

Online-Based Wellness Curriculum for Anesthesia Residents, a Randomized Controlled Trial

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Project description

Physician burnout is increasingly being recognized as an urgent healthcare issue. However, a major obstacle of studying the strategies of personal wellness in resident physicians is their highly unpredictable and demanding workload. To solve this problem, we plan to deliver evidence-based wellness interventions via an online-based video curriculum, with the goal of making the content engaging, relevant, and convenient to access for our anesthesia residents. Our proposed **randomized controlled study** will determine the efficacy of our multimodal intervention in reducing perceived stress both during everyday clinical practice as well as during the management of a simulated crisis. Using surveys, we will collect subjective measures of acute and chronic stress. Using heart rate variability analysis of ambulatory electrocardiogram recordings, we will objectively measure cognitive load and stress during a simulated medical crisis. **Our hypothesis is that the practice of the evidence based strategies presented in this wellness curriculum will decrease subjective and objective measures of stress, burnout, and cognitive overload.**

Rationale

The demands of residency expose physician trainees to high levels of acute and chronic stress that contribute to weakened resilience (Thomas 2004). Especially concerning is the detrimental effect of burnout upon patient care, as has been reported among anesthesiologists (Hyman 2011), surgeons (Balch 2009), and internal medicine physicians (Campbell 2010). Physicians suffering from burnout and depression report higher rates of medical errors (Shanafelt 2010, De Oliveira 2013). Housestaff are particularly vulnerable, as they carry heavy workloads, work long and unpredictable hours, and experience limited personal and professional control.

Pilot data

Our pilot study “Improving Mindfulness in Housestaff with a Phone-Based App” investigated the effect of the mindfulness meditation app Headspace in surgery and anesthesia residents. Primary outcome measures include the Positive and Negative Schedule (PANAS) and Freiburg Mindfulness Inventory (FMI). 31 residents enrolled in the four-week study and were invited to use the Headspace meditation app. 20 residents completed two of the three surveys. The app was used an average of seven times during the four-week study period. The perceived usefulness of the app, as scored on a 5-point Likert scale was 3. We found significant associations with the PAS subpart of the PANAS (but not the NAS), and the FMI. These initial results demonstrate that residents are motivated to learn and practice wellness techniques on a convenient platform.

Heart rate variability (HRV) is the variation in the intervals between consecutive heartbeats, or R-R interval. Analysis of HRV is a well established tool that measures the sympathovagal balance between sympathetic and parasympathetic activity in study subjects. Our group has successfully correlated changes in HRV with subjective stress in anesthesia residents taking weekend call.

Methods of Design

We propose a single-center, randomized controlled study that will be conducted at Stanford University Hospital and that has been approved by the Stanford IRB. All 78 Stanford anesthesia residents will be invited to participate in this research study and will be randomized into two groups. Randomization will be stratified within each CA-1 through CA-3 class to ensure even distribution among classes. Study subjects in the intervention group will receive the eight-week curriculum *prior* to their management of a simulated patient crisis scenario. Study subjects in the time-delayed control group will receive the eight-week curriculum *after* their management of a simulated patient crisis scenario.

Timeline and Implementation Plan

Creation of videos for intervention curriculum: Ongoing through July 2016

Study subject recruitment and enrollment: July 2016

Study launch: August 2016

First simulation course of the 2016-2017 academic year: September 2016

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Last simulation course of the 2016-2017 academic year: June 2017

Anticipated work product

Video Intervention: This online eight-week video curriculum will teach evidence-based exercises of mindfulness, compassion, and positive psychology. The full curriculum contains sixteen videos. Each five-minute video will follow the following three-part format: 1- Technique Instruction, 2- Presentation of the Evidence, 3- Interview clips of physicians sharing their personal experiences practicing the technique in the context of the medical lifestyle and clinical setting.

Smartphone-App Intervention: An ongoing independent mindfulness practice throughout the study will be supported by the free and validated smartphone meditation app Headspace (Howells 2014). Headspace was the top performing meditation app in a recent review of 23 smartphone-based mediation apps (Mani 2015).

Plan for evaluation

Both groups will complete surveys via Stanford Qualtrics at time zero, eight weeks, and sixteen weeks. The surveys will include the State Trait Anxiety Index (STAI) to measure stress, the Maslach Burnout Inventory (MBI) to measure burnout, and the Mindful Attention Awareness Scale (MAAS) to measure mindfulness.

At the eight-week time point of the study, subjects will participate in a mandatory departmental simulation course which challenges the resident to manage a life threatening clinical scenario using high fidelity simulation. Participants will complete the National Aeronautics and Space Administration–Task Load Index (NASA-TLX) survey immediately after the scenario to record *subjective* stress and mental burden. HRV will be analyzed to measure changes in sympathetic and parasympathetic outflow before, during and after the simulated crisis management. Analysis of participants' heart rate variability (HRV) during the scenario will *objectively* capture stress and mental load.

Plan for dissemination of results

The findings from this study will be prepared for submission and presentation at the Association of American Medical Colleges (AAMC), American Society of Anesthesiologists (ASA), and International Meeting on Simulation in Healthcare (IMSH) meetings.

Anticipated impact of the project on education and/or mentoring at the School of Medicine.

Upon successful completion of this work, we will have identified, for the first time, a time-efficient online-based multimodal curriculum, designed specifically for the resident to decrease stress, burnout, and cognitive load, both during periods of everyday clinical practice as well as during periods of acute stress. Given the similarity of stressors faced by physicians in training, the results of this study would be of interest for the office of graduate medical education, residency program directors, and hospital chiefs of staff. Finally, results from our study will lead to key studies across specialties and institutions.

Specific Aims

Aim 1: Develop and deliver smartphone and online-based video curriculum.

- A. Videos will teach evidence-based methods of mindfulness, compassion, and positive psychology.
- B. A validated and free smartphone-based mindfulness app will support their meditation practice.

Aim 2: Assess efficacy of curriculum on decreasing stress and burnout in everyday clinical practice.

- A. Surveys measuring stress (State Trait Anxiety Index), burnout (Maslach Burnout Inventory), and mindfulness (Mindful Attention Awareness Scale) will be administered.

Aim 3: Assess efficacy of curriculum on reducing cognitive load during a simulated crisis scenario

- A. Study subjects heart rate variability (HRV) will be recorded as an objective measure of cognitive load.
- B. Study subjects will report subjective cognitive load via survey completion (NASA-TLX) immediately upon completion of the simulation scenario.