

# The effect of N-acetyl cysteine on alcohol cue reactivity in alcohol use disorder: A randomized, placebo-controlled pharmaco-fMRI study

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## Introduction

N-acetyl cysteine (NAC) is an emerging potential pharmacotherapy for alcohol use disorder. We assessed whether NAC attenuated subjective craving and reduced alcohol cue-induced brain activation during a fMRI visual alcohol cue reactivity task in treatment-seeking alcohol dependent individuals compared to those taking placebo.

## Method:

Twenty-three alcohol dependent participants received NAC (2400 mg/day, n = 9) or placebo (n = 14) for 4 weeks. They completed a visual fMRI alcohol cue reactivity task at baseline prior to treatment commencement, and again during treatment, measuring blood oxygen level dependent (BOLD) responses as an index of alcohol cue reactivity. Region of interest analyses focused on key regions implicated in alcohol cue reactivity (dorsal striatum, dorsolateral prefrontal cortex, ventromedial cortex) to assess whether NAC modulated brain activation to alcohol versus control cues. Subjective alcohol craving was measured pre- and post-scan across baseline and treatment scan sessions. Participant age, presence of liver disease, and antidepressant use were added as control variables to analyses.

## Results:

There were no medication effects or changes across sessions on subjective alcohol craving. No differences in brain activation were seen for regions of interest associated with treatment, baseline vs treatment scan sessions, or interactions ( $p$ 's >.24). Presence of liver disease related to overall greater alcohol cue reactivity across scan sessions in the left ( $p < .003$ ) and right ( $p < .011$ ) dorsolateral prefrontal cortex.

## Discussions and Conclusions:

N-acetyl cysteine did not appear to modulate alcohol cue-elicited brain activity or affect subjective cravings in patients undergoing treatment, while presence of liver disease was associated with overall elevated alcohol cue reactivity.

## Disclosure of Interest Statement:

The Australasian Professional Society for Alcohol and other Drugs (APSAD) recognises the considerable contribution that industry partners make to professional and research activities. We also recognise the need for transparency of disclosure of potential conflicts of interest by acknowledging these relationships in all written publications.

*There are no competing interests related to this study.*