



## Asian pearls

## Effect of call organization on burnout and quality of life in psychiatry residents

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## ABSTRACT

We aimed to measure the effects of a residency program's mid-year shift from 24-h call to night float on resident burnout and quality of life. At the end of the year, residents who started the year with 24-h call had worse burnout and quality of life, with statistical significance and large effect sizes. Exposure to a twenty-four hour call system, when compared to a full year of night float, may be associated with increased burnout and decreased quality of life, though measuring this effect is not straightforward.

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## 1. Introduction

The Accreditation Council for Graduate Medical Education (ACGME) has instituted duty hours restrictions in response to data showing the negative effects of sleep deprivation on resident performance (Philibert et al., 2002; Weinger and Ancoli-Israeli, 2002). In the context of these limitations, there are two main methods for providing off-hours service coverage. In one, a resident on service during the day will stay overnight ("24-h call" [24HC]), followed by an off-work period of at least 14 h per ACGME requirements. In the second, one resident is scheduled to work all night shifts in a given period of time and has no day-time responsibilities ("Night Float" [NF]).

Concern persists regarding the well-being of residents. Studies indicate high rates of burnout (Goldstein et al., 2004; Lefrak et al., 2005) and depression (Mata et al., 2015). Restructuring work hours, including night and weekend service coverage, is one strategy to improve resident well-being. 24HC does not require a resident to be removed from daytime clinical services for an

extended period of time, but requires disruption to coverage for daytime services given the requirements for time off after call. It also can disrupt a resident's sleep-wake cycle, and may force a resident to work longer than is safe for patients and for the resident. NF offers the potential for more consistent sleep-wake patterns, shorter shifts, and less disruption of day-time services. However, it can cause social isolation and disrupt outside-of-work activities.

One potential benefit of NF is regulation of sleep-wake cycles, though data exist that challenge this assumption (Rosen et al., 2006; McDonald et al., 2013). In small studies, trainees on NF or 24HC did not differ in cognitive measures (McDonald et al., 2013; Weinger and Rancoli-Israeli, 2002) or psychomotor performance (Yi et al., 2013). Results vary over whether trainees perceived that they were more alert for their duties as part of NF (Cavillo et al., 2002; Jasti et al., 2009; Matthews et al., 2006). Reducing hours alone may not be sufficient to reduce burnout and improve QOL (Gopal et al., 2005). Some studies have supported the positive effect of NF on these measures (Cavillo et al., 2002; Goldstein et al., 2004; Mann et al., 2014) but others failed to show this (Elmariah et al., 2016; Reed et al., 2010; Zahrai et al., 2011).

We aimed to objectively measure the effects of changing the structure of call on resident well-being.

Abbreviations: ACGME, accreditation council for graduation medical education; 24HC, 24-h call; NF, night float; QOL, quality of life.

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## 2. Methods

### 2.1. Training program changes

PGY2 residents prior to this study spent half of their year doing 24HC at one clinical site and the other half doing NF at a second site. Program directors made a decision, independent of this study, to convert to NF at both sites. This decision was based on resident advocacy that this would improve quality of life (QOL) and the overall resident educational experience. The change occurred mid-year, thus some residents would spend half of their year on a service using 24HC following by a service using NF whereas a second group would experience only NF on both services.

### 2.2. Participants

All residents who were active in the training program were eligible for the study. The PGY2s were assigned groups based on resident preferences for overall rotation schedule. Eight PGY2s began the year with 24HC and seven began the year with NF. Group assignment occurred before study conception and thus not related to the study in any, and as such was not randomized.

The plan to convert to a NF at both PGY2 call sites was conceived after the schedule assignment, thus residents chose their schedule without knowing that the call structure would switch. A crossover design could not be used for the same reason.

### 2.3. Clinical service characteristics

PGY2 residents at the site that started with 24HC and was switched to NF were responsible for consultations in the emergency department, new admissions to an in-patient unit, and acute problems on the in-patient unit. PGY2 residents at the site that had NF for the whole year were responsible for consultations in the emergency department (a larger and busier emergency department than the other site) and urgent consults to medical and surgical units.

### 2.4. Instruments and data collection

Data was collected during the 2014–2015 academic year. We assessed burnout using the Maslach Burnout Inventory (MBI). The MBI is the only instrument to our knowledge that specifically measures burn-out and is known to be valid and reliable in physicians (Maslach et al., 1996; Yama and Soler, 2002). Higher scores on this scale represent greater burden of burnout. We used a five-point rating scale was used to assess QOL, which ranged from 1 (“As bad as it can be”) to 5 (“As good as it can be”).

We e-mailed an internet-based survey which collected data anonymously and was designed to generate a random number to identify individual responders to residents three weeks before the PGY2 class transitioned to an all NF and again six months later. We also surveyed PGY2 residents two months after the initial survey. Messages noted that participation in the survey was voluntary and was intended to collect data for quality improvement purposes, and that the data alone would not be used to support a decision to maintain or alter the current structure of rotations. We did not collect sociodemographic data given the small sample size and the risk of such data to anonymity.

### 2.5. Statistical methods

We made comparisons both within a group at different time points and between groups at specific time points by calculating two-tailed t-distributions and effect sizes with 95% confidence

intervals using Hedges' *g*. We planned to use a *p*-value of less than 0.05 as statistically significant and a *p*-value of 0.05–0.10 as indicative of a trend.

### 2.6. Adverse event monitoring

We instructed participants that if, in the course of completion of the survey, they found the need to speak to someone about feelings of burnout, poor quality of patient care, or poor QOL, they should directly contact the primary investigator who was also co-director of the residency program.

### 2.7. Institutional review board information

Data collection was undertaken as a Quality Improvement Initiative at Brigham and Women's Hospital, and as such was not formally supervised by the Institutional Review Board per their policies. The nature of the project, including the intent to publish data, was discussed with the director of the Partners Human Research Committee (the institutional review board governing research at Brigham and Women's Hospital) and we were informed that their policies did not require the study to be formally submitted.

## 3. Results

### 3.1. Data collection

Table 1 lists the response rates for the survey. Generation of random identification numbers was not successful as a means of pairing data, likely because participants did not consistently enter identical names into the survey and thus had different identification numbers at the initial and final time points. Thus, we could not perform within subject comparisons at different time points.

### 3.2. Burnout

The results for the MBI for PGY2 residents are shown in Table 1 and Fig. 1. At the initial time point, we found a large effect size suggesting higher levels of burnout in the PGY2 Crossover group, though this fell short of statistical significance ( $t(13) = -1.67$ ,  $p = 0.12$ ;  $g = 0.82$ , 95% CI  $-0.82$  to  $1.87$ ). At the final time point, PGY2s in the Crossover Group had statistically significantly higher burnout scores than those in the NF Group, with a large effect size ( $t(11) = 2.21$ ,  $p = 0.049$ ;  $g = 1.14$ , 95% CI  $-0.03$  to  $2.3$ ).

### 3.3. QOL

Table 2 and Fig. 2 show results for PGY2 QOL. We found a large effect size suggesting decreased QOL for the PGY2 Crossover Group at the initial time point, which did not reach statistical significance ( $t(13) = 1.73$ ,  $p = 0.11$ ;  $g = 0.84$ , 95% CI  $-0.22$  to  $1.9$ ). At the final time point, we found a statistically significantly worse QOL rating in the Crossover Group as compared to the NF group, with a large effect size ( $t(11) = 2.9$ ,  $p = 0.014$ ;  $g = 1.51$ , 95% CI  $0.28$ – $2.75$ ).

**Table 1**

Comparisons of scores on Maslach Burnout Inventory for PGY2 residents. Higher scores indicate higher levels of burnout. \*  $p < 0.05$ , <sup>a</sup> = Large effect size.

	PGY2 Crossover	PGY2 NF	<i>p</i>	Effect Size
Initial (Mean (SD))	59.2 (27)	40.4 (13)	0.12	0.82 <sup>a</sup> (−0.24, 1.87)
Final (Mean (SD))	57.2 (24)	35.4 (24)	0.049*	1.16 <sup>a</sup> (−0.08, 2.4)

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