Neuroscience Education

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Canadian neurosurgical attrition rate: a qualitative exploration

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Background: Canadian neurosurgery residency programs have an alarming 28.4% attrition rate—seven times higher than the average for most other specialties (1–4%) and double that of US neurosurgery programs. Canadian data for this issue is over 30 years old, highlighting the need for updated research. This study identifies factors contributing to Canadian neurosurgery attrition rates. Methods: Using critical constructivist theory, virtual interviews were conducted with current program directors (PDs) from Canada's 14 neurosurgery programs and neurosurgery residents who left training between 2013–2023. Interviews were recorded, transcribed, anonymized, and iteratively coded through descriptive thematic analysis to construct an analytical framework. Results: We conducted interviews with 7 PDs and 7 former neurosurgery residents, representing 7 neurosurgery programs across Canada. The average attrition rate was 14.11% (0%–28.6%) from 2013–2023. Contributing factors include poor job prospects in Canada, resource constraints leading to high workloads, poor work-life balance, moral distress due to high levels of patient mortality, and a lack of teaching and support from staff and senior residents. Conclusions: Neurosurgery residents are the future of neurosurgery. Our study uncovers factors contributing to high attrition rates in neurosurgery training, indicating that change must come from provincial governments and within training programs to retain residents.

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A psychological assessment tool to improve quality of life in neurosurgical residents: a prospective cohort study

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Background: Neurosurgery is a long and arduous training program, and the demands of neurosurgical training have led to resident burnout prevalence ranging from 11-67%, attrition, and suicide. We aimed to assess whether implementation of a weekly self-assessment tool with optional psychological counselling improves neurosurgical resident quality of life. Methods: We performed a one year prospective cohort study including 14 Calgary (intervention group) and 12 Toronto/Winnipeg residents (control group). Calgary residents utilized a mobile application ("HONE") weekly, and all residents responded to questionnaires at baseline, midpoint and endpoint: EQ-5D-5L, Maslach Burnout Inventory (MBI), and Mayo Clinic Well-being Index (WBI). Between and within group results were compared using two-tailed t-tests. Results: Pooled baseline scores were comparable to population norms, with increased mean MBI depersonalization scores (10.28 versus 7.12, p=0.033), and more WBI "at risk" scores compared to normative data. There were no baseline differences between cohorts. EQ-5D-5L, MBI, and WBI scores were comparable between and within cohorts at all three time points. Three intervention group residents accessed psychological counselling, totalling ten sessions. Conclusions: Weekly use of the HONE application did not impact resident quality of life, although multiple residents displayed help-seeking behaviours. HONE provided tangible data for the program director to track trends in team well-being.

Neurotrauma

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Latent home time trajectories for isolated moderate to severe traumatic brain injury survivors: a data-driven method identifies distinct outcome phenotypes

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Background: Traumatic brain injury (TBI) patients exhibit variable post-injury recovery trajectories. Days at Home (DAH) is a patient-centered measure that captures healthcare transitions and offers a more nuanced understanding of recovery. Here, we use DAH to characterize longterm recovery trajectories for moderate to severe TBI (msTBI) survivors. Methods: This multicenter retrospective cohort study utilized population health data from Ontario to identify adults sustaining isolated msTBI hospitalized between 2009-2021. DAH were calculated in distinct 30-day intervals from index admission to 3 years post-injury; latent class mixed modeling identified unique recovery trajectories and trajectory attributes were quantified. Results: There were 2,510 patients eligible for latent class analysis. Four DAH trajectories were identified: early recovery (69.9%), intermediate recovery (11.4%), late recovery (2.9%), and poor recovery (15.8%). Patients in the poor recovery group were older, more frail, and had lower admission GCS scores, while those in early recovery exhibited lower acute care needs. Intermediate and late recovery groups exhibited protracted transitions home, with near-complete reintegration by 24 months. A prediction model distinguished unfavorable trajectories with good accuracy (C-index=0.824). Conclusions: Despite high initial institutional care requirements, 85% of patients reintegrated into the community within three years of msTBI. These findings shed light on post-injury care requirements for brain-injured patients.