

Brain activities of healthy individuals are not significantly evoked by drug related cues

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ABSTRACT

Introduction: Drug addiction is a chronic brain disorder marked by compulsive drug seeking and use. Healthy individuals may have tendency to use drugs while being aware of their harmful effects on their health. Studies show that drug-related cues increase brain activity linked to craving in active drug addicts. However, studies examining the effect of drug cues on the brain activity of healthy individuals have largely remained unexplored. This study shows whether brain areas that implicated in drug craving show significant activation when viewing the drug cues in healthy individuals. **Materials and Methods:** In this cross-sectional study, 24 healthy male participants in Malaysia were recruited. One participant was excluded as he did not pass the eligibility criteria and the remaining 23 participants were included in this study. During the experiment, participants were positioned inside the MRI and viewed 48 trials of drug and neutral cues in 16 minutes. After scanning, the functional data was collected and undergo slice-timing correction, realignment, co-registration, segmentation, normalization, and smoothing using Statistical Parametric Mapping 12 (SPM12) in MATLAB version 9.14 – R2023a. The individual data were analysed using fixed effect analysis (FFX) and the individual brain activation maps were generated for drug > baseline. The group brain activation maps were generated by using random fixed effect analysis (RFX). The statistical threshold was set at $PFWE < 0.05$. **Results:** When participants viewed the drug cues, five brain regions were significantly activated. The areas included left calcarine cortex (Calc), right occipital pole (OCP), right fusiform gyrus (FuG), right inferior occipital gyrus (IOG), and bilateral inferior temporal gyrus (ITG). These brain areas are related to visual processing in general, they are not particularly related to drug addiction. These findings suggest that the brain activity of healthy individual did not show any activation in brain area that control craving when exposed to the drug cues. A possible reason is that the healthy participants have not been previously exposed to addictive stimuli or are less prone to addictive behaviours. **Conclusion:** This study aimed to understand how healthy individuals' brain activity responds to drug cues. While significant activation occurred in five brain regions associated with visual processing, no activation was observed in areas linked to craving control. This suggests that healthy individuals may not show the same neural responses to drug cues as addicts, possibly due to their lack of prior exposure or susceptibility to addictive behaviours.