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An exploration of difference in acute energy expenditure and acute mental well-being when using an E-scooter compared to walking in healthy adults. A Research Project

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Abstract

Background: This study investigates the difference in acute energy expenditure (EE) for e-scooter use compared to walking, to estimate the effects e-scooter use may have on physical activity (PA) output and how this may link to wider aspects of physical health; as well as mental well-being.

Methods: Twenty healthy adult participants were recruited to take part in a pilot randomised controlled crossover trial. This quantitative exploratory laboratory study, utilised online gas analysis to measure gas exchange under two conditions (e-scooter use and walking), to demonstrate the effects on EE. A Subjective Exercise Experience Scale (SEES) was implemented to measure mental state post both conditions (e-scooter use and walking), to understand the effects of e-scooter use on mental well-being. The data on gas exchange was analysed using a One-way repeated measures ANOVA, and data from the SEES was analysed using a paired samples t-test. For both methods of analysis, a p value of 0.05 or less was considered significant.

Results: Results showed that mean Oxygen consumption (VO2) and Carbon dioxide production (VCO2) were significantly higher for walking (0.97 ml/kg/min and 0.82 ml/kg/min, respectively) compared to e-scoter use (0.4 ml/kg/min and 0.33 ml/kg/min). Likewise mean Metabolic equivalent of Tasks (METs) was significantly greater for walking (3.89 METs) compared to e-scooter use (1.6 METs). Lastly psychological factors for mean positive well-being (PWB), psychological distress (PD) and mental fatigue were comparable for e- scooter use and walking, as statistical analysis revealed no significant difference between both conditions.

Conclusions: The study concludes that e-scooter use has significantly lower levels of EE compared to walking, and through sustained and repeated e-scooter use PA output may decrease as a result, consequently increasing the risk of poor physical health; further straining public health funding. In contrast the study concluded e-scooter use does not affect user mental well-being in comparison to walking, and thus would not increase the incidence

of poor mental well-being. Nonetheless, further research is required to improve data validity and generalizability.

Keywords: E-scooter | Physical Activity | Mental well-being | Energy Expenditure

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