

ABSTRACT

Purpose: High-fidelity simulation calls heavily upon cognitive capacities and generates stress and anxiety. The objective of this prospective, observational study was to evaluate the degree of stress in medical students by measuring hormone levels during critical care classes.

Methods: Overall, 55 students (senior years of medical faculty) of both sexes were divided into 5-person teams. Demographic data and information on diagnosed diseases, stimulants used, and previous experience in the field of medical simulation were collected with a personal questionnaire. Before starting the scenario (T0), after the end of the scenario (T1), and 120 min thereafter (T2), stress level was measured. For this purpose, systolic blood pressure, diastolic blood pressure, mean blood pressure, heart rate and blood oxygen saturation were evaluated. In addition, saliva was collected to determine alpha-amylase activity and the concentrations of secretory immunoglobulin class A, cortisol, and testosterone.

Results: Among hemodynamic parameters, systolic and mean blood pressure and heart rate were significantly higher in T1 than in T0 and T2 time points ($p < 0.05$). Cortisol concentration was higher at T2 compared with T0 and T1. Alpha-amylase activity was highest at T1. Secretory immunoglobulin class A concentration was highest at T0, followed by T1 and then T2. These differences were not statistically significant. Testosterone concentration showed significantly higher values at T2 compared with T0 and T1 ($p < 0.05$). The analysis of team leaders vs. other members revealed significantly lower cortisol and alpha-amylase values in leaders ($p < 0.05$).

Conclusions: High-fidelity simulation is a useful education method in medical subjects, especially in cases where a mistake could produce serious or irreversible consequences. It can increase stress hormone concentrations and thus can be assumed effective as a learning aid even in senior-year students of medical faculty.

Keywords: High-fidelity simulation; Medical education; Physiological stress; Stress; Stress hormones.