THE IMPACT OF MARIJUANA ON HEALTH AND HEALTHCARE

Ewald Horwath, MD, MS, FAPA
Professor and Chair, Department of Psychiatry
Director, Mental Health Center
Associate Clinical Director,
Family Care Service Line
The MetroHealth System
Case Western Reserve University
THE POTENTIAL IMPACT OF MARIJUANA LEGALIZATION
OVERVIEW: EFFECTS OF MARIJUANA ON HEALTH

I. Effect of marijuana on mental health
II. Medical risks associated with marijuana
III. Effects of marijuana on adolescent health
IV. Effect of marijuana on cognition and motor function
V. Risk of marijuana abuse and dependence
VI. Medical marijuana for the treatment of common medical and psychiatric disorders
EFFECT OF MARIJUANA ON MENTAL HEALTH

I. INCREASED RISK OF PSYCHOSIS
   • Chronic cannabis use increases risk of psychosis (Schiz Research 2012)
   • Frequent cannabis use doubles the risk of psychosis (Addict Biol 2008)

II. INCREASED RISK OF MOOD & ANXIETY DISORDERS
   • Regular cannabis use predicts the development of:
     • bipolar disorder
     • panic disorder
     • social phobia (J Psychiatric Res 2015)
EFFECT OF MARIJUANA ON MENTAL HEALTH

• AMOTIVATIONAL SYNDROME
  • Loss of interest in school or work success
• ALTERATION OF TIME PERCEPTION
• HALLUCINATIONS
• ANXIETY
• DEPRESSION
PHYSIOLOGIC EFFECTS OF MARIJUANA

- Increased appetite (munchies)
- Weight gain
- Injected conjunctiva
- Chronic cough
- Sinusitis, pharyngitis
- Increase in heart rate

I don't get why weed is still considered criminal. When I smoke it the only thing I'm a threat to is a cake.

facebook.com/theweedscene
ADVERSE HEALTH EFFECTS OF MARIJUANA

• Increased infertility
• Increased burn injuries
• Increased ER visits
• Unintended ingestion of edible THC products by infants & children
MARIJUANA AND MALE REPRODUCTIVE HEALTH

- Study of 1,215 young Danish men, ages 18-28 years, pre-induction medical exams
- 45% had smoked MJ within 3 months
- Regular MJ smoking (> 1/week) associated with 28% lower sperm concentration and 29% lower sperm count

MARIJUANA AND INFERTILITY

• 15% of couples in U.S. are unable to conceive after 1 year and are labeled infertile
• 17 million MJ users in U.S.
• 4.6 million use MJ almost daily
• MJ plays role in disrupting spermatogenesis, sperm function (motility, capacitation)
• Du Plessis, Agarwal, Syriac J Assist Reprod Genet 2015 Aug 16
MARIJUANA AND BURN INJURIES

• Substantial increase in # of MJ-related burn injuries at U of Colorado Burn Center following legalization
• Past 2 years, 31 admissions for MJ-related burns, some cases with >70% body surface area and 21 required skin grafts
• Majority are flash burns that occurred during THC extraction from MJ plants using butane as a solvent

• JAMA 2015;313(3):241-242
MARIJUANA AND INCREASED ER VISITS

• Increased # of ED visits for pure MJ intoxication
• Patients present with anxiety, panic attacks, public intoxication, vomiting or other symptoms related to MJ use
• U of Colorado ED:
  • 1-2 cases/week solely for MJ intoxication
  • 10-15 cases/week for MJ-associated illness
• JAMA 2015;313(3):241-242
INGESTION OF EDIBLE THC PRODUCTS BY INFANTS & CHILDREN

• Number of children evaluated for unintended ingestion of edible THC products increased dramatically at Children’s Hospital of Colorado
  • 0 cases in 5 years preceding liberalization
  • 14 cases in 2 years after medical MJ liberalization
  • 14 cases from Jan-Sept 2014 after legalization
    • 7 cases admitted to ICU  *JAMA* 2015;313(3):241-242

• Case of a 10-month old infant with drowsiness, hypotonia, restlessness  *(Arch Pediatr 2012)*
ADVERSE EFFECTS OF MARIJUANA ON ADOLESCENTS

• Chronic use may cause structural brain changes
• Increased risk of psychosis (including onset of schizophrenia), anxiety & depression
• Increased risk of drug dependence as an adult
• Increased risky behavior
EFFECTS OF CANNABIS USE ON THE BRAIN

- THC interacts with cannabinoid receptors in the brain:
  - basal ganglia
  - cerebellum
  - cerebral cortex
  - hippocampus
  - amygdala

- These brain regions are consistent with MJ’s effects on:
  - motor function
  - cognition
  - emotional regulation
LONG-TERM EFFECTS OF CANNABIS USE DURING ADOLESCENCE

• Chronic MJ use before age 17 is associated with deficits in:
  • working memory, attention, impulsivity
  • decision-making, executive functioning
  • overall and verbal IQ

• The magnitude of these deficits is proportional to:
  • frequency
  • dose
  • age of onset of use
LONG-TERM EFFECTS OF CANNABIS USE DURING ADOLESCENCE

• Heavy MJ use at ages 15 – 18 is associated with

  4 – 6 fold increased risk of onset of schizophrenia at ages 26 – 33

• MJ use during adolescence can double the risk of anxiety disorder in adulthood:

  • risk is greater for onset of use at < 15 years of age
  • risk is greater for girls than boys

• MJ use between ages 13 – 17 years is associated with 3-fold increased risk of depressive disorder during adulthood.
EFFECTS OF MEDICAL MARIJUANA LAWS ON CANNABIS USE IN ADOLESCENTS

- Medical MJ approved in Colorado in 2000
- In 2009, federal policy shift & loosening of Colorado restrictions on cultivation & distribution led to 6-fold increase in # of valid medical MJ registry ID cards
- As of October 2011, 2.3% of Colorado adults had medical MJ ID

*J Am Acad Child Adolesc Psychiatry* 2012 July
EFFECTS OF MEDICAL MARIJUANA LAWS ON CANNABIS USE IN ADOLESCENTS

• 74% of adolescents in drug treatment program in Colorado had used an adult’s medical MJ
  • a median of 50 times
• adolescents who used medical MJ had:
  • earlier age of regular MJ use
  • more MJ abuse & dependence
  • more conduct disorder symptoms

•CONCLUSION: There is substantial diversion of medical MJ from registered adult users to adolescents.
EFFECTS OF MEDICAL MARIJUANA LAWS ON CANNABIS USE IN ADOLESCENTS

• Longitudinal data from NSDUH

(National Survey on Drug Use and Health; 50 states; 2002 to 2011)

• CONCLUSION: medical MJ laws amplify recreational juvenile MJ use by:
  • allaying social stigma of juvenile MJ use
  • placating fear that MJ use causes negative health effects

Int J Drug Policy 2015 June 6
MEDICAL MARIJUANA FOR THE TREATMENT OF COMMON MEDICAL AND PSYCHIATRIC DISORDERS

What is the Scientific Evidence?

Potential Therapeutic Uses of Medical Marijuana
MEDICAL MARIJUANA FOR THE TREATMENT OF COMMON MEDICAL AND PSYCHIATRIC DISORDERS

• Systematic review of the benefits and adverse effects of MJ
• Review & analysis of 79 RCTs of cannabinoids for:
  • N & V due to chemotherapy
  • appetite stimulation in HIV/AIDS
  • chronic pain
  • spasticity due to MS or paraplegia
  • psychosis, depression, anxiety, sleep disorder
  • glaucoma, Tourette syndrome

JAMA June 2015
CONCLUSIONS:

Moderate-quality evidence to support use of CBDs:
- chronic pain
- spasticity due to MS

Low-quality evidence to support use of CBDs:
- N&V due to chemotherapy
- weight gain in HIV
- sleep disorders, Tourette syndrome

Common adverse effects: dizziness, dry mouth, drowsiness, confusion, loss of balance, hallucinations
EFFECTS OF LEGALIZING MEDICAL MARIJUANA

• What is “medical marijuana”? State law that permits dispensing of MJ in regulated sites to registered adults with a physician’s certificate.

• Columbia study: NESARC (National Epidemiologic Survey on Alcohol and Related Conditions)

• Residents in states with medical MJ laws:
  • higher risk of MJ use
  • higher risk of MJ abuse & dependence

*Drug Alcohol Depend* 2012 Jan 1
MEDICAL MARIJUANA IN THE WORKPLACE

Medical marijuana availability:
- increased absenteeism
- increased presenteeism

High potency MJ consistently impairs executive function and motor control for > 6 hours after smoking

Acute MJ consumption is associated with increased risk of MVA

Philadelphia (2013): MJ was key contributor to a heavy machinery accident that caused 6 deaths
MEDICAL MARIJUANA IN THE WORKPLACE

**CHALLENGES:**

- Maintaining a drug-free workplace
- Appropriate standards? Blood THC level > 5 ng/ml (used as legal limit for MV operation in states where MJ is legal)
- Level < 5 ng/ml does not mean lack of impairment
1. MJ use is associated with increased risk of psychiatric disorders.
2. MJ use is associated with increased risk of infertility, burn injuries, ED visits.
3. MJ use is associated with long-term effects on the mental health of adolescents, including > double risk of schizophrenia.
4. Long-term risks of MJ use in adolescents are increased by early age of onset, frequency and dosage.
5. Medical MJ and MJ legalization are associated with increased MJ use, abuse and dependence.

6. MJ use is associated with acute executive & cognitive impairment, and with increased risk of MVA and workplace accidents.

7. High quality scientific evidence of the effectiveness of medical MJ is limited to improvement in chronic pain and in spasticity in MS.