Effect of vestibular rehabilitation on fatigue in patients with multiple sclerosis. Amina Mohammad Abd AL-Hammed Awad; Supervisors: **Prof. Dr. Hussien Shaker,** Professor of Physical Therapy, Department for Neuromuscular Disorder and its Surgery**,** Faculty of Physical Therapy**,** Cairo University, **Prof. Dr. Amira El Gohary,** Professor of Clinical Neurophysiology, Faculty of Medicine, Cairo University, **Dr. Amr Hassan,** Associate Professor of Neurology, Department of Neurology, Faculty of Medicine, Cairo University. Doctoral Thesis, 2017.

ABRTRACT

Background: Fatigue is a multidimensional and complex symptom. It is the most common disabling symptom in patients with multiple sclerosis (MS) and has a significantly negative impact on their quality of life. The MS-related fatigue is most probably of central origin and could be attributed to the impaired sensorimotor integration and processing. The vestibular rehabilitation therapy (VRT) is based on the sensorimotor integration strategies and showed positive effects on many symptoms (eg. vertigo, depression, anxiety, depression), however its influence on MS-related fatigue is poorly studied. **Purpose:** This study was aiming to investigate the benefits of implementing a designed VRT for the purpose of decreasing fatigue in patients with remitting-relapsing MS (RRMS). **Subjects and Methods:** This randomized controlled trial included 36 patients with RRMS; 13 in the control group and 23 in the study group with matched general and clinical characteristics. All patients were treated for four successive weeks (12 therapeutic sessions). Both groups had been treated by aerobic exercises using stationary bicycle endurance training with intensity of 65% to 75% of the age predicted maximum heart rate (MHR). The study group had received a designed VRT in addition. Outcome measures included the fatigue severity scale (FSS), timed 25-feet walk (T25-FW) test, the Paced Auditory Serial Addition Test "PASAT" during three and two seconds (PASAT#3 and PASAT#2), and the relative power ratio between slow to fast waves of quantitative electroencephalogram (QEEG) activity using the equation [(θ+α)/β] over C3, C4, Fz and Pz sites. **Results**: The *FSS* showed significant improvement in both groups; the control (**95% CI 31.86 - 43.67, P=0.022***) and the study (**95% CI 28.41 - 37.49, P=0.026***). The T25-FW test showed a non-significant difference in either group post-treatment. The PASAT#3 and PASAT#2 showed a significant increase in the control (**95% CI: 23.21- 33.17, P=0.035*** and **95% CI: 20.51- 30.56, P=0.017***, respectively) and the study groups (**95% CI: 27.94 - 35.6, P=0.0001*** and **95% CI: 23.56- 31.29,** P=**0.001***, respectively). The QEEG showed significant improvement of the *[(θ+α)/ β] ratio* post-treatment

over **C3** in both groups; the control (**95% CI: 1.82 - 2.97, P=0.038***) and the study (**95% CI: 1.64 - 2.53**, **P=0.0001***) groups with remarkable improvement in the study group (**P=0.032***). The ratio over the sites **C4** and **Fz** only improved in the study group where p-values were (**95% CI: 1.81- 3.07, P=0.024***) and (**95% CI: 1.79 - 2.98, P=0.0001***), respectively. There was no significant change over the site **Pz** in both groups. **Conclusion**: VRT is effective in facilitating the sensorimotor integration and consequently reducing fatigue perception and improving cognitive processing speed in patients with MS.

Keywords: Vestibular rehabilitation therapy, Fatigue, quantitative electroencephalogram, Multiple Sclerosis**.**