A QUALITATIVE STUDY ON EXPLORING THE PERCEPTION AND MOTIVATION OF CANNABIS USE AMONG MALAYSIAN GRADUATES

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by

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It has been a tremendous pleasure working on this study as I had an opportunity of meeting new people and understanding the context of drug use better. A big thank you to my supervisors Prof. Dr. Vicknasingam and Dr. Darshan Singh for the support and guidance all throughout my study. I am very thankful for the opportunity given.

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Love and Light

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LIST OF ABBREVIATIONS

THC	Δ-9 tetrahydrocannabinol
CBD	Cannabidiol
NADA	National Anti-Drug Agency
NIDA	National Institute of Drug Abuse
MS	Multiple Sclerosis
DM	Diabetes Mellitus
HbA1c	Haemoglobin
IOP	Intraocular pressure
BDZ	Benzodiazepines
THCA	tetrahydrocannabinolic acid
ECS	Endocannabinoid system
CBR	Cannabinoid receptors
WHO	World Health Organization
CUD	Cannabis Use Disorder
DSM-5	Diagnostic and Statistical Manual of Mental Disorder
CWS	Cannabis Withdrawal Syndrome
UN	United Nations
AADK	*Agensi Anti-Dadah Kebangsaan*
PCOS	Poly-Cystic Ovarian Syndrome

KAJIAN KUALITATIF MENEROKA PERSEPSI DAN MOTIVASI PENGGUNAAN KANABIS DI KALANGAN GRADUAN MALAYSIA

ABSTRAK

Objektif kajian ini adalah untuk memahami motivasi penggunaan kanabis dalam kalangan graduan di Malaysia, untuk mendapatkan pemahaman tentang penggunaan kontekstual kanabis dalam kalangan pengguna dan mengkaji persepsi terhadap kegunaan kanabis dan isu berkaitannya. Sejumlah 23 peserta yang terlibat dalam kajian ini melalui pensampelan 'snowballing'. Peserta kajian ini adalah semua warganegara Malaysia dan mempunyai kelayakan minimum ijazah sarjana muda. Metodologi yang digunakan untuk kajian ini adalah Analisis Fenomelogi Interpretatif (IPA). Purata umur sampel kajian adalah 34.5 tahun. Peserta kajian ini terdiri daripada pengguna rekreasi dan pengguna untuk tujuan perubatan. Setiap peserta ditemubual secara individu sama ada bersemuka atau melalui telefon. Penemuan kajian ini memberi tumpuan kepada latar belakang penggunaan kanabis, pengalaman dan sebab penggunaan, persepsi mengenai isu berkaitan kanabis dan harapan mereka untuk masa depan. Sembilan tema utama yang ditemui: Tujuan kegunaan kanabis, Kesan penggunaan kanabis, Pengalaman penggunaan dadah lain, Rawatan ubat konvensional, Ketagihan, Penerimaan kanabis di Malaysia, Penerimaan kanabis di negara Lain, Perundangan kanabis di Malaysia dan Masa Depan Malaysia. Peserta kajian ini secara amnya menganggap kanabis sebagai tumbuhan yang bermanfaat bukan suatu jenis dadah. Walaupun tidak sah di sisi undang-undang, peserta kajian ini sanggup mengambil risiko dalam menerokai potensi penggunaan kanabis.

A QUALITATIVE STUDY ON EXPLORING THE PERCEPTION AND MOTIVATION OF CANNABIS USE AMONG MALAYSIAN GRADUATES

ABSTRACT

The objectives of the study includes understanding the motivation of cannabis use among young educated adults in Malaysia, to gain an understanding on the contextual use of cannabis among these users and to study the perception towards cannabis use and its related issues. There were in total 23 participants recruited in this study through snowball sampling. These participants are all Malaysians and have a minimum qualification of a bachelor's degree. The methodology used in this study was the Interpretative Phenomelogical Analysis (IPA). The mean age of the study sample is 34.5 years old. Each participants were interviewed individually face-to-face or by phone. The findings of the study focused on the background of cannabis use, experience and reason of use, perception on cannabis-related issues and their hopes for the future. These study participants reported to use cannabis recreational and medicinal purposes. Nine master themes emerged from the findings: The purpose of cannabis use, Effects of cannabis use, Experience with other substances, Defaulted conventional drug treatment, Dependency, Cannabis acceptance in Malaysia, Cannabis acceptance in other countries, Cannabis legislation in Malaysia and Cannabis use in Malaysia in the Future. Participants of this study generally regarded cannabis to be a beneficial plant rather than regarding it as a drug. Although forbidden by the law, these participants are willing to take the risk to explore cannabis and it's potential.

CHAPTER 1

INTRODUCTION

1.1 The Cannabis Plant

Cannabis is a generic term used referring to the dried leaves, flowers, stems and seeds where the resin has not been extracted from. Cannabis resin is the extracted resin (crude or purified) from the cannabis plant (ECDD, 2014). It is also commonly known as *Marijuana,* or other names and preparations indigenous to local cultures like *dagga, bhang, ganja* and many more. Some of its street names include *pot, weed, grass, dope* and *Mary Jane*.

The known types of cannabis that are available are Cannabis sativa, Cannabis indica, and of less commonly Cannabis ruderalis (Pollio, 2016). They can be differentiated by their different physical characteristics. Cannabis sativa is reported to be uplifting and has more psychotropic effects where else Cannabis indica is reported to be more relaxing and has sedative effects (Schwabe & McGlaughlin, 2018). Cannabis sativa is usually preferred by the recreational users due to its higher THC content (Atakan, 2012). New hybrid strains have been developed from crossbreeding Sativa and Indica types resulting in intermediate effects (Schwabe & McGlaughlin, 2018). These hybrid strains include *Super Sativa, Afgan Kush, Hindu Kush, Purple Kush* and many more (de Meijer, 2004; Gloss, 2015). The difference in the three main types of cannabis plant is described and shown on Table 1 and Figure 1.

Hemp which is also known as industrial hemp is a variation of Cannabis sativa species, mainly cultivated as an agricultural commodity. Taxonomically hemp and *marijuana* are from the same species but its variation has been bred for different purposes. Hemp is used for a wide range of products which includes fabrics and

textiles, nutritional supplements, yarns and spun fibers, paper, food and beverages, insulation materials and cosmetics. It contains high concentrations of cannabidiol (CBD) and almost no Δ-9 tetrahydrocannabinol (THC), usually below 0.3% on dry weight (Russo, 2007).

Table 1 Difference in the Types of Cannabis Plant

	Cannabis sativa	*Cannabis indica*	*Cannabis ruderalis*
Height	Grows up till 5-18 feet or more	2-4 feet tall	Does not grow more than 2 feet and wild-looking
Leaf size and structure	Thin leaves with pale green colour; has a few branches	Broad and dark green leaves; compactly branched	Thin and only develop 3-5 slender fingers; unbranched
Psychoactivity	Stimulating	Sedating	Usually lacking
Psychoactive contain	Higher THC content compared to indica	Higher CBD content compared to sativa	Cannabinoids levels are generally low
Location of originate	Central Asia	India subcontinent	Southern Russia

Source: Pollio, 2016; Gloss 2015
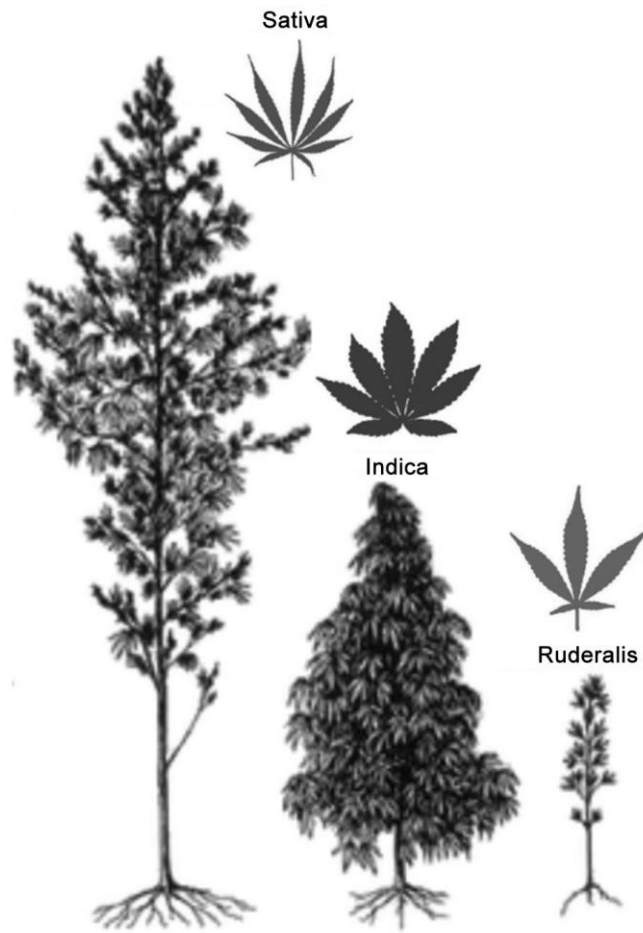
Figure 1 The Types of Cannabis Plant
Source: https://nomadicmedhunter.wordpress.com/marijuana-facts/ruderalis-vs-indica-vs-sativa

1.2 Chemical Compounds of Cannabis Plant

There are up to 750 chemical compounds in the cannabis plant among which 104 of them are phytocannabinoids. Although phytocannabinoids have similar chemical structures, they prompt different pharmacological actions (Bruni et. al., 2018). The principle cannabinoids include Δ-9 tetrahydrocannabinol (THC) as the main psychoactive compound while cannabidiol (CBD) is another major non-psychoactive constituent of the plant (Madras, 2015). THC and CBD have contrasting mechanism of action and therapeutic indications whilst THC has a higher risk of adverse effects

compared to CBD (Freeman et. al., 2019). The levels of THC and CBD varies in each species and strains. Other important phytocannabinoids include cannabinol, cannabigerol, cannabinoid acids and cannabivarins. Besides these cannabinoids, there are other components present in the cannabis plant such as monoterpenoids myrcene, limonene, pinene and many more (ElSohly and Slade, 2005). The difference in molecular structure of THC and CBC is shown in Figure 2.
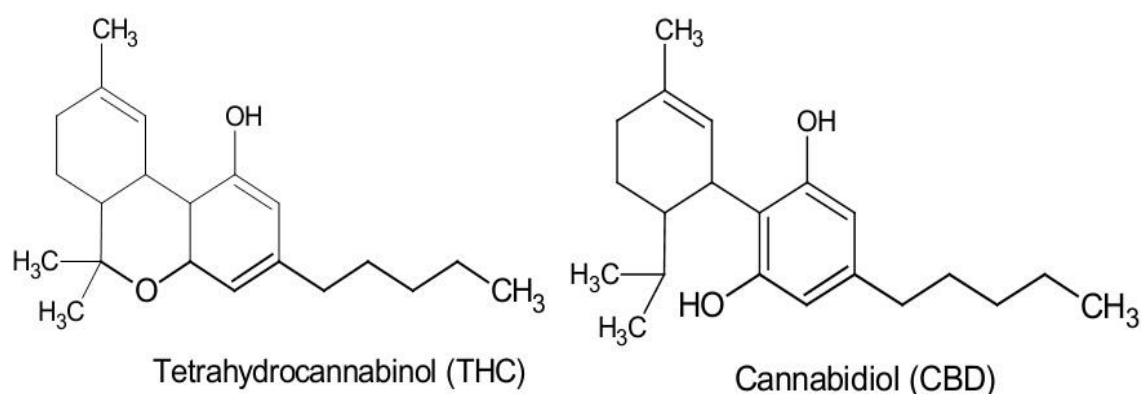
Figure 2 THC and CBD Molecular Structure
Source: https://cbdoilreview.org/cbd-cannabidiol/thc-cbd/

1.3 Legal Status of Cannabis

The legislation of cannabis has been rather controversial over the decades. Cannabis gained international attention in the early 20th century for drug regulation when Italy and the United States raised the issue on "Indian Hemp" (cannabis) during the Hague Conference 1912. Only in the second Opium Convention 1952 that exportation of "Indian Hemp" was banned to countries that had prohibited cannabis including its resin and galenical preparations, however there was an exclusion for medicinal and scientific use. In 1937, the United States of America legislated a Marijuana Transfer Tax and prohibited the production of hemp. The hemp industry became bankrupt following to this causing many farmers to lose their main income for

living. Later in 1941, Britain declared cannabis illegal and in 1942, cannabis was removed from the US Pharmacopeia (Warf, 2014).

In December 1964, cannabis and cannabis resin were scheduled in Schedule 1 and IV of the Single Convention on Narcotic Drugs. This convention is an operation of the United Nations (UN) aimed to coordinate international efforts to tackle the global drug issue by limiting possession, production and trafficking of drugs internationally. Following to this, in 1971 the American government categorized cannabis as a Schedule 1 drug, stating that this drug is not safe as it has high potential for abuse and has no medical use in the US, even under medical supervision. Ironically in 1985, the American government approved synthetic THC called *Marinol* as a legal pharmaceutical drug to be used for cancer patients.

There has been a recent call for a shift in drug policy concerning cannabis across the globe even in Malaysia. As of 2018, Uruguay and Canada have completely legalized cannabis, including a few states in the United States of America such as Colorado, Washington, Nevada, California, Oregon, Alaska, Maine, Massachusetts and a few more (Drug Policy Alliance, 2018). A few countries that have legalized cannabis for medical use are Czech Republic, Croatia, Argentina, Australia, Chile, Colombia, Denmark, Peru, Norway, Poland, Germany and many more (Aguilar et al., 2018). Where else the states that have legalized cannabis for medicinal use in the United States of America include Florida, New York and many more as shown in Figure 3. Europe is among the most progressive with medical cannabis. Many countries recognize the failure of 'war on drugs' especially with cannabis, hence legalization and decriminalization option is taken into consideration. Much drug reform advocacy is taking place, gaining the media and government attention.

Figure 3 States in the US that has Legalized Cannabis for Medicinal Use
Source: The National Institute on Drug Abuse Blog Team, 2018

1.4 Research Problem Statement

Cannabis is slowly gaining acceptance around the world and its legality is rapidly changing. Globally not only the use of illicit drugs has increased but socio-cultural attitudes regarding its use is diverging "from the margins toward the center of youth culture" (Parker *et. al*., 1998). The use of cannabis is no longer considered deviant (Hathway, 1997) hence the shift towards cannabis normalization among youth these days.

There is a great risk of drug use and abuse among professionals with high-stress jobs, with the motives of alleviating stress and to relax (Getz, 2012). On the other hand, some consume drugs recreationally for sensation-seeking. There are possibilities of people who engage in drugs use do not develop dependence (Shewan & Dalgarno, 2005). With a much greater number of recreational users from higher social hierarchy

and education, it now makes it more complex to understand these current trends of drug use and abuse.

In the modern era, globalization has an enormous impact on social, economy and culture that has contributed to the emergence of drug problems (Seddon, 2008). Global interconnectedness has transformed Malaysia in these dimensions, now with the access to internet, media and international travels. People are more exposed to the transmission of ideas and values from various different cultures. As the cultural globalization influences these evolving trends of social relations, there is a change in thoughts, beliefs and concepts of how one perceives cannabis use. A social taboo in the past may now be more acceptable in the modern time, leading to a change in normal patterns.

In Malaysia, the use of cannabis is illegal for all purposes. However, with the cultural globalization, Malaysians especially the educated white-collar group are now more exposed to the world and are more knowledgeable with drugs and its effects. Although cannabis is the most prevalent drug that is used globally (UNODC, 2018), the data of cannabis prevalence in Malaysia is rather vague. Based on figures obtained from National Drug Report (2017), though cannabis seizures and prevalence continue to increase, unfortunately the current data does not segregate cannabis users according to their education status. The national anti-drug agency does not document any information pertaining to cannabis use among young graduates or professionals in the country. It remains inconclusive whether the detected cannabis users were poly-drug users or vice-versa. Since the medicinal use of cannabis is becoming more popular among the highly educated segment of society in Malaysia, it vital that more investigations are conducted to explore the therapeutic use of cannabis among young

graduates in Malaysia who choose to use cannabis instead of other harmful illicit substances to cope with emotional states or health disorders in the country. The current cannabis legislation and the societal dogma in Malaysia does not permit cannabis users to be upfront about their engagement with this substance and hence the necessity for further studies on this particular plant has not occurred among researchers. However, in the changing trend towards cannabis normalization among Malaysian youngsters, more studies on cannabis should be conducted in Malaysia to create a platform of new information for researches and as well as the public to reflect on its related issues. Therefore, this study aims to explore the meanings to cannabis use and general perception on cannabis related issues from this hidden group of users' perspectives, giving us in-depth exploration of their lived experiences and how they are making sense of those experiences.

1.5 Research Questions

1. What leads to using cannabis?
2. What is the motivation of cannabis use?
3. What are the expectation from using cannabis?
4. What are the perception on negative side effects of cannabis?
5. What are the perception on therapeutic benefits of cannabis?

1.6 Study Objectives

The research objectives include:

1. To understand the reasons and motivation of cannabis use among Malaysian graduates.

2. To gain an understanding on the contextual use of cannabis among Malaysian graduates.

3. To understand the perception of cannabis use and its therapeutic benefits among Malaysian graduates.

1.7 Significance of Study

There has been a tremendous change to the cannabis policy landscape across the world this past decade. This policy changes have changed cannabis use patterns and perceived level of risk, showing a rise of use for both recreational and medical purposes. The effects of cannabis use still remains elusive as findings from various studies in the past decades contradict with one another. Research scope on cannabis has been restricted due to its illegality status resulting in lack of scientific exploration even here in Malaysia.

With the findings of this study, we are be able to understand the perceived notion about cannabis among Malaysian graduates. Coming from an educated background with a minimum of a bachelor's degree qualification, these study participants share their reasons of cannabis use despite the stringent drug law in Malaysia. Their point of view gives us an insight to why they choose to use the drug and why it appears to be beneficial to them although the consequences could be dire.

Drug use in Malaysia is often related to lower socio-economical stratum and poor educational background. This study enables us to look at different strata of society, exploring a whole different dimension of drug use, particularly cannabis among highly functional graduates. Due to the law, Malaysians will not be able to be upfront about their cannabis use, nor their view on the plant. This however is changing

with the rise of advocacy in the country for cannabis legalization especially for medicinal purposes, giving the rest of cannabis users hope that the punitive drug law will be amended.

Keeping up with the transition around cannabis policy in other countries, this study creates a platform in Malaysia to investigate further on cannabis including its effects on recreational use and potentials in the field of medicine. While many don't view cannabis as a drug, it's time we look deeper into this, why would Malaysians choose to use cannabis and its derivatives.

1.8 Scope of Study

The scope of study was to explore the perception and motivation of cannabis use specifically among young graduates in Malaysia who were above 18 years of age and have a minimum of bachelor's degree. An educated group of participants were recruited for this exploratory study mainly to understand their reasons of cannabis use despite such strict drug laws in Malaysia.

Majority of the detected drug users in Malaysia are from the lower strata, hence the findings of this study cannot be generalized to speak for the rest of the country's population. Due to the small sample size and research design of the study, this does not represent the actual prevalence of cannabis use among Malaysian graduates. However, this study could be used as a guide to develop prospective studies to determine the prevalence and therapeutic reasons of cannabis use among young graduates in Malaysia.

1.9 Conclusion

The study problem statement, research questions, study objectives, study significance and scope of study have been clearly delineated in this chapter. The following chapter is the literature chapter. All the relevant articles deemed appropriate to the scope of study is described in the next chapter of this thesis.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This chapter discusses the relevant studies on the historical background of cannabis, cannabis use prevalence in Malaysia and cannabis use prevalence globally. Besides that, use of cannabis plant including medical cannabis use, methods of cannabis administration, cannabis preparations, the pharmacology of Endocannabinoid System, the effects of cannabis and theories linked to cannabis use is also discussed.

2.1 Historical Background of Cannabis

The history of Cannabis goes way back to the ancient times, known to be used for various purposes. The cannabis or hemp plant originally evolved in Central Asia before stretching out to other continents of the world.

The earliest cultural evidence of cannabis use was found in China and India, one of the first civilizations to explore cannabis utilization. Cannabis plant is believed to be one of the earliest plants cultivated by man. Historical findings show an early domestication of this plant in China as early as 4000 B.C for its fiber contain. As a source of fiber, cannabis was used in the production of textile, rope, oil and paper. Besides that, this plant was also farmed as a food crop for its edible fruit (Zuardi, 2006).

Around 2700 B.C., Emperor Shen Nung discovered the healing potentials of cannabis, along with two other Chinese herbal medicine, ginseng and ephedra. Cannabis was considered one of the fundamental herbs in Chinese medicine. This was mentioned in an ancient text, believed to be the world's oldest pharmacopeia where by it was clearly stated that cannabis was used to treat over 100 ailments including constipation, malaria, rheumatism and gout (Institute of Medicine, 2000).

In India, cannabis was known as a spiritual herb being used in mystical and religious ceremonies for its psychoactive properties. Cannabis is described as one of the five sacred plant in the sacred Hindu text, Atharvaveda. It is often associated with Lord Shiva and is used among yogis up till today to attain spiritual enlightenment (Kuddus, Ginawi, & Al-Hazimi, 2013). Another great early civilization that recognized the benefits of cannabis was the Ancient Egypt. Scriptures have shown that cannabis was used to treat glaucoma and even administered as pessary and suppository for its respective indication. Evidences of cannabis use was also found in Egyptian mummies dated about 950 BC (Russo, 2007). Besides that, the Ancient Greeks also used cannabis leaves as an antiseptic to dress wounds and sore (Hand et. al., 2016). The mention of cannabis in ancient language is shown on Figure 4.

Figure 4 The Mention of Cannabis in Ancient Language
Source: Russo, 2007

2.2 Cannabis Prevalence in Malaysia

There has been a growing concern over the use of illicit drugs in Malaysia. According to the most recent report from Agensi Anti-Dadah Kebangsaan (a.k.a., National Anti-Drug Agency or NADA), methamphetamine is the most favourable drug, followed by heroin. 10,419 methamphetamine users and 10,154 heroin users were detected for year 2017. As for cannabis, there has been a decreasing trend shown in the statistics by AADK where by 1,885 users were detected in year 2013, followed by 1,919 users for year 2014, 1,389 users for year 2015, 1,236 users for 2016 and most recently 1,066 for year 2017. This data is shown in Figure 6. Out of 25,922 general drug cases that was detected for year 2017, only 0.44% (113 users) were graduates of

bachelors, masters and doctorate degree (AADK, 2017). The seizure of cannabis on the other hand had significant decrease from 2,945.46 kg in 2016 to 2,696.27 kg in 2017, reporting the price at RM 2,800 per kg with the average purity of 85% (Asean-Narco, 2017).
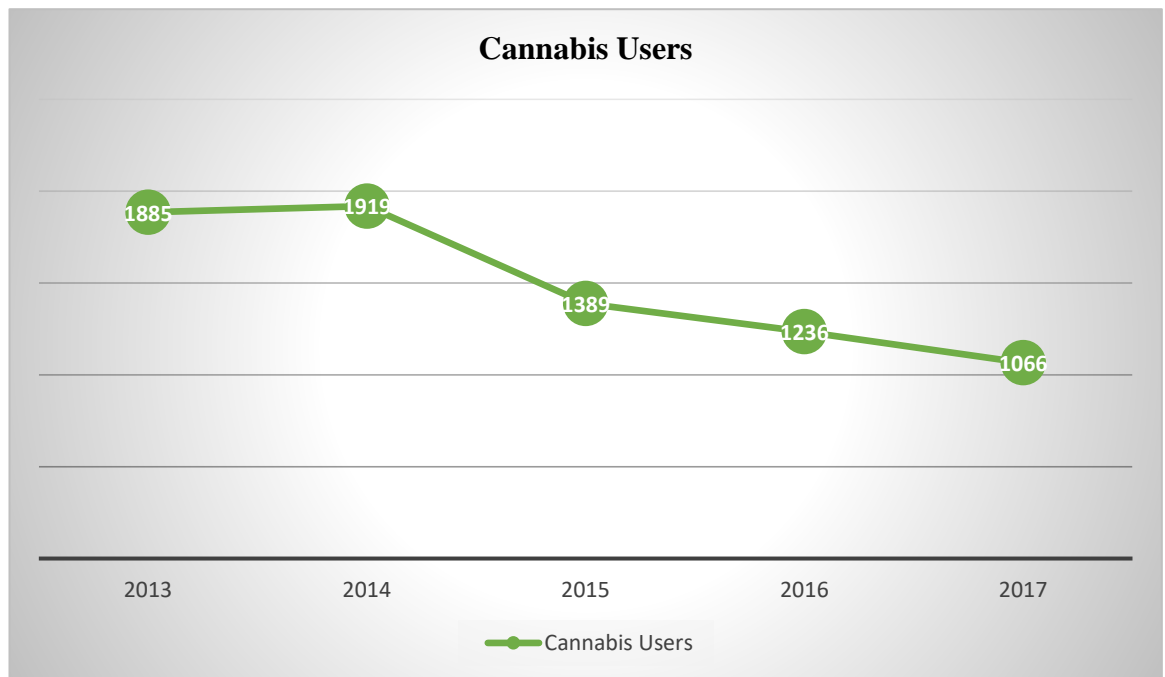
Cannabis Users

Figure 5 Cannabis Users in Malaysia that were Detected by AADK from 2013-2017

In the recent years, the use of cannabis has become more widespread across the globe. Just like alcohol, cannabis is now appearing to be more tolerable in the society even here in Malaysia. According to a study by Chie et al. (2015), ecstasy and cannabis were the most commonly used and easily available drug in Malaysian colleges and universities. Although AADK cited cannabis and amphetamine-type stimulant (ATS) to be consistently in the 3rd to 6th place in ranking across 5 years, these data were based on users that were caught for the respective years and is not suitable to be used as a source to reflect on the actual availability and commonality of drugs among the young educated generation. This could be because people of the higher strata have ways of

getting away with the laws, for an example using drugs in discrete places where it is not detectable by the authorities.

2.3 Drug Policy in Malaysia

Malaysia has one of the world's toughest drug laws that is often regarded as draconian. The Dangerous Drug Act 1952 is a Malaysian law which was enacted to prohibit the possession, use, manufacture, sale and importation of dangerous drugs. Cannabis including all its derivatives are among many other drugs that is included in this regulation. The offences for Cannabis Use under the Dangerous Drug Act 2952 are shown in Table 2. These offenses consist of the laws pertaining trafficking of cannabis, cultivation of cannabis and users who consume cannabis.

Table 2 Offenses for Cannabis Use under the Dangerous Drug Act 1952

Section	Offences	Punishments
39B	Possessing 200grams or more of cannabis (including cannabis resin)	Mandatory death sentence
39(A)(2)	Possessing 50grams or more of cannabis (including cannabis resin)	Not less than 5 years of imprisonment or imprisonment for life and >10 strokes of whipping
39(A)(1)	Possessing 20-50grams cannabis (including cannabis resin)	2-5 years imprisonment and 3-9 strokes of whipping
6B	Planting or cultivating cannabis plant	Imprisonment for life and a minimum 6 strokes of whipping
6	Possessing less than 5grams of cannabis seeds	Imprisonment not more than 5 years or fine not more than RM20,000 or both

Source: AADK, 2016: p 66

2.4 Cannabis Prevalence Worldwide

Interestingly although cannabis was strictly prohibited at some point of time, it continues to be a popular drug. The use of cannabis is growing across the globe with an estimation of 192.2 million users in 2016 aged 15-64 years old, making up to 3.9% of the global population. Approximately 13.8 million cannabis users are teenagers aged 15-16 years old. The highest prevalence rate of cannabis use is in West and Central Africa of 13.2%, followed by North America of 12.9% and Oceania of 11.0% (UNODC, 2018). The rates are high in Africa because of their larger populations. Also, from the UNODC database, approximately 13.7% of cannabis prevalence rate reported

in the USA (2009), 12.6% in Canada (2009), 8.9% in Israel (2008), 15.2% in Czech
Republic (2008), 14.6% in Italy (2008), 10.6% in Australia (2007) and 14.3% in
Nigeria (2008). The prevalence of cannabis use worldwide for year 2013 is shown on
Figure 6.
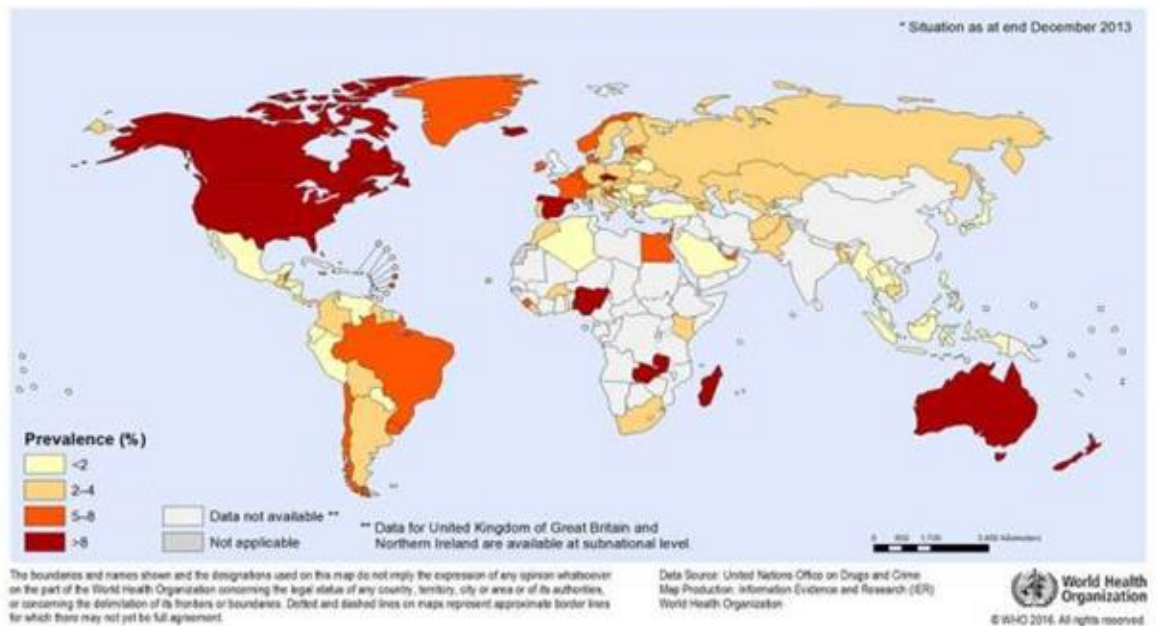
Figure 6 Cannabis Prevalence for Population Aged 15-64 across the globe for year
2013
Source: World drug report 2015. United Nations Office on Drugs and Crime

2.5 Uses of the Cannabis Plant

Cannabis is known for its versatility. This plant has a myriad purpose of use
which allows it to be used recreationally, spiritually, commercially and medically.
Considering its functions, most cannabis consumers use it for various reasons, most
commonly for recreational and medical use.

2.5.1 Recreational Use

Cannabis is a popular recreational drug at a global level (UNODC, 2015). THC
in the plant acts as the psychoactive property, responsible for the physiological

changes and the altered state of consciousness upon consumption. It is well known for its euphoric and relaxed sensation that is regarded as feeling "high" or "stoned". Cannabis users would experience an enhanced feeling of exhilaration and heightened sensory of perception, enabling them to indulge in the moment where they are able to enjoy music, food and even sex at a much intense level (NIDA, 2018).

On the other hand, cannabis could also cause an unpleasant experience which includes paranoia, anxiety, fear or panic. These effects may appear when cannabis is consumed too much, or it has an unexpected high level of potency. These effects could also be common among inexperienced users (NIDA, 2018).

2.5.2 Spiritual Use

Entheogens are psychoactive plants that are used as spiritual sacraments. Cannabis is considered an entheogen is some cultures a part of their religious, spiritual, shamanic practice. It is used as a spiritual medicine and to induce spiritual experience.

For thousands of years, cannabis was recognized in Shintoism, Japan's indigenous religion for its cleansing abilities where it is believed to ward off evil spirits. In India and China, cannabis is still used up till today in many religious groups to enter a state of profound stillness known as *samadhi* or to aid spiritual practice known as *sadhana*. A drink made of cannabis called *bhang*, is commonly consumed especially during weddings or festivals honoring Lord Shiva (Warf, 2014). This practice is to elevate the spirit during these special celebrations by eliminating reservations and restrictions, however only practiced by a certain sect of Hinduism.

In modern cultures, cannabis is used in the Rastafari movement for recreational, healing and spiritual purposes. In a spiritual context, it is said that

cannabis gives an inward experience as it is believed that *Jah* is found when looked within, leading to the road of salvation.

Cannabis acts as a medium of introspection and contemplation where these insights would assist in understanding and praying. The dive into depths of wisdom is then believed to create a new world of illumination and enlightenment (Pretorius, 2006).

2.5.3 Commercial Use

The earliest evidence of cannabis cultivation was found in China dated 4000 B.C in the countryside of Pan-p'o. It was farmed for its source of fiber and food. The hemp fiber is one of the most durable fibers and was used to make commercial products like rope, paper, canvas and textile (Zuardi, 2006; Gao et. al., 2014). The hemp seeds on the other hand is a source of nutritious high protein and ironically not intoxicating, making it suitable for the consumption of human and animal. Above all, hemp is environmentally friendly while having great economic and commercial potentials. It could be grown organically and is also quick-growing, making the products to be non-toxic, biodegradable and recyclable.

2.5.4 Medicinal Use of Cannabis

Before the birth of modern medicine, cannabis has been used traditionally by ancient cultures for its astounding therapeutic properties. From being used as a surgical analgesia to reducing inflammation and alleviating pain, this plant was also widely used for various other ailments like gout, rheumatism, malaria and many more. Cannabis also played a role as a 'over the counter drug' in treating fever, clearing phlegm, increasing appetite and curing dysentery. The first evidence of cannabis being

used as a medicine was found in China dated almost 5000 years ago subsequently it was found to be used throughout Asia, the Middle East, Southern Africa, South America and much later on in Europe (Robson, 2001).

Several countries have permitted the use of cannabis for medicinal purposes. These countries include Canada, Netherlands, Israel and 28 out of 50 states in the United States of America (Aguilar et al., 2018). Contrary to modern medications, this multipurpose plant contains myriad of chemicals and phytocannabinoids of unknown concentrations, serving a wide range of pharmacological effects. This plant serves its recuperative effects via smoking or vaporization (Madras, 2015). Rudroff and Honce (2017) mentioned in their study that cannabis does not necessarily relate to "abuse and addiction" as it may also produce positive effects. They claim the National Institute of Drug Abuse (NIDA) is biased towards the negative aspects of the drug use.

A study review by Kalant (2001) talked about the history and current cannabis medicinal use. Cannabis has been used therapeutically for many centuries. In the ancient times, cannabis was known for its sedative, relaxant, anxiolytic, anticonvulsant, analgesic, appetite stimulation, antipyretic and antibacterial properties. Cannabis was then introduced into Europe in the 19th century for its medical and nonmedical uses. O'Shaughnessy, a British physician working in India was intrigued by the plant and started exploring its medicinal uses. His scientific findings and writings then triggered an interest in England to use cannabis for medicinal purposes, later being adopted into the British and American Pharmacopoeia. This plant was then outlawed in the early 20th century.

The acute effect of cannabis consumption could possible benefit therapeutic use as below:

i.   Anxiolytic effects   - possible to be used in treating depression and anxiety

ii.   Analgesia   - possible to be used in pain management treatment

iii. Anticonvulsant   - possible as an adjuvant therapy for epilepsy

iv.   Antiemetic   - for terminally ill patients (e.g. cancer or AIDS)

v.   Appetite stimulant   - possible treatment for patients with eating disorders

vi.   Reduction of IOP   - possible for treatment of glaucoma

vii. Bronchodilation   - possible for treatment of asthma

viii. Immunosuppressant   - possible for treatment of autoimmune diseases

Source: Kalant, 2001: p. 86

However, the psychoactive effect of using cannabis may also include an unwanted effect that may interfere with user's psychomotor functions. Therefore, further clinical researches are recommended to determine and establish the most suitable routes of cannabis administration for medicinal use without the undesired effect. In Kalant's paper, the author also talked about the international perspective on medicinal cannabis use. Countries like Australia and Britain are looking into furthering clinical researches to establish cannabis as a potential therapeutic agent.

2.5.4(a) Cannabis and Multiple Sclerosis

Multiple Sclerosis (MS) is a chronic autoimmune disease that attacks the central nervous system. It affects the brain, spinal cord, and optic nerves. Globally it is said to affect about 2-3 million people. Due to the neural loss, a range of symptoms

like pain, spasticity, incontinence, fatigue, and insomnia arises. These symptoms eventually would impact one's quality of life. According to a study by Rudroff and Honce (2017), there is a growing acceptance of cannabis within the Multiple Sclerosis (MS) community. Approximately 20-60% of people with MS are reported to use cannabis while 50-90% are open to using cannabis if it was made legal and if more scientific findings are to be conducted.

Zajicek et. al. (2005) conducted a study on the effectiveness and long-term safety of using cannabinoids in MS. 630 MS patients with muscle spasticity received oral THC, cannabis extract or placebo for the first 15 weeks of treatment. The follow up phase later carried on from week 16-52, continuing the same medication. 219 patients were allocated cannabis extract, 216 were allocated THC while 222 were allocated placebo for the first 15 week of the study. Only 138 patients of cannabis extract, 125 of THC and 120 of placebo were elected to continue treatment till the end of the study. Although patients of the THC and cannabis extract group felt an improvement in their spasticity, the study outcome showed that the THC group had an improvement. Side effects of both the active group were reported to be similar. 74% of the placebo group felt that the medication provided was not beneficial compared to 45% of the cannabis extract and 42% of the THC group. The authors also suggested for a long-term study in exploring the role of THC in progressive MS.

2.5.4(b) Cannabis and Epilepsy

Epilepsy is a neurological disorder in which brain activity becomes abnormal, causing seizure or periods of unusual behaviour, sensations, and sometimes loss of awareness. About one third of people with epilepsy do not respond to the current treatment (Privitera, 2011). There is also a great concern over long term antiepilepsy

drug use such as carbamazepine, valproate and retigabine. Retigabine is found to cause blue staining of skin and retinal pigment while carbamazepine is found to have relations with osteoporosis and atherosclerosis (Clark et. al., 2015; Meier *et. al.*, 2011; Talaat et. al.*,* 2015). Valproate on the other hand is associated with generalized and cerebellar atrophy (Moyal, 2017). The side effects and safety of these antiepilepsy drugs have no doubt improved over the years, however side effects related to the central nervous system are common and shown to affect quality of life. There is a need for plant-based medication with less toxic and side effects from chronic use of antiepilepsy.

In a trial study by Devinsky and colleagues, patients ranging from age 1-30 years old were enrolled in a study using cannabidiol (CBD). These patients were of severe, intractable, childhood-onset, treatment-resistant epilepsy who were already on stable doses of antiepileptic drugs before participating in this trial. Patients were administered oral CBD daily for 12 weeks. The study findings suggest that CBD might reduce seizure onsets as there was a median reduction in patients' monthly seizures. The study also suggested that CBD was safe to be used in children and young adults with treatment-resistant epilepsy.

2.5.4(c) Cannabis and Diabetes Mellitus

In 2013, Penner et. al. (2013) conducted a study on the impact of cannabis on glucose, insulin and insulin resistance among American adults. 4657 adults were recruited consisting of both men and women who have participated in the National Health and Nutrition Examination Survey from 2005 to 2010. Blood samples were taken after a 9 hour fast to measure fasting insulin and glucose. As to evaluate insulin resistance, homeostatis model assessment of insulin resistance (HOMA-IR) was