

TITLE: Digital daily life assessment to disentangle the associations between sleep, craving, and substance use in addiction

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Aims: Although sleep disturbances among patients with substance use disorders are frequent, few studies have explored the daily relationship between sleep impairment, craving and substance use. This study used Ecological Momentary Assessment (EMA) in patients beginning treatment for substance addiction, to assess the association between sleep disturbances, craving and substance use.

Methods: Participants were recruited from an outpatient addiction clinic. Thanks to a dedicated smartphone app, craving intensity, primary substance use and fatigue were assessed in real time with four daily assessments during their first two weeks of treatment. Sleep characteristics were assessed each morning during the same period. Multilevel mixed models examined both same-day and prospective bi-directional associations between sleep disturbances, fatigue, craving intensity and primary substance use. Analyses were adjusted on age, sex, and week/week-end days.

Results: 257 participants (60 % males, 39 y.o.) were recruited and primary substance was alcohol (n=94), tobacco (n=64), cannabis (n=47), opiates (n=36), and stimulants (n=16). Fatigue was positively correlated to craving and substance use the same-day, and the fatigue effect on substance use was mediated by craving. Sleep duration during the night was inversely correlated with next-day craving ($\beta = -0.04$, $p = 0.042$) and substance use ($\beta = -0.01$, $p = 0.03$). Insomnia symptoms were associated with higher craving the next day ($\beta = 0.17$, $p = 0.02$). These effects were not totally mediated by fatigue. Craving/substance use during the day were not found predictive of sleep duration or insomnia symptoms the night after.

Conclusions: Among people initiating addiction treatment, poorer sleep quality during the night is associated with greater craving the day after, potentially leading to an increased risk of relapse and reduced response to treatment. Further studies should explore these relationships among participants at different treatment stages.

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