



Cognitive load and simulated critical medical skills performance on stationary and moving platforms

Adam Dubrowski, Discipline of Emergency Medicine and Marine Institute; Tia Renouf, Andrew Smith, Sabrina Alani, Discipline of Emergency Medicine; Chris Hearn, Rob Brown, Marine Institute

Purpose: Offshore operations in the north Atlantic have increased significantly since the 1970s when oil and gas exploration began. Supply vessels are tasked with transporting industry goods and workers and also providing emergency medical care when required at sea. Critical injuries occurring offshore need prompt intervention in a range of environmental conditions, sometimes on moving platforms. The literature supports the utility of simulation for teaching medical procedures. It is a core part of the curriculum at Memorial University - a distributed campus with research initiatives supporting operations in the remote Arctic and marine environments. **Methods:** We compared self-assessed confidence and cognitive load as they relate to the performance of simulated complex medical procedures on stationary vs. moving platforms using a ship's bridge simulator. The aim of the simulation was for Transport Canada (TC) physicians - tasked with marine health assessments of ocean workers, to gain knowledge of the stresses under which their patients work at sea. In July 2014 at Memorial's Marine Institute, our pilot study compared TC physicians performing 4 procedures on both stationary and moving platforms: board and collar application, Thomas splint application, sutures and intra-osseous needles. Half performed the procedures in the stationary setting, and then crossed over to a moving platform. NASA cognitive load scales were applied to each group. **Results:** Participants reported being more cognitively challenged, as measured by the NASA scales, and demonstrated inferior technical performances on the moving platform. Increased broken needles and longer completion times were used as markers of poor technical performance. Transport Canada physicians reported increased cognitive load, and showed inferior outcomes, while performing critical procedures on a moving platform, compared with a stationary platform. **Conclusions:** TC physicians report increased cognitive load and inferior simulated procedural skills on stationary compared with moving platforms. Health care practitioners, who are expected to work in extreme environments, should train under contextually similar circumstances.