

The Impact of Physical Activity on Hormonal Responses and Cognitive Efficiency During a Simulated Workday in Men and Women: Preliminary Findings

Aura Mažuolytė-Binderienė, Viktorija Grigaitė, Erika Krasinskė, Andrius Šatas, Marius Brazaitis

Lithuanian Sports University, Kaunas, Lithuania

Purpose: This study aimed to investigate the impact of moderate-intensity physical activity, performed before and after an 8-hour simulated workday, on hormonal responses and cognitive efficiency, and to compare these effects between women and men.

Methods: Twenty healthy men and women aged 18–36 years were randomly assigned to control ($n = 20$) and exercise ($n = 20$) protocols. During the exercise protocol, participants performed 30 minutes of moderate-intensity aerobic activity on a cycle ergometer before and after a simulated 8-hour workday. The simulated workday consisted of eight cognitive test sessions from the Automated Neuropsychological Assessment Metrics 4 (ANAM4), with each session lasting 45–50 minutes. To assess psycho-emotional changes, participants completed a Visual Analogue Scale (VAS) on a 10 cm horizontal line. Salivary samples were collected, and biochemical analysis of cortisol and testosterone levels was performed using enzyme-linked immunosorbent assay (ELISA) methodology.

Results: The study demonstrated significantly higher testosterone levels in men compared to women ($p < 0.05$) in both the exercise and control protocols, along with a tendency towards higher cortisol levels in women. Testosterone levels increased in both men and women following two hours of cognitive work and after the 8-hour workday in the exercise protocol. Although no significant gender differences were observed in subjective psycho-emotional responses ($p > 0.05$), both men and women reported increased mental fatigue ($p < 0.05$) and decreased motivation ($p < 0.05$) after eight hours of cognitive work. Significant decreases in memory and cognitive efficiency ($p < 0.05$) were observed in both genders and across both protocols. However, a tendency towards better cognitive efficiency was noted in the exercise protocol.

Conclusion: Moderate-intensity physical activity before and after prolonged cognitive work may support hormonal balance and help preserve cognitive performance. While both women and men showed increased mental fatigue and reduced motivation, the exercise protocol was associated with a tendency towards better cognitive efficiency, highlighting the potential benefits of physical activity during mentally demanding days. More data is needed to confirm the results.

Support/Funding Source: Study was funded by Lithuanian Sports University.

