The Adverse Health Effects of Cannabis

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Assessing the Effects of Cannabis Use

We require evidence:
• of associations between cannabis use and adverse health outcomes
• from longitudinal studies
  • to ascertain which comes first and to
  • separate effects of cannabis use from those of:
    – other drug use (licit and illicit)
    – pre-existing user characteristics
• A consilience of evidence for a causal relationship
  • Biological plausibility: animal evidence
  • Clinical and laboratory evidence
Acute Adverse Health Effects

- No risk of fatal overdose (unlike opioids)
- Anxiety, dysphoria, panic, paranoia
  - especially among naive users
  - common reason for discontinuing use
- Cognitive and psychomotor impairment
- Psychotic symptoms in high doses
  - Is vulnerability required?
Accidental Injury

• Dose-related impaired performance on:
  • complex psychomotor tasks & simulated driving
  • Cannabis users more likely to report accidents

• Epidemiological studies of fatalities
  • measurement of recent cannabis use
  • larger studies in many more countries
  • better control for confounding effects of alcohol etc

• Meta-analyses of epidemiological studies
  • RR of accident ~ 2 among recent cannabis users
  • Risk larger if cannabis affected drivers also use alcohol

• Attributable risk
  • Smaller than alcohol (2.8% vs 28% in France in 2000s)
Psychosocial Effects of Chronic Use

• What do we mean by chronic cannabis use?
  • Daily or near daily use as proxy
  • Over months, very often years (mid teens to late 20s)
• What adverse effects are of most concern?
  • Dependence
  • Use of other illicit drugs
  • Educational under-achievement
  • Poor mental health
    – Psychoses
    – Anxiety, depression and bipolar disorder
    – Suicide
Cannabis Dependence

- Epidemiological studies
  - NCS 1 and 2: 4% lifetime
  - NSMWHB in Australia 1997, 2007: ~2% past year
- Many more users seeking help
  - in Australia, EU, USA and Netherlands
  - CUDs 2nd most common after alcohol in Australia
  - withdrawal symptoms are reported by these users
- Clinical trials of CBT for cannabis dependence
  - Difficult to achieve enduring abstinence
  - Outcomes very like alcohol dependence
Risks and Consequences of Cannabis Dependence

- Risks of developing dependence
  - 9% of lifetime users (NCS study in early 1990s)
  - 16% in adolescent initiators
  - 33-50% of daily users

- Health consequences:
  - respiratory symptoms
  - impaired memory and cognitive performance
  - Impaired work performance

- Social consequences:
  - Strong partner disapproval of use
  - Economic costs of heavy use
Cannabis as a Gateway Drug

• Common sequence of drug involvement
  • alcohol & tobacco preceded cannabis &
  • cannabis use preceded heroin & other drug use
  • risk higher in users who begin in mid teens & used > weekly
• Consistently found in prospective studies

• Partially explained by common causes:
  • Selective recruitment & genetic vulnerability
• Some support for causal roles for:
  • Peer affiliation & greater access via drug markets
• Pharmacological sensitization?
  • Suggestive animal evidence
Educational Performance

• Longitudinal studies in New Zealand & USA
  • cannabis use predicted school drop out
  • meta-analysis of 3 Australasian studies

• Poor school performers were:
  • more likely to use cannabis
  • affiliate with other cannabis-using peers

• Cannabis use probably has a small direct effect
  • associations persist after statistical adjustment
Cognitive Impairment

- Case control studies of cognitive impairment
  - More consistent findings in heavy long term users
  - Supportive findings in neuroimaging studies
- In Dunedin cohort an 8 point lower IQ in
  - early cannabis initiators
  - who used cannabis daily throughout 20s into 30s
  - not explained by social class or other confounders
- Still uncertain about
  - how reversible these effects are
  - the mechanism: intoxication, residual effect, toxicity?
Cannabis and Schizophrenia:

- Reasonable evidence that
  - cannabis use exacerbates schizophrenia
- Consistent evidence from prospective studies that:
  - cannabis use can precipitate schizophrenia
  - Five longitudinal studies in 3 countries
  - consistent RR ~ 2 and AR ~ 13%
- Biological plausibility
  - Cannabinoid-dopamine interaction
  - Provocation studies of THC and psychotic symptoms
- Comparative analysis of evidence
  - Better than for psychotogenic effects of stimulants & alcohol
Cannabis, Depression and Suicide

- Relationship with depression RR ~ 1.6 in
  - Cross sectional surveys
  - Longitudinal studies
- Correlated with higher suicide risk in some studies
  - Including prospective ones but limited power
- Uncertain how well these studies have
  - controlled for confounding
  - separated cause and effect
- Depression needs attention in cannabis dependent
Cannabis and other mental disorders

• Higher rates of cannabis use disorders in:
  • Bipolar disorder and anxiety disorders

• Cause and effect less clear:
  • Cross-sectional studies, often clinical populations
  • Few longitudinal studies
  • Self-medication still a plausible hypothesis

• Cannabis probably worsens outcomes so:
  • Should screen for cannabis disorders and treat
  • Screen cannabis dependent persons
Adverse Health Effects of Chronic Cannabis Use

• Use during pregnancy
  • Reproductive effects

• Longer term health risks
  – Daily use over decades
    • Respiratory risks
    • Cancer risks
    • Cardiovascular risks
Cardiovascular Risks

- THC a potent cardiovascular stimulant
  - Increases heart rate acutely and has complex effects on blood pressure

- Tolerance develops in regular young users but
  - Case reports of MI and strokes in young users

- Many more older cannabis users
  - Persisting use among baby boomers and medical use in older adults

- Case-crossover study of myocardial infarction
  - Doubling of MI risk in hours after smoking cannabis
  - Consistent with older provocation studies in MI patients

- Longitudinal study of mortality in MI patients
  - Higher CVD mortality in cannabis smokers
Cannabis Potency

• Further increases in THC content in USA
  • THC content now in teens for sinsemilla
  • Market for seeds producing higher THC

• Similar findings in Europe in 2000s
  • Markets catering to regular users who prefer higher THC

• Is increased THC accompanied by declining CBD?
  • Possible increased adverse effects Some laboratory evidence

• Still weak evidence for dose titration
  • Studies suggesting incomplete titration
  • Increased ER mentions of cannabis in USA
Potential Effects of Increased THC

• For occasional users:
  • more dysphoria & psychotic symptoms?
  • higher rates of discontinuation?
  • higher rates of accidental injury?

• For regular users:
  • lower respiratory risk, if users titrate dose
  • higher risk of dependence?
    – especially among adolescent initiators
  • more cognitive impairment?
  • More psychotic symptoms?
High Risk Groups

• Adolescents
  • who initiate use early (~ 15 years)
  • with poor school performance and conduct disorders
• Pregnant women and women planning pregnancy
• Persons with pre-existing conditions
  • cardiovascular disease and older adults
  • respiratory disease
  • psychosis and common mental disorders
  • alcohol & other types of drug dependence