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TITLE:

Using Genetic Correlations and Polygenic Risk Prediction to Analyze Shared Genetics between Sleep Deficits and Cannabis Use Behaviors.

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Cannabis, Cannabis Use Disorder, Sleep Duration, Insomnia, Chronotype, Genetics.

ABSTRACT:

Increased cannabis frequency is associated with shorter sleep duration, increased rates of insomnia, and an eveningness chronotype. It is thought that the endocannabinoid system is involved in the regulation of sleep processes and that various sleep and circadian rhythm related genes are associated with cannabis use. We used summary statistics from the most recent European derived sleep and cannabis behavior GWAS to analyze genetic correlations between the domains of cannabis use and sleep deficits using Linkage Disequilibrium Score Regression (LDSC). We also generated polygenic risk scores (PRS) of sleep deficits to predict cannabis use traits in a self-identifying all-white target sample consisting of high-risk participants and participants from twin/family community-based studies ($n = 796$, male = 66%; mean age = 26.81). Using LDSC, we found significant genetic correlations between lifetime cannabis use and an eveningness chronotype ($r_G = 0.24$) as well as genetic correlations between cannabis use disorder and both short sleep duration ($r_G = 0.23$) and insomnia ($r_G = 0.20$). Controlling for sex, age, ancestral principal components (PCs 1-10), current depression symptoms, and past 180-day alcohol and tobacco use, an insomnia PRS predicted earlier age of first cannabis use ($\beta = -0.09$, $p = 0.02$) and increased lifetime CUD symptom count ($\beta = 0.07$, $p = 0.03$). Ultimately, we found evidence of shared genetics between sleep deficits and increased cannabis use behaviors, implying shared genetic risk and liability between these domains.

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