

Marijuana Use: The Cause or the Result of Mental Illness?



Presented by: Steve Crenshaw, PharmD

Disclaimer

- ▣ I have no relevant financial relationships or commercial interests to disclose in conjunction with this presentation

Objectives

1. Review the traditional and current role of marijuana
2. Identify adverse effects and potential drug interactions that may occur with the use of marijuana
3. Discuss the impact of marijuana use on mental health by summarizing recent studies that have evaluated mental health and marijuana use

Marijuana

- ▣ Anciently¹
 - Religious and medicinal purposes
 - ▣ 2900 B.C.
 - Healing properties of marijuana identified
 - Treated malaria, constipation, rheumatic pains, gout, female disorders, and absentmindedness
 - ▣ 500 A.D.
 - Ancient text recommends marijuana for over 100 ailments
 - Inflammation, cough, cramps, insomnia, arthritis, gout, epilepsy, and venereal disease, etc.

Marijuana

- ▣ Other historical uses¹
 - Textiles
 - Fabric, paper, clothing, and rope



Image available at: www.regulatemarijuana.org/hemp

Marijuana

- ▣ Today²
 - Medical marijuana currently legalized for use in 18 states and the District of Columbia
 - Used for cancer, cachexia, chronic pain, epilepsy, glaucoma, HIV/AIDS, multiple sclerosis, nausea, others



Image available at: www.foxnews.com/health

Marijuana

- ▣ Prescription products that mimic effects of marijuana
 - Dronabinol⁷
 - Mechanism of action
 - Unknown, but thought to affect the same receptors and endorphins as marijuana
 - FDA approved uses
 - Antiemetic
 - Appetite stimulant (AIDS-related)
 - Schedule
 - C III

Idaho's marijuana use policy

- ▣ Idaho Compassionate Use Marijuana Act²
 - Introduced by Representative Tom Trail (R-Moscow)
 - Received committee hearing, but no vote
 - August 2011
 - Boise State University Public Policy Poll found that 74% of Idaho residents support medical access to marijuana



Image available at: www.mass.gov

Prevalence of marijuana use

- ▣ Most commonly used illicit drug in the U.S.³
 - Over 40% of Americans >12 years of age have used marijuana
 - 16.7 million Americans smoke it on a regular basis
 - Estimated that an arrest due to marijuana use occurs every 45 seconds in the U.S.
- ▣ Age³
 - Use most common between ages 18-25 years
 - Rarely occurs < 12 years of age

Prevalence of use

- ▣ Gender
 - Males > females
- ▣ Ethnicity
 - African-Americans > Caucasians > Hispanics
- ▣ Education
 - College graduates less likely to use marijuana

Mechanism of marijuana

- ▣ Marijuana contents¹
 - Contains 480 substances; 66 cannabinoids
- ▣ Primary psychoactive component¹
 - Delta-9-Tetrahydrocannabinol (THC)
 - Absorbed orally or through inhalation
 - Then distributed rapidly throughout the body
 - Acts primarily on the Central Nervous System (CNS)

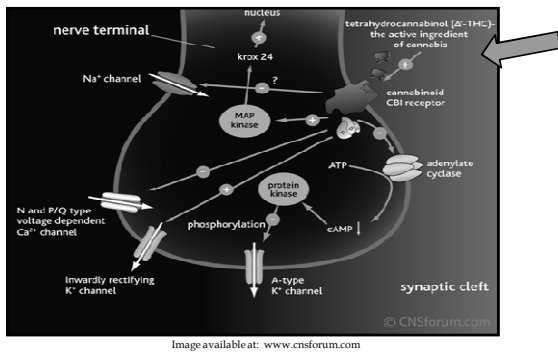


Image available at: www.spreadshirt.com

Mechanism of marijuana

- ▣ THC¹
 - Binds to the CB1 receptor
 - Primary cannabinoid receptor in the central nervous system (CNS)
 - THC + CB1 → inhibits the release of neurotransmitters essential for memory, cognition, and motor function (i.e. psychomotor impairment)

Mechanism of marijuana



Adverse effects

Cardiovascular effects¹

- Arrhythmia
- Acute myocardial infarction
- Hypertension
- Hypotension



Image available at: www.healthimaging.com

Adverse effects

- ▣ Cancers¹
 - Lung, head, and neck cancers
 - Some researchers state "smoking 3-4 cannabis cigarettes a day is associated with the same degree of damage to bronchial mucus membranes as 20 or more tobacco cigarettes a day"

Adverse effects

- ▣ Pulmonary function¹
 - Cannabis smoke
 - Contains many of the same combusted particles found in tobacco smoke
 - Contains 3 times the amount of tar found in tobacco smoke and 50-70% more carcinogens
 - Because marijuana is hand rolled to be smoked, there is no filter to limit the amount of smoke inhaled deeply
 - Associated with cough, sputum production, wheezing, bronchitis, and exacerbation of asthma and cystic fibrosis

Adverse effects

- ▣ CNS effects¹
 - Dry mouth
 - Nightmares/insomnia
 - Dizziness
 - Seizures
 - Believed to have both pro- and anticonvulsant effects
- ▣ Long-term CNS effects^{4,5,6}
 - Discussed momentarily.....

Drug interactions

- ▣ Marijuana interacts with a variety of drugs¹:
 - Opioids
 - Barbiturates
 - CNS depressants
 - Protease inhibitors
 - SSRIs
 - TCAs
 - Anticholinergics
 - Alpha-agonists
 - Lithium
 - Etc.

Now the question of the day?

- ▣ Does marijuana use cause mental illness or does having a mental illness lead to use of marijuana?



Image available at: www.culpwrit.com

Marijuana and mental illness

- ▣ **Is marijuana use a risk factor for mental illness?**
 - U.S. studies^{4,5}
 - Mood disorders occur in **61%** of individuals dependent on cannabis and **36%** of those who abuse cannabis
 - Anxiety disorders occur in **46%** of individuals dependent on cannabis and **26%** of those who abuse cannabis



Image available at: integral.options.blogspot.com

Marijuana and mental illness

- ▣ Swedish study⁴
 - Over 50,000 Swedish conscripts followed for 15 years
 - Use of cannabis during adolescence increased the risk of schizophrenia in a dose-response relation
- ▣ Dutch cohort⁴
 - 4,045 people free of psychosis and 59 baseline diagnosis of psychotic disorder
 - Strong association between use of cannabis and psychosis
 - Length of exposure to cannabis predicted the severity of the psychosis
 - Worse outcome of those who showed psychotic symptoms at baseline and used cannabis

Marijuana and mental illness

- ▣ New Zealand cohort⁴
 - Individuals who used cannabis ≥ 3 times by age 15 or 18 showed an increase in "schizophrenia symptoms"
 - Use of cannabis ≥ 3 times by age 18 increased the likelihood of having a depressive disorder at age 26
- ▣ Australian study⁴
 - Large cohort of 14-15 year olds followed for 7 years
 - Dose-effect relation between the use of cannabis and anxiety or depression

Marijuana and mental illness

- ▣ U.S. study⁵
 - 1,920 adults followed for 15 years
 - Fourfold increased risk of major depression with use of cannabis
 - Cannabis specifically linked to an increase suicidal ideation and anhedonia
- ▣ Meta-analysis of 83 observational studies⁶
 - Onset of psychosis (schizophrenia-related illness) occurred significantly earlier (2.7 years) in patients who used cannabis when compared with non-users

Marijuana and mental illness

- ▣ Are the studies valid?
 - Drug users often use >1 drug recreationally
 - Difficult to establish cannabis as the trigger for psychosis



Image available at: blogs.seattleweekly.com

- Assessments are based on subjective responses

Marijuana and mental illness

- ▣ To date
 - Significance of marijuana use being a risk factor for mental illness **remains controversial** and a causative role has not been proven
 - Certain studies have reported negative symptom reduction in patients dependant on cannabis



Image available at: www.123rf.com

Marijuana and mental illness

- ▣ **Is mental illness a risk factor for using marijuana?**
 - According to studies, mental disorders place individuals at risk for substance abuse and dependence
 - More frequent use has been seen in patients with mental illness than in the general population



Image available at: www.askmen.com

Marijuana and mental illness

- ▣ **Prevalence of cannabis use with specific illnesses**

Disorder	Prevalence of cannabis use
Schizophrenia	31%
Mania	30%
Dysthymia	22%
Hypomania	21%
Major depression	16%
Panic disorder with agoraphobia	26%
Generalized anxiety disorder	19%

Marijuana and mental illness

- ▣ **Hambrecht & Hafner⁴**
 - Evaluated 232 first-episode schizophrenia patients
 - Discovered that the first symptoms of schizophrenia were more often followed than preceded by the use of illicit drugs (cannabis being the most frequently used drug)
- ▣ **Netherlands “Zuid Holland” study (2005)⁴**
 - 14-year follow-up study assessing if psychotic symptoms are a risk factor for future cannabis use
 - Investigators confirmed that individuals with psychotic symptoms have a greater tendency to self-medicate with cannabis

Marijuana and mental illness

- ▣ Are the studies valid?
 - Self-medication hypothesis
 - Suggests individuals abuse alcohol or specific drugs to cope with deficits related to their mental disorder
 - Examples: using alcohol to overcome insomnia from hypomania or PTSD **OR**
 - Using cocaine to relieve dysphoria related to major depression
- ▣ Studies **unable to find patterns** of selective drug use to reflect individual mental disorders

Long-term effects

- ▣ Psychotic disorders^{4,5,6}
 - Evidence indicates that cannabis use causes psychosis beyond transient intoxication
 - Neurochemical studies suggested cannabis use may cause psychosis through its effects on dopamine release

Long-term effects

- ▣ Amotivational syndrome⁶
 - Chronic complacency, passivity, aimless drifting, introversion, apathy, and lack of motivation and productivity has been attributed to the long-term use of marijuana
 - One case-control evaluated individuals who used cannabis $\geq 5,000$ times vs. controls⁶
 - Cannabis users were less likely to graduate college when compared to the controls (44% vs. 78% respectively)
 - Cannabis users were less likely to earn $\geq \$30,000$ /year compared to controls (49% vs. 74% respectively)

Long-term effects

- ▣ Neuropsychological⁶
 - Minimal and **conflicting evidence** associated with long-term CNS effects and cannabis use
 - Meta-analysis of >600 cannabis users found no evidence of long-term effects on neurocognitive processes
 - 56 tests used to assess the domains of general intelligence, attention, memory, executive functioning, and motor skills found cannabis users perform significantly worse when compared to non-users

Conclusion

- ▣ Marijuana has been around for centuries
 - Historically used for healing and making various textiles
- ▣ Medicinal marijuana has gained significant attention recently
 - Currently legalized in 18 states and the District of Columbia
 - Chronic pain is the most frequent reason patients use medical marijuana

Conclusion

- ▣ There are many serious adverse effects associated with marijuana use
 - Cardiovascular
 - Pulmonary
 - Cancer
 - Mental disorders
 - Etc.

Conclusion

- ▣ Associations between marijuana use and mental health remains controversial
 - Marijuana thought to contribute to certain mental disorders

AND

 - Mental disorders are a known risk factor that lead to marijuana use
- ▣ More studies
 - More studies needed to help clarify the overall association between marijuana and mental health association

Questions?



References

1. Natural Medicines Clinical Database. Available at: <http://naturaldatabase.therapeuticresearch.com>. Keywords: Marijuana. Accessed February 15, 2013.
2. Medical Marijuana website. Available at: medicalmarijuana.procon.org. Keywords: Medical Marijuana. Accessed February 17, 2013.
3. WHO Cannabis website. Available at: www.who.int. Keywords: Marijuana Epidemiology. Accessed February 25, 2013.
4. Ferdinand RF, Sandoijker, F, et al. Cannabis use predicts future psychotic symptoms, and vice versa. *Addiction*. 2005;100:612-618.
5. Fergusson DM, Horwood JL, Ridder EM. Tests of causal linkages between cannabis use and psychotic symptoms. *Addiction*. 2004;100:354-366.
6. Rey JM, Tennant CC. Cannabis and mental health. *BMJ*. 2002;325:1183-1184.
7. Lexicomp website. Available at: www.lexi.com. Keywords: Dronabinol. Accessed March 3, 2013.