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STEREOLOGICAL ESTIMATION OF *Mus musculus* (MICE) HIPPOCAMPAL VOLUMES IN ALCOHOL AND *Cannabis sativa* (MARIJUANA) CO-ADMINISTRATION

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ABSTRACT

Substance abuse especially amongst young adults constitutes a global problem, with some studies indicating volumetric reductions in neuroanatomical structures among these abusers. In the present study, 24 apparently healthy mice were divided into 4 groups (n=6): Group one was administered 1 ml/kg body weight (bwt) of distilled water; group two had 145 mg/kg bwt ethyl acetate fraction of *Cannabis sativa*; group three had 20% v/kg bwt of alcohol and group four had 145 mg/kg bwt of ethyl acetate fraction of *Cannabis sativa* and 20% v/kg bwt of alcohol for 21 days with feeding. Neurobehavioural assessment was done via Y-maze and Novel Object Recognition (NOR) paradigms. Hippocampi were fixed in Bouin's fluid and isotropic uniform random samples were obtained via orientator method. Serial sections were systematically obtained, processed and stained with haematoxylin and eosin. Hippocampal volumes were estimated using the Cavalieri estimator and data were expressed as mean±SEM. One way analysis of variance and Kruskal Wallis tests were used to compare the means at p<0.05. Y-maze result showed a significant increase (p<0.05) in the mean rank, while NOR result showed a significant decrease (p<0.05) in discrimination and retention indexes in the co-administered group. However, hippocampal volume estimation showed no significant difference (p>0.05) in the groups. Histopathological evaluation revealed scattering, disorganization and focal necrosis of neural cells of the hippocampus in the co-administered group. In conclusion, the combined use of *Cannabis sativa* and alcohol can over-time lead to detrimental effects in the function, structure and volume of the hippocampus in users.

Key words: *Cannabis sativa*, Alcohol, Volume Estimation, Hippocampus

INTRODUCTION

The World Drug Report (2014) had scored Nigeria higher than any other African country in terms of drug seizure, especially *Cannabis* and its use is increasing especially amongst the youths and university students (Owoaje and Bello 2010). Amresh et al. (2011) reported that alcohol and *Cannabis* are the most popularly abused substances amongst adolescents. During adolescence, the brain undergoes substantial developmental changes as it

transits into adulthood and therefore the abuse of these type of substances can alter neural structure and function.

The main psychoactive constituent of *Cannabis sativa* is tetra-hydro-cannabinol (THC). Some of its effects are neurotoxic and cause impaired short-term

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