

Diminished gray matter in the hippocampus of cannabis users: possible protective effects of cannabidiol

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Abstract

Background: Chronic cannabis use has been associated with memory deficits and a volume reduction of the hippocampus, but none of the studies accounted for different effects of tetrahydrocannabinol (THC) and cannabidiol (CBD).

Methods: Using a voxel-based morphometry approach optimised for small subcortical structures (DARTEL) gray matter (GM) concentration and volume of the hippocampus were measured in 11 chronic recreational cannabis users and 13 healthy controls, and correlated with THC and CBD from hair analyses. GM volume was calculated by modulating VBM using Jacobian determinants derived from the spatial normalisation.

Results: Cannabis users showed lower GM volume located in a cluster of the right anterior hippocampus (Puncorr = 0.002; effect size Cohen's $d = 1.34$). In a regression analysis an inverse correlation of the ratio THC/CBD with the volume of the right hippocampus (Puncorr $p < 0.001$, Cohen's $d = 3.43$) was observed. Furthermore cannabidiol correlated positively with GM concentration (unmodulated VBM data), but not with GM volume (modulated VBM) in the bilateral hippocampus (P = 0.03 after correction for hippocampal volume; left hippocampus Cohen's $d = 4.37$ and right hippocampus 4.65).

Conclusions: Lower volume in the right hippocampus in chronic cannabis users was corroborated. Higher THC and lower CBD was associated with this volume reduction indicating neurotoxic effects of THC and neuroprotective effects of CBD. This confirms existing preclinical and clinical results. As a possible mechanism the influence of cannabinoids on hippocampal neurogenesis is suggested.

Keywords: Cannabis, delta-9-tetrahydrocannabinol, THC, cannabidiol, hippocampus, voxel-based-morphometry, DARTEL.

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The impact of needle and syringe provision and opiate substitution therapy on the incidence of hepatitis C virus in injecting drug users: pooling of UK evidence

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Abstract

Aims: To investigate whether opiate substitution therapy (OST) and needle and syringe programmes (NSP) can reduce hepatitis C virus (HCV) transmission among injecting drug users (IDUs).

Design: Meta-analysis and pooled analysis, with logistic regression allowing adjustment for gender, injecting duration, crack injecting and homelessness.

Setting: Six UK sites (Birmingham, Bristol, Glasgow, Leeds, London and Wales), community recruitment.

Participants: A total of 2 986 IDUs surveyed during 2001–09.

Measurement: Questionnaire responses were used to define intervention categories for OST (on OST or not) and high NSP coverage (≥ 100 % versus <100 % needles per injection). The primary outcome was new HCV infection, measured as antibody seroconversion at follow-up or HCV antibody-negative/RNA-positive result in cross-sectional surveys.

Findings: Preliminary meta-analysis showed little evidence of heterogeneity between the studies on the effects of OST ($I^2 = 48$ %, $P = 0.09$) and NSP ($I^2 = 0$ %, $P = 0.75$), allowing data pooling. The analysis of both interventions included 919 subjects with 40 new HCV infections. Both receiving OST and high NSP coverage were associated with a reduction in new HCV infection [adjusted odds ratios (AORs) = 0.41, 95 % confidence interval (CI): 0.21–0.82 and 0.48, 95 % CI: 0.25–0.93, respectively]. Full harm reduction (on OST plus high NSP coverage) reduced the odds of new HCV infection by nearly 80 % (AOR = 0.21, 95 % CI: 0.08–0.52). Full harm reduction was associated with a reduction in self-reported needle sharing by 48 % (AOR 0.52, 95 % CI: 0.32–0.83) and mean injecting frequency by 20.8 injections per month (95 % CI: -27.3 to -14.4).

Conclusions: There is good evidence that uptake of opiate substitution therapy and high coverage of needle and syringe programmes can substantially reduce the risk of hepatitis C virus transmission among injecting drug users. Research is now required on whether the scaling-up of intervention exposure can reduce and limit hepatitis C virus prevalence in this population.

Keywords: HCV, methadone, needle and syringe programmes, opiate substitution treatment, primary prevention.

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Long-term effects of a community-based intervention: five year follow-up of 'Clubs against Drugs'

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Abstract

Aims: To evaluate long-term effects of a multi-component community-based club drug prevention programme.

Design: A pre- (2003) and post-intervention study (2004 and 2008) design.

Setting: High-risk licensed premises in central Stockholm, Sweden.

Participants: The intervention programme, 'Clubs against Drugs', included community mobilisation, drug-training for doormen and other staff, policy work, increased enforcement, environmental changes and media advocacy and public relations work.

Measurement: The indicator chosen for this study was the frequency of doormen intervention towards obviously drug-intoxicated guests at licensed premises. Professional male actors (i.e. pseudopatrons) were trained to act impaired by cocaine/amphetamines while trying to enter licensed premises with doormen. An expert panel standardised the scene of drug intoxication. Each attempt was monitored by two male observers.

Findings: At the follow-up study in 2008 the doormen intervened in 65.5 % of the attempts (n = 55), a significant improvement compared to 27.0 % (n = 48) at the first follow-up in 2004 and to 7.5 % (n = 40) at baseline in 2003.

Conclusion: The 'Clubs against Drugs' community-based intervention programme, a systems approach to prevention, appears to increase the frequency and effectiveness of club doormen's interventions regarding obviously drug-intoxicated guests.

Keywords: Club drugs, 'Clubs against Drugs', community prevention, licensed premises, policy, pseudopatrons, training.

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