



Article Appraisal

Article: Patient safety, resident well-being and continuity of care with different resident duty schedules in the intensive care unit: a randomized trial

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Background and Study Objective(s):

Resident fatigue is common and thought to be associated with errors. Shorter shifts may help alleviate this fatigue, but they necessitate more care transitions, which is thought to lead to information loss. Many jurisdictions in Canada are considering mandating restrictions on resident work hours, similar to those introduced in Quebec in 2012. However, there is a paucity of data to support adoption of one scheduling model over another.

Study Design:

This was a randomized controlled trial (RCT) of resident schedules in two Toronto ICUs. The study was conducted during six two-month ICU rotations (January and June 2009). Each schedule consisted of 12, 16, and 24 hour call shifts. Two primary outcomes were considered: adverse events (AEs) and resident fatigue. Of note, continuity of care was initially planned as the primary outcome however it was difficult to find a good measure of this. Secondary patient outcomes included preventable AEs, death in the ICU, and severity of AEs. Secondary resident outcomes included somatic symptoms, burnout, continuity of care, and ICU staff's impression of resident judgement and residents knowledge of the patients clinical and social details.

Results:

807 patients with 971 ICU admissions were included in this study. There was no significant difference between schedules in terms of the primary outcomes (rates of AEs and resident fatigue). Seven out of eight of the preventable AEs occurred in the 12 hour schedule but there was no difference in ICU mortality. Somatic symptoms were more severe for residents allotted to the 24 hour call schedule. There was no effect of schedule on burnout. ICU staff felt that residents allotted to the 16 hour schedule knew less about their patients clinical and social history and that the residents allotted to the 12 hour schedule were more alert overnight.

Validity of Results:

The authors should be commended as this is a complex trial that is relatively methodologically sound. This is however a small study of 47 residents in 2 ICUs. Conclusions would depend heavily on which residents were allotted

to which blocks.

Moreover, it is unclear in this study what constituted an AE as the definition is vague and no examples were provided. However, this study was likely underpowered to detect a difference in AEs however they were defined. It was appropriately powered to detect a difference in resident fatigue. Moreover, AEs are difficult to measure as an outcome. AEs are complex, multifactorial events and decision making in the ICU is complex. It is therefore difficult to ascertain a resident's role in "causing" or "preventing" an AE.

Continuity of care is also an important outcome but perhaps not as measured by the authors. What may have been more useful would have been if the authors had assessed the quality of handover at rounds or AEs related to poor handover.

It is also unclear why fatigue was selected as a primary outcome. Somatic symptoms or burnout seems worse for residents and there is no hard evidence that fatigue as measured by the Stanford Sleepiness Scale is associated with errors.

Finally, the authors were unable to conceal the schedule which would have enabled bias in both ICU staff's impression of the residents as well as in screening for AEs (although the physician reviewers who had the final say in determining AEs were blinded to schedule).

Generalizability of Results:

ICUs are not all equal. APACHE II scores, median length of stay, admission rates and resident support both during the day and overnight varies widely between ICUs. Moreover, ICU is unique in both its resident and nursing support. Residents are responsible for less patients (albeit sicker patients) and nurses are highly skilled and there is typically a 1:1 nurse to patient ratio making it hard to extrapolate data from this study to non-ICU rotations.

The Bottom Line:

This is a small, well-conducted study examining an important issue. The authors conclude that overnight duty periods of 12 and 16 hours are better for residents and worse for patients. This conclusion is based on the results of secondary analyses and not their primary outcome as the study was likely underpowered to detect a difference in AEs as defined by the author. Larger studies over a longer period of intervention may be useful and authors could consider evaluating not only resident wellbeing and patient AEs but also the effectiveness of handoff and, if possible AEs related to information loss at handoff as opposed to just "preventable" AEs.