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EFFECTS OF HEAD-DOWN TILT BED REST PLUS ANTI BONE LOSS INTERVENTION ON
COGNITIVE PERFORMANCE AND PERCEIVED PSYCHOLOGICAL GROWTH**Abstract**

Objective. With the excitement of such ambitious endeavors, it's crucial to acknowledge the significant stressors in space explorations. Microgravity poses a formidable challenge during long-term space missions, potentially triggering negative physiological responses, such as bone loss. One countermeasure for microgravity-induced bone loss is taking pharmacological interventions. However, the potential impacts of these treatments on cognitive functions and psychological responses remain unexplored. This research aimed to investigate the effects of head-down tilt bed rest plus anti-bone loss intervention on cognitive performance and perceived psychological growth. **Method.** There were 17 participants recruited for the experiment which was divided into three phases: a 5-day Preparation phase for participants to get used to the environment, a 60-day head-down tilt bed rest (HDBR) phase where participants were engaged in strictly anti-orthostatic bedridden rest at -6, and a 10-day Recovery phase. We used the psychomotor vigilance task to test participants' alertness. We also used the Portrait Values Questionnaire and the Post-Experience Change Inventory to measure participants' perceived psychological growth in every two weeks. **Results.** Results showed that participants who had pharmacological interventions responded faster to PVT, but this difference was not significant (Mann-Whitney U = 47, p = 0.32). Also, these participants reported slightly higher personal growth indicated by effect size but also failed to reach the significance (All ps \geq 0.5). As result of extreme immobilization and long-term head-down position, all participants showed increased focus on personal interest, especially the emphasis on social status and dominance. **Conclusion.** In the 60-day HDBR experiment, participants could maintain their alertness. Moreover, all participants perceived personal growth after experiencing a challenging HDBR experiment. This suggests that, with motivation and changes in the core value system, participants could successfully manage the 60-day head-down condition. Meanwhile, with pharmacological interventions for preventing bone loss, participants showed slightly better performance. This may be due to the intervention had buffer effects to the stresses caused by HDBR.