Cannabis smoking and serum C-reactive protein: A quantile regressions approach based on NHANES 2005–2010

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Abstract

Background

Pre-clinical studies link cannabinoid-1 receptor activation to inflammation and atherosclerotic effects; anti-inflammation and immunosuppression seem to be mediated by cannabinoid-2 receptor activation. In this epidemiological study, we aim to present estimates on suspected cannabis-attributable immunomodulation as manifest in serum C-reactive protein (CRP) levels as non-specific inflammatory markers with interpretable clinical values. With strength of data from recent large nationally representative community sample surveys, the research approach illustrates value of a quantile regressions approach in lieu of the commonly used but relatively arbitrary cutpoints for CRP values.

Methods

The study population encompasses 20–59 year old participants from the National Health and Nutrition Examination Surveys, 2005–2010 (n = 1115 recently active cannabis smokers and 8041 non-smokers, identified via confidential Audio Computer Assisted Self-Interviews). Age, sex, race, education, income–poverty ratio, alcohol consumption, and tobacco smoking also were measured, together with body mass index (BMI), which actually might be on a mediational path. Quantile regressions, with bootstrapping for variance estimation, made it possible to hold these covariates constant while estimating cannabis-CRP associations.

Results

Evidence suggesting possible cannabis-attributable immunomodulation emerges at CRP levels below the median (p < 0.05). Whereas BMI might help explain a cannabis link with serum CRP, but BMI-stratified analyses disclosed no

Highlights

• We present estimates on cannabis smoking-attributable immunomodulation as manifest in serum CRP levels.
• Evidence suggesting cannabis-anti-inflammatory effects emerges at CRP levels below the median.
• Stratification by BMI disclosed no appreciable variation of the cannabis–CRP relationship.
Conclusions
Extending pre-clinical research on cannabis-attributable immunomodulation, this study's CRP evidence points toward possible anti-inflammatory effects of cannabis smoking. More definitive evidence can be derived by combining pre-clinical research, studies of patients, and epidemiological research approaches.

Abbreviations:
NHANES (National Health and Nutrition Examination Surveys), CRP (C-reactive protein), BMI (body mass index)

Keywords:
NHANES, CRP, Cannabis smoking, Inflammation, Immunomodulation