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The sex dependent changes in volume and volumetrie fractional of the grey and white matters in the cerebral hemispheres of young adults in Sudan

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ABSTRACT

Grey and white matter volumes of the cerebral hemisphere are essential for connectivity and cognitive function of the brain, they varies with sex, age, and health status of subjects. The aim of the present study is to measure the grey and white matter volumes and volume fractions of the cerebral hemispheres to examine the sex differences in young healthy Sudanese population. The study includes 139 healthy Sudanese subjects (80 males and 59 females). Participant's ages were ranging between 20-39 years old. Magnetic resonance imaging (MRI) was performed using a Philips 1.5 Tesla scanner. MRI of the subjects were analysed using the BrainSuite automatic segmentation software. Grey and white matter volumes and the volume fractions of cerebral hemispheres were estimated using the output data of the process. The mean volumes (cm^3) of the grey matter of right and left cerebral hemispheres of males (343.40 and 332.84) were larger than that of the females (301.21 and 316.81), respectively ($p \leq 0.05$). The mean volumes of the white matter of right cerebral hemispheres of males were also larger than the females (192.54 and 166.46), respectively ($p \leq 0.05$). The mean volumes of the white matter of left cerebral hemispheres of males and females (186.32 and 177.81) did not show statistically significant differences between the sexes, respectively ($p \geq 0.05$). The mean volume fraction (%) of the grey matter of right and left cerebral hemispheres of males (64.11 and 64.18) and females (64.45 and 64.12) did not show statistically significant differences between the sexes, respectively ($p \geq 0.05$). Our findings showed that the volume of the white and grey matters were larger in the males than that of the females. These findings are compatible with the fact that of the body and organ sizes are larger in the males. The most important findings are the volume fraction of the grey and white matters are same in both sexes. This means it is an independent value from the body size of the subject.

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