the American Food and drug Administration granted pharmaceutical companies permission to develop THC based preparations (e.g., Dronabinol and Nabilone), and thus cannabinoids were once again added to the armamentarium of physicians’ in numerous of countries (Krecevski-Skvarc et al., 2018).

### 2.2.2 International drug conventions

Since discovering the psychoactive properties of cannabis the drug has been a subject of fierce debate, which usually have formed the basis for some degree of restriction towards its use (Ballotta et al., 2008). A key development diminishing the medicinal use of cannabis stems from the advent of numerous international conventions on drugs during the 20th century. The establishment of an international legal framework for the regulation and
prohibition of cannabis has gone through multiple stages with numerous of conventions ratified during the 20th century (Belenko, 2000). The current international legislation encompassing cannabis stems from the United Nations single convention on Narcotics Drugs in 1961, which extended the reach of international drug regulation to include the cultivation of drug-producing plants (UN, 1962). Under the convention all cannabis related products were classified as dangerous narcotics with a high potential for abuse and no accepted medicinal value. This classification echoed the notion that cannabis was a “gateway drug” to the most toxic opiates (Pertwee, 2014). A decade later, a protocol was employed in order to modify the 1961 Single Convention by further strengthening its policy in regards to the production and trafficking of narcotics as well as its illicit use. In 1981, the United Nations General Assembly voted to petition the Economic and Social Council to formulate a convention in order to integrate both the 1961 and 1971 conventions known as the Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances, which further refined earlier treaties (UN, 1988). The Convention has been ratified by more than a hundred nations and represents the current International law to date.

2.2.3 The current state of medical cannabis

During the last decades there has been considerable changes both in the attitudes of the medical community and to the policy landscape surrounding medical cannabis. In most countries medical cannabis has been introduced as a treatment option for terminally ill cancer patients. However, some countries have broadened the indications for using medical cannabis whilst other countries maintain tight restrictions towards its use (Ablin et al., 2016). To date, 29 U.S states have legalised medical cannabis whereby 8 have opened up for its recreational use. The liberalisation of medical cannabis legislation has been echoed by numerous of other countries whereby cannabis formulations have been granted regulatory approvals in Canada, Israel, Russia and Turkey as well as 21 European countries (Krcevski-Skvarc et al., 2018). Moreover, several countries in Latin America (e.g., Argentina, Colombia, Mexico, Peru, Brazil and Chile) have legalised medical cannabis (Gostin et al., 2018).
2.3 Cannabis in Norway

Much like in many other western countries, cannabis extracts were readily available in Norwegian pharmacies until the 1950s (Fekjær, 2009). As a recreational drug cannabis was first introduced within the jazz scenes in Oslo and Bergen during the 1930’s, however, its popularity spiked during the 1960’s in line with the hippie movement and anti-Vietnam war rallies (Hauge, 2009). Following this movement a sense of public- and political moral panic was unleashed, which was fuelled by the classification of cannabis by international law as being as dangerous as other much feared opiates such as heroine. Cannabis smokers became looked upon as a source of contamination and a danger to society as a whole, and henceforth led to the criminalisation of cannabis in 1965 in Norway (Sandberg and Pedersen, 2010).

There are no available data on the magnitude by which cannabis is used as medicine in Norway a part of a handful of anecdotal reports of individuals (Sandberg and Pedersen, 2010). The European Monitoring Centre for Drugs and Drug addition (2012) estimates that approximately 50% of Oslo’s population have previously tried cannabis whereas 5.1% of the entire Norwegian population had reported to use the drug in 2005, which make cannabis the most popular illicit drug in the country.

2.3.1 Norwegian legislation on cannabis

Cannabis was made illegal in Norway in 1965 and during the following two decades penalties for cannabis related offences became significantly more stringent (Sandberg and Pedersen, 2010). Following the extensive international efforts during the 1980s the Willoch-administration introduced the highest possible penalty (21 years of imprisonment) in 1984 for the most severe drug violations, which effectively made Norwegian drug policy the strictest of its kind in Scandinavia (Brettville-Jensen, 2011). Later, based on prosecutions and case law from the Supreme Court, smaller doses of cannabis has usually been punished by the way of monetary fines and community service. This was later formalised by the attorney general in 1998, however, no changes has been made to the legislation (Brettville-Jensen, 2011). During the fall of 2017 the Norwegian parliament passed a vote to decriminalise all drugs, thus
revision of the current legislation is estimated to take place within few years (Independent, 2017).

2.3.2 Medical cannabis in Norway

Apart from cannabis extracts being available in pharmacies prior to 1950, and a handful of anecdotal evidence (Sandberg and Pederson, 2010), there has been no reported use of the cannabinoid based medicine until Sativex, an oromucosal spray containing a cannabis extract, was granted regulatory approval in 2012 based on its proven efficacy as remedy for symptoms in MS patients (Gramstad and Sagabråten, 2012). Furthermore, in 2016 the Norwegian Medicines Agency, in conjunction with the Norwegian Health Directorate, introduced new guidelines on medical cannabis whereby medical specialists’ may, upon request from patients, apply for exempt in order to legally prescribe cannabis for medicinal purposes. The process entails the prescribing physician’ to write a formal application in which must provide a medical rationale for prescribing an illegal substance to a patient. A board consisting of members from the Norwegian Medicines Agency and the Norwegian Health Directorate then reviews the request. Based on their approval a select number of patient groups may be exempted from the legal barriers of obtaining medical cannabis. Although not specified, the guidelines are confined to a small patient group suffering from severe conditions (i.e., end of life and late stage cancer) whereby first-line treatment has been insufficient or resisted altogether. There is only one reported incident by which where a patient in Norway have received regulatory approval for using herbal cannabis for medicinal purposes (Statens Legemiddelverk, 2018).

2.4 Adverse effects of cannabis

Although concerns of side effects associated with medical cannabis medications are on the rise (Volkow et al., 2014; Hall and Dagenhardt, 2015), most scientific literature on the adverse effects of cannabis consumption is derived from recreational use of the drug. As the legalisation of medical cannabis may entail the introduction of herbal cannabis through prescription it becomes appropriate to discuss the adverse effects of recreational cannabis use
in the context of medicinal use as it is in and by itself the same substance.

The available literature on adverse health effects associated with recreational cannabis use is extensive. The European Monitoring Centre for Drugs and Drug Addiction (2016) report that over 20 books on cannabis are published alone each year. Specialised and scientific literature far exceeds this. As a recreational drug, cannabis has generally been considered a soft drug and to be far less harmful than illicit psychoactive drugs such as heroin, cocaine and amphetamine, but also legal substances such as tobacco and alcohol (Witton, 2008). This is mirrored by scientific research on harms of drugs whereby cannabis is consecutively rated among drugs with low toxicity (Kelly and Nappe, 2018; Lachenmeier and Rehm, 2015). Moreover, it has been suggested that the adverse physical effects attributed to cannabis use stems from its intimate relation to tobacco use (Macleod and Hickman, 2010).

The physical effects associated with the consumption of cannabis are relaxation of bronchial passages, red eyes, increased heart rate and dry mouth (UNODC, 2017). The effects on human behaviour by cannabis consumption is said to depend on the amount consumed and its potency as well as previous experience and present use setting (Hall, 2015). However, the most prominent behavioural effects are reported to be feelings of euphoria, altered perception of time, sleepiness, anxiety and paranoia (Hall, 1998). Incidences of anxiety and paranoia are depicted as rare, and other pleasurable effects such as laughter and relaxation tends to be more common among frequent users (Witton, 2008). Death attributed to cannabis overdose is not yet been recorded and more generally acute toxicity is rare compared with other psychoactive drugs (Hall, 2015; Corrigan, 2008).

There is little certain evidence of long-term effects due to the lack of valid studies providing necessary epidemiological evidence on the health outcomes of long-term cannabis consumption (Hall, 1998; Witton, 2008). Nonetheless, excessive chronic use of cannabis has been linked with various adverse effects on human health such as respiratory disease and cognitive impairment (Hall, 1998). Moreover, its use has been associated with what is known as “cannabis dependence syndrome”, which entails withdrawal symptoms such as depression and insomnia (Hall, 2015; Budney et al., 2004). However, such reports are uncommon and the risk of becoming addicted to cannabis is considered to be low compared with any opioid medications (Fattore et al., 2005; Hall, 2015).
More concern has, however, been posed towards the impact cannabis use may have on mental health. Historically cannabis use has typically been correlated with increased risk of psychosis (Andréasson et al., 1987; Hall, 2001, Room et al., 2010). Additionally, other studies conclude that there is a positive relationship between higher potency of cannabis and incidence of schizophrenia and psychosis (Zammit et al., 2002; Henquet et al., 2004; Verdoux et al., 2002). According to Witton (2008) there is some evidence in which supports that a small group of cannabis users might be more prone to the psychotic effects of cannabis. However, evidence linking cannabis use with psychosis and schizophrenia are profoundly contentious due to a lack of scientific support. Cannabis use has substantially increased over the recent decades whereas incidences of psychosis and schizophrenia have remained unchanged (Macleod and Hickman, 2010).

2.5 Therapeutic effects of cannabis

According to anecdotal evidence the applicability of cannabis seems endless and have, thus, by some, been classified as a panacea. The diverse properties of cannabis has been eloquently described by Di Marzo et al. (1998), who stated that “cannabinoids help you feel less pain, control your movement, relax, eat, forget, sleep and protect your neurons” (p:522). Assertive claims of the therapeutic effects of both single cannabinoids (natural or synthetic) as well as plant formulations have been a prominent driving force for conducting clinical studies. However, despite the legal introduction of medical cannabis in numerous countries worldwide, conclusive evidence on the short- and long-term effects of cannabis remains elusive. Due to the prohibitionist policy landscape there has traditionally been a lack of scientific research on the drug, which in turn has resulted in a lack of information on health implications of cannabis consumption. In contrast to other substances such as opioids, no accepted standards exists in order to guide healthcare professionals and patients on issues surrounding, when, where, and how to consume cannabis safely in order to obtain the desired therapeutic effects. Nevertheless, further scientific- and clinical efforts are currently underway in order to bridge this gap in order to establish consensus on the therapeutic potential and issues surrounding dosage and potency of medical cannabis (NASEM, 2017). The following section will outline some of the most notable medical conditions in which medical cannabis is
sought to hold therapeutic value.

2.5.1 Chronic pain

The potential benefits of cannabinoids in treatment of neuropathic pain have been a key area of research producing compelling laboratory evidence towards its use (Walker and Hohmann, 2005). Several studies in the U.S have indicated that the vast majority of patients seeking cannabis treatments cite pain relief as a primary motivation (Light et al., 2014; Ilgen et al., 2013). The efficacy of cannabis in pain management has yielded positive results in numerous patient groups (Whiting et al., 2015; Elikottil et al., 2009; Abrams et al., 2007; Blake et al., 2006). Moreover, there is some evidence that point towards that patients suffering from arthritis and chemotherapy induced side effects are replacing the use of conventional pain medications (e.g., opioids) with cannabis (Boehnke et al., 2016; Bachuber et al., 2014; Carter et al., 2011). Consequently, the utility of cannabis in pain management has become a focal point for proponents of medical cannabis as it might serve as a partial solution to the on-going opioid epidemic in many western countries (Hurd, 2016). Additionally, compelling laboratory evidence has proven THC and CBD to have anti-inflammatory and analgesic properties, thus suggesting cannabinoids to be effective for treating inflammatory pain (Robson, 2013). A survey among patients using medical cannabis in the U.K reported a considerable amount of respondents using the drug for treating pain due to arthritis (Ware and Adams, 2005).

2.5.2 Multiple sclerosis

The current available treatment options for relieving several symptoms of MS such as spasticity, neuropathic pain and tremor are often deemed inadequate, especially in regards to tolerability (Robson, 2013; Killestein et al., 2002). Several anecdotal accounts by MS patients’ points towards that cannabinoids may be an effective therapeutic agent for the majority of such symptoms (Grinspoon and Bakalar, 1993). Based on such accounts a handful of pioneering clinical trials were conducted whereby the vast majority found encouraging results (Petro and Ellenberger, 1981; Meinck et al., 1989; Consroe et al., 1997). Such findings spurred interest in conducting studies of larger scales in which proved the efficacy of cannabinoid based medications in managing symptoms of MS (Zajicek et al., 2003; Langford
et al., 2013; Serpell et al., 2013; Kavia et al., 2010; Collin et al., 2007). Based on such findings Sativex was granted regulatory approval in 21 countries (including Norway) for the treatment of spasticity in MS patients (Statens legemiddelverk, 2018).

2.5.3 Nausea and vomiting in cancer patients

Compelling laboratory evidence suggests that THC and CBD are effective at managing nausea and vomiting (Parker et al., 2011). Moreover, an abundance of pioneering studies conducted in the U.S during the 1980s revealed that cannabinoid based medications significantly improved nausea and vomiting in cancer patients (Penta et al., 1981; Levitt, 1986; Whiting et al., 2015). In light of such evidence countries across the world have approved THC and CBD formulations for managing vomiting and nausea in cancer patients (Amato et al., 2017). This notwithstanding, cannabis-based formulations are rarely categorised as first-line treatment and usually only prescribed if traditional forms of treatment provide insufficient symptom relief or are resisted altogether (Robson, 2013).

2.5.4 Weight loss

A frequently cited anecdotal observation from recreational users of cannabis is that of “the munchies” – a term used for increased appetite. Laboratory research on cannabinoids has determined that both THC and CBD hold properties in which stimulate appetite (Kirkham and Williams, 2001). This has been echoed by numerous of clinical studies on cancer- and HIV/AIDS patients in which suggests that cannabinoid medications help facilitate weight gain and improve the quality of life of patients (Beal et al., 1995; Beal et al., 1997; Plasse et al., 1991; Abrams et al., 2003; Whiting et al., 2015). Such findings provided the basis for the use of Dronabinol (synthetic THC) to be expanded to include treatment of Anorexia and weight loss in HIV/AIDS patients in numerous countries (IOM, 1999).
2.5.5 **Epilepsy**

Numerous of cannabinoids have by laboratory evidence been found to have sound anti-convulsive features, which in conjunction with the established notion that the ECS and the central nervous system are central in modulating seizure activity, make cannabinoids a natural target as a remedy for epilepsy (Jones et al., 2010). However, to date, there are no studies conducted in which confirms the efficacy of cannabinoid medications towards the management of epilepsy.

2.5.6 **Parkinson’s disease**

Scientific evidence demonstrates that the ECS influence neurodegenerative processes, which consequently suggests that cannabis may be effective for treating the symptoms of neurodegenerative diseases (NASEM, 2017). Moreover, a growing amount of laboratory research studies have found that cannabinoids, most notably CBD, possesses antioxidant, anti-inflammatory as well as anti-excitotoxic properties that might enhance symptom relief in neurodegenerative diseases (de Lago and Ruiz, 2007). However, common for many neurological diseases (e.g., Tourette’s syndrome and Parkinson’s) is an abundance of anecdotal evidence accompanied by a handful of small clinical trials demonstrating beneficial effects of THC (Robson, 2013). Consequently, there is limited firm clinical evidence validating the utility of cannabis-based formulations for neurodegenerative diseases.

2.5.7 **Anxiety and depression**

The ECS has been found to influence mood regulation and thus it has been suggested that cannabis may hold therapeutic value for mental health disorders such as depression and anxiety (Donvite et al., 2018). This notwithstanding, there is limited clinical evidence confirming cannabis to be effective in treating both depression and anxiety (NASEM, 2017).
2.6 Healthcare provider perspectives towards medical cannabis

This section will entail an elaboration of previous research conducted on healthcare providers’ perspectives on medical cannabis and will predominantly draw upon survey-based quantitative research studies from both scientific journals and research articles obtained by conducting systematic searches using computerised databases such as: EBSCO, PubMed and Google Scholar. As outlined in chapter 1 cannabis may come in different formulations (e.g., herbal cannabis and synthetic cannabis formulations). In line with most available studies within this field, the following literature review will not distinguish between various types of cannabis drugs. The majority of available research studies on healthcare providers’ perspectives towards medical cannabis have been conducted on physicians’, however; some have included nurses and physician assistants in their sample. Due to the shortage of available research studies this literature review will include the minority of studies by which have included other professions in their sample. Furthermore, the following literature review will be of thematic design and systematically identify core relationships and patterns within available research studies as well as address any opposing evidence in regards to provider perspectives towards medical cannabis. In line with the title of the thesis, this review will be organised in the following thematic sections: attitudes, experience and knowledge.

2.6.1 Attitudes on legitimacy, adverse effects and therapeutic potential of cannabis

The earliest reported study on physicians’ attitudes on medical cannabis was conducted by Doblin and Kleinman (1991) in which surveyed 1035 oncologists in the U.S before the drug became legal in any American state. The study found that a majority (n = 652, 63%) of respondents viewed cannabis as a legitimate therapeutic agent. 79% of those with an opinion viewed cannabis as effective for treating nausea. It was also indicated that smoked cannabis is as safe as synthetic THC (Marinol), however, oncologists preferred to recommend herbal cannabis due to it being easier to self-administer for individual symptom alleviation. In another study conducted by Utritsky et al. (2011) 209 healthcare providers in hospice care, whereby nurses constituted the majority of the sample (n = 131, 68.6%) and only included a small number of physicians’ (n = 13, 6.8%), were surveyed on medical cannabis. A clear
majority (n = 180, 86%) indicated that medical cannabis has significant medical benefits in palliative care. Similarly, a recent study on Irish physicians’ found that over half (n = 339, 60%) of physicians’ surveyed agreed towards the notion that medical cannabis might play a role in palliative care, pain management and the treatment of MS (Crowley, 2017). Moreover, a relatively large sample (n = 1446) of physicians’ responded to a web-based poll conducted by the *new England Journal of Medicine* in which displayed a case vignette of an elderly cancer patient and subsequent opposing expert view points on whether or not medical cannabis could be deemed appropriate as a treatment option whereby 76% voted in favour for prescribing medical cannabis (Adler and Colbert, 2013). Additionally, a study conducted on Israeli physicians’ with various medical backgrounds found general acceptance towards medical cannabis as a therapeutic agent (Ebert et al., 2015). More specifically, 79.2% noted that medical cannabis yields therapeutic effects for chronic and terminally ill patients. By the same token, a more recent study on healthcare providers in Washington State by Carlini et al. (2017) showed that 90% viewed cannabis as a therapeutic agent for chronic debilitating conditions. Moreover, in a study conducted in 2016 the majority of Israeli rheumatologists held the stance that cannabis has a role in the management for rheumatic disease (Ablin et al., 2016). Furthermore, in a study containing 228 paediatric oncologists in the U.S almost all respondents (n = 209, 92%) reported willingness to help children access medical cannabis (Ananth et al., 2017). Of these, fewer listed cannabis as an appropriate treatment option for treating patients with curative intent (n = 118, 52%). As many as 89% approved oral formulations (e.g., Nabilone) whereas 57% approved smoking medical cannabis for cancer therapy.

In stark contrast to the above findings is a study of 520 family physicians’ in Colorado (Kondrad and Reid, 2013) whereby only a minority expressing the view that cannabis has benefits to physical- (27%) and mental health (15%). Those physicians’ who recommended its use listed medical cannabis as an effective treatment option for pain, nausea and cancer. The majority of respondents noted that cannabis poses serious mental- (64%) and physical (61%) health risks. Similarly, in a study on 1138 American physiatrists 39% indicated that cannabis offers no medicinal benefit versus 26% who saw benefits in its use while 35% remained undecided on the matter. Of these, 39% were extremely concerned that cannabis use is associated with psychiatric adverse effects (Kweskin, 2013). Moreover, a study on 128 Canadian rheumatologists’ found that only a small proportion (n = 22, 23%) indicated that
medical cannabis has a role in the treatment of rheumatic disorders (Fitzcharles et al., 2014).

Although, the vast majority of studies indicate that physicians’ view cannabis as a legitimate treatment option there are, in line with Konrad and Reid’s (2013) and Kweskin (2013) findings, raised concerns about potential side effects of cannabis use. Brookes et al. (2017) surveyed 114 Colorado-based providers for children, adolescents and pregnant- and breastfeeding women on medical cannabis by which most respondents (n = 98, 86%) associated daily cannabis use with adverse effects. Fewer (n = 50, 44%) associated consumption of cannabis once a week with adverse effects. The study found consensus among healthcare providers that cannabis use during pregnancy is associated with both physical- and mental health risks. Moreover, a large portion (n = 452, 80%) of Irish physicians’ held the stance that cannabis use is associated with impaired mental health and increased risk of schizophrenia. However, Israeli physicians’ were divided as to whether cannabis use may pose any serious mental health risks (Ebert et al., 2015). Oncologists, which constituted 45% of the sample, generally disagreed with the statement that cannabis pose any mental health risk whereas the rest of specialties tended to agree. Moreover, in two studies physicians’ firmly expressed that cannabis use was not associated with addiction (Konrad and Reid, 2013; Charuvastra et al., 2005) whereas other studies indicated physicians’ being undecided on the matter (Carlini et al., 2017; Uritsky et al., 2015).

2.6.2 Attitudes on availability of cannabis through prescription
A majority of studies indicate that physicians’ support cannabis being available by prescription. In 3 studies there is overwhelming support for cannabis being available by prescription: 90% (Utritsky et al., 2011): 88% (Carlini et al., 2017), 85% (Ziemianski et al., 2015). In another study 54 % of oncologists in the U.S were in favour with 38% remaining neutral (Doblin et al., 1991). Similarly, a majority (n = 331, 58.6%) of Irish physicians’ supported medical cannabis being available by prescription (Crawley, 2017). However, In Kweskin’s (2013) study on 1138 American psychiatrists responses were more balanced as 40% would consider prescribing, 37% would under no circumstance prescribe and 11% would prescribe, but only in pill form. By the same token, a study of a relatively large sample (n = 960) indicated that physicians’ in the U.S were undecided as: 36.1% of physicians’ held
the stance that medical cannabis should be available by prescription versus 37.8% opposing and 26% remaining undecided (Charuvastra et al., 2005). On the other hand, Kondrad and Reid (2013) found little support among physicians’ for cannabis being available by prescription as (n = 239, 46%) opposed versus (n=98, 19%) being in favour.

### 2.6.3 Barriers for prescribing medical cannabis

In most studies healthcare providers voice concerns in relation to prescribing medical cannabis. The most cited barriers for prescribing medical cannabis relates to the potential for increased drug abuse and the lack of clinical guidelines and knowledge in relation to dosage and potency (Michalec et al., 2015; Carlini et al., 2017; Kondrad and Reid, 2013; Ziemianski et al., 2015). However, in one study the majority (n = 412, 63%) of paediatric oncologists were not concerned with the risk of drug abuse in children (Ananth et al., 2017). Furthermore, studies found that physicians’ raised concerns in relation to patients wanting to use cannabis recreationally (Carlini et al., 2017, Michalec et al., 2015; Ziemianski et al., 2015; Ablin et al., 2016; Ebert et al., 2015). Moreover, in two studies on rheumatologists in Israel (Ablin et al., 2016) and Canada (Fitzcharles et al., 2014) a majority of respondents expressed a lack of knowledge on medical cannabis, and thus were reluctant to prescribe the drug.

### 2.6.4 Experience of physicians’ with medical cannabis

The experience of physicians’ in encountering medical cannabis in practice has varied considerably between research studies. Doblin et al. (1991) study was conducted before medical cannabis was made legal as a treatment option in the U.S. Nevertheless, a considerable amount of the relatively large sample population (n = 455, 44%) of oncologists reported previously recommending the (illegal) use of cannabis to patients in order to relieve chemotherapy induced side effects. On the other hand, in Kondrad and Reid’s (2013) study of family physicians’ in Colorado about one-third (n = 161, 31%) had never recommended medical cannabis even though the drug had been made legal 12 years prior to the study. In Canada medical cannabis had been available for 15 years when Ziemianski et al. (2015) conducted their study. The vast majority of Canadian physicians’ who responded to the survey (n = 336, 79%) reported having previously been approached by a patient or next kin to
discuss the medicinal use of cannabis, while some respondents (n = 166, 39%) had previously, at least once, initiated a conversation with a patient or next of kin on the use of cannabis as a treatment option. Moreover, two-thirds of respondents (n = 281, 66%) were currently caring for patients using medical cannabis, and 36% indicated to have prescribed cannabis whereby approximately half (51%) had prescribed the pharmaceutical cannabinoid Nabilone whilst 41% had never prescribed pharmaceutical cannabinoids. Furthermore, a considerable proportion of American psychiatrists responding (n = 330, 29%) reported being approached by patients wanting to discuss medical cannabis between 1-5 times a week while 1.5% reported being approached 5-10 times a week whereas 0.5% indicated being approached more than 10 times a week (Kweskin, 2013). In Ablin et al. (2016) study of Israeli rheumatologists’ a majority of the relatively small sample (n = 11, 49%) reported to have prescribed cannabis to patients whereas (n = 9, 39%) indicated to have never done so. Moreover, in Ebert et al. (2015) study the majority of Israeli physicians’ (n = 47, 66%) had come across less than 25 patients using cannabis for medical purposes whilst (n = 17, 23%) had encountered 25 or more whereas (n = 7, 9.9%) had never encountered such patients. Identical findings were captured in regards to how many had encountered patients by which asked for a cannabis prescription. A substantial proportion of the sample (n = 28, 40%) had never recommended cannabis whereas a slightly larger portion (n = 32, 45.1%) had prescribed to less than 25 patients whilst a minority (n = 10, 14.1%) had previously prescribed cannabis to more than 25 patients.

2.6.5 Assessment of physicians’ knowledge on medical cannabis

The level of knowledge on medical cannabis by healthcare providers varied considerably within the available literature. In Israel most physicians’ (n = 57, 80.2%) indicated having “medium-high” levels of knowledge in regards to the pharmacology of medical cannabis. Moreover, two-thirds (n = 53, 74%) indicated the same level of knowledge in relation to “risks and side effects”. When asked about “dosage and ways of administration” fewer (n = 39, 55%) rated their knowledge as “medium-high” or “high”. A significant correlation was found between greater knowledge of medical cannabis and those physicians’ who had previously prescribed it to patients (n = 43, 59.7%) versus those who had not (n = 29, 40.3%) (Ebert et al., 2015). However, according to the vast majority of studies physicians’ generally
express to have either limited or moderate knowledge on medical cannabis. In Ablin et al. (2016) study Israeli rheumatologists were asked to rate their level of confidence on two questions relating to cannabinoids and cannabis. Firstly, respondents were asked to rate their confidence in relation to “current knowledge of the ECS in health and disease” whereby the majority of respondents (n = 10, 43%) indicated “not confident”, fewer (n = 9, 39%) rated being “somewhat confident” and only a small portion (n = 4, 17%) expressed being “confident” while no respondents indicated being “very confident”. Secondly, physicians’ were asked about their current knowledge on cannabinoid molecules by which the vast majority (n = 17, 74%) reported being “not confident”. Correspondingly, a lesser amount (n = 5, 22%) rated being “somewhat confident” and only 1 respondent indicated being “confident”. Less confident were the majority of Canadian rheumatologists’ (n = 95, 75%) surveyed by Fitzcharles et al. (2014) who reported being “not confident” in regards to their current knowledge of cannabinoids. Furthermore, in Brookes et al. (2017) study of Colorado based healthcare providers few (n = 7, 8.3%) felt completely knowledgeable about cannabis and potential health risks associated with its use whereas the majority (n = 50, 49.5%) indicated being “fairly knowledgeable”, a minority (n = 21, 25%) indicating “not knowledgeable” and (n = 5, 6%) rated being “not at all knowledgeable”.

In Delaware, a state where medical cannabis had been available through prescription for 3 years at the time of study, physicians’ generally expressed being “less than knowledgeable” about cannabis for medical purposes (Michalec et a., 2015). On a 5-point Likert scale (1-5) respondents (n = 76) reported the following: 8.8% indicated having “little or no knowledge”, 16.3% felt they possessed “minimal knowledge”, 36.3% expressed being “somewhat knowledgeable”, 35% felt “knowledgeable” and 3.8% indicated being “very knowledgeable” on medical cannabis (Michalec et al., 2015). By the same token, Canadian physicians’ reported a moderate level of knowledge on medical cannabis when asked to indicate current knowledge on a similar 5-point Likert scale (1-5) whereby the mean score in relation to: (1) dosing and creating effective treatment plans was 2.21, (2) safety, warning signs and precautions of patients using medical cannabis was 2.65, (3) potential risks associated with cannabis use was 3.06 and, finally, (4) potential therapeutic effects of cannabis had a mean score of 3.07 (Ziemianski et al., 2015).
2.6.6 Sources of information on medical cannabis

The sources of information by which healthcare providers had obtained their information on medical cannabis varied considerably between different studies. Michalec et al. (2015) found that the most cited sources of information on medical cannabis among physicians’ in Delaware were: medical literature, lectures and seminars, news media and other physicians’, respectively. Somewhat similar findings were found in two other studies both indicating medical literature to be most cited, however, patient experiences was the second most reported source of information (Carlini et al., 2017; Kondrad and Reid, 2013). The fourth study produced divergent results as personal research was most prominently cited followed by the workplace as a source of information (Brooks et al., 2017). Interestingly, only a minor fraction of respondents in two studies indicated lectures as a source of information on medical cannabis, which in turn correspond with Evanoff et al. (2017) findings that almost all residents and fellows reported receiving no education on cannabis during medical school.

2.6.7 Education on medical cannabis

Considering previous studies healthcare providers seem to consistently voice the need for more education on medical cannabis. Research studies in which have inquired about educational needs on medical cannabis have generally, with few exceptions, been conducted on sample populations that are located in healthcare systems where medical cannabis is readily available as a treatment option. In Kondrad and Reid’s (2013) study of 408 family physicians’ in Colorado 81% of respondents’ voice the need for formal training before being authorised to prescribe cannabis. The same respondents’ express desire that cannabis is to be added into the medical curricula. Moreover, 92% held the stance that physicians’ in Colorado should receive continuing education on medical cannabis. Similarly, Carlini et al. (2017) found that 92% of healthcare providers in Washington call for more education on medical cannabis and for its introduction in the medical curricula. These findings are echoed in Michalec et al. (2015) study as physicians’ in Delaware adamantly voice the need for more information on cannabis legislation. Moreover, in Ziemianski et al. (2015) 426 Canadian physicians’ were asked to indicate on a 5-point Likert scale (1-5) the desired level of knowledge physicians’ should have in relation to: (1) dosing and creating effective treatment plans for patients using medical cannabis, (2) safety, warning signs and precautions using
medical cannabis, (3) potential risks of using medical cannabis and (4) potential therapeutic effects of medical cannabis. Responses were computed into means: (1) 3.95, (2) 4.21, (3) 4.23 and (4) 4.17, thus firmly expressing a “high - very high” desired level of knowledge in all survey items. A majority of the sample (n = 259, 61%) stated they would feel comfortable prescribing cannabis if they were formally trained to do so. Furthermore, physicians’ have expressed the need for in-person training and education clinical prevention guidelines (Brooks, 2017) as well as peer-reviewed literature and online training programs as part of continuing medical education (Ziemianski et al., 2015). Consequently, based on the available research on healthcare providers views it is demonstrated strong evidence for educating physicians’ on medical cannabis. Evanoff et al. (2017) conducted a study in which revealed fundamental disparity between state-level legislation on medical cannabis and the absence of training of physicians-in-training to prescribe it in the U.S. The national survey of U.S medical school curriculum deans and fellows at Washington University in St. Louis revealed that two-thirds of deans indicating that their graduates were under no circumstance prepared to prescribe cannabis to patients (Evanoff et al., 2017). Correspondingly, 90% of residents and fellows expressed that they were unprepared to provide cannabis prescriptions to patients. Moreover, 85% reported not receiving any education on medical cannabis. As a result, some scholars have proposed to introduce a “cannabis curriculum” in which encompasses the history, botanical, physiological, clinical and legal issues surrounding medical cannabis for healthcare providers (Ware and Ziemianski, 2015).

2.7 Summary

According to previous research on physicians’ attitudes, experience and knowledge towards medical cannabis there is, with the exception of two studies (Kondrad and Reid, 2013; Kweskin, 2013), overwhelming support towards the notion, that medical cannabis is a legitimate treatment option. The most notable potential therapeutic effects of cannabis were reported to be in palliative care, cancer and multiple sclerosis. However, almost all studies indicated that physicians’ perceive the consumption of cannabis to cause adverse effects, most notably on mental health. On the contrary, the majority of studies did not report physicians’ perceiving cannabis to be addictive. Similarly, the vast majority of studies found that physicians’ thought medical cannabis should be available by prescription, only with the
exception of one study holding a firm stance against (Kondrad and Reid, 2013) and one study whereby physicians’ were undecided (Charuvastra et al., 2005). The most notable barriers for prescribing medical cannabis was stated to be the risk of increased drug abuse as well as a lack of clinical guidelines on dosage and potency.

In regards to previous studies assessing the experience of physicians’ with medical cannabis most reported to (1) engage in discussions with patients about medical cannabis, (2) recommend medical cannabis or (3) prescribe medical cannabis to patients. This, however, is not surprising as studies were generally conducted in states or countries where medical cannabis is legal. Furthermore, there was a general trend in previous research that most physicians’ evaluated their current knowledge on medical cannabis to be moderate. The sources of information by which physicians’ obtained their knowledge on medical cannabis varied considerably between studies, however, few obtained knowledge on medical cannabis through lectures and seminars. Moreover, the current literature provides robust evidence that physicians’ desire more education on medical cannabis.

2.7.1 Gaps in literature and the contribution of this thesis

Despite a slight increase in interest in recent years, the current available literature on healthcare providers’ perspectives on medical cannabis remains inconclusive. Apart from the earliest available study by Doblin and Kleinman’s (1991), studies assessing the attitudes of physicians’ on medical cannabis in states where medical cannabis is illegal is poorly, if not at all, explored. Furthermore, a majority of previous studies have captured views on barriers in relation prescribing cannabis to patients. Considering medical cannabis is not readily available for patients in Norway it is compelling to study what barriers Norwegian physicians’ see as prominent in making such a potential policy change. To the best of my knowledge, no such study has been conducted on physicians’ in Scandinavia, let alone in Norway. This thesis aims to shed light on this field of study by exploring the attitudes, experiences and knowledge of Norwegian physicians’. Moreover, uncovering the perspectives of physicians’ within a healthcare system in which has yet to make medical cannabis readily available to patients provides valuable and much-needed insight not only for the Norwegian
healthcare system, but for other healthcare systems around the world in which are currently debating and revising drug policies. In light of this, the thesis will provide empirical evidence on, firstly, the position of physicians’ towards whether or not they view cannabis as a legitimate treatment option, and secondly, the position of physicians’ on whether or not medical cannabis should be available by prescription in Norway as well as justifications for their stance.
3 Methodology

This cross-sectional study aims at filling the current void in the literature on physicians’ perspectives towards medical cannabis by surveying physicians’ working at Oslo University Hospital (OUS) in order to assess their knowledge, experience and attitudes towards medical cannabis.

3.1 Study design

Following previous studies within the field of study, the research design utilised in this thesis is that of a cross-sectional survey-based quantitative study. A cross-sectional survey entails the collection of data at a single point in time derived from a specified population (e.g., physicians’ practicing in Norway). As noted by Visser et al. (1996), cross-sectional surveys are employed in order to assess the frequency with which people perform certain behaviours or the number of people who hold particular attitudes or beliefs. Moreover, a cross-sectional design offers the opportunity to assess relations between variables and differences between subgroups in a population. Additionally, cross-sectional data may be of useful in order to identify the moderators of relations between variables, thereby also shedding some light on the casual processes at work (Krosnick, 1988).

3.2 Material and sample

This cross-sectional study was carried out at Oslo University Hospital (OUS). OUS is a publicly owned university hospital and serves as a local and acute hospital for the majority of Oslo’s population, but also caters to a substantial amount of patients in Helse-Sør-Øst, which is the biggest out of the four regional health authorities in Norway. Moreover, OUS has a wide range of national functions and is the largest hospital in Norway with a budget exceeding 22 billion Norwegian kroner and currently employs 20,000 staff (OUS, 2018) whereby 2500 are physicians’ (Meyer, 2018; personal communication, 26 February) as indicated in an e-mail correspondence with the HR department at OUS. Moreover, OUS is a
national powerhouse in relation to medical research and medical training. The sample population for this study has been set to include physicians’ currently working at OUS. The sample will include all specialties and will include all practice types (i.e., physicians’ undergoing specialist training and foundation physicians’).

3.3 Measurement

Since there are no reported studies conducted on physicians’ perspectives on medical cannabis in Norway, it was crucial to develop an instrument that closely aligned with theory and had been validated by other research studies. Most previous studies contained similar approaches in obtaining information on knowledge, experiences and attitudes of physicians’ towards medical cannabis. Consequently, the design of the electronic survey instrument used for this study was based on previous research studies (Ablin et al., 2016; Ebert et al., 2015; Michalec et al., 2015; Ziemianski et al., 2015) and modified in order to correlate with the Norwegian healthcare system and the legislation surrounding medical cannabis in Norway.

The electronic survey contained 4 sections and had 31 items. All questions in the survey were close-ended questions. The first section concentrated on knowledge of medical cannabis and contained 10 close-ended questions whereby a combination of Likert-scale questions and multiple-choice questions were presented. Respondents were asked 1) At this time, how would you rate your knowledge about medical marijuana as a treatment option?, and 2) How familiar are you with the process of prescribing medical cannabis in Norway? Participants were provided response categories ranging from little/no knowledge to very knowledgeable (i.e., Likert-scale). Moreover, questions asked to what extent respondents were familiar with various central elements associated with medical cannabis whereby response categories ranging from small/some extent to a great/very great extent. Furthermore, physicians’ were asked to specify from what source(s) they had obtained information about medical cannabis; they were provided a list of various resources to choose from (e.g., medical literature, news media, lectures/seminars, friends/family) but allowed to list others as well – and were able to select multiple sources of information. The final two questions captured what adverse effects physicians’ see as prominent by: indicate which of the following adverse effects are
associated with cannabis whereby respondents were provided a list of adverse effects (e.g., dizziness, hallucinations, dry mouth, impaired memory, depression, anxiety, addiction, respiratory disorders, psychosis and cancer) but allowed for an additional option by which enabled respondents to indicate: cannabis has no therapeutic effects. Moreover, respondents were asked to indicate for what conditions cannabis might have therapeutic effects by: indicate for what disease(s) that cannabis may have therapeutic effects whereby a list of cited conditions were provided (e.g., side effects of HIV/AIDS, side effects of cancer and chemotherapy, rheumatic diseases, glaucoma, epilepsy, anorexia, multiple sclerosis, Parkinson’s, anxiety, eating disorders and Hepatitis C) but allowed to list others as well.

The second section entailed questions on the experience of physicians’ with medical cannabis in a clinical setting. Respondents were asked: 1) have you ever informally recommended cannabis to patients?, and 2), have patients or their next of kin ever inquired about cannabis as a treatment option? In total the section included 4 items by which 3 were binary closed-ended questions with response alternatives: (1) yes, (2) no and (3) don’t know. Conditional to the response in question 2, respondents were asked to indicate how many patients / next of kin had inquired about cannabis as a treatment option. Participants were provided response categories ranging from: less than 10/between 10 and 50 and between 50 and 100/more than 100 as well as a “don’t know” option.

In order to capture physicians’ attitudes towards medical cannabis the third section entailed 11 close-ended questions on various “hot-topics” on medical cannabis. Firstly, respondents were asked to indicate on a Likert-scale (1-5) to what extent they agreed with 5 statements regarding medical cannabis such as: 1) Cannabis is a legitimate medicine and 2), cannabis should become available by prescription in Norway. All Likert-scale alternatives in this section ranged from: strongly disagree/disagree to neither agree nor disagree to agree/strongly agree. The following 3 questions were multiple-choice styled questions whereby two of the items sought to capture why the respondents held their stance in question 2. In the third question respondents were asked to indicate from a list of barriers to which they saw as prominent in making cannabis readily available via prescription (e.g., lack of clinical studies on the therapeutic effects of cannabis, risk of drug abuse, adverse effects of cannabis, lack of information on dosing, financial costs for patients, political resistance and uncertainty.
in relation to interaction with other drugs). Respondents were also given the opportunity to specify any other barriers they saw as prevalent.

The fourth, and final, section contained demographical data such as: age, gender, marital status, place of obtaining medical diploma, specialty and number of years in practice.

There was no time restriction on completing the survey. The consent form can be found in Appendices 1. The survey instrument can be found in full in Appendices 2, and an English version of the survey may be found in Appendices 3.

3.4 Data analysis

Responses obtained from the electronic survey was exported from www.Surveymonkey.com into Excel (version 16) and subsequently exported into Statistical Package for the Social Sciences (SPSS) (version 25).

The sample was analysed as a group and frequencies for each item were tabulated and summarised using counts, percentages, means and standard deviation. Moreover, analysis was done on subgroups (age, gender, years in practice, obtaining medical diploma in Norway or overseas and practice type (i.e., specialists, physicians’ in specialist training).

Independent t-test were computed on two different groups in order to account for any significant variation between subgroups such as: gender, age, years in practice, place of obtaining medical diploma and practice type.

For more than two groups chi-square statistics were computed for group comparison.

For more than two groups a one-way ANOVA analysis was conducted in order to account for
variations between the subgroups such as: gender, age, years in practice, place of obtaining medical diploma and practice type.

0.05 was the chosen significance level for all statistical analysis.

3.5 Procedures

The data for this cross-sectional study was obtained by way of an electronic survey instrument that was developed using www.Surveymonkey.com. The survey was distributed over 4 weeks in February and March 2018. The researcher was not given access to a comprehensive list of e-mail addresses of physicians’ working at OUS. Rather the researcher distributed the survey among department leaders by e-mail, which in turn forwarded the survey to physicians’ working in the respective departments. The researcher was attached in e-mails forwarded to physicians’ by department leaders allowing the researcher to keep track of how many recipients were invited to complete the survey.

The researcher sent follow-up mails after each week in order to thank those who had participated as well as remind others to complete the survey.

3.6 Validity

The survey instrument was reviewed for construct validity by 5 physicians’ working at a local hospital in Oslo in order to make any necessary adjustments to the both the instrument and its instructions. These physicians’ were not included in the final study. In accordance to their comments, minor changes were made to the original survey instrument, mostly in relation to medical terminology, but also some in regards to the overall functionality of the instrument.

A strength of this study lies in its adaptation of previously tested and validated survey instruments in which enhances content validity (Ablin et al., 2017; Ebert et al., 2015; Michalec et al., 2015; Ziemianski et al., 2015). However, as there are no previously validated instruments available assessing physicians’ knowledge, experiences and attitudes towards
medical cannabis in Norway certain calibrations were made to the current survey instrument, which in turn may affect internal validity.

### 3.7 Limitations

OUS employs the largest amount of physicians’ out of all hospitals in Norway. The unique characteristics of OUS such as its sheer size and prominence in relation to medical research in Norway might provide the basis for unique organisational cultures by which certain beliefs, attitudes, values and norms are attached. Therefore, it is necessary to acknowledge that certain institutional- and regional differences might exist. Consequently, a limitation of external validity of this study lies in only obtaining data from one hospital, meaning the sample population is not generalisable to the whole population of physicians’ in Norway.

### 3.8 Ethical considerations

This study was approved by the Norwegian Centre for Research (NSD) (See Appendices 5) prior to the distribution of the survey instrument. Moreover, authorisation to conduct the study was granted from the research department at OUS (see Appendices 4).

No external funding was received for conducting the study.
4 Results

The following chapter will display the results of the current cross-sectional study. The chapter will first outline the demographics of the sample followed by counts, tabulations, means and standard deviation and subsequent statistical analysis on the survey data in relation to knowledge, experience and attitudes on medical cannabis.

4.1 Demographics

The electronic survey was distributed to 20 department leaders at OUS in which forwarded the questionnaire to 334 physicians’. Of these 114 responded (34.1% response rate).

<table>
<thead>
<tr>
<th>Table 1: Demographics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category</strong></td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Age (years)</td>
</tr>
<tr>
<td>&lt;35</td>
</tr>
<tr>
<td>35-45</td>
</tr>
<tr>
<td>46-55</td>
</tr>
<tr>
<td>56-65</td>
</tr>
<tr>
<td>&gt;65</td>
</tr>
<tr>
<td>Mean age:</td>
</tr>
<tr>
<td>Years in practise</td>
</tr>
<tr>
<td>&lt;10</td>
</tr>
<tr>
<td>10-24</td>
</tr>
<tr>
<td>&gt;25</td>
</tr>
<tr>
<td>Mean:</td>
</tr>
<tr>
<td>Graduated from</td>
</tr>
<tr>
<td>Norway</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>Practice type</td>
</tr>
<tr>
<td>Physicians in specialist training</td>
</tr>
<tr>
<td>Specialists</td>
</tr>
</tbody>
</table>
12 physicians did not provide enough answers for the analysis, and were therefore excluded from the subsequent analysis. The results in the current chapter will be based on the responses from 102 participating physicians.

The participant characteristics are displayed in Table 1. Males (n = 43) constituted 42.5% of the sample whereas (n = 58, 57.4%) were female. The mean age of the participants was 44.8 (SD = ± 9.12). The mean age was rounded up to 45 and selected as a cut off point for the analysis of age. Over half of the sample (n = 63, 62%) were 44 years or younger whereas (n = 38, 37.6%) were 45 years or older. Mean years of practice were 15.7 (SD = ± 10.11). The mean years of practice was rounded up to 16 and selected as a cut off point for the analysis of practice years. A slight majority of the sample (n = 58, 58 %) had a maximum of 16 years in practice while (n = 42, 42%) had 17 or more years in practice. Of the participating respondents (n = 65, 65%) were specialists whereas (n = 35, 35%) were physicians’ currently undergoing specialist training. The sample contained 20 different medical specialties including: general medicine (n =2, 2.1%), paediatric surgeons (n = 2, 2.1%), paediatrics (n = 2, 2.1%), breast- and endocrine surgeons (n = 4, 4%), obstetricians and gynaecologists (n = 6, 6.3%), gastroenterologists (n = 2, 2.1%), geriatricians (n = 11, 11.5%), cardiologists’ (n = 7, 7.3%), dermatologists (n = 4, 4.2%), internists’ (n = 10, 10.5%), infectologists (n = 5, 5.2%), vascular surgeons (n = 1, 1%), clinical pharmacologists (n = 4, 4.2%), neurophysiologist (n = 1, 1%), neurologists (n = 4, 4.2%), oncologists (n = 6, 6.3%), orthopedic surgeons (n = 4, 4.2%), psychiatrists (n = 15, 15.8%), rheumatologists (n = 1, 1%) and addiction specialists (n = 4, 4.2%).
4.2 Knowledge

As can be seen in Table 2a, the majority (n = 70, 70.2%) of physicians’ ranked their current level of knowledge on medical cannabis as a treatment option as either “no knowledge” or “little knowledge”. There were no significant differences between male- (mean = 2.14, SD = ± 0.8) and female physicians’ (mean = 2.11, SD = ± 0.9) in terms of how they ranked their own knowledge on medical cannabis (p > 0.05, t: 0.195, df: 98). Moreover, there were no statistical difference between specialists (mean = 2.17, SD = ± 0.92) and doctors currently undergoing specialist training in how they ranked their own level of knowledge on medical cannabis (mean = 2, SD ± 0.84) (p> 0.05, t: -0.78, df: 97). Furthermore, there were no statistical differences between physicians’ aged ≤44 (mean = 2.1, SD = ± 0.84) compared with ≥45 (mean = 2, SD = ± 0.9) nor any statistical difference in terms of the number of years in practice as the difference between physicians’ with ≤16 practice years (mean = 2.2, SD = ± 0.9) and ≥17 years in practice (mean = 1.9, SD = ± 0.78) on knowledge on medical cannabis as a treatment option as the analysis did not yield statistical significant values (p > 0.05, t: 1.06, df: 98; p > 0.05, t: 1.82, df: 97, respectively). However, physicians’ who obtained their medical diploma abroad (n = 22, 22.2%) registered having greater knowledge on medical cannabis (mean = 2.2, SD = ± 1) compared with physicians’ trained in Norway (n = 77, 77.7%). This finding was statistically significant (p < 0.05, t: -0.71, df: 97).

<table>
<thead>
<tr>
<th>n = 100</th>
<th>No knowledge</th>
<th>Little knowledge</th>
<th>General knowledge</th>
<th>Knowledgeable</th>
<th>Very knowledgeable</th>
<th>Mean</th>
<th>SD +/-</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>At the current time, how would you rate your knowledge on medical cannabis?</td>
<td>23</td>
<td>23,7</td>
<td>47</td>
<td>46,5</td>
<td>26</td>
<td>25,7</td>
<td>2</td>
</tr>
</tbody>
</table>


As displayed in Table 2b the mean scores on knowledge towards central cannabis-related elements were generally below 2, indicating the majority of physicians’ being mostly either very little or little familiar with these topics. The respondents did, however, report to be more familiar with the adverse effects of cannabis (mean = 3.1, SD = ± 0.9). For the following item “to what extent are you familiar with the ECS?” no statistical differences were found on knowledge scores between: physicians’ obtaining their medical diploma in Norway (mean = 1.8 , SD = ± 0.89) and overseas (mean = 2, SD = ± 1.1), male- (mean = 1.95, SD = ± 0.96)

<table>
<thead>
<tr>
<th>To what extent are you familiar with the endocannabinoid system?</th>
<th>Very little extent</th>
<th>Little extent</th>
<th>Neutral</th>
<th>Great extent</th>
<th>Very great extent</th>
<th>Mean</th>
<th>SD +/-</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>43</td>
<td>43</td>
<td>32</td>
<td>32</td>
<td>19</td>
<td>19</td>
<td>5</td>
<td>5</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1.8</td>
<td>± 0.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>To what extent are you familiar with the legislation on medical cannabis in Norway?</th>
<th>Very little extent</th>
<th>Little extent</th>
<th>Neutral</th>
<th>Great extent</th>
<th>Very great extent</th>
<th>Mean</th>
<th>SD +/-</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>43</td>
<td>42,5</td>
<td>33</td>
<td>32,6</td>
<td>18</td>
<td>17,8</td>
<td>6</td>
<td>5,9</td>
</tr>
<tr>
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<td></td>
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<td>1</td>
<td>0,9</td>
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<tr>
<td></td>
<td>1.9</td>
<td>± 0.9</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>To what extent are you familiar with the process of prescribing medical cannabis in Norway?</th>
<th>Very little extent</th>
<th>Little extent</th>
<th>Neutral</th>
<th>Great extent</th>
<th>Very great extent</th>
<th>Mean</th>
<th>SD +/-</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>53</td>
<td>51,9</td>
<td>38</td>
<td>37,2</td>
<td>9</td>
<td>8,8</td>
<td>1</td>
<td>0,9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>0,9</td>
</tr>
<tr>
<td></td>
<td>1.6</td>
<td>± 0.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>To what extent are you familiar with the dosage of medical cannabis?</th>
<th>Very little extent</th>
<th>Little extent</th>
<th>Neutral</th>
<th>Great extent</th>
<th>Very great extent</th>
<th>Mean</th>
<th>SD +/-</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>64</td>
<td>62,7</td>
<td>23</td>
<td>23,4</td>
<td>8</td>
<td>7,8</td>
<td>2</td>
<td>1,9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>0,9</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>± 0.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>To what extent are you familiar with the adverse effects of cannabis?</th>
<th>Very little extent</th>
<th>Little extent</th>
<th>Neutral</th>
<th>Great extent</th>
<th>Very great extent</th>
<th>Mean</th>
<th>SD +/-</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>4</td>
<td>3,9</td>
<td>24</td>
<td>23,5</td>
<td>37</td>
<td>36,2</td>
<td>33</td>
<td>32,3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>3,9</td>
</tr>
<tr>
<td></td>
<td>3.1</td>
<td>± 0.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
and female physicians’ (mean = 1.86, SD = ± 0.95), physicians’ aged ≤44 (mean = 1.9, SD = ± 1.0) and ≥45 (mean = 1.89, SD = ± 0.8), years in practice ≤16 (mean = 1.92, SD = ± 1) and ≥17 (mean = 1.86, SD = ± 0.78) as (p > 0.05, t: -0.71, df: 97; p > 0.05, t: 0.47, df: 97; p > 0.05, t: 0.057, df: 97; p > 0.05, t: 0.26, df: 96, respectively). This notwithstanding, physicians’ undergoing specialist training (mean = 2.12, SD = ±1.14) reported being more familiar than specialists (mean = 1.78, SD = ± 0.82) on the ECS. This finding was found to be statistically significant (p < 0.05, t: 1.67, df: 96).

In regards to the following item: “to what extent are you familiar with the legislation on medical cannabis in Norway?” no statistical differences were found in levels of familiarity between: physicians’ acquiring their medical diploma in Norway (mean = 1.86, SD = ± 0.92) compared with obtaining an overseas diploma (mean = 2, SD = ± 1.11), male- (mean= 1.93, SD = ± 1) and female physicians’ (mean = 1.88, SD = ± 0.94), physicians’ aged ≤44 (1.94, SD = ± 0.99) and aged ≥45 (mean = 1.87, SD = ± 0.94), years in practice ≤16 (mean = 1.93, SD = ± 1.02) and ≥17 (mean = 1.87, SD = ± 0.89) and specialists (mean = 2.06, SD = ± 1.05) compared with physicians’ currently undergoing specialist training (mean= 1.18, SD = ± 0.91) as (p > 0.05, t: -0.6, df: 97; p > 0.05, t: 0.27, df: 98; p > 0.05, t: 0.46, df: 98; p > 0.05, t: 0.307, df: 97; p > 0.05, t: 1.12, df: 97, respectively)

When provided with the following item: “To what extent are you familiar with the process of prescribing medical cannabis in Norway?” there were no statistical difference in scores between: physicians’ obtaining a diploma in Norway (mean = 1.63, SD = ± 0.77) and abroad (mean = 1.59, SD = ± 0.95), male- (mean = 1.67, SD = ± 0.96) and female physicians’ (mean = 1.57, SD = ± 0.75), physicians’ aged ≤44 (mean = 1.62, SD = ± 0.79) and aged ≥45 (mean = 1.61, SD = ± 0.75), and practice experience (years) ≤16 (mean = 1.62, SD = ± 0.79) and ≥17 (mean = 1.62, SD = ± 0.75) and specialists (mean = 1.63, SD = ± 0.86) and physicians’ in specialist training (mean = 1.62, SD = ± 0.74) as (p > 0.05, t: 0.198, df: 97; p > 0.05, t: 0.67, df: 99; p > 0.05, t: 0.086, df: 99; p > 0.05, t: 0.047, df: 98; p > 0.05, t: 0.081, df: 98, respectively).

When asked the following question: “To what extent are you familiar with the dosage of medical cannabis?” there were no statistical difference in knowledge scores between physicians’ with a medical diploma from Norway (mean = 1.5, SD = ± 0.73) and abroad
(mean = 1.59, SD = ± 1.05), physicians’ aged ≤44 (mean = 1.59, SD = ± 0.87) and aged ≥45 (mean = 1.39, SD = ± 0.67), and practice years ≤16 (mean = 1.56, SD = ± 0.84) and ≥17 (mean = 1.46, SD = ± 0.75) and specialists (mean = 1.54, SD = ± 0.88) compared with physicians’ currently undergoing specialist training (mean = 1.51, SD = ± 0.77) as (p > 0.05, t: -0.46, df: 98; p > 0.05, t: 0.19, df: 99; p > 0.05, t: 0.85, df: 98; p > 0.05, t: 0.20, df: 98, respectively). Despite overall low scores, male physicians’ (mean = 1.7, SD = ± 0.96) reported being more familiar with dosing medical cannabis compared with female physicians’ (mean =1.38, SD = ± 0.64). This finding reached statistical significance (p < 0.05, t: 1.98, df: 99).

Regarding the following item: “to what extent are you familiar with the adverse effects of cannabis?” there was no statistical difference in mean scores between: physicians’ obtaining their medical diploma in Norway (mean = 3.10, SD = ± 0.90) and overseas (mean = 3.09, SD = ± 1.06), male- (mean= 3.02, SD = ± 1.03) and female physicians’ (mean = 3.16, SD = ± 0.85) physicians’ aged ≤44 (mean = 3.29, SD = ± 0.90) compared with aged ≥45 (mean = 2.79, SD = ± 0.90) and practice years ≤16 (mean= 3.30, SD = ± 0.93) compared with ≥17 (mean = 2.79, SD = ± 0.86) as (p > 0.05, t: 0.051, df: 98; p > 0.05, t: -0.70, df: 99; p > 0.05, t: 2.66, df: 99; p > 0.05, t: 2.68, df: 98). However, doctors currently undergoing specialist training (mean = 3.41, SD = ± 0.85) indicated to be more familiar with the adverse effects of cannabis than specialists (mean = 2.93, SD = ± 0.94). This finding was found to be statistically significant (p < 0.05, t: 0.99, df: 97).

### Table 3: Source(s) of knowledge

<table>
<thead>
<tr>
<th>News &amp; TV</th>
<th>Medical literature</th>
<th>Healthcare providers</th>
<th>Lectures &amp; seminars</th>
<th>Friends &amp; family</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>From what source(s) have you obtained your knowledge on medical cannabis?</td>
<td>70</td>
<td>39.5</td>
<td>48</td>
<td>27.1</td>
<td>30</td>
</tr>
</tbody>
</table>

n = 100: respondents were able to choose multiple categories (n = 176)
Physicians’ cited their source(s) of obtaining their knowledge on medical cannabis in Table 3. The most frequently cited source of information by which respondents obtained their knowledge on medical cannabis were news and television, followed by medical literature and healthcare providers. Three physicians’ indicated other sources of information such as: patients, documentaries and travelling.

**Table 4a: Adverse effects of cannabis as indicated by participating physicians’**

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dizziness</td>
<td>55</td>
<td>10.6</td>
</tr>
<tr>
<td>Hallucinations</td>
<td>67</td>
<td>12.9</td>
</tr>
<tr>
<td>Dry mouth</td>
<td>41</td>
<td>7.9</td>
</tr>
<tr>
<td>Impaired memory</td>
<td>52</td>
<td>10</td>
</tr>
<tr>
<td>Depression</td>
<td>53</td>
<td>10.2</td>
</tr>
<tr>
<td>Anxiety</td>
<td>59</td>
<td>11.4</td>
</tr>
<tr>
<td>Addiction</td>
<td>66</td>
<td>12.7</td>
</tr>
<tr>
<td>Respiratory disease</td>
<td>32</td>
<td>6.1</td>
</tr>
<tr>
<td>Psychosis</td>
<td>73</td>
<td>14.1</td>
</tr>
<tr>
<td>Cancer</td>
<td>15</td>
<td>2.9</td>
</tr>
<tr>
<td>Cannabis has no adverse effects</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>0.7</td>
</tr>
</tbody>
</table>

**Total:** 517

\( n = 102: \) respondents were able to choose multiple categories.

As displayed in Table 4a the three most prominently indicated adverse effects of cannabis consumption by the sample were psychosis, hallucinations and addiction. Some physicians’ (\( n = 4 \)) provided additional categories such as: concentration problems (\( n = 1 \)), listlessness (\( n = 1 \)), impair coordination (\( n = 1 \)) and abdominal pain (\( n = 1 \)).
As shown in Table 4b the vast majority of respondents listed cannabis to hold therapeutic value towards cancer and chemotherapy induced side effects (n = 88, 88%). Subsequently, MS (n = 64, 64%) and side effects of HIV/AIDS (n = 43, 43%) were the second and third most cited conditions in which medical cannabis is a therapeutic agent. A handful of physicians’ (n = 5) indicated additional categories such as: spasticity (n = 1), chronic pain (n = 3) and post-traumatic stress disorder (n = 1).
4.3 Experience

The experience of physicians’ on medical cannabis is displayed in Table 5a and 5b. Psychiatrists (n = 9, 33%) and specialists in internal medicine (n = 6, 23%) constituted the majority of respondents by which indicated “yes” to the following item “have you ever treated patients for the adverse effects of cannabis?”. The remaining specialties featured were addiction medicine (n = 3, 11%), pharmacologists (n = 2, 7.4%), infectiologist (n = 1, 3.7%), cardiologists (n = 1, 3.7%), geriatricians (n = 2, 7.4%), breast- and endocrine surgeons (n = 1, 3.4%) and internists (n = 1, 3.7%).

<table>
<thead>
<tr>
<th>Table 5a: Experience with medical cannabis in a clinical setting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Yes</strong></td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td><strong>Have you ever treated patients for the adverse effects of cannabis?</strong></td>
</tr>
<tr>
<td><strong>Have you ever informally recommended cannabis to patients?</strong></td>
</tr>
<tr>
<td><strong>Have patients or next kind ever consulted with you about medical cannabis?</strong></td>
</tr>
</tbody>
</table>

Moreover, addiction specialists (n = 1), geriatricians (n = 1) and gastroenterologists (n = 1) constituted the respondents indicating “yes” for the following question “have you every informally recommended cannabis to patients”. The physicians’ indicating “yes” in regards to “have patients or next of kin ever consulted with you about medical cannabis?” had the following specialties: paediatrics (n = 1), breast- and endocrine surgeon (n = 1), obstetrics and gynaecologist (n = 1), gastroenterologists (n = 1), geriatricians (n = 1), cardiologists (n = 1), dermatologists (n = 2), internists (n = 1), infectiologists (n = 1), neurologists (n = 2), oncologists (n = 3), psychiatrists (n = 4) and addiction specialists (n = 3). Of these, the vast majority (n = 20) had been approached by 10 or less patients or next of kin (see Table 5b).
4.4 Attitudes

The attitudes of physicians in regards to various cannabis-related topics are displayed in Table 6. Responses to the statement “cannabis is a legitimate treatment option” yielded no statistical differences in terms agreement levels between: physicians obtaining their medical diploma in...
Norway (mean = 3.22, SD ± 1.43) and overseas (mean = 3.14, SD = ± 1.28), male- (mean = 3.44, SD = ± 1.33) and female physicians (mean = 3.02, SD ± 1.42), physicians aged ≤44 (mean = 3.21, SD = ± 1.42) and aged ≥45 (mean = 3.18, SD = ± 1.35) and physicians’ with ≤16 years of practice (mean = 3.43, SD = ± 1.37) compared with ≥17 years of experience (mean = 2.82, SD = ± 1.37) as (p > 0.05, t: 0.24, df: 98; p > 0.05, t: 1.52, df: 99; p > 0.05, t: 0.08, df: 99; p > 0.05, t: 2.15, df: 98, respectively). However, specialists (mean = 3.26, SD ± 1.19) agreed more to the notion that cannabis is a legitimate treatment option than doctors undergoing specialist training (mean = 2.58, SD = ± 1.28). This finding was found be statistically significant (p < 0.05, t: 0.99, df: 96).

In regards to the statement “Physicians’ in Norway should receive more education on medical cannabis” there were found no statistical difference in mean agreement levels between: physicians’ obtaining their medical diploma in Norway (mean = 3.90, SD = ± 1.05) and abroad (mean = 3.86, SD = ± 1.32), male- (mean = 3.86, SD = ± 1.18) and female physicians’ (mean = 3.91, SD = ± 1.04), physicians’ aged ≤44 (mean = 3.87, SD = ±1.18) and aged ≥45 (mean = 3.92, SD = ± 0.96), physicians’ with ≤16 years of experience (mean =3.95, SD = ± 1.13) and ≥17 years of experience (mean = 3.79, SD = ± 1.08) and between specialists (mean = 3.8, SD = ± 1.32) and physicians’ in specialist training (mean = 3.94, SD = ± 0.98) as (p > 0.05 t: 0.12, df: 98; p > 0.05, t: -0.23, df: 99; p > 0.05, t: -0.21, df: 99; p > 0.05, t: 0.86, df: 98; p > 0.05, t: -0.59, df: 98, respectively).

When indicating agreement levels on the following statement “medical cannabis may reduce the unnecessary use of opioids in patients with chronic pain” no statistical differences were found in mean scores between: physicians’ obtaining their medical diploma in Norway (mean = 3.14, SD ± 0.99) and overseas (mean = 3.86, SD = ± 0.99), male- (mean = 3.47, SD = ± 1.03) and female physicians’ (mean = 3.19, SD = ± 0.96), physicians’ aged ≤44 (mean = 3.25, SD = ± 1.04) compared with physicians’ aged ≥45 (mean = 3.39, SD = ±0.96) and the number of practice years ≤16 (mean= 3.33, SD = ± 1.02) compared with ≥17 years of experience (mean = 3.26, SD = ± 0.96) or between specialists (mean = 3.14, SD = ± 1.14) and physicians’ currently in specialist training (mean = 3.38, SD = ± 0.91) as (p > 0.05 t: -3.12, df:
Furthermore, specialists (mean = 3.27, SD = ± 1.19) tended to agree more to the statement “cannabis should be available by prescription in Norway” than physicians’ undergoing specialist training (mean = 2.54, SD = ± 1.29). However, this finding was not statistically significant (p > 0.05, t: -2.79, df: 97). Moreover, no statistically significant variations in mean agreement levels towards the notion that medical cannabis should be available by prescription were found between: male- (mean = 3.19, SD = ± 1.18) and female physicians’ (mean = 2.88, SD = ± 1.32) physicians’ obtaining their diploma in Norway (mean = 2.92, SD = ± 1.33) and overseas (mean = 3.32, SD = ± 0.99), physicians’ aged ≤44 (mean = 3.02, SD = ± 1.27) compared with aged ≥45 (mean = 3, SD = ± 1.26), physicians’ with practice experience (years) ≤16 (mean = 3.16, SD = ± 1.28) compared with ≥17 years of experience (mean = 2.76, SD = ± 1.24) as (p > 0,05 t: -1.29, df: 97; p > 0,05 t: 1.2, DF: 98 p > 0,05 t: 0.06, df: 98; p > 0,05 t: 1.53, df: 97, respectively).

Respondents generally agreed towards the statement “physicians’ in Norway should have significant influence on future changes in legislation regarding medical cannabis”. There were no statistical significant variation in mean scores on this item between: physicians’ obtaining their diploma in Norway (mean = 3.92, SD = ±1.95) and overseas (mean = 4.27, SD = ±0.82), male- (mean = 4.21, SD = ±0.86) and female physicians’ (mean = 3.84, SD = ±1.08), physicians’ aged ≤44 (mean = 4.14, SD = ±0.94) compared with physicians’ aged ≥45 (mean = 3.76, SD = ±1.07), physicians’ with practice years ≤16 (mean= 4.07, SD = ±0.99) compared with ≥17 years of experience (mean = 3.9, SD = ±1.04), and between specialists (mean =3.85, SD = ±0.98) and physicians’ in specialist training (mean = 4.29, SD = ±1.01) as (p > 0,05 t: -1.43, df: 98; p > 0,05, t: 1.81, df: 99; p > 0,05, t: 1.85, df: 99; p > 0,05, t: 0.8, df: 98, respectively).
Table 7a: Justifications for why cannabis should not be available by prescription in Norway

<table>
<thead>
<tr>
<th>Justification</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannabis has no therapeutic effects</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Cannabis bears to much stigma</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Lack of information about cannabis as a treatment option</td>
<td>13</td>
<td>22.8</td>
</tr>
<tr>
<td>Adverse effects of cannabis</td>
<td>19</td>
<td>33.3</td>
</tr>
<tr>
<td>Risk of an increase in drug abuse</td>
<td>19</td>
<td>33.3</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>7</td>
</tr>
</tbody>
</table>

**Total:** 57

*n = 28: respondents were able to choose multiple categories.*

As can be seen in Table 7a the main justifications for not making cannabis available by prescription in Norway as indicated by physicians’ is: risk of increased drug abuse (n = 19), the adverse effects of cannabis (n = 19) and the lack of information about cannabis as a treatment option (n = 13).

Table 7b: Justifications for why cannabis should be available by prescription in Norway

<table>
<thead>
<tr>
<th>Justification</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannabis hold a wide range of therapeutic effects</td>
<td>16</td>
<td>24.2</td>
</tr>
<tr>
<td>The current legislation inhibit patients from optimal quality of care</td>
<td>17</td>
<td>25.7</td>
</tr>
<tr>
<td>Cannabis may reduce unnecessary use of opioids</td>
<td>13</td>
<td>19.6</td>
</tr>
<tr>
<td>Cannabis may improve the quality of life for patients with chronic pain</td>
<td>19</td>
<td>28.7</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**Total:** 66

*n = 25: respondents were able to choose multiple categories.*

The justifications for why cannabis should be available by prescription in Norway are displayed in Table 7b. The vast majority of physicians’ that hold the stance that medical cannabis should be available by prescription cite that “cannabis may improve the quality of life for patients with chronic pain” (n = 19), followed by “the current legislation inhibits patients from optimal quality of care” (n = 17) and “cannabis hold a wide range of therapeutic effects” (n = 16). 1 physician provided an additional category whereby indicating that “the current prohibitionist legislation is based on emotions rather than evidence”.
The perceived barriers for making cannabis more accessible to patients in Norway as indicated by the sample are listed in Table 8. The most prominent barriers for making medical cannabis more accessible to patients were: “risk of increased drug abuse”, “adverse effects of cannabis”, “lack of clinical studies on the therapeutic effects of cannabis” and “political resistance”. Four physicians’ supplemented with the following additional barriers: “to little knowledge altogether on cannabis”, “risk of prescribing cannabis for incorrect indications” and “risk of dealing”.

The attitudes towards prescribing medical cannabis are displayed in Table 9.
In total 37% of males (n = 16) indicated “yes” whereas 18% (n = 8) indicated “no” in regards to whether they would prescribe medical cannabis if they were eligible to do so. For females 22% (n = 13) indicated “yes” and 32% (n = 19) indicated “no” to the same item. The remaining 44.1% of males (n = 19) and 44.8% of females (n = 26) expressed “don’t know” in relation to whether they would prescribe medical cannabis. Of those with an opinion 38.2% (n = 13) of physicians’ who obtained their medical diploma in Norway indicated “yes” whereas 61.7% (n = 21) indicated “no”. However, of those with an opinion and with a medical diploma from overseas 69.2% (n = 9) indicated “yes” compared to 30.7% (n = 4) stating “no”. Moreover, there were no statistical difference between: male- and female physicians’ (p > 0.05, $\bar{x}$: 3.73, df: 2), physicians’ obtaining their medical diplomas in Norway and overseas (p > 0.05, $\bar{x}$: 2.10, df: 2), age (p > 0.05, $\bar{x}$: 0.23, df: 2), years in practice (p > 0.05, $\bar{x}$: 4.33, df:2) and practice type (p > 0.05, $\bar{x}$: 5.07, df:2) among the responding participants in which stated they would prescribe medical cannabis if they were legally entitled to do so.

Furthermore, there were found statistical significant variation in means of the participating physicians’ who stated they would prescribe medical cannabis if they had the opportunity to do so on other items in the survey. Physicians’ willing to prescribing medical cannabis reported to agree more to the statement “medical cannabis is a legitimate treatment option” (mean = 4.45, SD = ± 0.91; p < 0.05, F: 51.98, df: 2). Moreover, the respondents who stated they would prescribe medical cannabis if they were eligible to do so agreed more strongly towards the statement “physicians’ in Norway should receive more education on medical cannabis”. This finding was statistically significant (mean = 4.52, SD = ± 0.63, p < 0.05, F: 15.82, df: 2). Similarly, physicians’ who would prescribe medical cannabis agreed more to the statement “the use of medical cannabis may reduce the unnecessary use of opioids in patients with chronic pain” (mean = 4.03, SD = ± 0.94). This finding was found to be statistically significant (p < 0.05, F: 13.95, df: 2). Moreover, the respondents in which were positive towards prescribing medical cannabis agreed more towards the statement that “medical cannabis should be available by prescription” (mean = 4.34, SD = ± 0.76). This finding was found to be statistically significant (p < 0.05, F: 47.8, df: 2).
5 Discussion

The main purpose of this study was to uncover the perspectives of physicians’ in Norway on medical cannabis whereby particular attention was made towards the position of physicians’ towards the legitimacy of cannabis as medicine and whether or not cannabis should be available by prescription in Norway. This thesis has yielded unique findings, as the current study is the first of its kind in Norway. The study revealed that physicians’ in Norway possess little knowledge across most aspects of medical cannabis, with adverse effects being a slight exception. Particular concerns were voiced by the sample towards the effect cannabis may have on mental health, most notably psychosis. The majority of participating physicians’ expressed that cannabis hold therapeutic value in the treatment of cancer and chemotherapy induced side effects and MS while a considerable amount holding the same stance towards HIV/AIDS. The results of this study show that physicians’ are slight favour as to whether or not medical cannabis should be available by prescription in Norway. Moreover, a slight majority indicate willingness to prescribe cannabis if they were entitled to do so. Furthermore, respondents displayed limited knowledge towards the current state of medical cannabis in Norway, which suggests unfamiliarity with the guidelines set forward by the Norwegian Medicines Agency and the Norwegian directorate of health on prescribing medical cannabis.

5.1.1 Knowledge on cannabis-related topics

Based on the survey data the vast majority of the participating physicians’ reported to have very little knowledge about medical cannabis as a treatment option. This finding is comparable to several previous studies (Michalec et al., 2015; Ablin et al., 2016; Fitzcharles et al., 2014; Ziemianski et al., 2015) all of which found relatively low scores of knowledge on medical cannabis as indicated by physicians’. On the other hand, other studies found physicians’ to have medium-to-high levels of knowledge in regards to medical cannabis (Ebert et al., 2015; Brookes et al., 2017). Moreover, one study found that there was a significant correlation between previously prescribing cannabis to patients and higher levels of knowledge (Ebert et al., 2015). The only cannabis-based formulation available in Norway is restricted to MS patients (i.e., Sativex), hence it is reasonable to assume that the majority of the participating physicians’ not engaged with MS patients have never prescribed
cannabinoid-based formulations, thus suggesting that physicians’ in Norway have little, if not no, experience prescribing medical cannabis, which in turn might partially explain the lack of knowledge on medical cannabis as a treatment option. Additionally, the current study revealed physicians’ to have very low knowledge on the ECS. This finding is echoed in previous research studies (Ablin et al., 2016; Fitzcharles et al., 2014).

The majority of participating physicians’ reported to obtain their knowledge on medical cannabis through news media (n = 70, 39.5%), followed by medical literature (n = 48, 27.1%) and other healthcare providers (n = 30, 16.9%). These findings align with those found in Michalec et al. (2015) study whereby the same sources are listed with similar frequencies. Somewhat diverging results were found in other studies as the most prominent source of information on medical cannabis was found to be medical literature, patients and healthcare providers (Carlini et al., 2017; Ebert et al., 2015; Kondrad and Reid, 2013). By the same token, Brookes et al. (2017) study displayed the workplace being the most frequent source of information by which physicians’ obtained knowledge on medical cannabis. Albeit in its infancy, the samples examined in those studies citing patients as a frequent source of information on medical cannabis are located within healthcare systems by which medical cannabis is an available treatment option. Consequently, it is possible to speculate that those physicians’ are more likely to obtain anecdotal reports from patients previously using medical cannabis for medicinal purposes. This notion is further underscored by that physicians’ in which work in countries that have medical cannabis as a treatment option routinely engage in consultations with patients about medical cannabis (Ananth et al., 2017; Carlini et al., 2017; Ziemianski et al., 2015; Ebert et al., 2015). Perhaps more interesting is the low amount of physicians’ indicating lectures and seminars as a source of information on medical cannabis. This finding coincide with available research studies (Ebert et al., 2015; Carlini et al., 2017; Ziemianski et al., 2015), and indicate that medical cannabis is not part of the medical curricula. This issue concurs with Evanoff et al. (2015) findings in which suggests that medical graduates are under no circumstances equipped with sufficient knowledge in relation to prescribing medical cannabis. Furthermore, almost the entire sample agreed to the statement “physicians’ in Norway should receive more education on medical cannabis”. This finding is unanimously consistent across all previous research studies (Ebert et al., 2015; Michalec et al., 2015; Carlini et al., 2017; Kondrad and Reid, 2013; Ziemianski et al., 2015),
thus confirming the already strong evidence towards educating physicians’ on medical cannabis.

The results from the current survey showed that the vast majority of participating physicians’ expressed being unfamiliar with the legislation surrounding medical cannabis in Norway. Moreover, physicians’ were unanimously unfamiliar with the process of prescribing medical cannabis in Norway, which is underscored by only a small number of physicians’ indicating that medical cannabis could be available for patients in Norway, thus suggesting a lack of awareness among participants in regards to the guidelines formalised by the Norwegian Medicines Agency and the Norwegian Directorate of Health on medical cannabis (see Statens legemiddelverk, 2018). These findings correspond with previous research as physicians’ in the U.S and Canada reported to generally have little knowledge on legislation surrounding medical cannabis within their respective healthcare systems (Ananth et al., 2017; Michalec et al., 2015; Ziemianski et al., 2015).

Almost all physicians’ who responded to the survey indicated being very unfamiliar with dosing medical cannabis. Such findings are synonymous with findings from the available literature assessing providers perspectives towards medical cannabis (Ablin et al., 2016; Michalec et al., 2015; Carlini, 2017). On the other hand, contrasting results were found by Ebert et al. (2015) in which found physicians’ to have higher levels of knowledge in relation to dosing medical cannabis. This, however, is arguably not surprising as the sample in Ebert et al. (2015) study consisted of Israeli physicians’, many by which had previously prescribed medical cannabis, and therefore had experience on dosing the drug.

Furthermore, the results of this study indicate that physicians’ in Norway are more familiar with the adverse effects of cannabis. Moreover, the vast majority of participating physicians’ indicated psychosis, addiction and mental disorders (e.g., anxiety, depression) as the most prominent adverse effects associated with the consumption of cannabis. These concerns are mirrored by previous research studies as Irish physicians’ report cannabis to be linked with increased risk of psychosis (Crowly, 2017). Moreover, healthcare providers in the U.S have
reported that cannabis use may cause significant harm on mental health (Kondrad and Reid, 2013; Kweskin, 2013; Brookes et al., 2017). However, Israeli physicians’ were generally undecided on the matter as half the sample in Ebert et al. (2015) study, mainly oncologists, disagreed with the notion that cannabis use poses any mental health risk, whereas other specialties held a firm stance that cannabis use may cause harms on mental health. Similarly, Oncologists in Doblin and Kleinmann’s (1991) study and healthcare providers working in hospice care in Utritsky et al. (2011) study were generally not concerned with adverse mental health effects attributed to cannabis use. Furthermore, this study found somewhat diverging results in relation to addiction from the literature, as two-thirds of the sample cited cannabis to be addictive. This stands in contrast to previous studies in which indicate physicians’ to not believe cannabis to be addictive (Kondrad and Reid, 2013; Charuvastra et al., 2005).

Furthermore, the majority of respondents indicated that cannabis is a therapeutic agent for cancer and chemotherapy-induced side effects and patients with MS. Moreover, a considerable amount of physicians’ noted that cannabis hold therapeutic value for HIV/AIDS patients. These findings are consistent with previous research as cannabis is frequently cited by physicians’ to have therapeutic value for cancer patients (Doblin and Kleinmann, 1991; Adler and Colbert, 2013, Ananth et al., 2017; Carlini et al., 2017; Crowley, 2017; Ebert et al., 2015; Utritsky et al., 2011). Moreover, within the available literature physicians’ have expressed that medical cannabis is a therapeutic agent for patients with MS (Ebert et al., 2015; Crowley, 2017; Ablin et al., 2016). Additionally, some studies found that HIV/AIDS was a familiar health condition by which medical cannabis was prescribed to patients due to its efficacy in symptom relief (Carlini et al., 2017; Ebert et al., 2015).

5.1.2 Experience with cannabis in a clinical setting

A small fraction of the sample in this study reported to have ever informally recommended cannabis to patients. Doblin and Kleinmann (1991) is the only available study assessing physicians’ experience towards, informally, recommending medical cannabis within a healthcare system whereby the drug was currently illegal. Almost half of the responding sample in Doblin and Kleinmann’s (1991) study reported to have previously recommended, the illegal, use of cannabis for symptom relief. In other studies containing physicians’ who are
eligible to prescribe medical cannabis 55% reported to have previously recommended medical cannabis to patients (Ebert et al., 2015). In Carlini et al. (2017) study 68% of physicians’ surveyed had previously made verbal recommendations of medical cannabis to patients.

Furthermore, one-fifth of respondents (n = 23) reported to have been approached by patients or next of kin wishing to consult physicians’ about medical cannabis. Of these, 18 reported to have been approached by “less than 10” patients or next of kin, 2 reported between “10 and 50 whereas one 1 respondent indicated “more than 100” patients or next of kin. In Ziemianski et al. (2015) as many as 79% had reported being routinely approached by patients in order to discuss cannabis as a viable treatment option. Moreover, 84% of Israeli physicians’ had previously been approached by 25 or more patients about medical cannabis (Ebert et al., 2015). In Ananth et al. (2017) study 30% of paediatricians reported 1 or more inquiries about medical cannabis per week. Similarly, 29% of a sample of psychiatrists in the U.S reported to be approached on a weekly basis by patients inquiring about medical cannabis (Kweskin, 2013). Despite medical cannabis being illegal at the time of Doblin and Kleinmann’s (1991) study, it is not surprising that physicians’ in the U.S have more frequently recommended cannabis as the drug has typically been a popular medicine in numerous American states (Kondrad and Reid, 2013). Similarly, in Ebert et al. (2015) and Carlini et al. (2017) the research were conducted in countries at a point of time in which medical cannabis was made accessible through prescription. Considering medical cannabis is not readily available in Norway, in conjunction with the notion that cannabis as medicine is more popular in the U.S and Israel, may partly explain the disparity between the relatively low prevalence of Norwegian physicians’ recommending medical cannabis and the relatively low number of patients and next of kin inquiring physicians’ on the matter.

5.1.3 Attitudes on cannabis-related topics

The majority of physicians’ in the current study tended to agree towards the notion that medical cannabis is a legitimate treatment option. This finding is mirrored in the vast majority of previous research on provider perspectives towards medical cannabis (Doblin and Kleinman, 1991; Uritsky et al., 2011, Crowly, 2017; Adler and Colbert, 2013; Ebert et al., 2015; Carlini et al., 2017; Ablin et al., 2016, Ananth et al., 2017). However, two studies
reported physicians’ to neglect cannabis as a legitimate treatment option as concerns were raised towards its harm on both physical- and mental health (Kondrad and Reid, 2013; Kweskin, 2013).

According to the survey data a slight majority of participating physicians’ agreed towards introducing medical cannabis by prescription in Norway as 52% of those with an opinion were in favour versus 47% who opposed such a proposition. Similar results are mirrored in the available literature as Charuvastra et al. (2005) found comparable results whereby 36% were in favour and 38% disagreed towards the introduction of medical cannabis through prescription. However, the study by Kondrad and Reid (2013) found that physicians’ were generally reluctant towards cannabis being available through prescription. However, most studies examining physicians’ perspectives towards the availability of cannabis through prescription have displayed that the majority of physicians’ surveyed are in favour of such a proposition (Crowley, 2017; Carlini et al., 2017; Ziemianski et al., 2015; Doblin and Kleinmann, 1991; Utritsky et al., 2011).

Furthermore, drawing on the sample of this study a slight majority of participating physicians’ with an opinion reported that they would prescribe medical cannabis to patients if they were eligible to do so. Most previous studies assessing physicians’ perspectives towards medical cannabis were conducted on samples in which are eligible to prescribe medical cannabis. Consequently, previous evidence on whether or not physicians’ would prescribe cannabis in healthcare systems by which medical cannabis isn’t readily available is scant. However, Doblin and Kleinmann (1991) study was conducted before medical cannabis was introduced in the U.S and found that 48% of oncologists would prescribe cannabis if they were legally entitled to do so. Moreover, Kweskin’s (2013) study sample partially included psychiatrists in which practice in states where medical cannabis is illegal whereby 40% would consider prescribing cannabis to patients. On the other hand, Canadian physicians’ reported being reluctant to prescribe cannabis due to an expressed lack of knowledge on the substance despite it being included in their armamentarium (Fitzcharles et al., 2014).

A backdrop of this thesis lies in its aim at uncovering the justifications for the opposing stances towards making medical cannabis available by prescription as such evidence is
currently absent within the available literature on provider perspectives towards medical cannabis. Drawing on the results from this study the main justifications for not making medical cannabis available through prescription were: “lack of information about cannabis as a treatment option” (n = 13, 43%), “adverse effects of cannabis” (n = 19, 68%) and “risk of increased drug abuse” (n = 19, 68%). On the other hand, the most cited justifications for making medical cannabis available through prescription in Norway were as follows: “cannabis hold a wide range of therapeutic effects” (n = 16, 64%), “the current legislation inhibit patients from optimal quality of care” (n = 17, 68%), “cannabis may reduce unnecessary use of opioids” (n = 13, 52%) and “cannabis may improve the quality of life for patients with chronic pain” (n = 19, 76%). These polarising justifications towards the introduction of medical cannabis by prescription in Norway mirror the overall debate about utility of cannabis in medicine and society altogether (Kristensen and Mlodozeniec, 2017). These findings are of importance because the attitudes and beliefs of physicians’ determine the acceptance of cannabis within local medical communities (Charuvastra et al., 2005). Moreover, as medical expert’s the perspectives of physicians’ surrounding both the therapeutic- and adverse effects of cannabis are among the most informed and thus should yield useful information in order to guide policy makers. This notion is further emphasised by the current study as the vast majority of respondents with an opinion agree to the statement “physicians’ in Norway should have significant influence on future change in legislation regarding medical cannabis”.

A focal point for proponents of medical cannabis is its utility in pain management as well as having the potential to reduce the unnecessary use of opioid medications following the so-called “opioid epidemic” in the U.S (Carter et al., 2011). Researchers have found cannabis to be a safer alternative compared with opioid medications as well as having identical analgesic effects as codeine (Kinzbrunner, 2001). Moreover, state-wide research studies have found that after the introduction of medical cannabis the amount of opioid prescriptions have significantly declined alongside opioid morbidity (Boehnke et al., 2016; Bachuber et al., 2014; Carter et al., 2011). Drawing from the sample three-quarters of participating physicians’ who expressed an opinion agreed to the statement “the use of medical cannabis may reduce unnecessary use of opioids for patients with chronic pain”. This finding correlate with cannabis-related prescribing behaviours and within previous studies as chronic- and neuropathic pain are the most frequent cited indications for prescribing cannabis (Doblin and
Moreover, previous research unanimously display that specialties involved in hospice care view cannabis as a legitimate and effective treatment option for pain relief, and are generally less concerned with the adverse effects associated with cannabis use (Utritsky et al., 2011; Ananth et al., 2017). Albeit a limited number of oncologists (n = 4) responded to the current survey, they displayed unanimous agreement levels towards the legitimacy of cannabis, its introduction through prescription and that medical cannabis may reduce unnecessary use of opioids, thus mirroring the attitudes of oncologists towards the utility of cannabis when compared with previous research studies (Utritsky et al., 2011; Ananth et al., 2017).

The most prominent barriers for making medical cannabis more accessible for patients in Norway as indicated by the sample were: “risk of increased drug abuse”, “political resistance”, “lack of clinical studies proving the efficacy of medical cannabis as medicine” and “adverse effects of cannabis”. Given the legal nature of cannabis laws in most previous studies, focus have predominately been placed towards barriers for prescribing medical cannabis as opposed to barriers towards making cannabis more accessible to patients. This notwithstanding, it is reasonable to assume that barriers towards making cannabis more accessible to patients bear close connotations to barriers towards prescribing medical cannabis to patients as legislation should consider prominent barriers towards prescribing medical cannabis. The most frequently cited barriers in this study partially concur with those of previous research studies as risk of increased drug abuse / recreational use is prominently cited (Michalec et al., 2015; Ziemianski et al., 2015; Ablin et al., 2016; Carlini et al., 2017; Kondrad and Reid, 2013), and adverse effects (Carlini et al., 2017) and lack of knowledge on the therapeutic effects of cannabis (Carlini et al., 2017; Ziemianski et al., 2015; Michalec et al., 2015). On the other hand, one study found that the vast majority of physicians’ were not concerned about increased drug abuse (Ananth et al., 2017). However, it is worth noting that this particular study was conducted on paediatricians and the study was concentrated on the role of medical cannabis in paediatric oncology. As drug abuse is not a prominent phenomenon in children these findings should not be generalised to have implications on adults.
6 Conclusion

The use of medical cannabis is extensive in world history, and has undertaken a contorted course from being frequently used as a remedy for numerous ailments to being subject to prohibitionist international law, and thus neglected by governments and the medical community altogether during the mid-20\textsuperscript{th} century, and thereafter regaining its legitimacy, and hence gradually being reintroduced as a therapeutic agent for a wide range of medical conditions across the globe. The legitimacy of cannabis as medicine was partially regained once scientists discovered the ECS and the main pharmacological active components of cannabis (e.g., THC and CBD) (Pisanti, 2016). These discoveries fuelled interest in conducting research on the therapeutic potential of cannabis, which in turn suggested cannabis to be a therapeutic agent for a wide range of medical conditions. As international law had scheduled cannabis in the same category as heroin and cocaine much concern has been posed towards the adverse effects of cannabis, and thus its applicability in medicine has been questioned (Pertwee, 2014). However, recent research revealed cannabis to have low toxicity and pose little harm on both physical- and mental health (Lachenmeier and Rehm, 2015), albeit some concerns are posed towards the early onset of psychosis of chronic use (Andréasson et al., 1987; Hall, 2001; Room et al., 2010). In recent decades governments around the world have approved various cannabis-based formulations for medicinal use, with on-going debates currently in motion in several countries. In Norway, the use of medical cannabis is confined to the use of Sativex for MS patients and the application process through the Norwegian Medicines Agency and the Norwegian directorate of Health. During the fall of 2017 the Norwegian Parliament passed a majority vote to decriminalise all drugs, which in turn may open the gate towards introducing medical cannabis in the Norwegian healthcare system. In such an event it is essential that policy is guided by a calmer, more balanced and evidence based approach. As medical experts physicians’ are sought to be the agents in which hold the most knowledge on clinical topics surrounding the delivery of healthcare services, and should thus be influential in policy debates on this controversial issue. Consequently, the main aim of this study was to uncover the perspectives of physicians’ in Norway towards medical cannabis.

This study is unique in terms of providing an account of the perspectives of physicians’ in Norway towards medical cannabis, and is only one of few studies available assessing
physicians’ views on this topical issue. Respondents in this study displayed having very little knowledge on medical cannabis as a treatment option, which is a recurring finding as physicians’ display having low levels of knowledge on cannabis from previous accounts in other countries (Michalec et al., 2015; Ablin et al., 2016; Fitzcharles et al., 2014; Ziemianski et al., 2015). Despite limited knowledge, the majority of participants view medical cannabis as a legitimate treatment option, something that is far from disputed by healthcare providers considering previous research (Doblin and Kleinman, 1991; Uritsky et al., 2011, Crowley, 2017; Adler and Colbert, 2013; Ebert et al., 2015; Carlini et al., 2017; Ablin et al., 2016, Ananth et al., 2017). Furthermore, the survey data confirm previous accounts in suggesting that adding medical cannabis to the existing armamentarium of antiemetic- and analgesic drugs would yield considerable benefits, especially to patients suffering from cancer and chemotherapy induced side effects and chronic pain (Doblin and Kleinmann, 1991; Adler and Colbert, 2013, Ananth et al., 2017; Carlini et al., 2017; Crowley, 2017; Carlini et al., 2017; Ebert et al., 2015; Utritsky et al., 2011). Likewise, respondents echo previous accounts in which display physicians’ to cite psychosis as the most prominent adverse effect of cannabis use (Crowly, 2017). However, a majority of participating physicians’ indicated cannabis to be addictive, which stands in stark contrast to previous studies (Kondrad and Reid, 2013; Charuvastra et al., 2005).

This study found acceptance towards making medical cannabis accessible through prescription in Norway, which mirror the stance of the vast majority of previous (Crowley, 2017; Carlini et al., 2017; Ziemianski et al., 2015; Doblin and Kleinmann, 1991; Utritsky et al., 2011). Despite this, no studies have examined the justifications for why physicians’ held a particular stance towards medical cannabis being available by prescription. This thesis contributed towards filling this void in the literature as participating physicians’ with an opinion on the matter indicated that: (1) lack of information about medical cannabis as a treatment option, (2) the adverse effects of cannabis, and (3) risk of increased drug abuse as justifications for why medical cannabis should remain unavailable through prescription. On the other hand, physicians’ indicated that: (1) cannabis hold a wide range therapeutic effects, (2) the current legislation inhibit patients from optimal quality of care, (3) cannabis may reduce unnecessary use of opioids, and (4) cannabis may improve the quality of life for patients with chronic pain. As expert opinions, these justifications provide vital information in
relation to future debates surrounding the availability of medical cannabis through prescription.

The current study examines the knowledge, experiences and attitudes of physicians’ and is not a controlled clinical study on the pharmacological effects of cannabis. Nevertheless, the findings of this study indicate that physicians’ view cannabis to hold therapeutic potential, and thus demonstrate more favourable attitudes towards the application of cannabis in medicine than what regulatory authorities appear to have believed.

6.1 Implications

The results of the current study indicate that a significant proportion of respondents were neutral towards whether or not cannabis should be available by prescription among several other survey items. Consequently, one might wonder whether physicians’ await more definitive evidence on cannabis as a therapeutic agent. In the current study the most cited source of information on medical cannabis in which physicians’ obtained their knowledge on medical cannabis was news media (i.e., TV and news). In previous studies there was found a significant correlation between physicians’ having higher levels of knowledge citing medical literature as a primary source of information on medical cannabis (Ziemianski et al., 2015). Consequently, in conjunction with the overwhelming low scores of knowledge on medical cannabis as indicated by participating physicians’, it raises the questions as to whether the sample of this thesis is sufficiently informed on medical cannabis as a treatment option in order to adequately form an opinion in regards to whether or not cannabis should be available by prescription. Moreover, respondents almost unanimously display a desire towards physicians’ in Norway receiving more education on medical cannabis, something by which there is strong evidence for considering the perspectives of other physicians’ across the globe (Ebert et al., 2015; Michalec et al., 2015; Carlini et al., 2017; Kondrad and Reid, 2013; Ziemianski et al., 2015). If medical cannabis were to be made accessible by prescription it would be wise to learn from the lessons learned in previous countries as there seems to be a recurring theme that physicians’ are not confident to prescribe medical cannabis due to a lack of knowledge on its use (Ziemianski et al., 2015). A solution could be to add cannabis to the
medical curricula, something that has already been proposed scholars (Ware and Ziemianski, 2015).

6.2 Limitations

An apparent limitation of the current research study lies in its low response rate (34.1%) and small sample size (n = 102). The low response rate may partially be due to the lack of financial compensation for participation, lack of time (Church, 1993), or reluctance to participate in research studies on this topic (Ziemianski et al., 2015). Moreover, research suggests that physicians’ are more reluctant to answer surveys due to the high frequency at which they are approached with them as well as participating in studies constitute a high opportunity cost (Flanigan et al., 2008). Furthermore, the low response rate might reflect that respondents have stronger opinions on the topic as opposed to non-responders (i.e., response bias). However, it is plausible that this is equally true for both proponents and protesters towards the introduction of medical cannabis. Additionally, given the politically sensitive nature of the topic in which this thesis is placed it is worth mentioning that regional differences might exists across healthcare providers in different regions of Norway. The sample of physicians’ is confined to only one healthcare provider in Norway. It is reasonable to assume that OUS feature unique organisational cultures in which might shape the attitudes and beliefs of its employees. Consequently, the results of this sample cannot be generalised to the represent the entire population of physicians’ in Norway.

Furthermore, another limitation of this study is the narrow spectrum of specialties in the sample (20 out of 44). Previous studies on physicians’ attitudes, perspectives and opinions on topics such as opioid therapy (Wilson et al., 2013), diabetes management (Williamson et al., 2016) and referral to specialist (Iverson et al., 2005) have identified that specialty subcultures play a pivotal role in shaping, and ultimately determining clinicians’ opinions. For instance, Uritsky et al. (2011) findings suggest that specialties involved in hospice care were more supportive of alternative medications when compared with other specialties. It is worth questioning whether similar differences may be identified in the case of medical cannabis. Consequently, as the perspectives of 24 specialties are lacking this research study might not
reflect the perspectives of the overall population of physicians’ in Norway. On a similar note, the study failed to capture the perspective of foundation physicians’. Failing to capture data on the attitudes, experiences and knowledge of foundation physicians’ might skew the results as the data currently obtained is confined to the perspectives of specialists and physicians’ currently undergoing specialists training.

The above limitations negatively impact that generalisability of the findings as well as the scope of the analysis in this thesis. This notwithstanding, as this thesis found the vast majority of physicians’ to have limited knowledge on medical cannabis, perhaps the lack of responses could be reflective of underlying uncertainty among physicians’. Despite this, the current study yields unique findings with regards to the attitudes, experiences and knowledge of physicians’ in Norway towards medical cannabis. Moreover, regardless of the small sample and low response rate these are comparable to previous studies (Michalec et al., 2015, Ablin et al., 2016; Ebert et al., 2015; Fitzcharles et al., 2014). Moreover, the age and gender distribution of the sample resembles that of the entire population of physicians’ in Norway as indicated by an e-mail from The Norwegian Medical Association (Taraldseth, 2018, personal communications, May 4th), suggesting that this is a good sample of the target population.

Despite the limitations of this research, the current study is the first of its kind in Norway and should be taken into account when new legislation and regulations are considered surrounding medical cannabis.

6.3 Suggestions for future research

The use of cannabis in medicine is expanding worldwide. However, only a handful of studies have captured the perspectives of physicians’ and the medical community altogether in relation to the therapeutic potential and harms of medical cannabis. Norway is currently on the foot of a major drug reform, which might impact the current state of medical cannabis in Norway. Consequently, larger theory-driven research is warranted in order to examine the factors in which determine the perspectives of physicians’ on this topical issue in order to
advise potential changes and regulations as well as assess the need for educating physicians’ on medical cannabis. On a similar note, more clinical studies are needed in order to reach conclusive evidence in regards to both the therapeutic- and adverse effects attributed to cannabis use in order to facilitate evidence-based clinical decision-making on medical cannabis as a treatment option. Moreover, as the relatively small sample in this thesis indicate cannabis to be effective for treating side effects of cancer and chronic pain, further research should be conducted in order to examine the perspectives of medical specialists working in hospice care in Norway.
References


Appendices

Appendices 1: Consent form

Hva slags holdninger, erfaringer og kunnskaper har leger i den norske spesialisthelsetjenesten om bruk av medisinsk cannabis?

Bakgrunn og formål
Formålet med studien er å kartlegge norske legers holdninger, erfaringer og kunnskaper om bruk av medisinsk cannabis. Studien er tilknyttet det medisinske fakultetet ved Universitetet i Oslo der kandidaten går et masterprogram i Health Economics, Policy and Management.

Utvalget er selektert fra Oslo universitetssykehus ettersom det er et nasjonalt kompetanseenter innen medisin og forskning. Som lege og ansatt ved OUS er du dermed invitert til å delta i denne studien. Deltagelse i studien innebærer at du svarer på et elektronisk spørreskjema.

Sporreundersøkelsen tar 6 minutter å fullføre.
Sporreundersøkelsen kan besvares på mobil, nettbrett og PC.

Hva skjer med informasjonen om deg?
Indirekte identifiserende opplysninger vil bli samlet inn (Kjonn, alder, sivilstatus, år i praksis etc.). Det er kun studenten selv og velfred som vil ha tilgang på informasjonen. Deltakere vil ikke kunne gjenkjennes i publikasjonen.

Frivillig deltakelse
Det er frivillig å delta i studien, og du kan når som helst trekke ditt samtykke uten å oppgi noen grunn. Dersom du trekker deg, vil alle opplysninger om deg bli anonymisert.

Dersom du har spørsmål om studien, ta kontakt med:
John Laurence Amfinsen
Mobil: 95 13 37 28
Epost: laurence.amfinsen@gmail.com

Dr. Adrian Kaa på:
Epost: Adrian.kaa@medisin.uio.no

Studien er meldt til Personvernombudet for forskning. NSD - Norsk senter for forskningsdata AS.

1. Samtykke til deltakelse i studien

☐ Jeg har mottatt informasjon om studien, og er villig til å delta
Appendices 2: Survey Instrument

Hva slags holdninger, erfaringer og kunnskaper har leger i den norske spesialisthelsetjenesten om bruk av medisinsk cannabis?

Kunnskap

2. På det nåværende tidspunkt, hvordan vil du rangere din egen kunnskap om medisinsk cannabis som et behandlingsalternativ?

- Ingen kunnskap
- Utt kunnskap
- Generell kunnskap
- God kunnskap
- Meget god kunnskap

3. Fra hvilke kilder har du fått din kunnskap om medisinsk cannabis?

- Nyheter (Avisa, TV)
- Medisinsk litteratur
- Kolleger (helsetpersonell)
- Forelæsninger / seminarer
- Venner / familie
- Annet (vennligst spesifisør)

4. I hvilke land tror du medisinsk cannabis kan være tilgjengelig for pasienter?

- Danmark
- USA
- Nederland
- Tyskland
- Storbritannia
- Annet (vennligst spesifisør)

5. I hvilken grad er du kjent med endocannabinoidsystemet?

- I svært stor grad
- I stor grad
- I meget stor grad
- I liten grad
- Nytral

6. I hvilken grad er du kjent med lovgivningen om bruk av medisinsk cannabis i Norge?

- I svært liten grad
- I liten grad
- I stor grad
- I svært stor grad
- Nytral
7. I hvilken grad er du kjent med prosessen å ordnere medisinsk cannabis til pasienter i Norge?

- I svært liten grad
- I liten grad
- Nøytral
- I stor grad
- I svært stor grad

8. I hvilken grad er du kjent med doseringen av medisinsk cannabis?

- I svært liten grad
- I liten grad
- Nøytral
- I stor grad
- I svært stor grad

9. I hvilken grad er du kjent med skadevirkningene av cannabis?

- I svært liten grad
- I liten grad
- Nøytral
- I stor grad
- I svært stor grad

10. Indiker hvilke skadevirkninger bruk av cannabis kan medføre

- Smellhet
- Hallusinasjoner
- Terr munn
- Hukommelsesavstap
- Depresjon
- Angst
- Avhengighet
- Lungesykdommer
- Psykose
- Kreft
- Cannabis har ingen skadevirkninger

Annet (vernligst spesifisere)
11. Indiker for hvilke sykdommer cannabis kan ha en lindrende effekt:
- Bivirkninger av HIV/AIDS
- Bivirkninger av kreft og cellegift
- Revmatologiske lidelser (anhitt, ulcerøs kolit)
- Glaukom
- Epilepsi
- Anoreksia
- Multippel sklerose
- Parkinson's
- Depresjon
- Angststiller
- Spiselidende
- Hepatitis C
- Cannabis har ingen medisinsk nytte

Annet (vær nitelig spesifiser):

---

Hva slags holdninger, erfaringer og kunnskaper har leger i den norske spesialisthelsetjenesten om bruk av medisinsk cannabis?

Erfaring

12. Har du noen gang behandlet pasienter for skadevirkninger av cannabis?
- Ja
- Nei
- Vet ikke

13. Har du noen gang uformelt anbefalt cannabis til pasienter?
- Ja
- Nei
- Vet ikke

14. Har pasienter eller pårørende noen gang rådført seg med deg angående medisinsk cannabis?
- Ja
- Nei
- Vet ikke

15. Hvor mange pasienter / pårørende har rådført seg med deg angående medisinsk bruk av cannabis?
- Mindre enn 10
- Mellom 10 og 50
- Mellom 50 og 100
- Mer enn 100
- Vet ikke
Hva slags holdninger, erfaringer og kunnskaper har leger i den norske spesialisthelsetjenesten om bruk av medisinsk cannabis?

Holdninger

Ventligst indiker hvor enig eller uenig du er med de følgende påstandene:

16. Cannabis er et legitimt legemiddel
   - Helt uenig
   - Litt uenig
   - Hverken enig eller uenig
   - Litt enig
   - Helt enig

17. Leger i Norge bør få mer utdannelse om medisinsk cannabis
   - Helt uenig
   - Litt uenig
   - Hverken enig eller uenig
   - Litt enig
   - Helt enig

18. Bruk av medisinsk cannabis kan redusere unødvendig bruk av opioider hos pasienter med kroniske smertelidser
   - Helt uenig
   - Litt uenig
   - Hverken enig eller uenig
   - Litt enig
   - Helt enig

19. Cannabis bør bli tilgjengelig på resept i Norge
   - Helt uenig
   - Litt uenig
   - Hverken enig eller uenig
   - Litt enig
   - Helt enig

20. Leger i Norge bør ha større innflytelse på fremtidige endringer av den norske lovgivningen på medisinsk cannabis
   - Helt uenig
   - Litt uenig
   - Hverken enig eller uenig
   - Litt enig
   - Helt enig

21. Hvorfor bør ikke cannabis være tilgjengelig på resept i Norge?
   - Cannabis har ingen terapeutiske effekter
   - Cannabis bærer for mye stigma
   - Det er manglende informasjon om cannabis som et behandlingsalternativ
   - Skadevirkningene av cannabis
   - Fare for olf rusmisbruk
   - Annet (vennlig spesifiser)

   [området for vennlig specifisering]
22. Hvorfor mener du cannabis bør være tilgjengelig på resept?

☐ Cannabis har en rekke terapeutiske effekter
☐ Den nåværende lovgivningen hinder pasienter i å få optimal behandling
☐ Cannabis kan redusere unødvendig bruk av opioider
☐ Cannabis har potensiale til å bedre livskvaliteten for pasienter med kroniske smertefølelser

☐ Annet (vennligst spesifiser)

23. Hvilke av de følgende hindringene ser du på som sentrale for å gjøre medisinsk cannabis lettere tilgjengelig for pasienter i Norge?

☐ Økt farer for rusmisbruk
☐ Skadelignende effekter av cannabis
☐ Manglende kliniske studier om de terapeutiske effekter av cannabis
☐ Stigmatiseringen av cannabisbrukere

☐ Manglende informasjon om dosering av cannabis
☐ Økonomiske utgifter for pasientene
☐ Politisk motstand
☐ Usikkerhet rundt interaksjon med andre medikamenter

☐ Annet (vennligst spesifiser)

24. Dersom du hadde mulighet, ville du ha ordinert medisinsk cannabis til pasienter i Norge?

☐ Ja
☐ Nei
☐ Vet ikkje
Hva slags holdninger, erfaringer og kunnskaper har leger i den norske spesialisthelsetjenenesten om bruk av medisinsk cannabis?

Demografi.

25. Velg kjønn
   ☐ Mann
   ☐ Kvinne

26. Oppgi din alder
   ☐

27. Hva er din civilstatus?
   ☐ Gift
   ☐ Ugift
   ☐ Stilt
   ☐ Enke

28. Hvor fullførte du din legeutdanning?
   ☐ Norge
   ☐ Utenlands (vennligst spesifiser)
      ☐

29. Hvor mange år har du vært i praksis?
   ☐

30. Oppgi om du er følgende
   ☐ Tarmstrøg
   ☐ Lege i spesialisering (LIS)
   ☐ Legespesialist

31. Oppgi din spesialisering
   ☐

Appendices 3: English version of the survey instrument

2) At the current time, how would you rate your own knowledge on medical cannabis as a treatment option?
   • No knowledge
   • Some knowledge
   • General knowledge
   • Knowledgeable
   • Very knowledgeable

3) From what source(s) have you obtained your knowledge on medical cannabis?
   • News (newspaper and TV)
   • Medical literature
   • Colleagues
   • Lectures / seminars
   • Friends / family
   • Other (please specify)

4) In what country(ies) do you think medical cannabis may be available to patients?
   • Denmark
   • USA
   • Netherlands
   • Norway
   • Germany
   • UK
   • Other (please specify)

5) To what extent are you familiar with the endocannabinoid system?
   • To a very little extent
   • To a small extent
   • Neutral
   • To a great extent
   • To a very great extent

6) To what extent are you familiar with the legislation surrounding medical cannabis in Norway?
   • To a very little extent
   • To a small extent
   • Neutral
   • To a great extent
   • To a very great extent

7) To what extent are you familiar with the process of prescribing medical cannabis to patients in Norway?
• To a very little extent
• To a small extent
• Neutral
• To a great extent
• To a very great extent

8) To what extent are you familiar with dosing medical cannabis?
• To a very small extent
• To a small extent
• Neutral
• To a great extent
• To a very great extent

9) To what extent are you familiar with the adverse effects of cannabis?
• To a very little extent
• To a small extent
• Neutral
• To a great extent
• To a very great extent

10) Indicate the adverse effects attributed to cannabis consumption:
• Dizziness
• Hallucinations
• Dry mouth
• Impaired memory
• Depression
• Anxiety
• Addiction
• Respiratory disease
• Psychosis
• Cancer
• Cannabis has no adverse effects
• Others (please specify)

11) Indicate what medical conditions cannabis may hold therapeutic value:
• Side effects of HIV-AIDS
• Cancer and chemotherapy induced side effects
• Rheumatic disease (arthritis, ulcerative colitis)
• Glaucoma
• Epilepsy
• Anorexia
• Multiple sclerosis
• Parkinson’s
• Depression
• Anxiety
• Eating disorders
• Hepatitis C
• Cannabis has no medicinal value
• Other (please specify)

12) Have you ever treated patients for adverse effects of cannabis?

• Yes
• No
• Don’t know

13) Have you ever informally recommended cannabis to patients?

• Yes
• No
• Don’t know

14) Have patients or next of kin ever consulted with you about medical cannabis?

• Yes
• No
• Don’t know

15) How many patients / next of kin have consulted with you about medical cannabis?

• Less than 10
• Between 10 and 50
• Between 50 and 100
• More than 100
• Don’t know

16) Cannabis is a legitimate treatment option:

• Strongly disagree
• Disagree
• Neither agree nor disagree
• Agree
• Strongly agree

17) Physicians in Norway should receive more education on medical cannabis:

• Strongly disagree
• Disagree
• Neither agree nor disagree
• Agree
• Strongly agree
18) Medical cannabis may reduce the unnecessary use of opioids in patients with chronic pain:

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

19) Cannabis should be available by prescription in Norway:

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

20) Physicians in Norway should be influential in future changes on legislation surrounding medical cannabis:

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

21) Why shouldn’t medical cannabis be available by prescription in Norway?

- Cannabis has no therapeutic value
- Cannabis bears too much stigma
- There is lack of information on cannabis as a treatment option
- The adverse effects of cannabis
- Increased drug abuse
- Other (please specify)

22) Why should medical cannabis be available by prescription in Norway?

- Cannabis as a wide range of therapeutic effects
- The current legislation inhibit patients from optimal quality of care
- Cannabis may reduce the unnecessary use of opioids
- Cannabis may increase the quality of life of patients with chronic pain
- Other (please specify)

23) Which of the following barriers to you see as prominent towards making medical cannabis more accessible to patients in Norway?

- Risk of increased drug abuse
- The adverse effects of cannabis
- The lack of clinical studies on the therapeutic effects of cannabis
- Stigmatization of cannabis users
- Lack of information on dosing medical cannabis
- Financial outlays for patients
• Political resistance
• Uncertainty on interaction with other drugs
• Other (please specify)

24) If you were eligible to do so, would you prescribe medical cannabis to patients in Norway?

• Yes
• No
• Don’t know

25) Select gender

• Male
• Female

26) Select your age

• Please specify:

27) Select marital status:

• Married
• Unmarried
• Divorced
• Widowed

28) Where did you obtain your medical diploma?

• Norway
• Abroad (please specify)

29) How many years have you been in practice?

• Please specify

30) Please indicate if you are the following:

• Foundation physician
• Physician currently in specialist training
• Specialists

31) Indicate your specialty:

• Please specify
### Appendices 4: OUS approval «forenklet meldeskjema»

Forenklet meldeskjema - student-/mastergradsprosjekter
Kompetanseene for personvern og sikkerhet
Oslo universitetsbyhus HIF

Forenklet meldeskjema for student/mastergradsprosjekter som medfører behandling av personopplysninger som er melde- eller konsejonspliktig i henhold til personopplysningsloven med forskrifter.

For at forenklet melding skal kunne benyttes må man kunne krysse av på samtlige punkter nedenfor. Dersom sitt av uttagene ikke stemmer overens med prosjektets formål og gjennomføring, så må fulgtstående melding sendes til personvernbudet.


Når forenklet melding er sendt inn kan prosjektet starte, under forutsetning av at man har innhentet godkjenning fra avdelingsleder. Det er ikke nødvendig å anrenge personvernombudets tilbakemelding.

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<table>
<thead>
<tr>
<th>3</th>
<th>EKLERERING OM PROSJEKTET</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Avsender erklærer at følgende utsagn er korrekte (sett kryss):</td>
</tr>
<tr>
<td></td>
<td>✅ En høyskole / et universitet i Norge er databehandlingsansvarlig for prosjektet</td>
</tr>
<tr>
<td></td>
<td>✅ Prosjektet er ikke søknadspliktig til REK. Viledder har vurdert spørsmålet.</td>
</tr>
<tr>
<td></td>
<td>✅ Prosjektet meldes til NSD</td>
</tr>
<tr>
<td></td>
<td>✅ Deltagerne samtykker skriftlig</td>
</tr>
<tr>
<td></td>
<td>✅ Samtykket vil utformes i tråd med vilkårene i NSDs skråting</td>
</tr>
<tr>
<td></td>
<td>✅ Deltagene er kun ansette ved sykehuset</td>
</tr>
<tr>
<td></td>
<td>✅ Det registreres ingen informasjon om deltagernes helse</td>
</tr>
<tr>
<td></td>
<td>✅ Det registreres ingen informasjon om andre personers helse</td>
</tr>
<tr>
<td></td>
<td>✅ Det sakes om avdelsleder/er godkjenning av deltagelsen i prosjektet</td>
</tr>
<tr>
<td></td>
<td>✅ Det sakes om avdelsleder/er godkjenning til bruk av deltagernes arbeidstid (hvis aktuelt)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4</th>
<th>LAGING AV DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Skal elektroniske data som sammes inn lagres ved sykehuset? ☐ Ja ✅ Nei</td>
</tr>
<tr>
<td></td>
<td>Hvis ja, hvordan skal data lagres?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5</th>
<th>DATA FOR UTFYLING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Skilt og dato</td>
</tr>
<tr>
<td></td>
<td>Oslo, 09.02.18</td>
</tr>
<tr>
<td></td>
<td>Utrykk:</td>
</tr>
<tr>
<td></td>
<td>John Laurence Amfinsen</td>
</tr>
</tbody>
</table>

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Appendices 5: NSD approval

Adnan Kisa
Postboks 1130 Blindern
0318 OSLO

Vår dato: 15.02.2018
Vår ref. 58495 / 3 / AGL
Deres dato: 
Deres ref.:

Vurdering fra NSD Personvernombudet for forskning § 31

Personvernombudet for forskning viser til meldeskjema mottatt 18.01.2018 for prosjektet:

58495 The role of medicinal cannabis in palliative care. A qualitative study of cancer patients' experience of medicinal marijuana in managing side effects.
Behandlingsansvarlig Universitetet i Oslo, ved institusjonens øverste leder
Daglig ansvarlig Adnan Kisa
Student John Laurence Arntfinsen

Vurdering
Etter gjennomgang av opplysningene i meldeskjemaet og øvrig dokumentasjon finner vi at prosjektet er meldepålagt og at personopplysningene som blir samlet inn i dette prosjektet er regulert av personopplysningsloven § 31. På den neste siden er vår vurdering av prosjektoppgjøret slik det er meldt til oss. Du kan nå gå i gang med å behandle personopplysninger.

Vilkår for vår anbefaling
Vår anbefaling forutsetter at du gjennomfører prosjektet i tråd med:
• opplysningene gitt i meldeskjemaet og øvrig dokumentasjon
• vår prosjektvurdering, se side 2
• eventuell korrespondanse med oss

Vi forutsetter at du ikke innhenter sensitive personopplysninger.

Meld fra hvis du gjør vesentlige endringer i prosjektet
Dersom prosjektet endrer seg, kan det være nødvendig å sende inn endringsmelding. På våre nettsider finner du svar på hvilke endringer du må melde, samt endringskjema.

Opplysninger om prosjektet blir lagt ut på våre nettsider og i Meldingsarkivet
Vi har lagt ut opplysninger om prosjektet på nettsidene våre. Alle våre institusjoner har også tilgang til egne prosjekter i Meldingsarkivet.

Vi tar kontakt om status for behandling av personopplysninger ved prosjektslut

Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.
Ved projektslutt 15.05.2018 vil vi ta kontakt for å avklare status for behandlingen av personopplysninger.

Se våre nettsider eller ta kontakt dersom du har spørsmål. Vi ønsker lykke til med prosjektet!

Marianne Hegsetveit Myhren

Audun Lovlie

Kontaktperson: Audun Lovlie tlf: 55 58 23 07 / audun.lovlie@nsd.no

Vedlegg: Prosjektvurdering
Kopi: John Laurence Amfinsen, laurence.amfinsen@gmail.com
Personvernombudet for forskning

Prosjektvurdering - Kommentar

Du har opplyst i meldeskjema at utvalget vil motta skriftlig informasjon om prosjektet, og samtykke skriftlig til å delta. Vår vurdering er at informasjonsskrivet til utvalget er greit utformet, men vi må be om at formuleringer som sier at undersøkelse er anonym erstattes med formuleringer om at undersøkelsen vil være indirekte identifiserende.

Vi ber deg om å sende det reviderte informasjonsskrivet til personvernombudet@nsd.no Hvis å oppgi prosjektnummer. Prosjektet kan deretter starte.

Data samletes ved spørreskjema, vi minner om at det av hensyn til helsepersonellens tilsynspapir ikke kan fremkomme identifiserbare opplysninger om enkeltpasienter. Vi anbefaler at forsker minner informanten om dette i for eksempel informasjonsskrivet, eller direkte i spørreskjemaet der spørsmål gir mulighet for åpne besvarelser.

Personvernombudet fortsetter å du/dere behandler alle data i tråd med Universitetet i Oslo sine retningslinjer for datahantering og informasjonsikkerhet. Vi legger til grunn at bruk av privat pc er i samverk med institusjonens retningslinjer.

Du har opplyst i meldeskjema at det tas i bruk en online surveytjeneste (Survey Monkey) som databehandler i prosjektet. Dersom det ikke allerede eksisterer en databehandleravtale mellom Universitetet i Oslo og databehandleren, skal det inngås en skriftlig avtale om hvordan personopplysninger skal behandles, jfr. personopplysningsloven § 15. For råd om hva databehandleravtalen bør inneholde, se Datailsynets veileder: https://www.datailsynet.no/regelverk-og-skjemaer/veileder/databehandleravtale/

Prosjektutt er oppgitt til 15.05.2018. Det fremgår av meldeskjema/informasjonsskriv at du vil anonymisere datamaterialet ved prosjektutl. Anonymisering innebærer vanligvis å:
- slette direkte identifiserbare opplysninger som navn, fødselsnummer, kloakensøkkel
- slette eller omskrive/gruppcere indirekte identifiserbare opplysninger som bosted/arbeidsted, alder, kjønn

For en utdypende beskrivelse av anonymisering av personopplysninger, se Datailsynets veileder: https://www.datailsynet.no/globalassets/global/regelverk-skjemaer/veileder/anonymisering-veileder-041115.pdf

Personvernombudet gjør oppmerksom på at også databehandler må slette personopplysninger tilknyttet prosjektet i sine systemer. Det inkluderer eksempelvis transkripsjoner, filer, logger og kloakensøkkel mellom IP-epostadresser og besvarelserne.