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Ganja and Geriatrics: The Health Benefits and Risks of Medicinal Cannabis for Older Adults

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**Ganja and Geriatrics: The Health Benefits and Risks of Medicinal Cannabis for
Older Adults**

by

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Chapter 1: Introduction

As the United States population grays, it faces a myriad of controversial issues regarding older adults. One such issue is the use of various types of alternative medication, specifically the use of marijuana as a treatment for a variety of ailments. It is important to explore all possible routes on how to treat this portion of this population that may be suffering from different types of illnesses, diseases, and pain that may be more commonplace in older adults. As a graying nation, there is fundamental importance of being well informed about the topic of medical marijuana. It is vital to be aware of the existing research, so the best possible decisions can be made for our elders, loved ones, and ourselves.

In 2011, a national Gallup poll found that 50% of Americans support the legalization of marijuana (Johannignman & Eschiti, 2013). As more states legalize the drug and accept its use as a form of medication, the topic is gaining more attention and, consequently, more criticism. As of 2016, most of the known health benefits to using medical marijuana/cannabis come from a limited pool of research with an even smaller number of participants, especially as it pertains to older adults. This leaves today's society with an abundance of questions concerning the use of medicinal marijuana for illnesses prevalent in elderly population. Is it more harmful or helpful? What forms does it come in and do some of those forms of marijuana work better than others? Does research support marijuana as an illicit substance or as a beneficial medication? These topics have become increasingly prevalent in today's society where the medical use of marijuana is quickly becoming more accepted throughout the United States. (Denning, 2015).

Whether or not marijuana should be used for medicinal purposes has been a highly debated topic in the United States that dates back to the 1800s (Kreit, 2003). Kreit (2003)

states “marijuana was not regulated in the United States (medical or otherwise) until 1941” (p. 1793). Although there was never a consensus of the extent of its efficiency, marijuana was believed to have therapeutic value and was included in the United States Pharmacopeia until 1941 (Kreit, 2003). Most of the research on marijuana-based drugs was originally conducted in the 1980s. However, with recent popularization of the usage of cannabis-derived drugs, the effects and usefulness of marijuana is again being investigated (Johanningman & Eschiti, 2013).

As of 2015, only Colorado and Washington allow the legal use of marijuana both medicinally and recreationally (Denning, 2015). However, the number of states that are becoming more accepting of the legal use of marijuana (both recreationally and medically) is growing (Denning, 2015). Seventeen states, along with the District of Columbia, now have policies that allow the possession and personal use of marijuana, and 21 states allow marijuana possession for medical use only (Denning, 2015). Denning (2015) states, “Public opinion is shifting rapidly as well: three-quarters of Americans support decriminalization for personal use of marijuana; 58 percent favor legalization” (p. 568). As more states and citizens begin to contemplate the issue of marijuana use, the research into the drug’s medical benefits should follow suit.

Throughout this paper, some terms may be used that have similar definitions. These terms may be used interchangeably throughout this discussion. The operational definitions of such terms are as follow:

Operationalization of Terms

Medical (medicinal) marijuana. Bayer (1997) defines medical marijuana as “Marijuana used to treat pain and other clinical conditions” (p. 1134). However, Reiman,

Aggarwal, and Reinerman (2014) state that “a drug must be carefully studied in many people before it can be approved by the FDA. There have not been enough large studies of marijuana to definitively show that it is a safe and effective drug” (p. 1931). Though used in some states as a medication, marijuana is not an FDA approved drug.

Cannabis/Ganja. Pudney (2010) describes cannabis (which can be interchangeable with ganja) as “(or marijuana, hashish, etc.), which derives from the hemp plant *cannabis sativa*, particularly the subspecies *indica*. Products of the cannabis plant are commonly classified into three main forms: cannabis resin and other extracts (hashish or hash oil); ‘regular’ herbal cannabis (marijuana); and preparations of the female flowering top (*sinsemilla*, skunk)”.

Tetrahydrocannabinol (THC). The cannabis plant contains a complex array of chemical components, but tetrahydrocannabinol (THC) is the primary psycho-active component in marijuana and the most understood and tested component (Pudney, 2010).

Dronabinol. Dronabinol is a man-made, cannabinoid derived compound that is approved by the FDA. This drug contains concentrated THC without the risk of other components found in actual marijuana, which is not approved by the FDA (Ogbru, 2016). Dronabinol is used to treat illnesses and diseases where some researchers have recommended the use of medical marijuana.

With the topic of legalizing being so controversial and popular, it is difficult for the literature and research to keep pace with the ever-changing legalization and acceptance of medicinal marijuana. The information collected throughout this paper is from the most current sources available as of summer 2016. It is important to note that readers should continue their own research as more data regularly becomes available on this subject. By collecting the most

recent and prevalent information, this paper serves to inform citizens and lawmakers alike about the lack of research done on the use of medical marijuana and the health benefits it could lend for diseases in older adults. It will hopefully inspire additional research and consideration for the drug based on the benefits or its use, especially in older adults.

Chapter 2: Literature Review

Background on Older Adults in the United States

According to the Profile of Older Americans (2015), the older population is classified as those persons aged 65 years or older (p. 2). In 2014, there were 46.2 million people aged 65 and older, a 28% increase since 2004 (Profile of Older American, 2015). The percentage of the population aged 65 and over among the total population increased from 4.1% in 1900 to 13.0% in 2010 and is projected to reach 20.9% by 2050 (West, Cole, Goodkind, & He, 2014). This segment of the population has and will continue to grow at an accelerated rate (Profile of Older Americans, 2015).

The Profile of Older Americans (2015) also states, “In 2012-2014, 44% of non-institutionalized people age 65 and over assessed their health as excellent or very good (compared to 55% of persons aged 45-65 years)” (p. 12). However, research has also identified that most older persons have at least one chronic condition and many have multiple conditions (West et al., 2014). The most common chronic illnesses and impairments reported from 2011-2014 include: diagnosed arthritis (49% aged 65+), heart disease (31% aged 65+), stroke (West et al., 2014), diagnosed diabetes (21% aged 65+), hypertension (71% aged 65+ in 2009-2012), cancer (24% aged 65+), and osteoporosis (Profile of Older Americans, 2015; West et al., 2014). These are diseases/illnesses that have a long duration and generally progress slowly (West et al., 2014). West et al. (2014) reports that “Among the older population in 2008, only eight percent had no chronic conditions, compared with 51% who had one or two, and 41% who had three or more chronic conditions” (p. 36). These conditions need to be managed on a continual basis. Some chronic conditions can limit people’s independence and lower their quality of life (Bentler et al., 2009).

With such a high percentage of elderly individuals experiencing some kind of chronic illness and the increasing amount of individuals entering this targeted population, the idea of medical marijuana as an alternative medication needs to be more thoroughly explored.

Research indicates that many elderly individuals experience some kind of chronic illness and the population of older adults is expected to continue to increase (West et al., 2014).

With this outlook of our population, it is important that we take a look at as many forms of treatments for chronic illnesses as possible.

Brief Overview of Marijuana

Marijuana derives from the plant *Cannabis sativa*. It contains more than 400 chemicals, many with unknown effects, which differ from plant to plant. It is the most widely used drug throughout the United States (Johanningman & Eschiti, 2013). Medical marijuana differs significantly from most other forms of prescription medications. The U.S. Food and Drug Administration (FDA) struggles to support the usage of medical marijuana because the evidence supporting its efficiency varies substantially and, in general, falls short of the standard for approval largely because there is no way to prescribe an exact amount for treatment (Johanningman & Eschiti, 2013).

Marijuana as a medication. Marijuana has been used to treat illnesses throughout the world for hundreds of years (Reinarman, Nunberg, Lanthier, & Heddleston, 2011). However, it was not until 1839 that Dr. William O'Shaughnessy began to utilize the substance as medicine. During the mid-19th century into the 21st century, marijuana was prescribed for therapeutic use in medical practice for a variety of conditions throughout Europe and subsequently the United States. In 1850, marijuana was admitted to the United States Pharmacopoeia and listed in the National Formulary and the US Dispensatory (Reinarman et

al., 2011). It was not until 1936 that the Federal Bureau of Narcotics initiated a law prohibiting the use of marijuana. Though the American Medical Association urged against the ban of medical marijuana, Congress passed the law in 1937. The passing of this law, as well as the increased prescription rates of aspirin and barbiturates, expelled cannabis from the United States Pharmacopoeia and most medical practice by 1942 (Reinarman et al., 2011). In the 1960s, after the use of nonmedical cannabis spread, the number of Americans reporting lifetime usage increased dramatically (Reinarman et al., 2011). Estimates from the 2011 National Survey on Drug Use and Health report that approximately 1.5 million Americans 55 years and older have used this drug, usually without physician involvement (Reinarman et al., 2011). The sharp increase of marijuana being used recreationally led to the rediscovery of therapeutic uses of cannabis (Reinarman et al., 2011).

Forms of marijuana.

Inhalation. Marijuana can be consumed in several ways. The first form, and most common, is by inhalation of smoke. Inhalation of marijuana results in the quickest delivery of THC and avoids hepatic-pass metabolism. Additionally, smoking marijuana allows for maximum rapid absorption into the lungs (Johanningman & Eschiti, 2013). Inhalation delivers a higher percentage of THC into the bloodstream in comparison to other methods of consumption (Seamon, Fass, Maniscalco-Feichtl, & Abu-Shraie, 2007). McGuinness (2009) found that when smoked, THC passes quickly from the respiratory tract to the bloodstream and finds its way to the brain. It then binds to cannabinoid receptors and within minutes, the active component of the drug affects brain chemistry. The effects will peak approximately 15 to 30 minutes later, but the overall euphoric effects can last up to 3 hours (McGuinness, 2009). Unfortunately, this form of administration is associated with a significant exposure of

mutagens, carcinogens, and other toxic products of pyrolysis (Szczeniak, Kelly, Whynot, Shek, & Hung, 2006).

While inhalation seems to be the most common method of administration for marijuana users, it may not be the best form for older adults using marijuana for medical purposes as they are less likely than young adults to smoke. In 2010, less than 10% of those aged 65 and older smoked marijuana and/or tobacco (West et al., 2014). West et al. (2014) also found that “adverse health outcomes faced by older smokers include a higher risk of cardiovascular and respiratory diseases, stroke, and cancer (in particular lung and breast cancer)” (p. 34). Additionally, smoking of any kind in older age can increase your risk of the following: dementia, osteoporosis, diabetes, erectile dysfunction, macular degeneration, nuclear cataracts, and skin alterations (West et al., 2014). These enhanced risk factors can contribute to shorter life expectancy (West et al., 2014).

Ingestion of pill. Another way marijuana is consumed is via ingestion of pill. THC in pill form is already available and approved by the FDA. However, this form of administration seems to be less popular in comparison to other forms of consumption. This could be partly because its euphoric effects are not immediate and cannot be reliably controlled, unlike the inhalation of smoke (Wilkinson & D'Souza, 2014).

Other. Other forms of consumption include edibles (which provide erratic absorption), tinctures and tonics, teas and sodas (McGuinness, 2009), hash and wax, and topicals (Johanningman & Eschiti, 2013). Szczeniak et al. (2006) state that “the low aqueous solubility of cannabinoid compounds poses a challenge for these routes of administration” (p. 161). Though most of these delivery systems would minimize possible adverse systemic side effects, they do not deliver THC as directly. When considering the negative side effects of

inhalation, alternative forms of marijuana consumption seem like the best option when prescribing marijuana for older adults.

Health Benefits of Medicinal Marijuana

Glaucoma. One of the most common conditions where patients are prescribed medical marijuana is glaucoma. Glaucoma is a sensory impairment that is more prevalent in older adults that is caused by elevated intraocular pressure (IOP) (Hall & Degenhardt, 2003). Often times, glaucoma puts older adults at a greater risk for falls and automobile accidents (West et al., 2014). Visual impairments increase as people age, and they tend to be more common in women than in men, especially in the 65 to 84-year-old age group (West et al., 2014). It has been found that when cannabis or dronabinol (a cannabis-based drug containing THC) are taken orally or intravenously, they can reduce IOP by up to 25%. However, the effects are only known to last about three to four hours. (Hall & Degenhardt, 2003).

HIV/AIDS. Another disease in which the cannabis derived drug dronabinol has been shown to help relieve symptoms of is HIV/AIDS. The reason why dronabinol is so highly recommended to help with HIV/AIDS is because it stimulates appetite and assists with weight gain. Dronabinol is currently registered for this medical use in the U.S. (Hall & Degenhardt, 2003). Those with HIV/AIDS who have used dronabinol report that in addition to helping them gain weight and increase their appetite, dronabinol has also aided them in decreasing their anxiety and depression, pain, nausea and vomiting (Bottorff et al., 2011). Hall and Degenhardt (2003) state that there have been anecdotal reports of smoked cannabis being just as effective in treating HIV/AIDS associated anorexia and weight loss. However, there have been no controlled studies published as of 2016.

Cancer and symptoms associated with cancer. Other drugs with a cannabis base that have been found to aid in relieving nausea and vomiting include nabilone and levonantradol. These drugs, along with dronabinol, are mostly used by patients who receive chemotherapy (Hall & Degenhardt, 2003). The most recent information on these drugs reports, that in some cases, they show more antiemetic efficiency in comparison to other antiemetic drugs on the market. Conversely, other, newer antiemetics such as ondansetron (ex. Zofran) allow for better control over nausea and vomiting (Johanningman & Eschiti, 2013). The difference in efficiency and comparison of side effects is especially apparent when looking at the difference in smoked cannabis and ondansetron (Johanningman & Eschiti, 2013). One study compared which drug relieved symptoms of nausea and vomiting induced by syrup of ipecac with the fewest side effects. While smoked marijuana seemed to initially work the fastest, it also appeared to have more adverse side effects (Hall & Degenhardt, 2003).

In regards to oncology, marijuana is most often used to reduce pain, increase appetite, and decrease nausea and vomiting (Johanningman & Eschiti, 2013). Johanningman and Eschiti (2013) suggest that the THC in marijuana not only helps alleviate some of the symptoms of some cancers but could actually help stop the development and progression of cancer cells from spreading. West et al. (2014) reported that over 50% of the population that is diagnosed with cancer is 65 years old and over making the use of marijuana to treat the unwanted side effects of chemotherapy especially relevant to older adults.

Multiple Sclerosis and ALS. Cannabis based drugs have also recently been used to alleviate some symptoms of Multiple Sclerosis (MS) (Bottorff et al., 2011). Patients who have MS primarily use marijuana to treat lower urinary tract symptoms (mainly urge incontinence). Investigations have also found marijuana to be helpful in relieving both general symptoms

(relaxation of the entire body and stress relief) as well as specific symptoms of MS including reduction of pain, tremors, numbness, falling/balancing problems, and vertigo (Bottorff et al., 2011). One study in particular investigated why patients with MS report that painful muscle spasticity is reduced after using cannabis (Bottorff et al., 2011). Other studies have provided some support of this finding, but there are too few clinical trials to fully evaluate efficacy (Hall & Degenhardt, 2003).

Similar symptom relief has been found for those patients who suffer from amyotrophic lateral sclerosis (ALS). These patients reportedly use marijuana to induce analgesia (inability to feel pain), muscle relaxation, bronchodilation (decrease the resistance in respiratory airways and increasing air into the lungs), saliva reduction, appetite stimulation, and sleep induction (Seamon et al., 2007).

Movement disorders. Marijuana has also been used in the treatment of various movement disorders to relieve muscle spasms and tics associated with dystonia such as Parkinson's disease, Huntington's disease, and Tourette's syndrome (Seamon et al., 2007). One study looked specifically at how marijuana had anecdotal evidence in helping treat abnormal skeletal muscle movements in the face, limbs, and trunk (Seamon et al., 2007). This study also showed some positive effects on observer ratings of tremors and tics (Seamon et al., 2007). However, there has yet to be more than one small study (12 participants), placebo-controlled, single-dose, crossover trial of dronabinol in Tourette's syndrome (Hall & Degenhardt, 2003)

Pain and inflammatory disorders. Due to its analgesic and anti-inflammatory properties, marijuana is often used in a variety of pain disorders, specifically to help relieve arthritis pain and pain associated with sickle cell disease (Seamon et al., 2007). Arthritis is a

progressive disorder that, when left untreated, can lead to damage of the joints, disability, and early mortality (Stone, 2009). In a 2007-2009 United States Survey, data revealed that arthritis was doctor-diagnosed in over 50% of adults aged 65 and older (Cheng et al., 2012). Stone (2009) found arthritis to be one of the most common health problems we see limiting activity and independence among older adults. For every 1,000 people aged 65 to 74, 122 reported activity limitations caused by arthritis or other musculoskeletal disorders. It was further found that number increased to 167 per 1,000 in people aged 75 to 84 and to 281 per 1,000 in those 85 years old and older (Stone, 2009).

Seizures. Marijuana has also been used to help prevent seizures in patients with epilepsy (specifically those with Dravet's syndrome) and is believed to have neuroprotective properties (Seamon et al., 2007). This is important to note because the number of older adults that have been diagnosed with epilepsy has steadily increased over the last few decades (Stefan, 2011).

Neurological disorders. In like manner, it is believed that the THC found in marijuana may slow the progression of Alzheimer's disease (Seamon et al., 2007). Rafii and Aisen (2015) note that Alzheimer's disease is a form of dementia that affects approximately 36 million people worldwide and manifests as progressive memory impairment leading to a decline in other cognitive abilities, ultimately resulting in complete functional dependency. Marijuana has also been used to treat other neurological conditions including brain trauma after concussions and strokes (Seamon et al., 2007). Other ways that cannabis has shown to physically impact people is by lessening the effects of Hepatitis C, help aid in the painful effects of inflammatory bowel disease, help regulate metabolism, improve the symptoms of Lupus and other autoimmune diseases, as well as aid in relieving symptoms of asthma and

other pulmonary disorders (Seamon et al., 2007). Many neurological diseases, especially Alzheimer's, worsen as individuals age making the need for alternative medicines ever more important.

Mental and emotional disorders. Marijuana has also been used to treat an array of mental and emotional issues. It has proved to be especially effective in older adults, particularly veterans, diagnosed with posttraumatic stress disorder (PTSD), anxiety, depression, schizophrenia, and suicide ideation (Conwell & Thompson, 2008). Risk factors for suicide among the older population of veterans include major psychiatric illness, particular personality traits and disorders, physical illness, life event stressors, and functional status (Conwell & Thompson, 2008).

PTSD. West et al. (2014) found that in 2010, 42% of the total veteran population was made up of people ages 65 years and older. Additionally, they found that almost 20% of the veteran population was very near approaching older age (55 to 64 years old). It has been reported that using marijuana can calm some veterans' symptoms of hyper arousal that occur when experiencing flashbacks. Likewise, using marijuana can also help eliminate night terrors that often occur in people with PTSD (Bonn-Miller, Vujanovic, Boden, & Gross, 2011). Seamon et al. (2007) further reports that marijuana has been used for the prophylactic and symptomatic treatment of migraine headaches and phantom limb pain that Veterans often tend to experience as well as serving as a mood stabilizer.

Most of the health benefits to using medical marijuana/cannabis come from a limited pool of research with an even smaller number of participants that fall into the age range of older adults. Further clinical investigation is needed in order to determine the usefulness of medicinal marijuana as well as how it compares to other drugs.

Health Risks of Medicinal Marijuana

Side effects. One reason medical marijuana is controversial is because the drug in and of itself causes unwanted side effects. In 2007, it was reported as the most commonly abused drug in the United States (Seamon et al., 2007). The side effect that is most common for marijuana usage is damage to the lungs and respiratory system. Cannabis smoke, like tobacco smoke, is a risk factor for respiratory disease (Seamon et al., 2007), lung damage, and possibly cancer (Hall & Degenhardt, 2003). Marijuana smoke contains 50-70% more carcinogenic ingredients than cigarette smoke that puts people at a higher risk for lung cancer (Seamon et al., 2007). McGuinness (2009) further notes that marijuana users frequently experience coughing, respiratory infections, higher rates of asthma, chronic bronchitis (Seamon et al., 2007), reduced lung density, and lung cysts.

Cardiac. Cardiac side effects are another thing to consider when using marijuana. Some cardiac side effects include tachycardia (Reese, 2009), syncope, palpitations, orthostatic hypotension (McGuinness, 2009), (Reese, 2009) stroke, paroxysmal atrial fibrillation (Seamon et al., 2007), and hypertension (Reece, 2009). Of those aged 65 years and older, hypertension affects about 50% and tends to be more common in women than men (West et al., 2014). West et al. (2014) states, "Hypertension, or high blood pressure, is a chronic illness that can lead to cardiovascular disease (including stroke and coronary heart disease) and heart failure, as well as kidney failure but because hypertension does not produce obvious symptoms, over one-fifth of people who have hypertension are unaware of it and thus may not seek treatment" (p. 38).

Some preliminary evidence also suggests that marijuana can trigger acute myocardial infarction (Reece, 2009). Patients with cardiovascular disease or who are at risk of stroke or

myocardial infarction may have an increased risk of cardiovascular effects from marijuana (Seamon et al., 2007). Researchers also found that using marijuana has been reported as a risk factor for invasive pulmonary aspergillosis (Seamon et al., 2007). Furthermore, marijuana has been reported to cause transient ischemic attacks in patients with a low risk of developing cardiac abnormalities (Seamon et al., 2007). It is important to understand the ways in which marijuana affects the heart because some older adults experience heart conditions without the added stress of smoking. West et al. (2014) reports that for every 1,000 people aged 65 to 74, 96 report activity limitations caused by heart or other circulatory conditions with heart disease being one of the most common. For those aged 75 to 84 the numbers increased to 138 per 1,000 people and 204 per 1,000 people for those aged 85 and over (West et al., 2014).

Disease. Marijuana can also adversely affect older adults with certain diseases, some of which include: immunosuppression, psychiatric disturbances, cardiac disease, and respiratory disease (Seamon et al., 2007). Due to marijuana's suggested immunosuppressive properties, it may present additional health risks to patients with diabetes, HIV, lupus, rheumatoid arthritis, cancer, or organ transplants (Seamon et al., 2007). It was also found that smoking marijuana can suppress the immune system, making it harder to recover from illness and disease (McGuinness, 2009). When using marijuana, you are at an especially higher risk of developing head and neck cancers (Seamon et al., 2007). Men in particular should be aware of the negative side effects of marijuana use as it can debilitate their testosterone levels, sperm count, and libido (McGuinness, 2009). Sperm from men who are chronic marijuana users have been found to behave abnormally (McGuinness, 2009).

Psychological and emotional. Other negative side effects that come from smoking marijuana or using cannabis-derived drugs are psychological or emotional. West et al. (2014)

reports, “In 2008, 15.7 percent of women and 10.7 percent of men aged 65 and over had clinically relevant depressive symptoms. The highest share with depressive symptoms was found among men aged 85 and over (18.9 percent)” (p. 42). Depression is associated with not only increased mortality, but also increased functional limitations (Seamon et al., 2007).

Marijuana may exacerbate psychiatric disorders in patients with schizophrenia, psychosis, bipolar disorder, depression, eating disorders, or panic and anxiety disorders and in patients predisposed to such disorders (Seamon et al., 2007).

Wilkinson’s (2014) research found that there is evidence that marijuana exposure is associated with an increased risk of psychotic disorders in vulnerable individuals. The problem in his research was he was unable to identify or formulate a way to identify the vulnerable at-risk individuals. For those with established psychotic disorders, marijuana use has a negative effect on the course and expression of the illness. Marijuana has been found to heighten the symptoms that come with psychosis and schizophrenia (Reece, 2009; Wilkinson & D’Souza, 2014).

Acute toxic psychosis induced by marijuana may be characterized by hallucinations, delusions, depersonalization (a loss of the sense of personal identity or self-recognition), fear of dying, paranoia, anxiety, changes in mood (e.g., depression), altered mental astuteness, violent behavior, and visual disturbances (Seamon et al., 2007). Those visual disturbances can often also result in blurred vision, dry eyes, reddening of the conjunctiva, mydriasis, and photophobia (Seamon et al., 2007).

Depression, anxiety and sleep disturbances. Other negative mental and emotional side effects include higher risk of depression and anxiety (Reece, 2009). These symptoms are particularly prevalent in military Veterans and may also have other comorbidities with

schizophrenia, PTSD, hallucinations, and agoraphobia. It is reported that marijuana users are four times more likely to develop depression than people who do not use marijuana (Seamon et al., 2007). Additionally, when marijuana is taken with alcohol, benzodiazepines, or muscle relaxants, it can result in excessive central nervous system (CNS) depression (Seamon et al., 2007). It has also been found that chronic marijuana use leads to serious sleep disturbances. Seamon et al. (2007) states that “CNS effects reported with marijuana include dry mouth, flu-like symptoms, nausea, drowsiness, numbness, dizziness, nightmares, and difficulty sleeping” (p. 1041).

Attention, judgment, and balance. Marijuana usage can also interfere with attention, judgment, and balance (Reece, 2009). Since marijuana has been shown to cause dizziness, it may complicate the diagnosis and treatment of vertigo as well (Seamon et al., 2007).

Marijuana use has also been linked to seizures and is believed to have both proconvulsant and anticonvulsant effects (Seamon et al., 2007). In regards to attention, Dougherty et al. (2013) found that current and abstinent adult and older adult marijuana users performing a visual attention task also showed less activity in their right prefrontal, medial and dorsal parietal cortical regions of the brain. He also found that they showed greater activity in multiple frontal, parietal, and occipital brain regions relative to controls. This suggests altered regulation of attention circuitry (Dougherty et al., 2013).

Memory. Rafii and Aisen, (2015) states that Alzheimer’s disease is a form of dementia that effects approximately 36 million people worldwide and manifests as a progressive memory impairment leading to a decline in other cognitive abilities, ultimately resulting in complete functional dependency. Contrary to the findings of Seamon et al. (2007), Dougherty et al. (2013) found that marijuana use can debilitate one’s memory. He reported that those

who are heavy marijuana users can develop short-term memory impairments and often show persistent deficits in recall memory. Dougherty et al. (2013) also stated that, “Poor recall memory performance in adult marijuana users is accompanied by decreased activity in the prefrontal cortex, increased activity in the cerebellum, and altered hippocampal lateralization” (p. 308). Additionally, Seamon et al. (2007) reports that heavy marijuana use can result in overall psychological dysfunction, affecting a person’s ability to form memories, recall events, and maintain focus.

Psychomotor performance. Another negative side effect of using cannabis based drugs or smoking marijuana is the adverse effect it can have on psychomotor performance (Reece, 2009). It is often advised that those who use such drugs should avoid operating equipment that might pose danger to themselves or others (ex., driving a car or working with heavy machinery) while experiencing its effects (Seamon et al., 2007). Hwang, Hong, Hao, and Jong (2011) found that “Interactions between sensory motor and cognitive aspects of behavior change as one ages” (p. 716). They additionally stated that, “Age-related neuromuscular changes result in older adults having muscles that do not respond as well as those of younger adults” (p. 717).

Other. Other potential negative changes that can be experienced by marijuana users include changes in mood, distorted sense of time, and a decline in IQ (Reece, 2009). Recent findings suggest that long-term marijuana exposure is associated with structural brain changes as well as a decline in IQ (Dougherty et al., 2013; Wilkinson & D’Souza, 2014).

Even though marijuana has a long list of negative side effects it is important to keep in mind that even pharmaceutical drugs have various negative effects on the human body. The FDA reports that all medications have side effects and risks. The FDA’s Adverse Event

reporting system has 2 million reports to date about various negative symptoms associated with an array of pharmaceutical drugs. Annually, the FDA receives 345,000 reports about drugs with negative side effects (2000). The research is also contradictory at times. Some studies show marijuana to help a certain symptom while others find it increases the negative effect of the same disease.

The benefits and disadvantages of medical marijuana, like with any current pharmaceutical drug, must be weighed, especially for older adults who may be susceptible to unwanted side effects. This helps emphasize the importance of increasing the research related to medical marijuana use in older adults. If we can establish a proper way to prescribe marijuana and safely establish dosage sizes, marijuana/cannabis derived drugs may be beneficial as a medication for individuals 65 years and older. However, due to the lack of scientific research, the benefits and disadvantages cannot be definitively compared.

The stigma associated with marijuana use and potential for addiction and dependence. Along with health risks, there are various social issues associated with medical marijuana. The most commonly disputed negative aspect about using marijuana is that it is a gateway drug and leaves potential for addiction and dependence. Hall and Degenhardt (2003) argues that the potential adverse effects of long-term cannabis use are of great concern especially because some medical conditions would require regular cannabis use over periods of years or even a lifetime. Some health issues that older adults might have for which marijuana could be prescribed for long periods include glaucoma, MS, spinal cord injuries, and HIV/AIDS. As with any drug, prescribing marijuana use for such a length of time puts people at risk for addiction and dependence on the drug. Though the risk of developing dependence on THC is highest among adults with psychiatric disorders, substance-use

problems, and other comorbidities, researchers still confirm that any user of the substance could potentially become addicted or dependent on using it (Hall & Degenhardt, 2003).

Marijuana as a gateway drug. With increased use of marijuana being prescribed as a medicine, many fear that patients may use this as a gateway drug. A gateway drug is a substance that opens up potential opportunity of other harmful drugs being used (Seamon et al., 2007). Oftentimes, gateway drugs are associated with adolescents and teens. However, the illnesses that call for a prescription of medical marijuana primarily affect older adults, many fear that we will see much more illicit drug use accompanying it in older populations (Seamon et al., 2007).

Policy and Legality

Federal policy states that cannabis possession is a criminal offense, and the Drug Enforcement Agency (DEA) continues to maintain a conservative stance on cannabis use, calling for it to be classified as a schedule I drug (Johanningman & Eschiti, 2013). The American Medical Association states that it would support changing the use of cannabis from a schedule I drug if doing so would facilitate further research and development on cannabinoid-based medicine (Johanningman & Eschiti, 2013). In fact, many physicians and advanced practice nurses (APNs) say they would recommend and prescribe marijuana use more if it was legalized (Johanningman & Eschiti, 2013). Currently, if they do dispense or prescribe marijuana, practitioners may be charged federally with aiding and abetting (Johanningman & Eschiti, 2013). The legal use of marijuana is a state-level decision, but because federal law prohibits possession of marijuana, patients who possess marijuana are still at risk of being subject to federal criminal charges (Joahnnningman & Eschiti, 2013).

As of 2016, 25 states and the District of Columbia have legalized medical marijuana. However, more and more states are going through the process of marijuana legalization. In states where it is legal, patients are only allowed to use and possess small quantities of marijuana for medical purposes (Johanningman & Eschiti, 2013). However, state laws do not regulate marijuana's quality or potency. Therefore, some marijuana may be stronger than others. Additionally, most states do not address how to obtain the drug (Johanningman & Eschiti, 2013).

With so many medical professionals in favor of legalization and therapeutic use of marijuana, it is no wonder why more people are investing time and effort into making medical marijuana more socially acceptable (Johanningman & Eschiti, 2013). In 2013, a national poll suggested that up to 50% of Americans support the legalization of cannabis use (Johanningman & Eschiti, 2013). With these overall positive attitudes towards medical marijuana legalization, more states have been more accepting of this option (Johanningman & Eschiti, 2013). However, one of the biggest current concerns about legalizing marijuana is that legalization would act more as an advertisement or promotion for its use (Johanningman & Eschiti, 2013). Many are concerned that this will specifically be directed to a younger population (Johanningman & Eschiti, 2013). Additionally, it is feared that legalization would increase dependence on the drug. It is estimated that nine percent of users may become dependent (based off of usage) (Johanningman & Eschiti, 2013).

How a Medication Becomes Legal

Getting a drug federally approved as a new medication is not an easy task. In order for any drug to become legal, the FDA, not popular vote or state legislature, must approve the compound and affirm that it is produced according to good manufacturing practice standards,

distributed by regulated pharmacies, and dispensed in conventional and safe methods (Wilkinson & D'Souza, 2014). Some law makers believe that if these practices are not put into place for medical marijuana, states are essentially legalizing recreational marijuana while forcing physicians to act as gatekeepers for those who want to obtain it (Wilkinson & D'Souza, 2014). Additionally, those with concerns about legalizing marijuana use would want the drug to be considered an official medicine (Wilkinson & D'Souza, 2014).

For a drug to become an FDA approved medication, the ingredients in the medication need to be measureable and consistent with each dose (Wilkinson & D'Souza, 2014). That means that the same amount of active ingredients, in this case THC, is in one pill (or dose) so that the health care professionals can evaluate how much and how often a patient should potentially take the drug (Wilkinson & D'Souza, 2014). One of the issues surrounding cannabis is that it is a unique drug that can be consumed in many different forms. Each form has different effects on the body and can make marijuana's active ingredient (THC) last for different amounts of time in one's system (Seamon et al., 2007). Taking into account the various forms and varying potency of cannabis based drugs, it is apparent why classifying marijuana as an official medicine, achieving national legalization, and gaining support from the FDA have been so difficult to accomplish (Seamon et al., 2007).

How much marijuana is a safe amount? One issue that researchers are facing is how to prescribe quantity and establish potency. What exactly is a safe amount of marijuana to use? Wilkinson's (2014) research suggest that there is no clear optimal dose of marijuana that can be prescribed for its various approved conditions. The amount of THC and other cannabinoids in each form of marijuana (cigarette, pill, topical, etc.), the size or amount of these forms, and the quantity consumed by users can vary considerably. Wilkinson (2014)

further notes that the relative lack of controlled clinical trial data makes finding the appropriated dose even more challenging. It is also important to remember that marijuana is approved for mostly chronic conditions that require patients to be on the drug for long periods of time. However, it is important that physicians be aware of the potential development for drug tolerance and dependence as well as withdrawal upon the discontinuation of use (Wilkinson & D'Souza, 2014). All of these factors make it difficult for researchers to establish guidelines for dosage and administration.

Health care professional's role. When prescribing medical marijuana, physicians play a key role in screening patients for potential drug-to-drug interactions as well as counseling patients about the health risks associated with marijuana use (Seamon et al., 2007). This step is particularly crucial because many people who are prescribed marijuana have comorbidities and are likely to be on more than one drug to treat their ailments (Seamon et al., 2007). Patients with a history of immunosuppression, psychiatric illness, substance abuse issues, respiratory illness, and cardiovascular disease are urged to avoid marijuana use (Seamon et al., 2007). This is especially important for older adults who tend to be more susceptible to illness as they age. Seamon et al. (2007) argues there should also be counseling put into place for those patients who live alone, drive, or operate heavy machinery, as marijuana can impair reaction time and motor control (Seamon et al., 2007). Additionally, people who use marijuana should refrain from using other drugs (alcohol in particular) recreationally, as the effects of the drugs together may have adverse effects (Seamon et al., 2007). Patients should also be aware that usage of marijuana might cause significant and undesirable weight gain and pose further health risks in susceptible patients (Seamon et al., 2007). Additionally, physicians should consider alternative forms of administration before

inhalation, as smoking poses many of the same respiratory risks as regular cigarettes (Seamon et al., 2007).

Pharmacists also play a significant role in the legalization, distribution and use of medical marijuana (Seamon et al., 2007) because they are currently only allowed to dispense FDA approved drugs (2015). As of 2016, federal law still renders medical marijuana illegal meaning pharmacies are not authorized to supply or dispense it. Similarly, physicians cannot prescribe medical marijuana as a medication. Until it is approved by the FDA, medical marijuana is a drug that can only be recommended by health professionals. If medical marijuana is recommended for a patient, they will receive a note from their doctor or (in some states) an ID card that describes the patient's diagnosis and the doctor's recommended cannabis treatment. If a patient has a note from their physician or ID card, they can then buy medical marijuana at a dispensary or (in some locations) vending machines (Silverman, 2016).

Some researchers argue pharmacists should conduct in depth background checks of patients' medical and social histories, including asking about the possible use of medical marijuana (Seamon et al., 2007). This is especially crucial if the patient is or has received drug therapy for a serious chronic or debilitation medical condition or resides in a state where medical marijuana is illegal (Seamon et al., 2007). With all of these warnings to physicians and pharmacists alike, Hall and Degenhardt (2003) still contend that marijuana is unlikely to be prescribed because of the concerns about legal liability. They argue that the least problematic way of providing medical access to cannabis may be allowing patients with specified medical conditions an exemption from criminal prosecution to grow cannabis for their own therapeutic personal use (Hall & Degenhardt, 2003).

With the increased use of marijuana for health benefits across the United States and the growing number of states legalizing this substance to be used for medical purposes (Denning, 2015), leads many to question how and who will be covering the costs of such medications. It is important to note that costs for medical marijuana come out of the patient's pocket as insurance companies won't cover medications not approved by the FDA (Silverman, 2016). The Profile of Older Americans found that in 2015 "almost all (93%) non-institutionalized persons 65+ were covered by Medicare. Medicare covers mostly acute care services and requires beneficiaries to pay part of the cost, leaving about half of health spending to be covered by other sources" (13). Medicare does cover some forms of alternative medicine such as chiropractic care (Wheadon & Song, 2012). Even if the drug did become legal, financial restrictions may keep some eligible patients from obtaining the drug.

Conclusion

In summary, it is important that we continue to do research on how medicinal marijuana is harmful and helpful in treating ailments of older adults. As shown in the existing research, there are many health benefits for using medical marijuana, but the negative side effects and stigma surrounding marijuana in any form hold many physicians and researchers back from pursuing legalization further. The social and economic implications of the aging of the U.S. population will be of significant interest to policy makers and the private sector alike (West et al., 2014). As population aging continues, the pool of potential individuals who could benefit from medical marijuana will increase the demand for more discussion on this topic. The question of what kind of drug marijuana is considered and how it is legally or illegally accepted still varies state to state. With new forms of the drug that yield fewer negative side effects, it could be easier to strike a balance between risk and reward.

Additionally, as more states legalize marijuana, there is greater opportunity to conduct research case studies on marijuana users and the effect the drug has on them. Researchers and policy makers alike should take advantage of this available pool of users to further research and support the discussion towards legalization. In all, medical marijuana is and will continue to be a controversial topic in need of continuous research and discussion.

Chapter 3: Recommendations

The purpose of this paper is to showcase the research, however limited, pertaining to the medical benefits and risks of medical marijuana. My intent is to start conversations among policy makers, medical professionals, and the general public about medical cannabis in order to recognize the potential benefit as well as risks to a large percentage of our population. Starting the conversation will hopefully bring more attention the topic and make it clear that more research needs to be done to accurately make a judgment on the use of marijuana as a legal medication.

Based on the findings of my compiled research and the numerous gaps in their results, I have formulated the following recommendations for future research. These recommendations not only further the scant research of this important topic but suggest a way to shape research that is driven toward the goal of finding a legal use for marijuana to aid the graying population of our nation.

Directing Future Research

Based on the information gathered from the literature review above, it is evident that there are at least three major gaps in the current research on medical marijuana: (1) lack of a regulated dosage and potency of the drug, (2) small sample sizes for existing research groups, and (3) overall lack of extensive study on the effects or benefits. Using these three shortcomings as guides for future study, researchers can move forward toward the legalizing medical marijuana to aid the population group that has the most to benefit from it, older adults.

Establish dosage and potency. Wilkinson and D'Souza (2014) reported that for a drug to be deemed as medication, the ingredients in the medication need to be measurable

and consistent with each dose. This is arguably the biggest hurdle to clear before marijuana can be used as a legal medication. Researchers need to find a way to regulate the amount of THC in a single dose of marijuana. Not only would this meet the requirements for the FDA, it could also potentially facilitate more clinical trials. If there is an established dosage and form of marijuana for researchers to test consistently, the results may be viewed as more reliable and carry more weight. Establishing a consistent dosage could also aid in answering questions such as how much is safe for certain ages, how much is safe/helpful for certain ailments, how effective it is in comparison to other drugs. Once a baseline dosage is established, all of these questions can be more easily tested.

Expand sample sizes. Much of the existing research to date includes illness-specific studies with small sample sizes, and not many included participants over the age of 65. In order to produce more thorough and applicable results, researchers need to expand the sample sizes for their studies to include more individuals across a wider age range. Very few studies regarding medical marijuana had participants over the age of 65 years. This could be due to lack of willing participants, stigmas associated with older adults and marijuana, or researchers overlooking the older population as medical marijuana users. Involving more of the older population in studies could balance out data and bridge a gap to addressing further awareness on the benefits of medical marijuana on older adults. Much of the research on older adult's health appears to lack data on alternative forms of medication such as marijuana, but if older adults were to participate in research and become more informed about the benefits of medical marijuana specifically for illnesses they experience, this could easily change.

Build upon the small foundation of existing research. The information in the literature review above was gathered to address the potential health risks and benefits of

medicinal marijuana on older adults. However, I did not find a single article that addressed this topic specifically, the reason likely being that the topics of older adults and medical marijuana are both just gaining a lot interest now because of the baby boomers reaching older adulthood and medical marijuana being a more highly accepted form of medicine. As population aging continues, the pool of potential individuals who could benefit from medical marijuana will increase the demand for more discussion on this topic. With ever changing laws and views on both older adults and medicinal marijuana, it would be beneficial for further research on this specific topic to be conducted. Based on the existing research, older adults have the most to gain from medical marijuana. Many of the diseases where marijuana is used as treatment are more prevalent in older adults or get worse as the individual ages.

Future research has the potential to further raise awareness and get more people talking about the benefits of medical marijuana for a variety of illnesses and diseases. The American Medical Association states that it would support changing the use of cannabis from a schedule I drug if doing so would facilitate further research and development on cannabinoid-based medicine (Johanningman & Eschiti, 2013). If more researchers pursue practical research involving medical marijuana as it pertains to older adults, it is more likely that policy will follow suit. As stated earlier, many physicians and advanced practice nurses (APNs) say they would recommend and prescribe marijuana use more if it was legalized (Johanningman & Eschiti, 2013). As the topic of marijuana becomes more prevalent in American society, the stigma associated with medical marijuana can be counteracted by legitimate research aiming to legalize the drug. Pursuing further research into medical marijuana could have the power to eliminate stigmas about using medical marijuana and

prove that it can be used as more than just a recreational drug and aid a large percentage of the population as they enter old age.

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