Demystifying Marijuana Dependence in Youth

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Learning Objectives

1. Describe cannabis dependence and vulnerability in youth
2. Distinguish between cannabis myths and facts
3. Recognize cannabis related problems and association with mental disorders
4. Evaluate the need and direct treatment for cannabis dependence in youth
Legend

Substance Use Disorders = SUD
Cannabis Use Disorders = CUD
Marijuana is no big problem – everyone uses it
EPIDEMIOLOGY

- Substance use has moved into the mainstream adolescent population and to younger age groups.

- Cannabis is the most common substance of daily use by adolescents (5-6% of senior high school students vs. alcohol at 2.5-3%).
EPIDEMIOLOGY


- 20-25% of adolescents met criteria for a lifetime mental disorder with severe impairment
- Comorbidity was common (40%) in adolescents with mental disorders
- Median age of onset for SUD~ 15 years with steep increase thereafter
EPIDEMIOLOGY

- Lifetime Prevalence:
  - Substance Use Disorders: 11.4%
  - Drug abuse/dependence: 8.9%
  - Alcohol abuse/dependence: 6.4%

- Somewhat more prevalent in males 12.5% than females 10.2%
EPIDEMIOLOGY

- Prevalence of use increases with grade level
- Perceived risk has declined over time
- Cannabis is the most common substance of dependence in youth
In comparison to disorders with severe impairment:

- Depressive Disorders 8.7%
- Anxiety Disorders 8.3%
- ADHD 4.3%
EPIDEMIOLOGY

- Gradual but notable increase of CUD in young adults (ages 18-25) over the last decade
- CUD ~ 4% in those 12 years or older (US)
- Onset after 30 is rare
ETIOLOGY

- Adolescence from a developmental perspective may be a unique period of heightened susceptibility for SUD.

- Convergence of major psychosocial challenges (stresses) and maturational neurodevelopmental brain changes in adolescence may enhance their vulnerability to the effects of substance use.
DEVELOPMENT AND COURSE

- Adolescence is a period of major risk for the onset of SUD.

- In general peak age of onset for SUD is between ages 18-20.

- However, the peak age of onset for CUD is 16-18 years.
DEVELOPMENT AND COURSE

Marijuana has been identified as a gateway drug.

Early initiation of substance use (<15y.o.) has been shown to increase the risk for:

- Continued use and subsequent daily use.
- Other SUD in adulthood apart from cannabis.
DEVELOPMENT AND COURSE

- Weekly cannabis use marks a threshold for increased risk of later dependence.

- Youth who report positive reactions or preference to early use of cannabis are at increased risk of later cannabis dependence.
Negative consequences of CUD in youth are well established and include:

- Disruption of adolescent developmental tasks
- Education and employment
- Family and community role responsibilities
You can’t get hooked on marijuana
CANNABIS DEPENDENCE

Chronic heavy use of cannabis may be associated with both psychological and physiological dependence as indicated by drug craving, compulsive use, tolerance and withdrawal.
CB1 receptors have been identified in the brain

Presence of endogenous ligands or Endocannabinoids has been established

Active ingredient/metabolite of marijuana is THC
There are many derivatives of THC
CB1 receptor distribution mirrors effects of THC
Cannabis modulates mood and possesses euphoric properties, mediated by its effect on CB1 receptors.

Evidence suggests that marijuana interacts with the endogenous opioid system in the brain.
How cannabis gets to work on our brains

Frontal cortex—decision making, social skills, high-level consciousness. Rich in receptors. Drug’s action here crucial to euphoria and dreamy feeling.

Hippocampus—information storage and retrieval. Drug’s ability to suppress cell firing here may explain short-term effects on memory.

Basal ganglia—movements and postural control. Rich in receptors.

Cerebellum—movements. Rich in receptors. Drug’s action here explain effects on coordination.

Nucleus accumbens—part of a “reward pathway” regarded by some as a key player in addiction. Cannabis’s action here is controversial.

Brain stem—basic bodily functions. Cannabis’s lack of effect here explains why even high doses are not life-threatening.
NEUROBIOLOGICAL HIGHER DOSE ADVERSE EFFECTS

- Acute panic reactions or mild paranoia have been observed.
- May also lead to an acute toxic psychosis accompanied by loss of insight.
  - Cannabis-induced psychotic disorder (CIPD) is an infrequent event estimated at 2.7 per 100,000 person-years.
Heavy and frequent marijuana use (daily use in past 30 days) is associated with significantly greater impairment than light use (1-9 days of use in past 30 days) on attentional and executive functions.

Short-term/working memory impairment may persist for some time on neuropsychological testing (up to 3 months).
Solid evidence that persistent regular cannabis use (4 day/week) and/or dependence in adolescence is associated with broad based neuropsychological decline in adulthood.

Greater the duration of use the greater the decline
NEUROPSYCHOLOGICAL ADVERSE EFFECTS

Cont’d

- Negative impact on functioning
- Cessation of cannabis did not fully restore neuropsychological profile
- Even after controlling for years of education

Meier et al, 2012
therapeutic effects

- bronchodilation
- antiemetic effect
- appetite stimulation
- analgesia
- decreased intraocular pressure
- decreased spasticity/ataxia/muscle weakness
- glaucoma
- multiple sclerosis, cerebral palsy, spinal cord injuries
- cancer pain, post-operative pain, phantom limb pain

- bronchial asthma
- prevention of nausea/vomiting caused by anticancer drugs
- palliative care for anorexia caused by opioids, antiviral drugs, AIDS-related illnesses or terminal cancer

therapeutic use
PHARMACOLOGY OF CANNABIS

- The cannabis used today has a significantly higher THC content and is much more potent than the cannabis used in the late 1960's and 70's.

- Currently a good quality marijuana cigarette contains 10-15% THC (active metabolite).
CANNABIS DEPENDENCE

- Both American and Australian studies have concluded that approximately 9% of those people who ever used marijuana will qualify for a lifetime diagnosis of marijuana dependence.

- The risk of developing cannabis dependence may be as high as 20-30% among those people who used marijuana more than a few times.
CANNABIS DEPENDENCE

- In adults, patterns of use have been found to be stable with a high rate of dependence but few recognized that they had a cannabis problem.

- Mean duration of cannabis:
  - Abuse 35 months
  - Dependence 44.3 months
Rates of cannabis dependence in the U.S. among those who used cannabis within the last year have been found to be greater in adolescents than adults.

Rates being similar for females and males in adolescence and significantly higher for males than females in adulthood.
CANNABIS WITHDRAWAL IN ADOLESCENTS

- Cannabis withdrawal is common showing a similar time course and symptoms
- Cannabis withdrawal increases risk of relapse
- Cannabis withdrawal appears to be an indicator of dependence severity and predictor of a more chronic course
Marijuana helps me cope
COMORBIDITY

➢ Weekly or more frequent use of marijuana doubles an adolescent’s risk of depression and anxiety

➢ Marijuana use is associated with and may worsen depression in adolescents
COMORBIDITY

- Depressed adolescents are 2X more likely to abuse or become dependent on marijuana.

- Frequent cannabis use in adolescence increases the risk for depression and anxiety, especially in young women.
COMORBIDITY

- Substance use (1° marijuana) has a negative impact on treatment response in adolescent MDD

- SUD significantly adds to the burden of youth mental disorders with evidence of poor treatment response and clinical outcomes
CUD AND PSYCHOSIS

- Growing body of evidence to support cannabis use increases risk of psychotic outcome and clinically relevant psychotic disorders controlling for confounding factors.

- Increased risk of psychosis:
  - 40% for ever used cannabis
  - 50-200% for used cannabis most frequently
CUD AND PSYCHOSIS

- Similar significant relationship for cannabis use as an independent risk factor for development of schizophrenia in adulthood

- 2-3 X greater risk of developing schizophrenia
CUD AND PSYCHOSIS

- Risk for psychotic outcomes/disorders increases in dose dependent manner (severity) and greater with onset of use in adolescence (duration)

- Preliminary findings suggest a link between higher potency cannabis and development of first episode psychosis
Evidence, however, to date doesn’t support a causal link between cannabis use and schizophrenia.

Nonetheless, there is now sufficient evidence to warn young people that cannabis use may increase their risk for developing a psychotic disorder in adulthood.
CUD AND PSYCHOSIS

- Converging epidemiological and clinical evidence to show:
  - CIPD not a random event or benign condition.
  - Drug induced psychotic disorder represents a cogent vulnerability marker for development of schizophrenia.

- Clinical follow-up of CIPD is warranted.
I can stop whenever I want to
TREATMENT

- Majority of individuals with CUD have not received treatment

- However the number of adolescents and adults receiving treatment for CUD almost doubled in the last decade

- CUD is the most common reason for which adolescents seek SUD treatment
There have been significant advances in evidence based psychosocial treatments specific for adolescent SUD.

These include developmentally appropriate:

- Family Therapy Modalities
- Cognitive Behavioural Therapy (CBT)
Motivational Enhancement Therapy (MET) has been incorporated into psychosocial treatments for SUD.

The addition of contingency management have shown promise in the treatment of CUD in youth.
CANNABIS YOUTH TREATMENT (CYT) STUDY
Dennis et al, 2004

- RCT of treatment modalities
- Multisite 1 year study
- N=600 with CUD
- Comorbid sample: 33% Internalizing & 60% Externalizing disorders
CYT STUDY 2004

Trial 1:
- MET/CBT 5 sessions
- MET/CBT 12 sessions
- FSN: Family Support Network includes MET/CBT 12 + engagement type case management, family support groups and aftercare
CYT STUDY 2004

Trial 2:

- MET/CBT 5
- ACRA: Adolescent Community Reinforcement Approach
  - 10 individual sessions
  - 4 sessions with caregivers
  - Focus to rearrange environmental contingencies
- MDFT: Multidimensional Family Therapy
  - 12 weeks (12-15 sessions)
CYT STUDY 2004

- Promising findings
  - Treatment improvements
    i. in days of abstinence
    ii. percent in recovery/remission (range 17 to 34%)
- No clear advantage to any of the 5 treatments
Promising findings

- Although treatments were effective and treatment effect was sustained at follow-up
  - 2/3 of the CYT youths were still reporting substance use related problems at 1 year post-treatment
  - Relapse rates were high
TREATMENT

Pharmacotherapy, Gray et al 2012

- RCT (N=116) of N-acetylcysteine (NAC) in youth (ages 15-21) with cannabis dependence
- NAC 1200mg bid
- Contingency management & brief weekly cessation counselling
TREATMENT

Results

- NAC group 2X more likely of having negative urine cannabinoid results during treatment (primary outcome measure)
- Findings suggest NAC may be an effective complement to psychosocial treatment for Cannabis Dependence in adolescents
MARIJUANA AS MEDICINE

Position Paper of American Psychiatric Association (Dec 2013)

Key Clinical Points

- No current scientific evidence that marijuana is beneficial for the treatment of any psychiatric disorder
- Current evidence supports a strong association of cannabis use with the onset of psychiatric disorders
- Adolescents are particularly vulnerable to harm
- Further research needed
A FEW SELECTED REFERENCES


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REVIEW REFERENCES

