Bournemouth University

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# The beliefs and attitudes of key populations in the UK in regards to whether cannabis should be legalised for medicinal purpose.

**A dissertation submitted as part of the requirement for the BSc Biological Science.**

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# Abstract


## Background

Cannabis has been used for its therapeutic properties for five millennia and was prescribed for medicinal use in the UK until 1971. Cannabis then became classified as a Class B, Schedule 1 drug under the Misuse of Drugs Act 1971, which declared it has "no medicinal value". However, since then a growing body of evidence derived from clinical trials and case reports have supported the plants claimed therapeutic potential. Consequently, many campaign for the legalisation of cannabis for medicinal use in the UK. Given this is a topic of much current debate, this study explores the views and concerns of the key sectors of UK populations, including healthcare professionals, politicians, lawyers, and students, as well as the general British public, in regards to the legalisation of medicinal cannabis in the UK.

## Method

An anonymous online survey was created using SurveyMonkey. Healthcare professional, lawyers and politicians were contacted via email (contact details found on online websites). Students were targeted through social media and a paper survey which was handed out in Bournemouth University lectures. Members of the general public were also targeted through social media and a paper survey which was handed out in Bournemouth Town Centre. There was representative sample of 392 respondents.

## Results

A statistically significant proportion (70%) of the key UK populations (as defined by this study) believe cannabis should be legalised for medicinal use. Furthermore, there is a common consensus among those surveyed that cannabis should be recognised for its medicinal value. A breakdown is below:

- Healthcare professionals - 65%
- Lawyers - 68%
- Politicians - 58%
- Students - 81%

Among the most common concerns of the overall key UK populations in regards to the potential legalisation of medicinal cannabis use were related to the mental health of the consumer (71%) and the risk of giving young people the wrong impression, suggesting cannabis is a harmless drug (61.4%).

## Conclusion

Current literature provides supporting evidence for the safety and efficacy of the drug. However, good quality, controlled clinical trials are lacking due to the Schedule I classification of cannabis. It is the opinion of this report that the Government should listen to the overall majority of the representative sample examined in this study and reclassify cannabis as a Schedule IV drug. This will allow more research to be done, remove patients already using cannabis from the criminal justice system, and improve the quality, safety and accessibility of the drug for patients suffering a medical condition that cannabis has purported benefits for. This study does recognise how evocative a proposal this is and recommends further research to support the thesis before action is taken.

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# Contents

# 1. Introduction

## 1.1 What is cannabis?

Cannabis, also known as marijuana, refers to the preparation of the dried leaves, flowers, stems, and seeds of the cannabis plant, primarily used recreationally to experience a sense of mild euphoria and relaxation, often referred to as a "high" (Murray et al. 2016). It is among the most widely used of all the psychoactive drugs, accounting for 65% of all police recorded drug offences in the UK in 2015 (Office for National Statistics 2015; Walsh et al. 2017). Cannabis is most commonly taken in the form of smoking, however, other delivery routes include: vaporising, ingesting cannabis-infused edibles and drinking as a tea (Baggio et al. 2014). Although the plant is primarily used for its psychoactive effects, cannabis is increasingly being used illegally by patients with a variety of disabling diseases to relieve them from their painful symptoms (Iverson 2007). Cannabis has a long history in medicine, and the therapeutic properties of the plant have been highly reported in a large body of literature, suggesting it can be used in the management of pain, spasticity in neurodegenerative disease, wasting syndromes and psychiatric disorders, among many others (Ware et al. 2010; Borgelt et al. 2013). However, concerns relating to abuse and other harmful consequences of cannabis have limited its progress in medical utility (Fasinu et al. 2016). Consequently, these concerns, along with potential therapeutic properties of the drug, will be addressed in this research study.

## 1.2 A brief history of medicinal cannabis and its legal status in the United Kingdom

Cannabis has been widely used throughout the world for its therapeutic properties for five millennia (Bostwick 2012). The earliest recorded use of cannabis for medicine was in China (Russo 2007). In 2737 B.C, the Chinese emperor, Shen Nung discovered the healing properties of the plant and wrote the earliest extant Chinese pharmacopoeia, pen-ts'ao ching, which was the first to include the use of medical cannabis as a treatment method (Li 1978). Not long after, India, along with many other countries, including Egypt, Persia and Syria

began to follow suit (Bostwick 2012). However, it was not until the nineteenth century that this plant entered the Western medical world (Zuardi 2006). In 1842, an Irish physician, William Brooke O'Shaughnessy, who had studied the drug while working as a medical officer in India, returned to the United Kingdom (UK) with a quantity of cannabis (Iversen 2007). This was the beginning of its wide use in the UK for a variety of ailments, such as pain relief, nausea and vomiting, insomnia, anxiety and spasticity (Machado Rocha et al. 2008; Tringale and Jensen 2011; Fasinu et al. 2016). As a result, cannabis was included in both the British and American pharmacopoeias from the 1860s onwards (Russo 1998). Even, Sir John Russell Reynolds recommended it for various conditions ranging from insomnia to dysmenorrhea and prescribed it to Queen Victoria (Mathre 1997).

However, in the 20th century, during an international drug conference in Geneva, an Egyptian delegate insisted on bringing cannabis under international control, which subsequently led to a widespread prohibition of the drug (Mills 2012). British representatives opposed the move, but in the end reluctantly signed the treaty (Mills 2012). Consequently, in 1928, the UK added cannabis as an addendum to the Dangerous Drugs Act 1928 (Mills 2012). This meant the government was obliged to control domestic consumption, though it remained clinically available under this Act (Mills 2012).

Towards the end of the 20th century, however, cannabis was entirely eliminated from Britain under the Misuse of Drugs Act 1971 (Baron 2015). In 1970, the US Assistant Secretary of Health, Dr Roger O. Egeberg, recommended that cannabis be classified as a Schedule I substance due to "a considerable void in our knowledge of the plant and the effects of the active drug contained in it" (Baron 2015, p. 886). This then influenced Britain to follow suit. Consequently, when the Misuse of Drugs Act 1971 came into force creating the Class A, B and C classification system, cannabis and its derivatives were made a Class B controlled substance (Misuse of Drugs Act 1971). The Misuse of Drugs Regulations 2001, SI 3998**,** then determined in what circumstances it is lawful to possess, supply and produce these controlled drugs, which depend on the schedule the drug is given. Under The Misuse of Drugs Regulations 2001, SI 3998**,** cannabis was classified as a Schedule I drug, suggesting cannabis has "no therapeutic value" and therefore cannot be lawfully possessed or prescribed. Consequently, patients who are finding relief from their various symptoms using this drug, face the worrisome

consequences of 5 years' imprisonment and an unlimited fine if they are caught in possession of cannabis (Sentencing Council for England and Wales 2012). Furthermore, Under The Misuse of Drugs Regulations 2001, SI 3998**,** this status means production, possession and supply of these drugs are limited to research; therefore, the potential medical benefits cannabis has to offer cannot be fully exploited.

In 2004, for a short period, cannabis was reclassified as a Class C substance on the advice of the Advisory Council on the Misuse of Drugs (ACMD) (Mills 2012). This was short-lived as, in 2009, unjustifiably, cannabis was again reclassified as a Class B substance (Mills 2012). In 2006, the UK House of Commons Science and Technology Committee produced a report that concluded that the existing classification was unscientific and suggested improvements. However, so far, no changes have been made as a result of their recommendations.

Since the end of the twentieth century, a number of advocacy groups were set up, such as NORML UK, CLEAR, LEAP, DEA, UKCSC and ENCOD, and have pressed the UK government to reform its cannabis drug policies. Furthermore, scientific research into the potential therapeutic properties of cannabis has been vastly expanding, which has led to growing pressures for legalisation of cannabis for medical use in the United States (Fasinu et al. 2016). Currently, 28 states and the District of Columbia have recognised the therapeutic value of cannabis and have passed medical marijuana laws under their state laws (Carliner et al. 2017). Additionally, at least 11 European countries already ensure access to cannabis including: Austria, the Czech Republic, Finland, Belgium, Germany, Italy, the Netherlands, Romania, Portugal and Switzerland (All Party Parliamentary Group 2016). This has heightened the pressure for legalisation of medicinal cannabis in the UK.

In 2015, James Richard Owen started a petition on the UK government official petitions website calling for the legalisation of the cultivation, sale and use of cannabis (UK Government and Parliament 2016). This petition gained a compelling 236,995 signatures (UK Government and Parliament 2016). Parliament debated this petition on 12th October 2015; however, no advancement was made (UK Government and Parliament 2016).

In 2016, a cross-party group of MPs and peers known as the All Party Parliamentary Group for Drug Policy Reform conducted an Inquiry Report and concluded that "policy

reform in this field is long overdue" (All Party Parliamentary Group 2016, p.38). The All Party Parliamentary Group (2016) recommends that the Home Office reclassifies herbal cannabis as a Schedule IV drug, allowing doctors to be able to prescribe the drug to patients, and chemists to dispense it. The debate on whether cannabis should be recognised for its medical benefits continues to be a controversial issue, and one that matters to a substantial proportion of the UK population. Chronic pain is a major health care problem in the UK, affecting the quality of social and working lives of 20% of the UK population (Breivik et al. 2006; van Hecke et al. 2013). Furthermore, around 50% of chronic pain sufferers receive inadequate pain management (Breivik et al. 2006; Kelleher et al. 2017). Currently, the campaign group, End Our Pain estimates the number of patients finding relief in medicinal cannabis in the UK approaching 1 million in total, all of whom have to face the added stress of having to break the law to access their medicine (All Party Parliamentary Group 2016).

## 1.3 The science behind how cannabis exerts its effect

Understanding the pharmacology of cannabis is essential as it helps to understand the side effects associated with the drug and its proposed medical benefits (Zhang and Ho 2015). Cannabis comprises of over 400 different compounds, of which over 100 have been classified as cannabinoids (Hill 2015). These cannabinoids have been found to have important therapeutic properties which can be used to modulate analgesia, anti-inflammatory pathways and provide neuroprotection among many other functions (Grotenhermen and Müller-Vahl 2012). The two most commonly researched cannabinoids found naturally in the cannabis plant are cannabidiol (CBD) and Δ9-tetrahydrocannabinol (THC) (Atakan 2012). In 1964, THC was first extracted and identified as the primary psychoactive component of cannabis (Gaoni and Mechoulam 1964). Not long after, in 1992, a substance that occurs naturally within the brain and mimics the action of THC, called anandamide (AEA) was discovered (Devane et al. 1992). Additional naturally occurring substances within our body, termed endocannabinoids have since been identified, as seen in table 1. This caused for a greater understanding of the endocannabinoid system and stimulated cannabis research to be focused on this area (Maccarrone et al. 2015).

Table 1: The endocannabinoids currently known and their binding affinity (Reggio 2010; Oka et al. 2007; Shoemaker et al. 2005; Ross 2003; Porter et al. 2002; Huang et al. 2002; Bisogno et al. 2000).

| Endocannabinoid | Receptor Binding Activity |
|---|---|
| Anandamide (AEA) | Binds mainly to the $CB_1$ receptor but also binds to the $CB_2$ receptor to a lesser extent, where it acts as a partial agonist. AEA is also an agonist for the vanilloid receptor subtype 1 (TRPV1)*. |
| 2- Arachidonoylglycerol (2-AG) | Binds to both the $CB_1$ and $CB_2$ receptors with similar affinity, acting as a full agonist at both. |
| 2-Arachidonoyl glyceryl ether (noladin ether) | Binds to both $CB_1$ and $CB_2$ with high affinity. |
| O- Arachidonoyl ethanolamine (virodhamine or OAE) | A full agonist at $CB_2$ receptors and a partial agonist at $CB_1$ receptors. |
| N- Arachidonoyl dopamine (NADA) | Binds primarily to the $CB_1$ receptors. NADA is also an agonist for TRPV1. |
| Lysophosphatidylinositol (LPI) | Bind to the endocannabinoid sensitive receptor, G protein-coupled receptor 55 (GPR55)**. |
| **TRPV1: also known as the capsaicin receptor, is a protein with the function of detection and regulation of body temperature.*<br>***GPR55: a cannabinoid-sensitive receptor suggested to play a role in regulating human body weight.* | |

The endocannabinoid system comprises endogenous cannabinoids seen in table 1, and the specific receptors they interact with (Lu and Mackie 2016). Two kinds of cannabinoid receptors located within different parts of the body have been found to date (Goodman and Packard 2015). These receptors are known as cannabinoid binding receptor type 1 ($CB_1$) and cannabinoid binding receptor type 2 ($CB_2$) (Kruk-Slomka et al. 2016). $CB_1$ receptors exist heavily within the central nervous system and are well known for their neurological effects when activated (Kruk-Slomka et al. 2016). Whereas $CB_2$ receptors are largely found in the peripheral nervous system and are most abundant in a variety of immune cells, with very few found within the brain (Howlett 2002; Van Sickle et al. 2005; Kruk-Slomka et al. 2016). Therefore, unlike $CB_1$ receptors, $CB_2$ receptors have almost no psychoactive effects when stimulated, and are mainly involved in immune system functions (Howlett 2002; Ruiz-Valdepeñas et al. 2011).

The cannabinoid receptors are activated by three major groups of ligands: endocannabinoids produced by the body, phytocannabinoids produced from the cannabis plant, and synthetic cannabinoids (congeners of THC and CBD produced in a lab) (Lu and Mackie 2016). THC (a phytocannabinoid) and the endocannabinoids: AEA and 2-arachidonyl glycerol (2-AG), are thought to exert their myriad effects in the same way (Skaper and Di Marzo 2012). The mechanism works like a lock and key. THC, AEA and 2-AG (the molecular keys) fits into the "orthosteric" binding site on the $CB_1$ receptor (the molecular lock), which activates it and triggers a signalling cascade that inhibits the release of other neurotransmitters, thereby protecting the brain from too much excitation (Laprairie et al. 2015; Pertwee 2015). This is one of the many reasons why THC is such a remarkable therapeutic substance (Pertwee 2015).

Less is known about how CBD exerts its effects; however, current scientific evidence indicates that CBD also interacts directly with the $CB_1$ receptor in ways that are therapeutically relevant (Morales et al. 2016). However, unlike THC, CBD attaches to an "allosteric" binding site on the $CB_1$ receptor (Laprairie et al. 2015). This action does not initiate a signalling cascade like THC does, instead, induces a conformational change which impacts how the $CB_1$ receptor responds to stimulation by THC and endogenous cannabinoids (Morales et al. 2016). In 2015, Laprairie et al. found that CBD is a negative allosteric modulator of $CB_1$, meaning that CBD lowers the ceiling on the ability of THC and endogenous cannabinoids to stimulate $CB_1$. Research into allosteric modulation of the endocannabinoid system is still in its early phases; however, this progress sheds new light on CBDs medicinal potential and the importance of the whole plant not just isolated components for medicinal uses (Smith et al. 2010; Laprairie et al. 2015).

Cannabis contains many important compounds other than the most well-known cannabinoids, THC and CBD (Wagner and Ulrich-Merzenich 2009). Although less is known about these other compounds, studies have proposed, that although they may not directly bind to the receptors, they all have an important role in regards to the plants therapeutic potential (Wilkinson et al. 2003). This is due to what's known as the "entourage effect". The basic concept of the "entourage effect" is that all the compounds in the cannabis plant work together to provide therapeutic relief. Consequently, certain cannabinoids should

not be isolated in a lab and treated with more importance than the other compounds present in the plant (Ben-Shabat et al. 1998; Wagner and Ulrich-Merzenich 2009).

It is important to note that endocannabinoids typically occur at low levels and are only produced in large quantities when stimulated (Pacher et al. 2006; Maccarrone et al. 2015). This activation can occur as a response to painful stimuli, bacterial and viral infections, stress response, or inflammation (Pacher et al. 2006; Maccarrone et al. 2015). Hence, indicating the importance of the endocannabinoid system in pain modulation, as well as a vital role in the inflammation pathway and the immune response.

Furthermore, a shortage of these endocannabinoids has been identified as a condition called endocannabinoid deficiency (Russo 2001; Russo 2004; Russo 2016). It is thought that a lack of these endogenous cannabinoids result in a lowered pain threshold, digestion problems and alterations in mood and sleep (Pacher and Kunos 2013; Izzo et al. 2015; Gatta-Cherifi and Cota 2015). This supports the large body of evidence suggesting the medical potential of cannabis for a variety of ailments (Maccarrone et al. 2015; Russo 2016). Additionally, it is known that the endocannabinoid system has a range of important natural functions in the control of movement, protection of nerve cells, a role in brain plasticity, and has also been proposed to have a possible role in the control of tumour growth (Pertwee 2015; Fernandez-Ruis et al. 2015; Velasco et al. 2016). Consequently, with the discovery of the endocannabinoid system and the growing body of scientific research indicating therapeutic potential, many scientists have been appealing to remove the Schedule I drug restrictions on cannabis so medical research can more easily be done, and the medical potential of the drug can be fully exploited.

## 1.4 The impact of state medical marijuana laws in the United States

Although there are obvious improvements in regards to the life of the medical marijuana users, permitting better access to the drug and removing them from the criminal justice system, many are still concerned about the potential wider negative impacts of these medical marijuana laws. These fears include higher crime rates, increased recreational use of the drug,

a decrease in the perceived riskiness of cannabis, and an increase in alcohol consumption and other harder drugs (All Party Parliamentary Group 2016).

However, studies assessing the impact of state medical marijuana laws on crime rates found no increase in crime, and in fact, were associated with lower rates of homicide and assaults (Kepple and Freisthler 2012; Morris et al. 2014).

Additionally, although noted in Oregon, the movement of medical cannabis to the recreational market is apparent, in the states which have fully controlled the supply chain, this spillover effect is much less (Private Holding 2015). Also, when comparing the recreational use of cannabis and the perceived riskiness of the drug in adolescents before and after the implementations of medical marijuana laws in certain states in America, Hasin et al. (2015) found no significant difference. Interestingly, when comparing states which have passed medical marijuana laws (Nevada and Montana), to geographically close states that have not (Utah and Idaho), Choo et al. (2014) found that the states that have implemented this policy have a lower recorded cannabis use.

Moreover, studies have also found a correlation between medical marijuana laws and a decrease in alcohol consumption, which in turn has reduced the negative social consequences of alcohol (Anderson and Rees 2014; Smith et al. 2014).

Furthermore, an American study found a significant relationship between the implementation of medical marijuana laws and a significant reduction (24.8%) in opioid overdose fatalities (Bachhuber et al. 2014). This relationship is postulated to be due to patients replacing analgesic opioids with cannabis (Bachhuber et al. 2014). This is particularly important, considering opioid use contributes significantly to adult mortality in the United Kingdom, most commonly due to overdose (Cornish et al. 2010). In fact, opiates are the most common cause of poisoning from controlled drugs in the population (Morgan et al. 2006).

Overall, using American states as an example to show the impacts of legalising cannabis for medicinal use, it can be clearly seen, that the results of medical marijuana laws are all positive if fully controlled. Legalising cannabis for medicinal purpose in the UK will provide hope to many patients suffering from a variety of ailments and the wider consequences of the implementation of this law are not a concern. In fact, as seen, there is actually a relationship

between medical marijuana laws and improvements in crime rates, recreational cannabis use, opioid overdose rates and alcohol consumption.

## 1.5 Literature Review

Public opinion on whether cannabis should be legalised for medicinal use in the UK has been sharply divided. Some advocate that cannabis is a safe and effective medicine that has been withheld from suffering patients, whereas others claim it is a harmful drug, both to the health of the consumer and to society, and therefore should not be legalised for medicinal use. Consequently, in this research study, both the therapeutic potentials of cannabis, along with the many health and social concerns of the drug will be discussed.

### 1.5.1 Therapeutic benefits of cannabis

Cannabis has largely been a part of the medicine cabinet for a variety of ailments in the past, and a large number of theoretical therapeutic effects of the plant have been proposed since the contribution of studies investigating the important natural functions of the endocannabinoid system (Ramos et al. 2005). Additionally, there is a considerable amount of literature in the form of clinical trials, case studies, questionnaires, uncontrolled trials and anecdotal reports demonstrating the safety and efficacy of cannabis and cannabis-based products for a number of conditions, including: chronic and neuropathic pain, nausea and vomiting, movement disorders, spasticity, appetite stimulation, migraines, dementia, glaucoma, mental health disorders, sleep and gastrointestinal disorders, among many others, as seen in table 2 (Koppel et al. 2015; Hill 2015; Smith et al. 2015; Whiting et al. 2015). However, good quality, placebo-controlled double blind experiments are made difficult due to the classification of the plant, therefore, not all of the studies proposing cannabis as an effective treatment/symptom relief for particular ailments provide sufficient evidence. Consequently, when limiting the conditions benefitting from cannabis and cannabis-based products to only the ones which have been supported by good quality, placebo-controlled experiments showing significant results, the list is reduced to just four conditions: chronic/neuropathic pain, spasticity, nausea and vomiting (in particularly related to chemotherapy) and anxiety (All Party Parliamentary Group 2016).

Table 2: Studies of the therapeutic potentials of cannabis.

| *Symptom* | *Medical condition* | *Cannabis form* | *Study design* | *Study quality* | *Outcome* | *Authors* | *Year* |
|---|---|---|---|---|---|---|---|
| ***Pain*** | Multiple sclerosis neuropathic pain | Nabiximols | Open study | Class III | Reduced pain rating and improved quality of life. | Russo et al. | 2016 |
| | Neuropathic pain from spinal cord injury and disease | Natural cannabis (vaporised) | Crossover, randomised, placebo-controlled study | Class III | Significant analgesic response to cannabis. | Wilsey et al. | 2016 |
| | Multiple sclerosis neuropathic pain | Nabilone | Randomised, double-blind, placebo-controlled study | Class II | As an add on to gabapentin it was effective and well tolerated. | Turcotte et al. | 2015 |
| | Cancer pain | Nabiximols | Randomised, double-blind, placebo-controlled trial | Class I | Statistically significant improved pain and sleep. | Langford et al. | 2013 |
| | Neuropathic pain in HIV | Natural cannabis (smoked) | Double-blind, placebo-controlled, crossover trial | Class III | Statistically significant pain relief. Side effects were mild. | Ellis et al. | 2009 |
| | Therapy resistant chronic pain | Nabilone | Placebo-controlled, double-blind pilot study | Class I | Decrease in average spinal pain intensity, headache intensity, and an increase in the number of days without headache. Improvements in quality of life. | Pinsger et al. | 2006 |
| | Rheumatoid arthritis | Nabiximols | Randomised, double-blind, placebo-controlled trial | Class I | Statistically significant improvements in pain, quality of sleep and quality of life. Adverse effects were mild to moderate. | Blake et al. | 2006 |
| ***Nausea and Vomiting*** | Chemotherapy-induced nausea and vomiting | Nabiximols | Randomised, double-blind, placebo-controlled trial | Class I | As an add on to standard antiemetic therapy it significantly improved nausea and vomiting. It was well tolerated. | Duran et al. | 2010 |
| | Chemotherapy-induced nausea and vomiting | Dronabinol | Randomised, double-blind, placebo-controlled trial | Class I | Dronabinol was just as effective as ondansetron (an accepted anti-nausea medication). | Meiri et al. | 2007 |
| | Chemotherapy-induced nausea and vomiting | Dronabinol | Randomised, double-blind, placebo-controlled trial | Class II | The combination of dronabinol and prochlorperazine was significantly more effective than either drug alone. | Lane et al. | 1991 |
| ***Spasticity*** | Multiple sclerosis | Nabiximols | Open-label, long term, real-world study | Class IV | Follow up study confirms efficacy and safety in the treatment of spasticity and pain, which is maintained up to a year. | Ferre et al. | 2015 |
| | Multiple sclerosis | Nabiximols | Long term open study | Class IV | Confirms the long-term effectiveness and tolerability. | Flachenecker et al. | 2014 |

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|---|---|---|---|---|---|---|---|
| | Multiple sclerosis | Oral cannabis extract | Double-blind, placebo-controlled trial | Class I | Muscle stiffness relief, reduced body pain and better sleep was almost twice as high. | Zajicek et al. | 2012 |
| | Multiple sclerosis with resistant spasticity | Nabiximols | Double-blind, randomised, placebo-controlled trial | Class I | Significant improvement in spasticity. | Collin et al. | 2010 |
| | Multiple sclerosis with resistant spasticity | Nabiximols | Follow up, double-blind, randomised, placebo-controlled trial | Class I | Significant improvements in spasticity rating, sleep disturbances and spasm frequency. Safe and effective. | Novotna et al. | 2011 |
| ***Movement disorders*** | Parkinson disease | Natural cannabis (vaporized) | Open study | Class IV | Cannabis significantly improved motor scores and pain. | Shohet et al. | 2017 |
| | Parkinson disease | Natural cannabis (smoked) | Open-label observational study | Class III | Significantly improved tremors, rigidity, bradykinesia, sleep and pain. No significant adverse effects. | Lotan et al. | 2014 |
| | Parkinson disease | CBD | Controlled, double-blind trial | Class III | Significant improvements in wellbeing and quality of life. | Chagas et al. | 2014 |
| ***Dementia*** | Alzheimer's disease | Cannabis oil | Open-label study | Class III | Delusions, agitation/aggression, irritability, apathy, and sleep and caregiver distress significantly decreased. | Shelef et al. | 2016 |
| | Alzheimer's disease | Low dose THC | Randomised, double-blind, placebo-controlled study | Class I | No significant reduction in dementia-related neuropsychiatric symptoms, although it was well-tolerated. | van den Elsen et al. | 2015 |
| | Alzheimer's disease | Dronabinol | Uncontrolled study | Class IV | Significantly decreased agitation and improved global impression scores, sleep duration and appetite. Adverse effects were mild and well tolerated. | Woodward et al. | 2014 |
| ***Appetite stimulation*** | Advanced cancer | Marinol | Randomised, double-blind, placebo-controlled study | Class II | Increased overall appreciation of food and appetite. | Brisbois et al. | 2011 |
| | HIV | Dronabinol and smoked natural cannabis | Randomised, double-blind, placebo-controlled study | Class II | Both significantly increased food intake and body weight. Improvements in mood was also reported. | Haney et al. | 2007 |
| | Aids | Dronabinol | Randomised, double-blind, placebo-controlled study | Class I | Increased appetite and weight, improvement in mood and decreased nausea. | Beal et al. | 1995 |
| ***Epilepsy*** | Uncontrolled epilepsy | Natural cannabis | Anonymous survey | Class IV | Improvement in seizure, sleep, stress and memory/ concentration. | Massot-Tarrús and McLachlan | 2016 |

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|---|---|---|---|---|---|---|---|
| | Tuberous sclerosis complex | CBD | Open study | Class IV | Reduced median weekly seizure frequency. It was well-tolerated. | Hess et al. | 2016 |
| | Treatment resistant pediatric epilepsy | CBD enriched cannabis oil | Controlled study | Class III | Significantly reduced seizure load and a reduction in seizure frequency. It was well-tolerated. | Tzadok et al. | 2016 |
| | Dravet's syndrome and Lennox-Gastaut syndrome | CBD | Open-label study | Class III | Significant reduction in monthly motor seizures. It was well tolerated. | Devinsky et al. | 2016 |
| | Pediatric epilepsy | CBD enriched cannabis preparations | Survey | Class IV | 85% of parents reported a reduction in seizure frequency and 14% reported complete seizure freedom. There was also improvement in sleep, alertness and mood. The side effects were well tolerated. | Hussain et al. | 2015 |
| ***Gastrointestinal disorder*** | Inflammatory bowel disease | Natural cannabis | Survey | Class IV | Reported helpful for symptom control (abdominal pain, nausea, and diarrhea), including patients with ulcerative colitis. | Allegretti et al. | 2013 |
| | Inflammatory bowel syndrome | Natural cannabis (smoked) | Uncontrolled study | Class IV | After 3 months of smoking cannabis, patients reported improvement in general health, social functioning, ability to work, pain and depression. | Lahat et al. | 2012 |
| | Crohn's disease | Natural cannabis | Retrospective observational study | Class IV | 21 out of 30 patients improved significantly. | Naftali et al. | 2011 |
| ***Mental health disorder*** | Bipolar disorder | Natural cannabis (smoked) | Controlled study | Class II | Mood alleviation and not at the expense of cognitive impairment. | Sagar et al. | 2016 |
| | Post-traumatic stress disorder | Nabilone | Randomised, double-blind, placebo-controlled cross-over study | Class II | Significantly decreased trauma-related nightmares and improved general well-being. | Jetly et al. | 2015 |
| | Post-traumatic stress disorder | Nabilone | Retrospective open study | Class III | Significant improvements in insomnia, nightmares and chronic pain. Safe and effective. | Cameron et al. | 2014 |
| | Schizophrenia | CBD | Double-blind, randomised, controlled study | Class II | Marked tolerability and safety compared to current antipsychotics. Also a significant increase in serum anandamide levels was reported, which was significantly associated with clinical improvement. | Leweke et al. | 2012 |
| | Anxiety | CBD | Double-blind, randomised, placebo-controlled study | Class I | Significantly reduced anxiety, cognitive impairment, and discomfort in patients subjected to a public-speaking test. | Bergamaschi et al. | 2011 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Anxiety | CBD | Double-blind, randomised, placebo-controlled study | Class I | Significantly decreased anxiety and this was related to its effects on the limbic and paralimbic brain areas. | Crippa et al. | 2011 |
| | Anxiety | THC and CBD | Double-blind, randomised, placebo-controlled study | Class I | CBD reduced anxiety whilst THC was found to increase anxiety. | Fusar-Poli et al. | 2009 |
| ***Glaucoma*** | Glaucoma | Cannabis-based extract THC and CBD (sublingual) | Randomised, double-blind, placebo-controlled four-way crossover study | Class III | THC reduced intraocular pressure compared to placebo, but, CBD did not. The treatment was well tolerated. | Tomida et al. | 2006 |
| ***Brain injury*** | Traumatic brain injury | THC | Open controlled study | Class IV | The mortality rate in the group which were treated with THC was significantly decreased. | Nguyen et al. | 2014 |
| ***Headache*** | Migraines | Natural cannabis (smoked) | Retrospective, observational study | Class IV | Migraine frequency significantly decreased. | Rhyne et al. | 2017 |

Additionally, many other studies have shown that cannabis can also be used to not only provide symptom relief but can also be used to treat certain illnesses or prevent relapse (Kogan 2007). This has been shown in a few studies proposing cannabis can be used to prevent relapse in multiple sclerosis patients, reduce cancer growth, slow down the progression of myelin sheath degeneration in Alzheimer's disease, and even has been found to significantly reduce plasma HIV viral loads (De Petrocellis et al. 1998; Bifulco and Di Marzo 2002; Baker and Pryce 2003; Arévalo-Martín et al. 2008; Cao et al. 2014; Milloy et al. 2015). However, like with the many other conditions, because cannabis is a Schedule I drug, which perceives it as having "no medicinal value", enough good quality experiments assessing these potential benefits are lacking (Grant et al. 2012).

In summary, both cannabis and cannabis-based products have shown to be a well-tolerated and effective drug for providing relief from chronic/neuropathic pain, spasticity, nausea and vomiting (in particularly related to chemotherapy) and anxiety (Barnes and Barnes 2016). However, more good quality short- and long-term studies are needed for the conditions which cannabis has purported benefits. Additionally, due to what is known about the "entourage effect", more studies are required using 'natural' cannabis or whole plant extracts, which may reveal new information about other potential therapeutic properties of the plant (Lapraire et al. 2015). This will be made easier by reclassifying cannabis and its derivatives as a Schedule IV drug.

### 1.5.2. Concerns associated with medical marijuana legalisation

As shown in table 2, studies investigating the efficacy of cannabis show the plants potential to provide relief to so many suffering patients in the UK. Additionally, not only have these studies provided evidence for efficacy, many have reported that the short-term side effects were mild and well-tolerated (Barnes and Barnes 2016). However, still, the concerns relating to abuse and other long-term harmful consequences of cannabis have limited its progress in medical utility (Savage et al. 2016). Consequently, these long-term concerns will be discussed in the following.

One concern is that cannabis is a drug that causes severe long-term mental health issues, such as psychosis and therefore should not be prescribed as a medicine. The first longitudinal study addressing this concern was by Andreasson et al. (1987), suggesting an association between cannabis use and subsequent onset of schizophrenia. In 2002, Zammit et al. followed up this study and confirmed these finding, proposing that heavy cannabis users were six times more likely than non-users to develop schizophrenia. Since then, the link between the use of this drug and psychosis has consistently been reported in a large body of literature, but establishing causality from these studies is problematic (Fergusson et al. 2005; Semple et al. 2005; Moore et al. 2007; Hides et al. 2009; Rossler et al. 2012; Gage et al. 2016). A 2016 review by Ksir and Hart proposed that the current evidence suggests that cannabis does not cause psychosis, rather, the evidence indicates that both early use and heavy use of cannabis are more likely in individuals with a vulnerability to psychosis. Additionally, although cannabis use may have severe long-term effects in some users, only a minority of cannabis users develop psychosis (Casadio et al. 2011). For example, in Andreasson et al. (1987) and Zammit et al. (2002) cohort study, only 3% of heavy cannabis users went on to develop schizophrenia (Casadio et al. 2011). The low incidence of development of psychosis in cannabis users can be attributed to several factors, particularly the degree of cannabis exposure, genetic predisposition, other environmental risk factors and the age of first cannabis use (Wagner and Anthony 2002; Caspi et al. 2005; Casadio et al. 2011). All of which, when prescribing medical cannabis can be taken into consideration.

Another concern many have regarding cannabis use for medicinal purpose is the risk of

cannabis use disorder (Walsh et al. 2017). Cannabis use disorder, also known as cannabis dependence, is defined in the fifth revision of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) as the continued use of the drug despite clinically significant impairment, ranging from mild to severe (American Psychiatric Association 2013). Effects of cannabis dependence include major mental health problems, cognitive deficits and decreased work or academic productivity (Lorenzetti et al. 2016). Cannabis addiction has been clearly indicated by an array of studies, including Copeland (2004), Budney and Hughes (2006), Roffman and Stephens (2006) and Cerdá et al. (2016). Haberstick et al. (2014) found that lifetime rates of cannabis dependence were 8.3%. However, when compared to other drugs of abuse, this addiction risk is less concerning, for example, the lifetime dependence risk is 32% for nicotine, 23% for heroin, 17% for cocaine, and 15% for alcohol (Robson 2011). Additionally, unlike cocaine dependence, which can occur after the first use and at any age, cannabis dependence is a gradual progression and predominantly only a risk for users under the age of 25 years (Wagner and Anthony 2002; Bostwick 2012). Consequently, when prescribing cannabis to individuals of a vulnerable age, consideration and caution can be taken.

Additionally, cannabis has been called a “gateway drug”, which proposes that cannabis use is likely to lead to the use of other more harmful, illicit substances (Yamaguchi et al. 2006; Mayet al. al. 2012). Consequently, for many, this has raised the concern that legalising the plant for medicinal use, would increase the use of other more harmful drugs, such as heroin and cocaine. This concern has been supported by a large body of evidence showing a high degree of association between cannabis use and the use of other more dangerous illicit drugs (Fergusson et al. 2006; Mayet at al. 2012; Khan et al. 2013). As seen from a study by Secades-Villa et al. (2015), the cumulative probability of transition from cannabis use to other illicit drug use was 44.7%. Additionally, in agreement with the predictions of the “gateway hypothesis”, a minority of the total reported using other illicit drugs before cannabis (Secades-Villa et al. 2015). However, Wagner and Anthony (2002) proposed that this “stepping-stone” effect of cannabis is best explained by the “exposure opportunity” concept. This concept suggests that cannabis users are often more exposed to opportunities to use other illicit drugs, as the social environment and distribution channels for cannabis and other illegal drugs frequently overlap (Wagner and Anthony 2002; Mayet et al. 2012). This, however, although a problem concerning the illegal recreational use of the drug, does not concern the controlled medicinal use of the drug.

A fourth concern raised by many is that legalising cannabis for medicinal use would increase the accessibility and appeal of the drug to vulnerable populations, namely adolescents (Friese and Grube 2013; Thurston et al. 2011). This concern has been highlighted by a study by Wall et al. (2011), proposing that US states with medical marijuana laws have higher average adolescent marijuana use, 8.68% (95% confidence intervals) and lower perception of riskiness, during the period 2002–2008 compared to states without medical marijuana laws, 6.94% (95% confidence intervals). However, as the authors acknowledged, there was already a higher prevalence of cannabis use, and lower risk perception in those eight states analysed that had passed medical marijuana laws compared to those states that have not (Wall et al. 2011; Hasin et al. 2015). Furthermore, an elaboration of this study, performed by Hasin et al. (2015), determined that the passage of state medical marijuana laws does not increase adolescent use of cannabis. This concurs with a study by Choo et al. (2014) assessing the impact of medical marijuana legalisation across the United States. Choo et al. (2014) compared trends in adolescent cannabis use before and after the implementation of the medical marijuana law and found no statistically significant difference. Additionally, when comparing cannabis use between geographically close states with and without the legalisation of medical marijuana, no change was observed (Choo et al. 2014). Consequently, this study suggests that the legalisation of marijuana for medical purpose has not increased adolescent use of the drug, a finding supported by a growing body of literature, such as Lynn-Landsman et al. (2013) and Harper et al. (2012).

Finally, many fear about the wide-spread social implications legalising cannabis for medicinal use could potentially create (Volkow et al. 2016). These social concerns include negative consequences related to education, employment and personal relationships, among many others (Cerdá et al. 2016). Chronic cannabis use has been suggested by Ganzer et al. (2016) to be associated with a number of neurocognitive effects, such as sustained deficits in memory, impaired motor function and poor concentration. Additionally, the chronic use of the plant has been related to a lack of motivation, disruptions in decision-making and behavioural issues (Fridberg et al. 2010). These neurocognitive implications of the drug especially affect those at school, as indicated by Meier et al. (2015), persistent marijuana use across the four years of high school was associated with a lower grade-point average. Additionally, Silins et al. (2015) found that adolescent cannabis use (weekly+) was associated with 1 and a half to two-fold increase in the odds of high school non-completion. Furthermore, several other studies have also linked heavy marijuana use to lower income,

greater welfare dependence, unemployment, criminal behaviour, and lower life satisfaction (Fergusson and Boden 2008; Brook et al. 2011; Brook et al. 2013). Consequently, an observed relationship between cannabis and a number of social harms have been heavily reported in the literature. However, as with the concerns related to mental health, although an association can be recognised and longitudinal prospective studies rule out reverse causation, causality cannot be determined due to confounding factors (McCaffrey et al. 2010). Additionally, all of the studies analyse the effects of recreational cannabis use, not the controlled medicinal use. Subsequently, whether these social concerns regarding medicinal cannabis are warranted cannot be determined from these studies.

Overall, there is a large collection of scientific evidence suggesting cannabis has a vast array of medical benefits, especially for providing relief from chronic conditions. Additionally, there is an abundant body of literature assessing the purported risks of non-medical cannabis use, which has raised concerns among many and have prevented cannabis being exploited for its medicinal value. However, there is a lack of research addressing the views of the key UK populations, namely, politicians, healthcare professionals, lawyers, students and the general public, whose opinions are important in regards to whether cannabis should be legalised for medicinal use or not. Addressing this area of research allows the views of these important groups to be assessed, and ultimately determine the majority outlook. The intention is to assess whether the general attitudes of these groups, support the belief that cannabis should be moved from a Schedule I drug to a Schedule IV drug in the UK as the All Party Parliamentary Group for Drug Reform (2016) suggests and consequently be recognised for its medicinal value.

## 1.6 Aim

The aim of this research study is to investigate the views and concerns of key UK populations, including healthcare professional, lawyers, politicians, students as well as the general public in regards to medicinal cannabis. The intention is to assess whether overall view supports the belief that cannabis should be moved from a Schedule I drug to a Schedule IV drug in the UK.

## 1.7 Objectives

- To find out the main views and concerns of the general British public.
- To see which of the key populations, including healthcare professionals, lawyers, politicians and students, if any, support the legalisation of cannabis and its derivatives for medicinal use.
- To assess the concerns of the individuals who believe cannabis should remain a Schedule I drug.
- To consider which delivery route is believed to be the best for medicinal cannabis use, mainly aimed at healthcare professionals.
- To assess the views of the key UK populations in regards to whether cannabis is a safe and effective drug.
- To consider which medical conditions cannabis is most believed to treat or help alleviate the symptoms of.
- To compare the views and concerns of these key UK populations (as defined by this study).
- To make recommendations based on research as to whether cannabis should be legalised for its medicinal value.

# 2. Methodology

## 2.1 Survey method

**Sample:**

The sample comprised of a total of 392 people from the UK population. Additional to the views of the general British public, the views of certain key UK populations were also assessed, including politicians, criminal/drug defence lawyers, healthcare professionals and students. Among the medical professionals, seven different specialisms were primarily targeted, encompassing: GPs, doctors, nurses, neurologists, oncologists, psychiatrists, paediatricians and pulmonary specialists. The groups were chosen for three primary reasons: 1) pre-existing knowledge of cannabis as a recreational and medicinal drug (in the case of healthcare professionals, lawyers and students), 2) the centrality of the individuals to policy making and the practice of healthcare (in the case of politicians and healthcare professionals), and 3) to engage the opinions of a diverse group with different backgrounds, experiences and outlooks (in the case of all of the key groups, including the general public). It is important to note, patients suffering a medical condition were also targeted via a number of UK societies, however, unfortunately, they were not willing to email the survey to their members. Consequently, this population were removed from this study.

As it is known that the approximate overall UK population is around 65 million people, a representative sample can be determined (Office for National Statistics 2016). Determining the most appropriate sample size is important to make sure that not only are the results accurate and reflect the target population, but also to make sure that time is not wasted on trying to obtain a sample that is unnecessarily large. After exploring the foundations of a successful survey, it was found that most researchers (and research texts) suggest that a confidence level of 95% with a margin of error of 5% should suffice (The Researcher Advisors 2006). Therefore, this was what was used for this study. Calculating the sample size needed for a degree of accuracy of ± 5% at a 95% confident level was determined using the Creative Research Systems (2012) sample size calculator, which uses the two formulas seen in figure 1.

A)

$$ss = \frac{Z^2 (p) (1-p)}{c^2}$$

B)

$$\text{new ss} = \frac{ss}{1 + \frac{ss-1}{pop}}$$

Figure 1: The determination of the sample size using formula A) which determines the sample size (ss) using the Z value (Z), confidence level expressed as a decimal (p) and the confidence interval expressed as a decimal (c); and formula B) which corrects for finite population to create the new sample size (ss) using the previous calculation of sample size (ss) and the estimated population size (pop) (amended from Creative Research Systems 2012)

Due to time constraints and targeting hard-to-reach groups, it was not possible to achieve a sample size that large enough for each key population, therefore, the decision was made to ensure a representative sample size was achieved for the overall UK population instead.

**Questionnaire:**

The data collection method comprised of an anonymous, online and paper survey. A survey was chosen because it is easy to manage, can be administered online, can be quickly developed and obtain results fairly rapidly and is capable of collecting data from a large number of respondents, including those that are hard to reach in person, such as politicians. Additionally, surveys conducted anonymously tend to obtain more honest and unambiguous responses than other types of research methods (Preisendörfer and Wolter 2014). This is particularly important when the research question is a controversial matter, such as illegal medicinal cannabis use.

Several topics were covered, including opinions on whether cannabis should be legalised for medicinal use, if the drug was considered safe and effective, what medical condition it can provide relief from, the best delivery route, and the main concerns people have in regards to the legalisation of medicinal cannabis. Only nine question were chosen, which took an average of two minutes to complete. The length of the survey was chosen to make sure the respondent remained engaged and to maximise the response rate. The survey consisted of a

number of liker-scale questions, dichotomous scale questions and ones that require a rating system from 1-10 to allow comparisons to be made and easy data analysis. The final version of the questionnaire incorporated comments from researchers and lecturers interested in this issue.

**Procedure:**

Once the questions were selected, the survey was made online using a website called Survey Monkey. The next step was ethical approval, which was passed by Professor David Osselton.

To find the contact details of certain key healthcare professionals a number of websites provided useful, including Bupa, Nuffield Health and NHS Working Across Wessex. The GPs and nurses at Bournemouth University Lansdowne Campus were also approached using their email found on their Bournemouth University profile. When searching for the contact details of politicians, the parliament.uk website was particularly useful. A list of all the MPs, Lords and offices emails were provided. The contact details of lawyers, predominantly in Bournemouth and Poole, but also elsewhere in the UK, were found by visiting a number of law firm websites, including: Old Bailey Solicitors, Jacobs and Reeves Solicitors, Hine Solicitors, Renshaw Derrick & Co, Irwin Mitchell Solicitors, Aldridge Brownlee Solicitors, Ellis Jones Solicitors, Hurley Solicitors and Preston Redman Solicitors.

The online survey was sent via email and posted and shared on a number of social medias, including Facebook and Twitter. Additionally, a paper form of the survey was printed, and results were collected by approaching the general public in Bournemouth town centre and handing it out to students in lectures.

**Data analysis:**

Data was entered into Microsoft Excel (Version 15.26). As this study was only to investigate the views and concerns of key UK populations, this research study predominantly only reports descriptive statistics (the raw value, percentages and means). However, a two proportions Z-test was completed when comparing the proportion of the population who believe cannabis should be legalised for medicinal use, to the proportion who do not. This z-score was achieved using the formula seen in figure 2 to establish if the results were valid and

repeatable. Additionally, the confidence intervals of the overall UK population, as well as the key populations were calculated using Excel, as seen in figure 3.

$$z = \frac{(p_1 - p_2) - 0}{\sqrt{p\,(1-p) / \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

Figure 2: The two proportions z-test formula. *p* is the proportion as a decimal of the sample choosing one of the options in the survey question (e.g. either yes or no), and *n* is the total sample size (e.g. either of the population saying yes or the population saying no) (Zou et al. 2003).

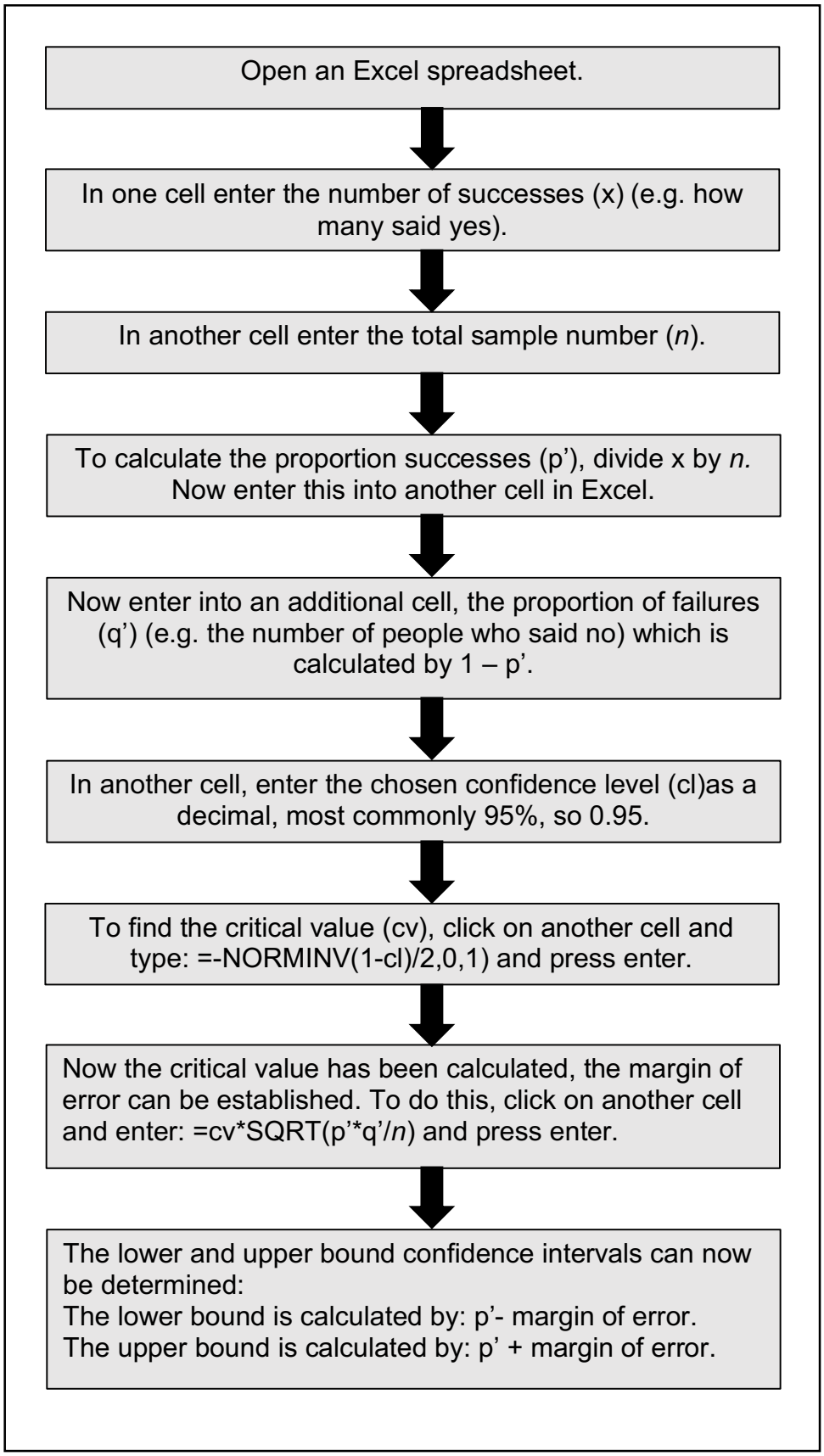


Figure 3: The calculation method using Excel to determine confidence intervals.

## 2.2 Literature research method

When searching for books and peer-reviewed journals, a number of databases were consulted including: PubMed (NCBI), Google Scholar, Science Direct, PLOS Biology, TOXLINE, MEDLINE Complete and library resources. Additionally, a particular useful archive that displayed all of the most recent clinical trials and case reports available regarding cannabis was the International Association of Cannabinoid Medicines. When typing "medicinal cannabis" into the search button of Google Scholar, 43,600 results were revealed. Consequently, certain keywords were used together to narrow down the search, as seen in Appendix 2, and a 3-year date range was applied of 2014-2017.

# 3. Results

## 3.1 Response rate

As seen in table 4, the online survey sent via email achieved a fairly respectable response rate, especially for targeting lawyers (36.5%) and healthcare professionals (32%). Politicians (7.7%), however, were a hard population to achieve a response from due to policies stating that many MPs do not complete questionnaires from individuals, not from their constituency.

Table 4: The response rate of the online survey sent to the key populations via email.

| Occupation | Number of individuals contacted | Number of respondents | Response rate (%) |
|---|---|---|---|
| **Healthcare professionals** | 259 | 83 | 32 |
| **Lawyers** | 137 | 50 | 36.5 |
| **Politicians** | 649 | 50 | 7.7 |

When handing out a paper survey in lectures for students to complete, the response rate was 100%. This collection method, however, was a lot less successful when handing it out to

members of the general public in the Bournemouth town centre. After 4 hours, only 18 individuals completed it.

## 3.2 Sample composition

As seen from figure 4, out of the 392 respondents, 83 were heath care professional (21%), 50 were lawyers (13%), 50 were politicians (13%), 153 were students (39%) and 56 were members of the general public (14%).

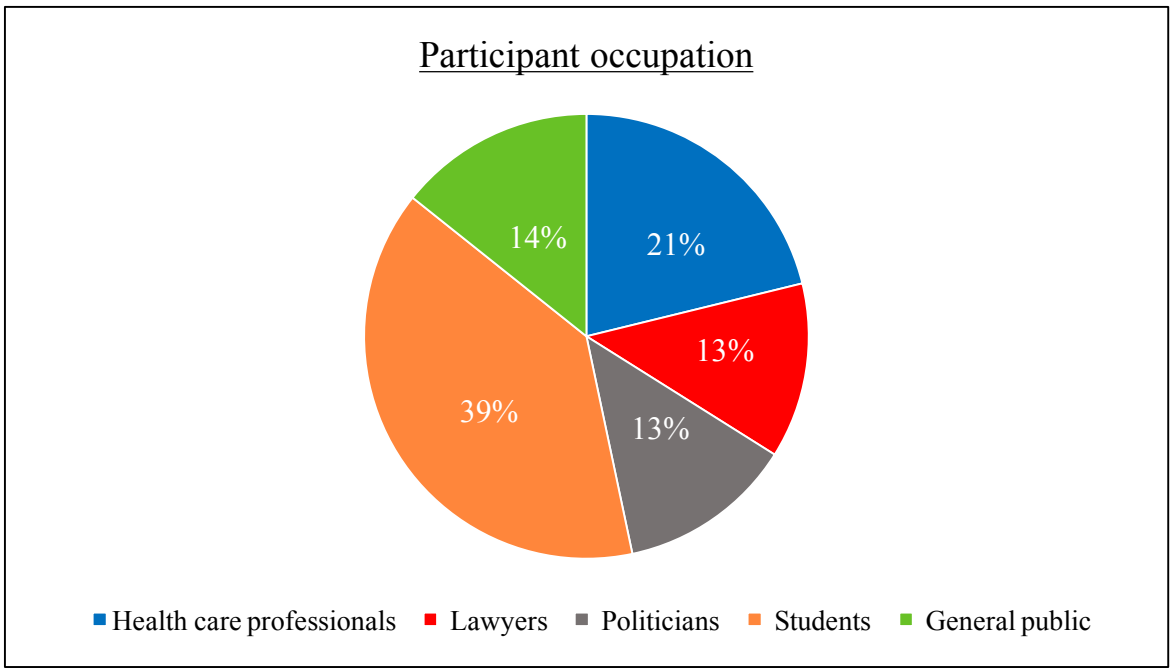


Figure 4: The percentage of healthcare professionals, lawyers, politicians, students and members of the general public in the overall sample.

## 3.3 Should cannabis be legalised for medicinal use: the beliefs of key UK populations

As shown from table 5, which is summarised in figure 5, 277 of the total 392 respondents (70%) believe cannabis should be legalised for medicinal use, compared to only 115 (30%) that believe it should not (confidence level 95%; margin of error ± 4.5%). A z-proportions test was performed, which indicated a statistically significant difference between the proportion of the population stating cannabis should be legalised and the proportion of the population stating it should not ($z= 7.3$, $p= <0.05$).

Table 5: The results showing the percentages and raw values of how many healthcare professionals, lawyers, politicians, students and the general public believe cannabis should be legalised for medicinal use.

| **Occupation** | **Should cannabis be legalised for medicinal use?** | | | |
|---|---|---|---|---|
| | **Yes** | | **No** | |
| | **%** | **Raw data** | **%** | **Raw data** |
| **Healthcare professional** | 65 | 54/83 | 35 | 29/83 |
| **Lawyer** | 68 | 34/50 | 32 | 16/50 |
| **Politician** | 58 | 29/50 | 42 | 21/50 |
| **Student** | 81 | 124/153 | 19 | 29/153 |
| **General public** | 64 | 36/56 | 36 | 20/56 |
| **Total** | 70 | 277/392 | 30 | 115/392 |

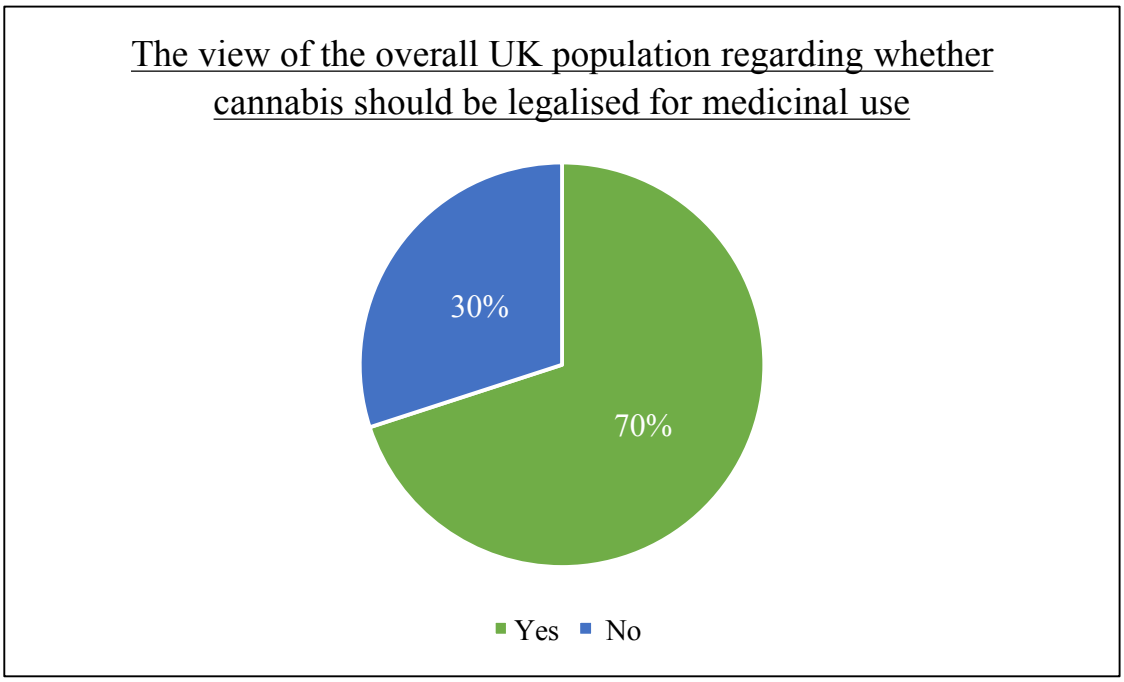


Figure 5: The percentage of the general view of the UK population regarding whether cannabis should be legalised for medicinal use.

Additionally, as shown from figure 6, when separating the overall UK population into their key groups, as defined by this study, 65% of healthcare professionals (95% confidence level; margin of error ± 10.25%), 68% of lawyers (95% confidence level; margin of error ± 12.93%), 58% of politicians (confidence levels 95%, margin of error ± 13.68%), 81% of students (confidence level 95%; margin of error ± 6.2%) and 64% of the general public believe cannabis should be legalised for medicinal use (confidence level 95%; margin of error ± 12.5%).

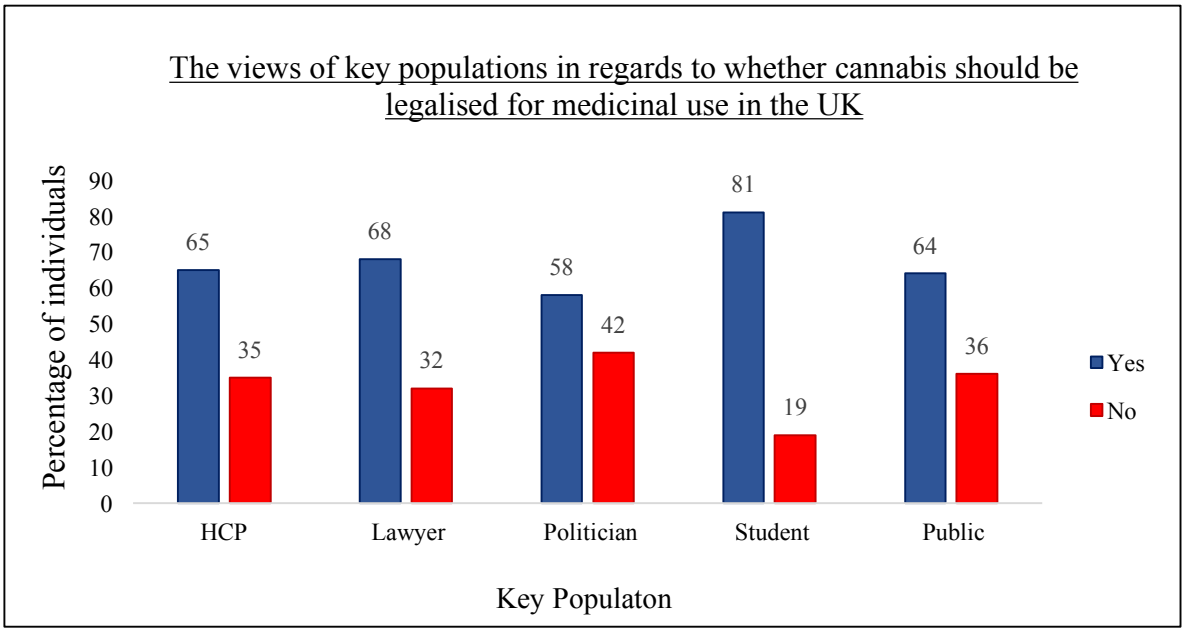


Figure 6: The percentage of healthcare professionals (HCP), lawyers, politicians, student and the general public who believe cannabis should be legalised for medicinal use.

## 3.4 The views on the safety and efficacy of cannabis

As shown from figure 7, although many indicated they didn't have enough knowledge in regards to the safety and efficacy of cannabis (on average 47%), 41% of healthcare professionals, 55% of lawyers, 41% of politicians, 53% of students and 42% of the general public regard cannabis as an effective drug with a wide margin of safety (average of 46.4%). This is in comparison to just 18% of healthcare professionals, 6% of lawyers, 7% of politicians, 8% of students and 14% of the general public which indicated that cannabis is not a safe and effective drug (average of 10.6%). Furthermore, from the student population, one respondent replied that they have epilepsy, and from their experience, it is a safe and effective treatment.

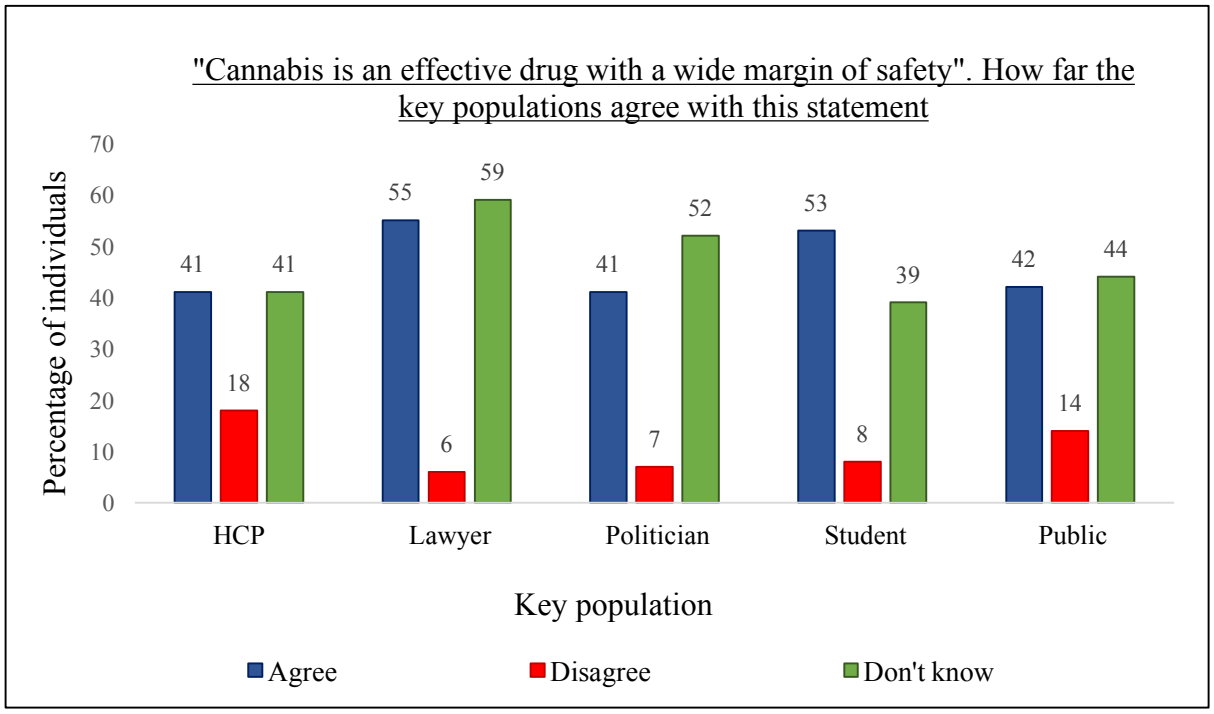


Figure 7: The percentage of healthcare professionals (HCP), lawyers, politicians, student and the general public who either agree cannabis is an effective drug with a wide margin of safety, who don't know or who disagree with this statement.

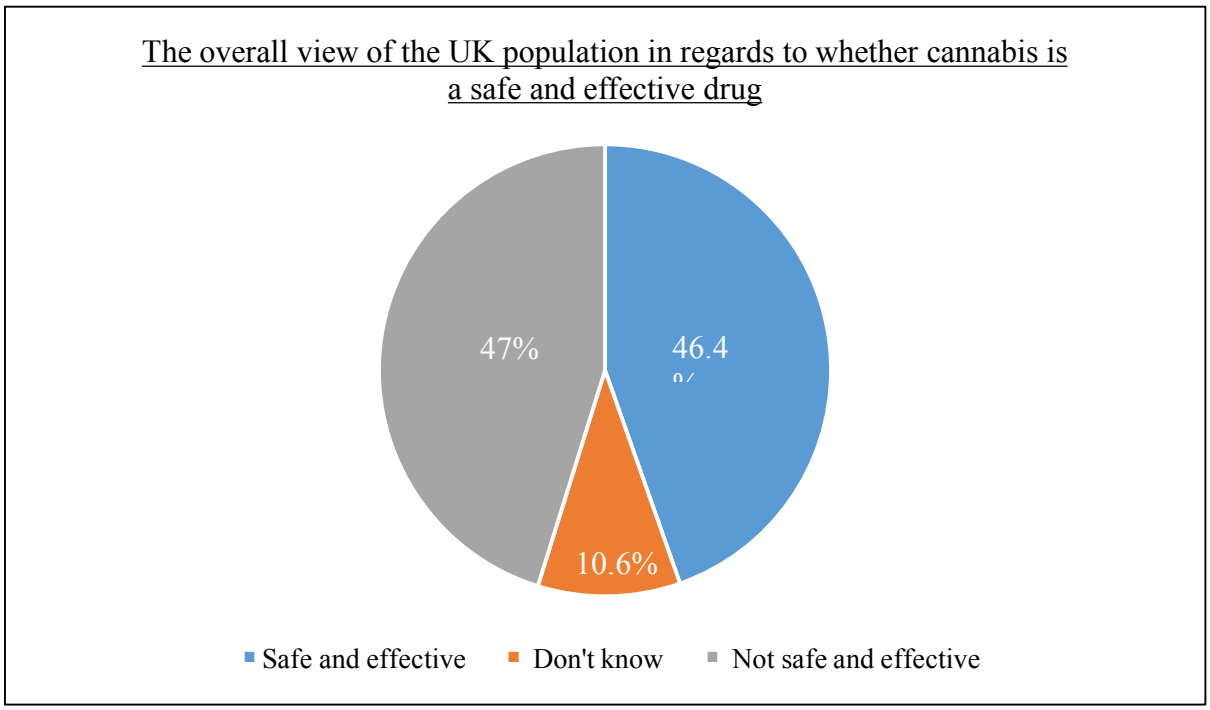


Figure 8: The beliefs of the overall UK population in regards to whether cannabis is an effective drug with a wide margin of safety.

## 3.5 The views on which medical conditions cannabis can be used to treat

As you can see from figure 9, the views of all the key populations are predominantly in agreement with each other and the literature. The majority indicated that chronic pain (average of 81.2%), multiple sclerosis (average of 75.6%) and cancer (average of 68.2%) are the conditions that cannabis has the most therapeutic potential for. Additionally, half of the healthcare professional respondents regarded cannabis as having therapeutic potential to treat spasticity in general. Furthermore, although, not many politicians, healthcare professionals, and lawyers view cannabis as a potential treatment for epilepsy and migraines, among the general public and the student population, over half indicated cannabis as a potential treatment for these conditions.

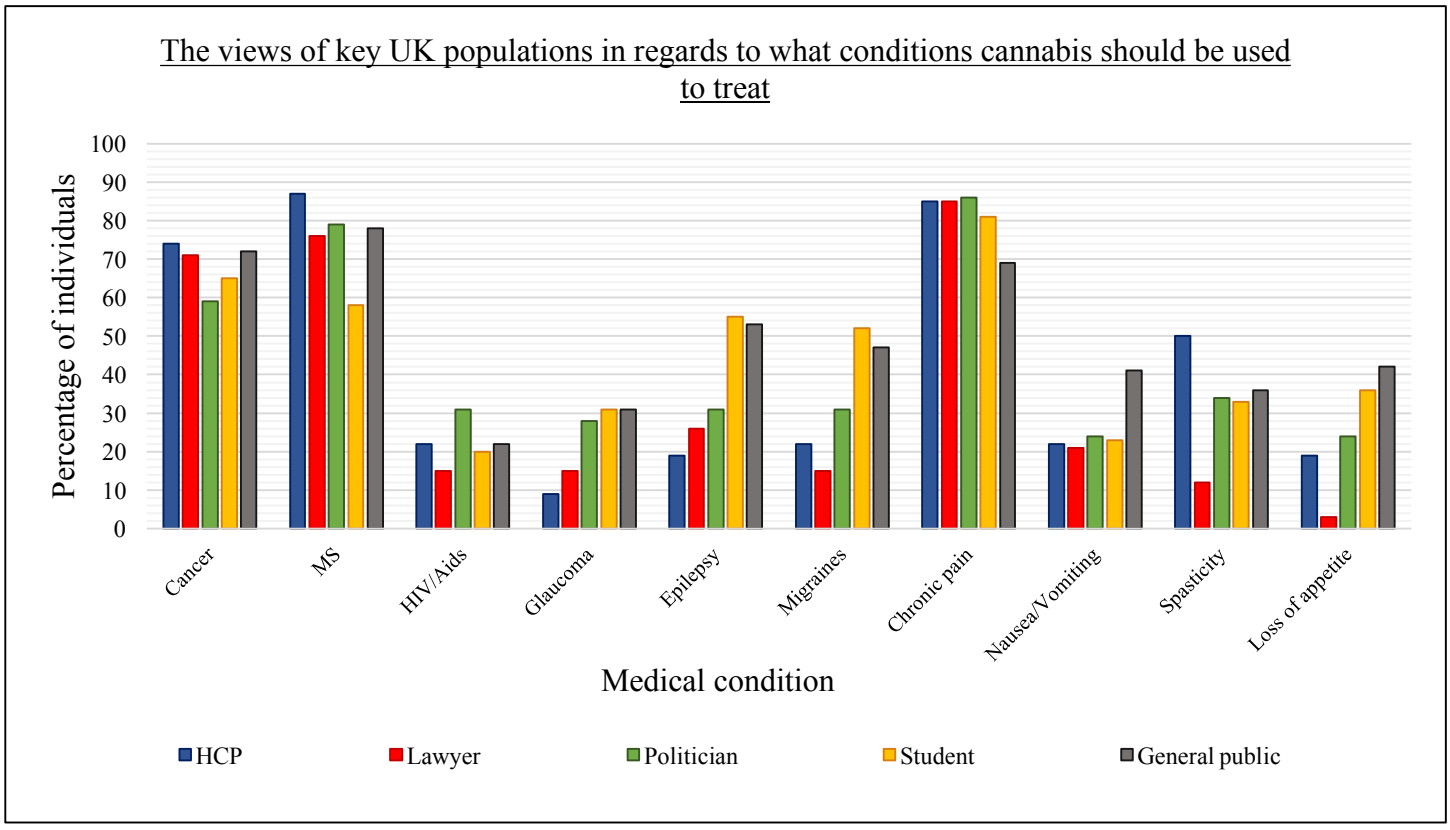


Figure 9: The percentage of healthcare professionals (HCP), lawyers, politicians, students and the general public who believe cannabis can be used to treat the following medical conditions: cancer, multiple sclerosis (MS), HIV/Aids, glaucoma, epilepsy, migraines, chronic pain, nausea/vomiting, spasticity and loss of appetite.

## 3.6 The views of healthcare professionals in regards to which delivery route medicinal cannabis should be prescribed as

As shown from figure 10, the majority of healthcare professionals (44%) believe that medicinal cannabis should be taken in the form of a tablet. This is in comparison to just 19% who suggest an oral spray, 13% for vaporising, 9% for an inhaler, 9% for ingestion of cannabis-infused edibles (e.g. cooking oils), 2% for tea and only 2% for smoking.

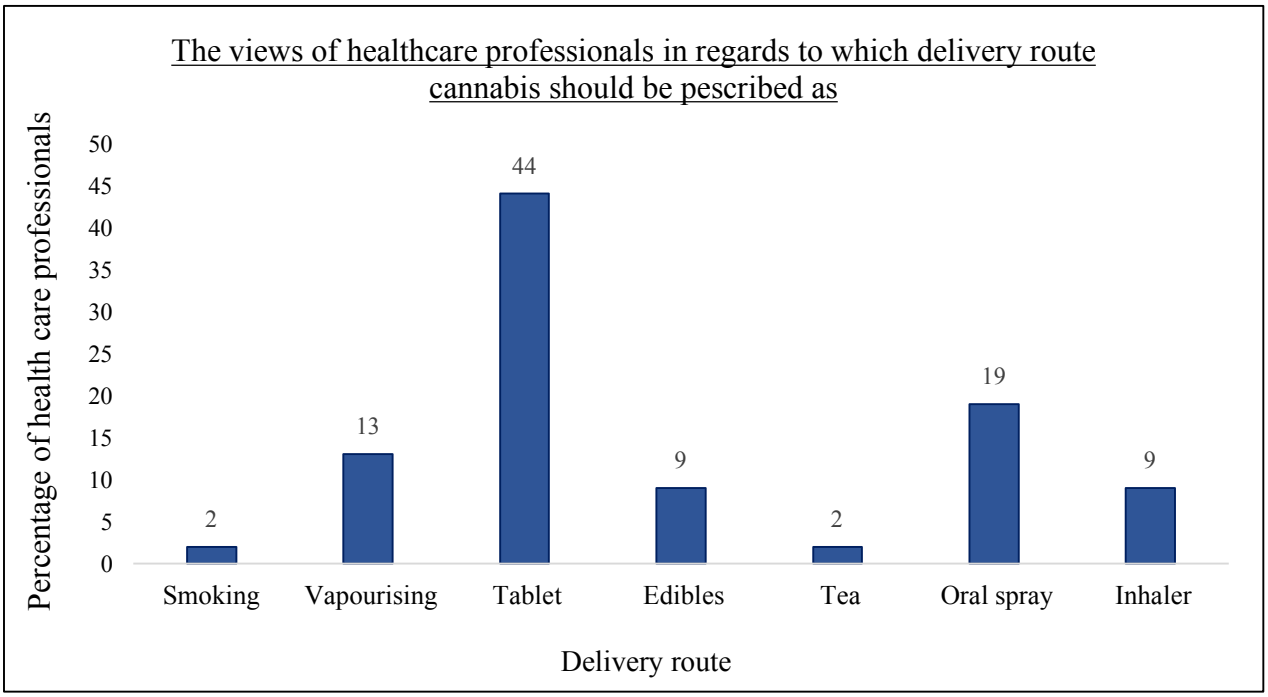


Figure 10: The percentage of healthcare professionals who believe cannabis should be delivered either by smoking, vaporising, in a tablet form, infused in edibles (e.g. cooking oils), in tea, via an oral spray or an inhaler.

## 3.7 The concerns of the UK population in regards to the legalisation of medicinal cannabis

When asked to rate how concerned they are that legalising cannabis for medicinal use may increase the recreational use of the drug and other more harmful substances on a Likert scale ranging from "very concerned" to "not at all concerned", as seen from figure 11, the majority

of healthcare professionals (45%), lawyers (50%), students (50%) and the general public (36%) are "not very concerned". This is compared to just 8% of healthcare professionals, 10% of lawyers, 6% of students and 14% of the general public stating they were "very concerned" about this potential risk. However, in comparison, the majority of politicians are more apprehensive, with 38% stating they were "somewhat concerned" and 30% stating they were "very concerned", with only 24% indicating they were "not very concerned" about the risk of the movement of medicinal cannabis into the recreational market.

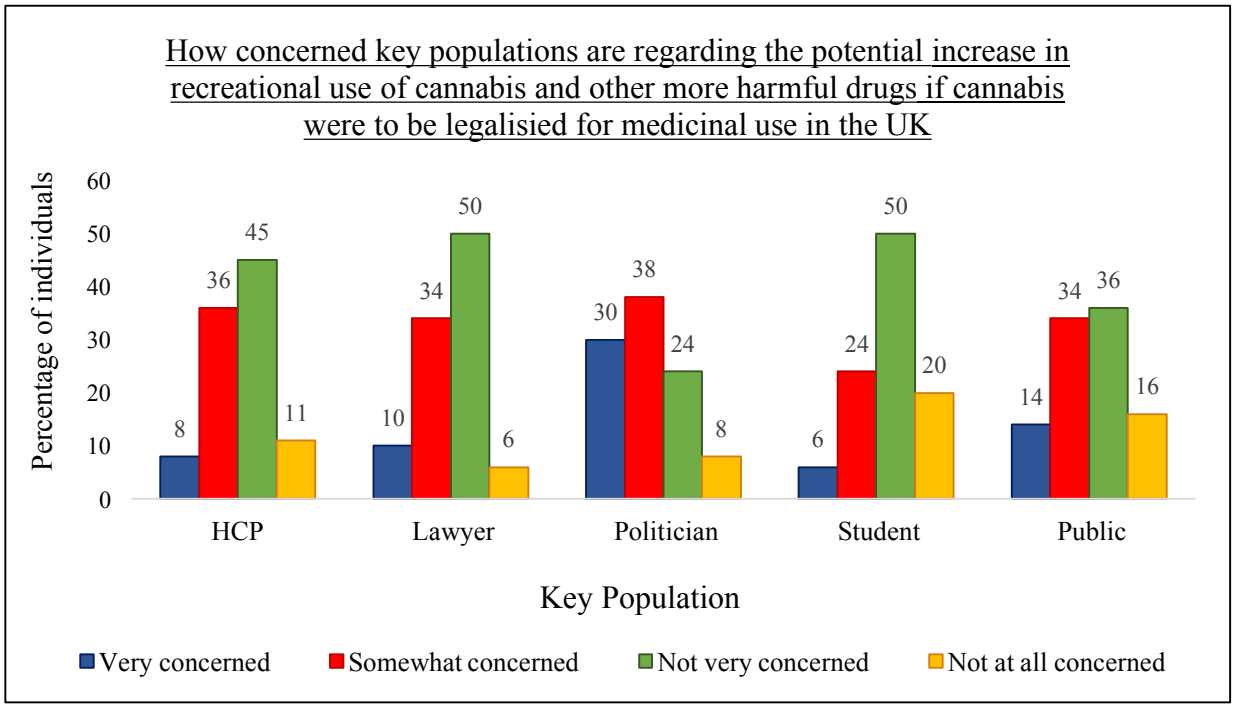


Figure 11: The percentage of healthcare professionals (HCP), lawyers, politicians, students and the general public who are either "very concerned", "somewhat concerned", "not very concerned" or "not at all concerned" in regards to potential increase of the recreational use of cannabis and other more harmful drugs as a consequence of medicinal cannabis legalisation.

Figure 12 highlights the main reasons why some individuals from the key populations believe cannabis should not be legalised for medicinal use. The main concerns of healthcare professionals (62%), lawyers (81%), politicians (71%), students (66%) and the general public (75%) regards the risk to the mental health of the consumer. Additionally, a high proportion of individuals from each key group (on average 61.4%) worry about the potential legalising cannabis for medicinal use may give the wrong impression to young people and decrease their perceived riskiness of the drug. The risk of cannabis addiction and abuse, and the

potential cannabis has to increase the consumption of harder drugs is also a concern worth noting (average of 37.8%). However, in regards to the plant as a lung toxin, although a considerable concern for the general public (45%), is not significant among politicians (10%). Most have recognised the need for new, effective treatments with only a minority suggesting cannabis should not be legalised for medicinal use because of the already existing safe and effective medication which cannabis has purported benefits for (on average 19.6%).

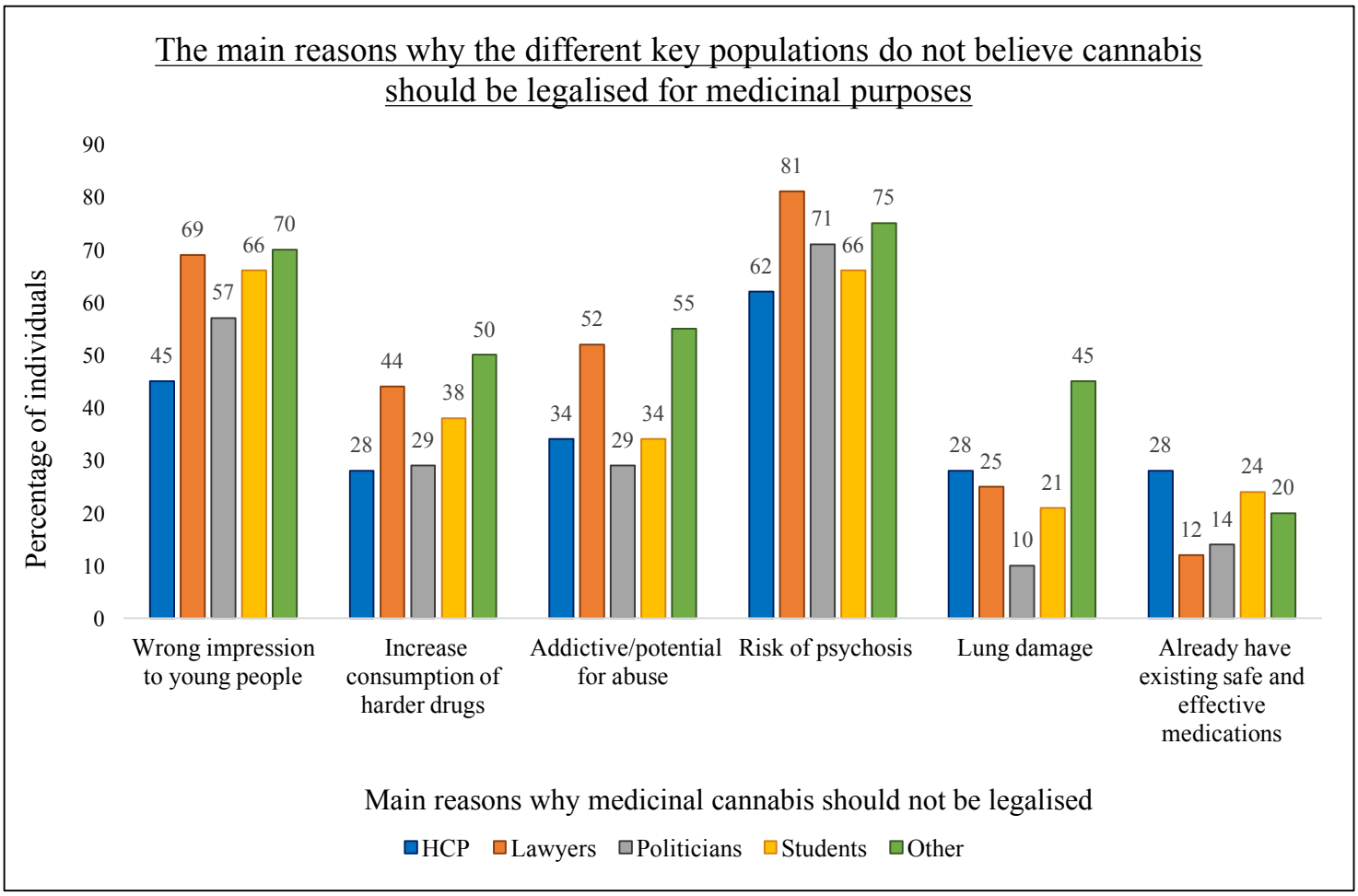


Figure 12: The percentage of healthcare professionals (HCP), lawyers, students, politicians, and the general public indicating the main reason why they believe cannabis should not be legalised for medicinal use.

Additional to the concerns presented in figure 9, further reasons why the respondents believe medicinal cannabis should not be legalised have been recorded in table 6. Two healthcare professionals stated that they felt there was not enough research and that the evidence base needs to be more robust, whereas two others suggested that they did not know enough to

support the cause. Additionally, another healthcare professional indicated that their anecdotal experience of seeing the effects of people taking cannabis in a recreational way has influenced their opinion. Furthermore, an interesting point suggested by three healthcare professionals was to legalise the recreational use of cannabis, which would remove the imperative to create an exception for medical use. The reason being is that doctors don't want to have the responsibility of deciding if someone should be allowed to use this "ordinary garden plant" or not. Additionally, they believe the already financially vulnerable NHS should not be having to pay a large sum for a synthetic congener of cannabis, when the patients might benefit the same from using home-grown cannabis leaves consumed in tea.

When assessing the additional reasons of politicians for believing cannabis should not be legalised for medicinal purpose, one suggested a lack of knowledge, another addressed the concern of cannabis use effecting education, whereas one emphasised the risk to the mental health of the consumer and the views of those, and their families, who are sectioned in a psychiatric ward.

The main reason for why cannabis should not be legalised for medicinal use in the UK for two students was a lack of knowledge and limited research. One member of the general public felt that reclassifying cannabis to a Schedule IV drug would disrupt productivity in the work place and lower the value of the British economy.

Table 6: The additional reasons why healthcare professionals, lawyers, politicians, students and the general public believe cannabis should not be legalised for medicinal use.

| *Occupation* | *What was the main reason why you believe cannabis should not be legalised for medicinal use?* |
|---|---|
| ***Healthcare professionals*** | Not convinced yet by the evidence base. However, would maybe be convinced based on high quality research evidence (both quantitative and qualitative). |
| | I believe forms of cannabis were already available for medicinal use. I would not agree with making it free on prescription as it would be funded by the NHS, a system which is already facing financial struggles. I also think the system would be abused, as is obvious in America. If they legalise it, it should be for recreational use and taxed accordingly, the same as alcohol. |
| | I only have my own anecdotal experience of seeing the effects on people who take cannabis in a recreational way. My reactions to this are negative. I feel it stupefies people and does nothing to promote the welfare of those smoking it. It encourages illegal drug trade. I do understand that for certain medical conditions that cause painful spasm, cannabis can be useful and under strict medical supervision then cannabis should be prescribed (but this too could be open to abuse). |
| | Herbal cannabis is currently in use for pain relief for people with MS. There are numerous trials in operation for the use of cannabis as a therapeutic drug. Until results are known it would not be wise to use or legalise this drug. |
| | I believe recreational use of cannabis should be legalised which would remove the imperative to create an exception for medical use. As a separate issue, cannabinoids should continue to be studied and agents developed for appropriate licencing as conventional pharmaceutical products. I don't think cannabis is 'special' either as a panacea or as a toxin. |
| | Cannabis is a garden plant. It should not be regulated as a medication to be prescribed by doctors - doctors don't want to have the responsibility of deciding who should be allowed to use an ordinary plant or not. People who use it know the dangers. The NHS should not be having to pay £300 for a THC mouth spray for someone when a patient might benefit the same from using home-grown cannabis leaves in tea. I don't think it is wise to allow large drug and tobacco companies dominate this new market. It should simply be regulated the same as alcohol and made illegal to sell to under 18s because they are the ones who are most at risk. The Dutch and places like Colorado seem to have got it right. For "medical use" is just a cop-out by a cautious and uncourageous government and is a way to make some drug companies much richer. |
| | Lack of knowledge to make an informed opinion. |
| | Not enough knowledge to have an opinion. |
| | The evidence base needs to be robust (as it would be for any other application for medicinal use). |
| | Legalising a drug makes it acceptable to use it recreationally and it should be discouraged. |
| ***Politicians*** | I think it would discourage people to take effort to improve their lives. |
| | I support medicine based on cannabis, but do not support stain cannabis. |
| | Cannabis use would affect education and create a new generation of low achievers. |

| | |
|---|---|
| | whilst I understand constraints, there are more nuanced salient factors. I know some find the use of marijuana useful and medicinal, if you speak to any mental health secure ward staffer, or more importantly the families of those sectioned, you would find a large proportion are there because of marijuana use/misuse. Any rational individual would then find it hard to argue for decriminalisation, whatever the perceived benefits. |
| | I don't believe I have enough medical information to support the cause. |
| | Still unclear in my mind whether cannabis extracts/oil negate the mental health implications of the readily available illicit narcotic. If not, assume it would require prescription and control if available for medical purposes. |
| ***Students*** | Don't know enough to form a solid opinion. |
| | Not enough studies are done. |
| ***General public*** | I am concerned about the wide use of so called health benefit drugs would lead to an addiction of harder drugs. I don't believe in drug use for whatever reason. |
| | I believe it would disrupt productivity in the work place, lowering the value of our economy. |

# 4. Discussion

This research study examined the views and concerns of key UK populations, including healthcare professionals, lawyers, politicians and students, as well as members of the general public, in regards to whether cannabis should be legalised in the UK for medicinal purpose.

Firstly, the limitations of this study need to be acknowledged. Although surveys provide a great source of insight into people's beliefs and attitudes, particularly when the topic of interest is a controversial issue, limitations still exist, primarily in the form of accuracy and response bias. In this questionnaire, the knowledge rating scales are fairly inaccurate as they are subjective to the individual's personal judgement. Some may rate themselves too highly, whereas other too low. Additionally, response bias is a particular problem, as although when targeting the individuals, the best was done to include a large range of people with an array of opinions, the survey may have attracted more responses from those whose views on medical cannabis were typically positive. Furthermore, although a representative sample of the overall UK population was achieved, due to time constraints and targeting hard-to-reach groups, a sufficient sample size for many of the key populations, especially politicians and lawyers was lacking. Additionally, although this survey included results from people all over the UK, the majority of students and members of the general public targeted were residents of

Bournemouth, again reducing the generalisability of the results. However, although this study was conducted predominantly in one region, the results are consistent with other local and international surveys. Therefore, this research study can be seen to be generalisable to other areas. Despite these flaws, the results still provide an important insight into the attitudes and beliefs of these key groups.

The major findings of this study is that, not only do the majority of the overall UK population believe cannabis should be legalised for medicinal use, more importantly, it is clear that there is also strong support among all of the key groups. Additionally, the results show that the consensus of the key UK populations is that cannabis is an effective drug with a wide margin of safety. Furthermore, of the purported conditions cannabis can be used to treat, consistent with the literature, the majority believe cancer, multiple sclerosis and chronic pain are the main conditions that will benefit from the legalisation of medicinal cannabis. When assessing the concerns, the majority of healthcare professionals, lawyers, students and the general public are "not very concerned" that legalising cannabis for medicinal use may increase the recreational use of the drug and other more harmful substances. However, politicians are more apprehensive, with the majority stating they were "somewhat concerned", with a large proportion that is "very concerned". Furthermore, the main arguments against the legalisation of cannabis for medicinal use are two-fold. Firstly, there is the argument concerning the mental health of the consumer, and secondly, the impression legalising cannabis for medicinal use may give to young people.

These findings concur with other local, international and nationwide surveys showing that public opinion has always favored legalising the use of medical cannabis (Zogby International 2002; Hawkeye Poll Cooperative 2010; Gallup 2010; Alder and Colbert 2013; Rubens 2014; The Harris Poll 2015; Sznitman and Bretteville-Jensen 2015; Roy Morgan Research 2015; Malloy and Smith 2017). In 2016, a poll released by End Our Pain (2016) found that 68% of the British public are supportive of a change in the law that would allow doctors to prescribe cannabis where they consider it help their patients (All Party Parliamentary Group 2016). Additionally, a survey conducted in Israel (where marijuana is already legalised) found that 78% of Israelis believe cannabis should be a medical option (Sznitman and Bretteville-Jensen 2015). These results are consistent with the outcome of the current study showing that 64% of the UK public believe cannabis should be legalised for medicinal use.

Moreover, when assessing the subgroups of people, including politicians, healthcare professionals and students, other studies provide support, showing the majority of all are in favour of legalising cannabis for medicinal purpose. The results of a poll of a representative sample of 108 British MPs reflect the exact same findings of the current research study, showing that 58% of politicians back the use of medicinal cannabis (Populus 2016). Respectively, an international survey consisting of 1,446 doctors from 72 different countries found that an astonishing 76% approved the use of cannabis for medicinal purpose (Alder and Colbert 2013). This is coherent with a poll assessing the views of 150 doctors from the British Medical Board panel in 1994, indicating that 74% of them believed that cannabis should be available on prescription (Meek 1994). These results are also supported by a study by Uritsky et al. (2011) and are consistent with the results from this research study showing that 65% of UK healthcare professionals believe cannabis should be legalised for medicinal use. It is important to note, however, that despite thorough searching, additional studies assessing the views of lawyers could not be found.

Furthermore, as seen above, although there is an abundance of binary data assessing the proportion of the British and international populations who believe cannabis should be legalised for medicinal use, there is a distinct lack of pre-existing survey data considering more in depth questions about particular views and concerns. Consequently, in spite of significant searching, the only relevant information that was discovered, pertained to medical professionals. When addressing the views in regards to which purported benefits cannabis has been suggested to treat, the majority of healthcare professionals supported its use for patients suffering from multiple sclerosis (87%), chronic pain (85%) and cancer (74%). This is broadly consistent with a study by Crowley et al. (2017) investigating the views of Irish GPs. Crowley et al. (2017) found that 63.5% of medical professionals indicated cannabis having a role to play in pain management, and 62.3% suggested cannabis as a treatment for multiple sclerosis. Additionally, in agreement with a survey conducted by Kondrad and Reid (2013), the current research study found that the majority of healthcare professionals (62%) were largely concerned about the risk to the mental health of the consumer. Kondrad and Reid (2013) reported the concerns of 520 family physicians in Colorado and similarly found that 64% believe cannabis poses serious mental effects. Additionally, 82.7% of Irish GPs indicated cannabis use has a significant adverse effect on patients' mental health (Crowley et al. 2017). However, although many of the physicians in Colorado (61%) and GPs in Ireland

(60%) were concerned about the physical health risks of cannabis, only 28% of UK healthcare professionals view this as a reason why cannabis should not be legalised for medicinal use (Kondrad and Reid 2013; Crowley et al. 2017).

An interesting point to discuss is that three healthcare professionals believe that the recreational use of cannabis should be legalised, which would remove the imperative to create an exception for medical use. Their reasoning is that doctors don't want to have the responsibility of deciding who should be allowed to use an "ordinary plant" or not. The NHS, a system which is already facing financial struggles should not be having to pay a large sum of money for a THC mouth spray or a synthetic cannabinoid congener when a patient might benefit the same from using home-grown cannabis leaves in tea. One said, that they "don't think it is wise to allow large drug and tobacco companies dominate this new market... instead, it should simply be regulated the same as alcohol and made illegal to sell to under 18s because they are the ones who are most at risk". This would allow access to cannabis for patients suffering a medical condition that cannabis may be used to treat and will remove the responsibility GPs and doctors don't want to have. This view interestingly is very much in agreement with the California Medical Association (2011). They state that physicians, who are allowed to recommend medical cannabis, have been stuck in an uncomfortable position, as they don't know what they are recommending due to poor regulation and a lack of knowledge (California Medical Association 2011; Hwang et al. 2016). The California Medical Association (2011) recommend the rescheduling of medical cannabis at federal level and the regulation of recreational cannabis in a similar manner to alcohol and tobacco.

Furthermore, an important response to this survey was an email from Rt. Hon Dr Liam Fox MP, a GP before his election to Parliament and the former Shadow Health Secretary (1999-2003). In his email, he stated that, "cannabis in its raw form is not recognised as having any medicinal purposes", and that "the official advice from the Advisory Council on the Misuse of Drugs cites medical and scientific research showing that cannabis use has a number of adverse acute and chronic health effects". However, he also acknowledges "that there are people with chronic pain and debilitating illnesses who seek to alleviate their symptoms by using cannabis" and if there are derivatives of cannabis that can be produced pharmaceutically and licensed for medical use, then he does not think there could be any objections as we use opiates regularly in clinical practices. Additionally, although he states that "the Government has no plans to legalise the recreational use of cannabis", he does not

mention anything in regards to the potential legalisation of the medicinal use of the plant. The full email can be referred to in Appendix 3.

These results describe for the first time the beliefs and attitudes of not only the British public but also distinctly the views of the key populations whose opinions matter in regards to drug classification and the legalisation process of medicinal cannabis. Additionally, unlike the vast majority of other surveys assessing the views of the general public, this survey provides answers to more in depth questions regarding not only the beliefs and attitudes of those who believe cannabis should be legalised for medicinal use, but also provides answers to the main reasons why cannabis should not be legalised for medicinal use. These findings can contribute considerably to the campaign of medical cannabis legalisation in the UK, and can also mean the main concerns of these key populations can be addressed.

Several questions are left unanswered. Crucially, how do the views and concerns raised here compare to regions in the world where cannabis is already legalised for medicinal use? An understanding of the attitudes in regions where medicinal cannabis is already legalised would aid assessment of how the UK populous would react. As such, this study suggests it would be beneficial for the survey to be conducted overseas in American states which have passed medical marijuana laws. The benefit would be twofold. Firstly, an assessment of whether these UK concerns are justified. Second, do the populations living within societies where medical cannabis is legal have concerns about it.

In addition, it is important to note a key population was unable to be assessed. Future studies should address patients suffering a medical condition that cannabis has been considered to help. Also, as suggested by a politician who mentioned a large proportion of mental health problems are a result of marijuana use, it is recommended that the views of mental health secure ward staffers and the families of people who are sectioned in a psychiatric ward should be analysed. Assessing the views and concerns of these significant populations would give an insight into the opinions of those that cannabis use has predominantly affected, both for the good and the bad. Future studies addressing these recommendations would be of interest and would contribute to the establishment of the majority views and concerns relating to medical cannabis across all of the most important groups of people. This opens the door for the concerns to be addressed, and a campaign for the views to be listened to. Both these elements form an important stage in the road to the legalisation of cannabis for medicinal use.

# 5. Conclusion

Cannabis is a plant with a long history of medical importance. Numerous studies have reported the safety and efficacy of cannabis for a variety of ailments. However, an abundance of good quality, controlled, clinical trials are lacking due to the Schedule I status of the drug. Consequently, this classification of cannabis is restricting research and the progression of its medical utility.

This current study, consistent with previous findings, has shown that a statistically significant proportion of the British public support medicinal cannabis legalisation. Additionally, the majority of healthcare professionals, politicians, lawyers and students, likewise agree cannabis should be reclassified and recognised for its medical value. This current study also records that the most common concerns in regards to the legalisation of medicinal cannabis relate to the mental health of the consumer and the risk of giving young people the impression that cannabis is a harmless drug.

It is recommended by this study, that the Government should listen to not only the general public but also the key populations which are regarded as important individuals involved in prescribing the drug and/or the legalisation process. Cannabis should be reclassified from a Schedule I drug to a Schedule IV drug, which would put it in the same category as steroids, permit doctors to be able to prescribe the drug when they feel necessary and would allow more research to be done. Additionally, so the same problem in the US is not repeated in the UK, it is recommended that healthcare professionals allowed to prescribe the drug take part in a medical cannabis education program. Therefore, the physicians will be educated on when it is appropriate to prescribe cannabis and will know what adverse side effects to look out for. Furthermore, to address the main concerns of the UK people, it is recommended that a fully controlled system should be implemented. This will reduce the chance of medical cannabis entering the recreational market and will decrease the risk of adverse mental health effects of the drug, as it will only be prescribed under full medical supervision.

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## Legislation

Misuse of Drugs Act 1971.

Dangerous Drugs Act 1928.

Misuse of Drugs Regulations 2001, SI 3998.

# Appendices

## Appendix 1: Evaluative Supplement

There are a number of strengths of this study. Firstly, the online survey created by SurveyMonkey was quick, cheap and easy to make. It allowed for a large range of people to be targeted, including hard-to-reach populations such as politician. The response rate was fairly good, especially when contacting lawyers and healthcare professionals. This allowed for a large number of respondents in a short time. An additional strength of this study is the significance of the findings. This research project has provided an insight into not only the views of the British public, but also the views of the key populations that have the most influence over the legalisation of medicinal cannabis. To the knowledge of this study, this is an area of research that has not been explored before. A representative sample of the overall British public was achieved, and the results showed that a statistically significant proportion back the legalisation of medicinal cannabis. Moreover, this attitude was also the consensus across all of the key groups, as defined by this study. Consequently, this research project can contribute to the campaign for the legalisation of cannabis for medicinal use.

Additionally, this study used the most current data to analyse both the evidence proposing the therapeutic benefits of cannabis, as well as the concerns and risks associated with the drug. Data showing the impact of medical marijuana laws were also used to predict what the effects of legalising cannabis for medicinal use in the UK will be. By doing so, it showed that Britain should opt. for a fully controlled system and provide training for those doctors allowed to prescribe the drug. By doing this, it is suggested that the impact of medical marijuana laws will only be positive.

Although this research study has many strengths and achievements, contributing to the campaign of medical marijuana, the limitations of this project must be noted. One of the major limitations of this study is related to the generalisability of the results of the key populations, namely politicians and lawyers. Although the results obtained regarding the views of politicians were confirmed by a study containing a representative sample of MPs, despite significant research, no studies analysing the views of lawyers have been conducted.

This, therefore, raises issues in regards to the representation of the views from the lawyer sample to the rest of the population. Additionally, problems exist in regards to surveys in general. Response bias and accuracy of the respondent answers are a common concern regarding this form of research method. Additionally, although this survey included results from people all over the UK, the majority of students and members of the general public targeted were residents of Bournemouth. However, the results of this current study conform to other local and international studies, suggesting that although predominantly conducted in one region, the results are generalisable to other areas. Despite these flaws, this research study still provides an important insight into the views and concerns of important UK groups, including health care professionals, lawyers, politicians and students.

## Appendix 2: The key words used when searching the literature.

| Key words: |
| --- |
| Medical marijuana |
| Chronic pain |
| THC |
| CBD |
| Cannabinoids |
| Sativex |
| Marinol |
| Dronabinol |
| Delivery routes |
| Entourage effect |
| Endocannabinoid system |
| Endocannabinoids |
| Anandamide |
| 2-AG |
| Cannabinoid receptors |
| Cannabis pharmacology |
| Therapeutic use |
| Analgesic |
| Nausea/vomiting |
| Chemotherapy |
| Cannabis oil |
| Epilepsy |

| |
|---|
| Cancer |
| HIV/Aids |
| Spasticity |
| Parkinson’s |
| Movement disorder |
| Appetite stimulant |
| Migraines/headaches |
| Glaucoma |
| Brain injury |
| Alzheimer’s |
| Myelin sheath |
| Neuroprotection |
| Anti-inflammatory |
| Immune system |
| Gastrointestinal disorders |
| Mental health |
| Adverse effects |
| Cannabis addiction/dependence |
| Psychosis |
| Schizophrenia |
| Depression |
| Social implications |
| Education |
| Gateway drug |
| Recreational cannabis use |
| Perceived riskiness |
| UK law/classification |
| US medical marijuana laws impact |

## Appendix 3: An email from Rt. Hon. Dr Liam Fox MP (received on 16/01/2017).

Dear Miss Miles

Thank you for your email about the legalisation of cannabis for medicinal use. This was the subject of an EDM in a previous Parliamentary session.

Cannabis in its raw form is not recognised as having any medicinal purposes. The licensing regime for medicines is administered by the Medicines and Healthcare Products Regulatory Agency (MHRA), which issues licenses for medicines in the UK which have been tested for their safety, quality and efficacy.

I do appreciate that there are people with chronic pain and debilitating illnesses who seek to alleviate their symptoms by using cannabis. Although such use is illicit, the Sentencing Council's guidelines on drug offences identify such circumstances as a potential mitigating factor.

The Government has no plans to legalise the recreational use of cannabis. The official advice from the Advisory Council on the Misuse of Drugs cites medical and scientific research showing that cannabis use has a number of adverse acute and chronic health effects, especially for people with mental health problems, and continues to present a significant public health issue.

If there are derivatives of cannabis that can be produced pharmaceutically and licensed for medical use, then I do not think there could be any objections as we use opiates regularly in clinical practices. I would not, however, support the relaxation of something which I believe can be harmful to a great many individuals.

Yours sincerely

LIAM FOX

## Appendix 4: An email from Dr. Alasdair McDonnell MP (received on 16/02/2017).

In order for me to support the use of cannabis on medical grounds I feel that there would need to be strong controls in place. I believe that we have to ensure that cannabis prescribed for medical purposes is solely used for medical purposes and that can only happen if there are strict controls on the supply of medical cannabis.

As a GP for over 30 years I seen at first hand the destruction some drugs have had on patients.

I believe that Cannabis can be used as a gateway drug for the use of harder and more destructive drugs however I believe it can also help relieve chronic pain being suffered by many in society.

I have total compassion for people who are in severe/chronic pain due to illnesses and feel that Cannabis could help relieve their pain.

I could be persuaded on medical grounds for the use of cannabis.

I hope what I have said today outlines my position on this very important issue.

## Appendix 5: An email from David Davies MP (02/02/2017).

If somebody produces a medicine which contains cannabis and NICE approve it then I have no issue with it being prescribed.

I don't like the idea of everyone who smokes dope being able to conjure up the excuse that it was for some ailment.

Having said that I would not make it a priority to break down the door of someone who was terminally ill or in great pain just because of a suspicion that they might be smoking some cannabis.

Regards,

David Davies MP

## Appendix 6: Survey

Beliefs and attitudes regarding the legalisation of medical cannabis

**The controversial topic of whether cannabis should be legalised in the UK for medicinal use has recently been heightened and widely discussed in the media since its legalisation in many states of America. This anonymous survey aims to gain an insight into the views of health care professionals, lawyers, politicians and the general public regarding medical cannabis.**

1. Please state your occupation.

- ◯ Health care professional
- ◯ Lawyer
- ◯ Politician
- ◯ Student
- ◯ Other

2. How knowledgeable do you feel you are about the therapeutic benefits of cannabis on a scale of 1-10? 1 being not very, 10 being very knowledgeable.

0 10

3. How knowledgeable are you about the adverse effects of cannabis on a scale of 1-10? 1 being not very, 10 being very knowledgeable.

0 10

4. How concerned are you that legalising cannabis for medicinal purposes may increase the recreational use of the drug and other more harmful drugs? Please select from the following.

- ◯ Very concerned
- ◯ Somewhat concerned
- ◯ Not very concerned
- ◯ Not at all concerned

5. Do you believe cannabis should be legalised for medicinal purposes in the UK? Please select your answer.

- ◯ Yes
- ◯ No

If the answer to question 5 is **yes**, please answer questions 6 to 8.

If the answer to question 5 is **no**, please skip to question 9.

6. Which of the following conditions could cannabis be used to treat? Please select all that apply.

- ☐ Cancer
- ☐ Multiple Sclerosis
- ☐ HIV/AIDS
- ☐ Glaucoma
- ☐ Epilepsy
- ☐ Migraines
- ☐ Chronic pain
- ☐ Nausea and vomiting
- ☐ Spasticity
- ☐ Loss of appetite

7. "Cannabis is an effective drug with a wide margin of safety". Please select whether you agree or disagree with this statement.

- ◯ Agree
- ◯ Disagree
- ◯ Don't know

8. To the best of your knowledge, which of the following administration routes do you believe medical cannabis should be prescribed as? Please select your answer.

- ◯ Smoking
- ◯ Vaporising
- ◯ Tablet form
- ◯ Ingestion of edibles (for example, infusing cannabis into cooking oil)
- ◯ Tea
- ◯ Oral spray
- ◯ Via an inhaler

9. If the answer to question 5 is no, what is the main reason for your answer? Please select all that apply.

- ☐ Legalising cannabis for medicinal use would give the wrong impression to young people, suggesting that cannabis is a harmless drug.
- ☐ Medical marijuana use could increase the consumption of harder drugs, such as heroin and cocaine.
- ☐ Cannabis is highly addictive and has the strong potential for abuse.
- ☐ The potential adverse mental health effects are too great to legalise cannabis for its medicinal value.
- ☐ Marijuana smoke, like tobacco smoke is a throat irritant and contains toxic gases and particles that can damage the lungs.
- ☐ For the conditions for which cannabis has purported benefits for, we already have existing safe medications demonstrated to have value.
- ☐ Other (please specify)

## Appendix 7: Learning Contract

BU Bournemouth University

**LEARNING CONTRACT: INDEPENDENT RESEARCH PROJECT**

**Student Name:** CHARLOTTE MILES

**Degree Programme:** BIOLOGICAL SCIENCES

**Proposed Project Title:** IS CANNABIS AN EFFECTIVE REMEDY OR HARMFUL DRUG?

**Supervisor:** DAVID OSSELTON

**Research Proposal Attached** ☑ YES ☐ NO and includes:

| | | |
|---|---|---|
| ☐ YES | ☒ NO | Risk Assessment for fieldwork and evidence of COSSH assessment for all laboratory procedures |
| ☐ YES | ☒ NO | Completed booking forms for all field equipment |
| ☐ YES | ☒ NO | Letters of permission where appropriate providing evidence of access to such things as field sites and/or museum archives |
| ☑ YES | ☐ NO | Completed Ethics Checklist |

Copies of all relevant forms may be found on myBU - SciTech tab - Projects - Project Guidance - Forms

**INTERIM INTERVIEW – Progress evaluation**

The nature of this review should be clearly defined and agreed. Please complete the box below with the agreed details including the agreed submission date which is normally the first week of November in Level H. Submission is via a formal tutorial with the supervisor.

**Assessment Due:**

**FINAL ASSESSMENT – RESEARCH PAPER/REPORT**

This assessment is normally governed by the guidance provided in the Independent Research Project Guide. Any variance in terms of format and word limit should be agreed and specified in the box below. Submission date cannot however be changed unless evidence of mitigating circumstances are provided in accordance with the standard BU Guidelines.

**As the student undertaking the above project I agree to:**

- E-mail my supervisor on a fortnightly basis with a progress report
- Meet with my supervisor at least once a month to discuss progress and I understand that it is my responsibility to organise these meetings
- Comply with the terms of this learning contract and the guidance set out in the Guide to Independent Research Projects
- I understand that this is an *independent* project and that I am solely responsible for its completion
- I agree to comply with all laboratory and fieldwork protocols established by the Faculty.

**As the supervisor of this project I agree to:**

- Meet with the student undertaking this project on at least a monthly basis and to respond to the progress e-mails as appropriate
- To meet formally with the student during the first week in November to undertake the interim interview
- To provide guidance and support to the student undertaking this project bearing in mind that it is an *independent* research project. This is inclusive of commenting on drafts of the final report in a timely fashion.

| **Both of the undersigned parties agree to be bound by this learning contract:** | |
|---|---|
| **Student Signature:** | Miles |
| **PRINT NAME:** | CHARLOTTE MILES |
| **Date:** | 9/5/2016 |

| | |
|---|---|
| **Supervisor Signature:** | |
| **PRINT NAME:** | D. OSSORTON |
| **Date:** | 9/5/2016 |

# Appendix 8: Research Ethics Checklist

Bournemouth University

## INITIAL RESEARCH ETHICS

NOTE: *ALL RESEARCHERS* MUST COMPLETE THIS BRIEF CHECKLIST TO IDENTIFY ANY ETHICAL ISSUES ASSOCIATED WITH THEIR RESEARCH. BEFORE COMPLETING, PLEASE REFER TO THE BU *RESEARCH ETHICS CODE OF PRACTICE* WHICH CAN BE FOUND WWW.BOURNEMOUTH.AC.UK/RESEARCHETHICS. SCHOOL RESEARCH ETHICS REPRESENTATIVES (OR SUPERVISORS IN THE CASE OF STUDENTS) CAN ADVISE ON APPROPRIATE PROFESSIONAL JUDGEMENT IN THIS REVIEW. A LIST OF REPRESENTATIVES CAN BE FOUND AT THE AFOREMENTIONED WEBPAGE.
SECTIONS 1-5 MUST BE COMPLETED BY THE RESEARCHER AND SECTION 6 BY SCHOOL

| 1 RESEARCHER DETAILS | | | | | | |
|---|---|---|---|---|---|---|
| NAME | CHARLOTTE MILES | | | | | |
| EMAIL | c1724398@bournemouth.ac.uk | | | | | |
| STATUS | ☑ UNDERGRADUATE | ☐ POSTGRADUATE | ☐ STAFF | | | |
| SCHOOL | ☑ BS | ☐ AS | ☐ DEC | ☐ HSC | ☐ MS | ☐ ST |
| DEGREE FRAMEWORK & PROGRAMME | BIOLOGICAL SCIENCES | | | | | |
| **2 PROJECT DETAILS** | | | | | | |
| PROJECT TITLE | | | | | | |
| PROJECT SUMMARY *SUFFICIENT DETAIL IS NEEDED; INCLUDE METHODOLOGY, SAMPLE, OUTCOMES ETC* | Desk based dissertation. Visit archives and read and reference many journals and other scientific published sources. | | | | | |
| PROPOSED START & END DATES | | | | | | |
| PROJECT SUPERVISOR | Prof G. D. Osselton | | | | | |
| FRAMEWORK PROJECT CO-ORDINATOR | | | | | | |

| 3 ETHICS REVIEW CHECKLIST – PART A | | | |
|---|---|---|---|
| I | IS APPROVAL FROM AN EXTERNAL RESEARCH ETHICS COMMITTEE (E.G. LOCAL RESEARCH ETHICS COMMITTEE (REC), NHS REC) REQUIRED/SOUGHT? | ☐ YES | ☒ NO |
| II | IS THE RESEARCH SOLELY LITERATURE-BASED? | ☒ YES | ☐ NO |
| III | DOES THE RESEARCH INVOLVE THE USE OF ANY DANGEROUS SUBSTANCES, INCLUDING RADIOACTIVE MATERIALS? | ☐ YES | ☒ NO |
| IV | DOES THE RESEARCH INVOLVE THE USE OF ANY POTENTIALLY DANGEROUS EQUIPMENT? | ☐ YES | ☒ NO |
| V | COULD CONFLICTS OF INTEREST ARISE BETWEEN THE SOURCE OF FUNDING AND THE POTENTIAL OUTCOMES OF THE RESEARCH? (SEE SECTION 8 OF BU RESEARCH ETHICS CODE OF PRACTICE). | ☐ YES | ☒ NO |
| VI | IS IT LIKELY THAT THE RESEARCH WILL PUT ANY OF THE FOLLOWING AT RISK: LIVING CREATURES? | ☐ YES | ☒ NO |
| | STAKEHOLDERS? | ☐ YES | ☒ NO |
| | RESEARCHERS? | ☐ YES | ☒ NO |
| | PARTICIPANTS? | ☐ YES | ☒ NO |
| | THE ENVIRONMENT? | ☐ YES | ☒ NO |

| | | | |
|---|---|---|---|
| | THE ECONOMY? | | |
| VII | DOES THE RESEARCH INVOLVE EXPERIMENTATION ON ANY OF THE FOLLOWING:<br>ANIMALS?<br>ANIMAL TISSUES?<br>HUMAN TISSUES (INCLUDING BLOOD, FLUID, SKIN, CELL LINES)?<br>GENETICALLY MODIFIED ORGANISMS? | ☐ YES<br>☐ YES<br>☐ YES<br>☐ YES | ☒ NO<br>☒ NO<br>☒ NO<br>☒ NO |
| VIII | WILL THE RESEARCH INVOLVE PROLONGED OR REPETITIVE TESTING, OR THE COLLECTION OF AUDIO, PHOTOGRAPHIC OR VIDEO MATERIALS? | ☐ YES | ☒ NO |
| IX | COULD THE RESEARCH INDUCE PSYCHOLOGICAL STRESS OR ANXIETY, CAUSE HARM OR HAVE NEGATIVE CONSEQUENCES FOR THE PARTICIPANTS OR RESEARCHER (BEYOND THE RISKS ENCOUNTERED IN NORMAL LIFE)? | ☐ YES | ☒ NO |
| X | WILL THE STUDY INVOLVE DISCUSSION OF SENSITIVE TOPICS (E.G. SEXUAL ACTIVITY, DRUG USE, CRIMINAL ACTIVITY)? | ☒ YES | ☐ NO |
| XI | WILL FINANCIAL INDUCEMENTS BE OFFERED (OTHER THAN REASONABLE EXPENSES/ COMPENSATION FOR TIME)? | ☐ YES | ☒ NO |
| XII | WILL IT BE NECESSARY FOR THE PARTICIPANTS TO TAKE PART IN THE STUDY WITHOUT THEIR KNOWLEDGE / CONSENT AT THE TIME? | ☐ YES | ☒ NO |
| XII | ARE THERE PROBLEMS WITH THE PARTICIPANT'S RIGHT TO REMAIN ANONYMOUS? | ☐ YES | ☒ NO |
| XIV | DOES THE RESEARCH *SPECIFICALLY* INVOLVE PARTICIPANTS WHO MAY BE VULNERABLE? | ☐ YES | ☒ NO |
| XV | MIGHT THE RESEARCH INVOLVE PARTICIPANTS WHO MAY LACK THE CAPACITY TO DECIDE OR TO GIVE INFORMED CONSENT TO THEIR INVOLVEMENT? | ☐ YES | ☒ NO |

**4 ETHICS REVIEW CHECKLIST – PART B**

PLEASE GIVE A SUMMARY OF THE ETHICAL ISSUES AND ANY ACTION THAT WILL BE TAKEN TO ADDRESS THESE.

| ETHICAL ISSUE: | ACTION: |
|---|---|

**5 RESEARCHER STATEMENT**

I BELIEVE THE INFORMATION I HAVE GIVEN IS CORRECT. I HAVE READ AND UNDERSTOOD THE BU RESEARCH ETHICS CODE OF PRACTICE, DISCUSSED RELEVANT INSURANCE ISSUES, PERFORMED A HEALTH & SAFETY EVALUATION/ RISK ASSESSMENT AND DISCUSSED ANY ISSUES/ CONCERNS WITH A SCHOOL ETHICS REPRESENTATIVE/ SUPERVISOR. I UNDERSTAND THAT IF ANY SUBSTANTIAL CHANGES ARE MADE TO THE RESEARCH (INCLUDING METHODOLOGY, SAMPLE ETC), THEN I MUST NOTIFY MY SCHOOL RESEARCH ETHICS REPRESENTATIVE/ SUPERVISOR AND MAY NEED TO SUBMIT A REVISED INITIAL RESEARCH ETHICS CHECKLIST. BY SUBMITTING THIS FORM ELECTRONICALLY I AM CONFIRMING THE INFORMATION IS ACCURATE TO MY BEST KNOWLEDGE.

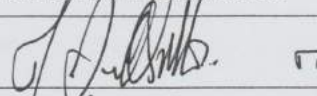
| SIGNED |  | DATE | 9/05/16 |
|---|---|---|---|

**6 AFFIRMATION BY SCHOOL RESEARCH ETHICS REPRESENTATIVE/ SUPERVISOR**

SATISFIED WITH THE ACCURACY OF THE RESEARCH PROJECT ETHICAL STATEMENT, I BELIEVE THAT THE APPROPRIATE ACTION IS:

| | | |
|---|---|---|
| THE RESEARCH PROJECT PROCEEDS IN ITS PRESENT FORM | ☑ YES | ☐ NO |
| THE RESEARCH PROJECT PROPOSAL NEEDS FURTHER ASSESSMENT UNDER THE SCHOOL ETHICS PROCEDURE* | ☐ YES | ☑ NO |

** THE SCHOOL IS REMINDED THAT IT IS THEIR RESPONSIBILITY TO ENSURE THAT NO PROJECT PROCEEDS WITHOUT APPROPRIATE ASSESSMENT OF ETHICAL ISSUES. IN EXTREME CASES, THIS CAN REQUIRE PROCESSING BY THE SCHOOL OR UNIVERSITY'S RESEARCH ETHICS COMMITTEE OR BY RELEVANT EXTERNAL BODIES.*

| | | | |
|---|---|---|---|
| REVIEWER SIGNATURE |  M. D. OSBORN | DATE | 9/5/2016 |
| ADDITIONAL COMMENTS | Accept + proceed as is. | | |

## Appendix 9: Proposal

**Is cannabis a natural, effective remedy or a harmful drug?**

**Literature Review:**

In Europe, chronic pain of a disabling nature affects over one in four elderly people (Frondini et al. 2007). These patients face further difficulties as the available opiate, antidepressants and anticonvulsant drugs are often inadequate and no strong effective drug has been established without severe side effects (Russo 2008). Much of the research today has been directed in overcoming such implications, and many researchers suggest the solution is the treatment of cannabis.

Currently, in the UK cannabis is a schedule 1 substance. This means that the substance has no accepted medicinal use, a high potential for abuse, and a lack of any accepted margin of safety for usage. This assignment of cannabis being in this schedule is very controversial. Recently, clinical trials with smoked and vaporized marijuana indicate the likelihood that the cannabinoids (the active constituents of cannabis) can be useful in the management of neuropathic pain, spasticity due to multiple sclerosis, and possibly other benefits (Grant et al. 2012). Additionally, many propose that cannabis is safer than alcohol and has fewer side effects than the already available prescription pain management medication. Consequently, cannabis should be considered as a schedule 2 drug, which will allow further research to be done.

**Purpose:**

The purpose of my desk-based dissertation is to research published data on cannabis use as an analgesic and antiemetic agent, and discuss the right for herbal cannabis to be acknowledged for its medicinal properties and be made a schedule 2 drug. This will enable cannabis to become more easily researched. One of the questions I will propose is whether the use of herbal cannabis by patients suffering from chronic pain provides a reduction in pain without the unfavourable side effects, as compared with the currently available, conventional medications and treatments.

**Aim:**

The aim of this dissertation is to educate people on the therapeutic properties that cannabis has to offer, which could relieve patients from conditions such as multiple sclerosis, as well as chronic pain in general, and the nauseous side effects of chemotherapy. Consequently, I will hopefully encourage the reader to support the action of categorising cannabis as a schedule 2 drug in the UK.

**Objectives:**

I will use many scientific journals and books to gather information about the positive, and the negative effects of herbal cannabis to complete a literature-based dissertation. I will compare herbal cannabis inhaled or vaporised against conventional therapies, as well as against herbal cannabis that has been altered for reduced quantities of active compounds.

**Methodology:**

To achieve my aim and objectives I will visit appropriate data archives and research published data such as scientific journals and books, which requires no ethical considerations.

**Timetable:**

- I will meet with you once a month and send you progress reports every 2 weeks.

Summer holidays-

- I will conduct the primary research for my project by visiting data archives and reading and making notes on many scientific journals on my subject matter
- I will read relevant literature and develop a thorough literature review for my dissertation

Semester 1-

→ Interim Interview (November 2016)

- In September I will meet with you to show you what I have done over the summer holidays
- My primary focus in semester one is analysing and evaluating my data collected (from scientific journals)
- I will have gathered a sufficient amount of data to be able to analyse and summarize it.
- I will be able to explain clearly what the results from my data collection (from many published sources) mean in relation to my aim and the context of my work
- By the time we reach Christmas holidays I will be in the position to draw up a detailed plan for my research paper – this will be completed before Christmas holidays commence.

Christmas holiday-

- I will complete the introduction and methodology during this time.

January- May (week 44)-

- I will meet with you to after Christmas holidays to show you my progress
- I will complete the main body of my dissertation in January (data results & analysis; case studies; presentation and description of data collected; analysis and synthesis of data → all of which would have been obtained in summer holidays).
- In February, I will meet with you again to show you my progress and then complete my discussion section of my dissertation.
- In March, I will complete my Summary and Conclusion and Abstract
- In April, I will complete my appendices, and make sure everything is referenced properly and the presentation is perfect.
- I will meet with you at the end of April to go through it all, and then make any amendments you suggest before the deadline (week 44 – mid-May).

# Interim Interview Comments

## Independent Research Project Interim Interview : Agreed Comments Form

| | |
|---|---|
| Student Name:<br><br>Charlotte Miles | Programme:<br>Biological Sciences |
| Date:<br>10.04.17 | IRP Title:<br>The views and concerns of key UK populations regarding medicinal cannabis use. |
| Supervisor Name:<br><br>Professor David Osselton | |

- Met with supervisor at least once every fortnight.
- Completed introduction and literature review.
- Collected all data in regards to survey sent to health care professionals, lawyers, politicians, students and the general public.
- Made graphs and tables of the results.
- Nearly finished results section.
- Recently (7th April 2017) decided to expand the survey to patients suffering from a condition that cannabis could have the potential to treat.
- Sent out survey to many societies (including MS society, MS society Bournemouth, Epilepsy society, Wessex cancer trust Bournemouth, Terrance Higgins Trust, International AIDS society, Cancer Research UK, My Chronic Pain Team) – however, no success yet.
- Aim to get at least 20 replies to my survey from patient population.
- Collected other references in regards to other surveys performed (for discussion).

Very good Progress

Two copies of this form are needed – student to retain one copy the other is to be handed in to the student admin office C114.

| | |
|---|---|
| Student Signature: | Supervisor Signature: |