INTRODUCTION

Studies on substance abuse, in particular, on heroin addiction have reported depression to be a highly prevalent psychiatric disorder (Brady & Sinha, 2005a,b). For instance, epidemiological data indicate that the twelve-month prevalence of major depression among heroin dependents to range from 23 % to 46% (Miller, Klamen, Hoffmann & Flaherty, 1996; Qiu et al., 2013; Rajkowska et al., 1999; Teesson et al., 2005). This data suggests the prevalence of major depression to range from twice to five times higher among heroin addicted individuals than in the general population (Brady & Sinha, 2005a).

Aside from epidemiological data, clinically, both of the two conditions have several commonalities in symptoms and impairments in brain regions. Acute or withdrawal of HD and MDD are characterized by irritability, sleep dif ò ٔ ضر l א

are normally activated by endogenous opioids in response to reinforcers and stress (Naravane et al., 1997). Depression may result from repeated desensitization of the brain reward system as a response to intermittent withdrawal from dependence of heroin (a short-acting drug) or to stressful situations of being addict. Furthermore, withdrawal from opioids results in activation of locus coeruleus (a principal site for brain synthesis of brain noradrenaline) leading into enhanced noradrenergic postsynaptic responsiveness, which in turn

compared to healthy controls. These brain regions with significant differences are responsible for intermingling executive cognitive functions; such that MFG is responsible for high level executive functions including decisions, arousal and motivation (Camchong et al., 2011) and MPFC for emotional processing and motivation aspects of behavior (Drevets, Bogers & Raichle, 1997) and left SFG for working memory (du Boisgueheneuc et al., 2006). Certainly, from this evidence it is plausible that disruption of these

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be statistically different between MDD and HD groups, thus, it is possible that the findings of this study may be partly influenced by the observed difference in the duration of illness. Therefore, future studies with well-matched groups that include control of the duration of illness might be helpful to ameliorate these findings.

To best of our knowledge, this is the first study to use unbiased

Yuan, Y., Zhu, Z.D., Shi, J.F., Zou, Z.L., Yuan, F., Liu, Y.J., et al. (2009). Gray matter density negatively correlates with duration of heroin use in young lifetime heroin-dependent individuals. *Brain and cognition*, *71*, 223-228.

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