

Heart Rate and Heart Rate Variability as Indicators of Stress in Emergency Medicine Residents during Simulation

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POSTER PRESENTATION ABSTRACT | ORIGINAL RESEARCH CATEGORY

Introduction: This project was completed through collaboration between a Rice University Collegiate EMS research course and a Baylor College of Medicine EM Physician. When confronted with a stressful event, the human body responds by activating the sympathetic nervous system pathway. Studies have shown a relationship between stress-induced heart rate increases and cognitive performance. Certain cognitive tasks, such as memory recall and information processing, in many cases are negatively affected by such stress responses. Significant stress response has been shown in emergency medicine residents during regular shifts.

Methods: We measured stress-induced heart rate and heart rate variability of Baylor College of Medicine emergency medicine residents during a simulated case, specifically, a pulseless electrical activity cardiac arrest scenario. In addition to these vitals, and a few others, we also tested the resident's cognitive performance before and during the simulation. To measure physiological signs of stress we had the participants wear an Empatica E4 wristband. For cognitive performance level, the participants completed a trail-making test.

Results: Our data showed insignificant signs of stress levels during the case, but the cognitive performance level was significantly better during the case as compared to before.

Discussion/Conclusions: The data is consistent with the conclusion that simulation cases do not create stress levels seen during shift, but they may mimic cognitive improvement. This conclusion has interesting implications for collegiate EMS, in reference to training exercises and testing using scenarios. An important future study could perform similar tests but on EMTs.

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