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Research Report

Recovery of Sleep or Recovery of Self? A Grounded Theory Study of Residents' Decision-Making Regarding How to Spend Their Nonclinical Postcall Time

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Supplemental digital content for this article is available at [LWW INSERT LINK].

Abstract

Purpose

As resident work hour policies evolve, residents' off-duty time remains poorly understood. Despite assumptions about how residents should be using their postcall, off-duty time (e.g., sleeping, studying), there is little research on how residents actually use this time and the reasoning underpinning their activities. This study sought to understand residents' nonclinical postcall activities when they leave the hospital, their decision-making processes, and their perspectives on the relationship between these activities and their well-being or recovery.

Method

The study took place at a Liaison Committee on Medical Education–accredited Canadian medical school from 2012–2014. The authors recruited a purposive and convenience sample of postgraduate years 1–5 residents from six surgical and nonsurgical specialties at three hospitals affiliated with the medical school. Using a constructivist grounded theory approach, semi-structured interviews were conducted, audio-taped, transcribed, anonymized, and combined with field notes. The authors analyzed interview transcripts using constant comparative analysis and performed post hoc member checking.

Results

Twenty-four residents participated. Residents characterized their predominant approach to postcall decision-making as one of making trade-offs between multiple, competing, seemingly incompatible, but equally valuable, activities. Participants exhibited two different trade-off orientations: being oriented toward maintaining a normal life or toward mitigating fatigue.

Conclusions

The authors' findings on residents' trade-off orientations suggest a dual recovery model with postcall trade-offs motivated by the recovery of sleep or of self. This model challenges the dominant viewpoint in the current duty hours literature and suggests the duty hours discussion must be broadened to include other recovery processes.

Around the globe, resident work hour restrictions are either in place or under consideration in response to a growing body of evidence that suggests fatigue due to long working hours may be detrimental to residents' well-being and clinical performance.[1–5] Extended working shifts have been linked to more frequent medical errors,[6] as well as increased risks of percutaneous needlestick injuries and motor vehicle collisions among clinical trainees.[1,2] Research in other contexts has suggested that prolonged sleep deprivation may lead to neurobehavioral performance impairment[7,8] and stifle innovative and divergent thinking.[9] Public opinion also seems to favor shorter working hours for doctors in training.[10] Even as resident work hour policies evolve, however, residents' off-duty time remains poorly understood.

While it may seem logical that reduced resident working hours would lead to less fatigued residents and thereby increase patient safety, this has not been consistently demonstrated by the literature. Many studies question the patient safety benefit of reduced hours on the basis of an increase in patient handoffs;[11–13] reduced learning opportunities that may negatively impact residents' education;[13] and emerging ethical dilemmas for residents faced with the choice between abiding by duty hour policies or maintaining continuity of care.[14] Another lingering issue is whether shorter working hours will result in residents who are better rested.[1–3,15] There are those who suggest that even residents who abide by duty hour policies may fail to reap the benefits of shorter working hours if they pursue other "diversions"[16] instead of sleeping and studying while off-duty.[16–21] Certainly, there are compelling critiques on both sides of the duty hours debate, which is indicative of the complexity of this issue.

To complicate things further, Canada remains one of the few jurisdictions without nationally legislated resident work hour rules.[22] Instead, resident contracts are negotiated between resident

representatives and hospital employers within each province, which has led to variability in both the regulations and the degree to which they are enforced.[22] In Quebec, for example, an arbitrator ruled that 24-hour call shifts violated the Canadian Charter of Rights and Freedoms and banned any shifts longer than 16 hours across the entire province.[23] By contrast, resident contracts in Ontario, where this study took place, stipulate a maximum of 1 in 4 (in-hospital) and/or 1 in 3 (out of hospital) 24-hour shifts averaged over a 28-day period.[24] They also indicate when residents should be dismissed from duty following a 24-hour overnight on-call shift,[24] a term that is colloquially known as the "postcall day." The postcall day provides a valuable lens through which to explore how residents' work hours may inform their off-duty decisions because it is designated as protected off-duty time following an extended call shift.

While much attention has been paid to the issue of residents staying to work postcall, to the best of our knowledge, only one study has specifically explored how residents decide what to do with their postcall time and the reasoning underpinning their activities. In that study, we employed a qualitative approach to understand how residents decide whether to leave the hospital postcall.[25] We found that residents believed they were invoking values of patient safety and education, regardless of the postcall behavior they endorsed.[25]

Despite limited research, assumptions exist within the literature about what residents should be doing with their postcall, off-duty time (e.g., sleeping, studying).[17–19] Most of these assumptions are expressed indirectly with limited empirical support. For example, when authors of one study found that residents' academic performance did not improve after duty hour reductions, they surmised that residents might have used their additional free time for socializing rather than studying.[19] Another study cautioned that residents might not use their leisure time in "healthy ways," choosing instead to

"participate in … activities that could result in more fatigue."[17] Such studies reflect a growing sense that "what [residents] do, or fail to do, with [their free] time may have real implications for … residents' health and well-being."[18] To inform the debate about how postcall time should be used, we need empirical data on what residents actually do postcall when they leave the hospital and why. To work toward addressing this gap, this study sought to understand residents' nonclinical postcall activities when they leave the hospital, their decision-making processes, and their perspectives on the relationship between these activities and their well-being or recovery.

Method

We employed a constructivist grounded theory approach, a qualitative methodology well suited to exploring a complex social phenomenon that is not currently explained by any pre-existing theory.[26]

The study took place at a Liaison Committee on Medical Education–accredited Canadian medical school from 2012–2014. During this time there were no changes to the national, provincial, or institutional resident duty hours policies. We recruited postgraduate years 1–5 residents whose schedules routinely included 24-hour on-call shifts from six surgical and nonsurgical specialties—general surgery, obstetrics and gynecology, orthopedic surgery, urology, internal medicine, and pediatrics—at three hospitals affiliated with the medical school. We chose these programs based on past research which indicated their intensity and frequency of on-call shifts were comparable[25] and insider knowledge contributed by one investigator (T.S.T.), an obstetrics and gynecology resident at the medical school. The scheduling of call shifts for all residents in this cohort was expected to comply with the Professional Association of Residents of Ontario contract, which stipulates that in addition to their regular daytime duties, residents may work a 24-hour call shift an average of 1 in 4 (in hospital) and/or 1 in 3 (out of hospital) days over a 28-day period.[24]

We began with purposive sampling and convenience sampling to ensure that characteristics such as gender, postgraduate year, marital status, age, and parental status were represented across the programs. We invited residents to participate through recruitment e-mails and during weekly program-specific academic sessions and obtained informed consent from each participant. Participants did not receive any compensation or incentive for their participation.

One investigator (T.S.T.) conducted 24 individual, semi-structured interviews (for an interview outline, see Supplementary Digital List 1 at [LWW INSERT LINK]) from October–December 2012. Open-ended questions invited residents to describe their postcall activities and probed them for the reasons underpinning their postcall activities. Following grounded theory methodology, the interviews and analysis proceeded iteratively, allowing us to use the strategy of theoretical sampling, in which we sought new participants or inserted new prompts into the interview protocol to probe emerging issues or themes.[26,27] Interviews were audio-taped, transcribed, anonymized, and combined with the investigator's accompanying field notes.

We conducted the analysis in three phases, beginning with line-by-line coding and using constant comparative analysis to develop focused codes. Joint discussions between two coinvestigators (T.S.T., L.L.) facilitated the coalescence of key concepts into major themes. Through further analytical discussions (T.S.T., L.L., P.W.T., T.D., J.N.), we developed an explanatory theory that accounted for the relationships among the themes.[26] Data collection continued until no new theoretical insights emerged.[28] In 2014, one investigator (T.S.T.) performed post hoc member checking, during interviews in a separate study of other residents at this medical school who fit the same inclusion criteria, which revealed that our findings resonated with these residents. We used

NVivo 10 (QSR International, Doncaster, Victoria, Australia) for data management and interpretive data procedures.[26]

This study was approved by the Health Sciences Research Ethics Board at Western University (REB #102769).

Results

A total of 24 postgraduate years 1–5 residents from across the six specialty programs participated. Of these, 12 were male. Other participant characteristics, such as age (range: 24–35 years), marital status (13 were married), or parental status (5 had dependents) were also represented across the programs. Quotations are identified with anonymous resident codes (e.g., R 020).

By definition, the postcall day immediately followed a 24-hour overnight on-call shift, which distinguished postcall days from other off-duty time. The temporal relationship between on-call shifts and postcall days meant that residents often situated their postcall experience by contrasting it with the nature of their on-call experience: "[While on call,] it was not uncommon to not eat until 10 p.m. at night and to not have time to go to the bathroom and to be completely overwhelmed" (R 005). Residents described their postcall behaviors as deliberate and purposeful. Being postcall provided an opportunity to exert greater personal control over their lives than during other times in their clinical schedule. Regardless of what postcall behaviors residents described, they expressed a strong sense that the potential need for restorative sleep was one of many demands competing for their postcall time and energy. In the context of this overarching sentiment, residents characterized their predominant approach to postcall decision-making as one of making trade-offs between multiple, competing, seemingly incompatible, but equally valuable, activities. Two orientations

toward trade-offs among these activities were evident in the data: being oriented toward maintaining a “normal” life and being oriented toward mitigating fatigue. Although some residents expressed one orientation more consistently than the other, the majority of residents shifted orientations according to the circumstances of their postcall day. Consequently, trade-offs were predominantly informed by contextual factors, such as an awareness of feeling fatigued (“essentially hung over” [R 008]) or feeling functional (“fine to do a normal day” [R 020]), and varied accordingly. Using representative quotations, we define and illustrate the two orientations below.

Oriented toward maintaining a normal life

Trade-offs that were oriented toward maintaining a normal life represented situations in which residents were motivated to choose activities that permitted them to maintain what residents characterized as “normal human things” (R 004) involving their personal lives and relationships outside of the hospital. As a result, when making trade-offs within this orientation, sleep or rest during the postcall day was necessarily restricted to a few hours or sacrificed altogether. When operating within this orientation, residents were emphatic about the significance of the postcall day, as evidenced by the advice they would offer to incoming residents: “Love them. Love your postcall days” (R 022). It was “precious time” (R 022), which provided a rare chance to stray from routine: “… particularly when you’re doing 26 hours on call … your life could be work, sleep, work, sleep, that’s all that you would be doing. I think you have to make sure that you do break that cycle” (R 012).

Many residents were motivated to “break that cycle” (R 012) by a desire to make time for social and family commitments. Residents offered two main explanations to justify the trade-off between recovering sleep and maintaining personal relationships. First, some residents reasoned that their

long—and often unpredictable—work hours during normal working days made it difficult to make plans after a typical workday. In contrast, postcall days were guaranteed and more predictable; residents felt compelled to make use of the time:

> … there's [*sic*] definitely been opportunities where I've tried to sneak in family or friends time … when you're as busy as we are, you take all these opportunities, and sometimes maybe you don't make the best decision for that weekend but when you're planning ahead of time, you just see this time that you have open. (R 006)

Making plans during the postcall day may have been opportune, but the decision to forfeit extra hours of sleep was not always easy:

> Interviewer: Do you ever have difficulties waking up from your postcall sleep, if you do have plans?
> Resident: Yeah, I usually regret making those plans. When my alarm starts going off, I go, why didn't I just plan to sleep all afternoon? But you've got to do it. (R 004)

Second, some residents were motivated to prioritize time with loved ones because they sensed that long work hours had already led them to miss out on quality time:

> Before my son was born, I would sleep a lot more. But after he was born, I realized that, you know, when I was at work certainly I missed time with him growing up and things like that. I just decided that I wanted to spend time with him on those days when I had the opportunity to do so. (R 017)

Residents also described sacrificing time they could be resting to perform tasks that allowed them to keep their personal life in order. Some of their rationalizations were pragmatic: banks, dentists, and car repair shops are only open during normal business hours. As one resident reasoned, if it was not for postcall days, these services would be fairly inaccessible to residents:

> Especially when you're on these busy services, you really almost need those postcall days to get what I call normal people's stuff done like get groceries, attend appointments, or things like that. I tend to book stuff for that time postcall because it's the only time I can really get stuff done like car maintenance, things like that. (R 001)

However, at other times, residents were motivated to restrict their sleep or rest because of a personal desire to feel productive. In this line of reasoning, sleeping or resting was an acceptable trade-off because it was less personally fulfilling:

> I think I'm the type of person where I always like to be productive all the time, even though, probably what I should be doing is just resting … I just couldn't see myself not taking advantage of the time to work out or go food shopping or just make food and do stuff that I need to do. I just can't see myself sleeping all day because it's just a waste of time. (R 013)

Oriented toward mitigating fatigue

Trade-offs that were oriented toward mitigating fatigue occurred in situations where recharging experiences, such as choosing to "crawl right into bed and sleep for as long as possible" (R 008) or engage in passive activities, took priority over tasks that required more energy expenditure, such as studying, socializing, or attending to normal life. While oriented toward fatigue mitigation, residents emphasized that taking a postcall day was necessary to compensate for the physical and cognitive demands of busy on-call shifts.

An interesting feature of this orientation was that, despite sharing a common intention to recuperate after prolonged sleep deprivation while on call, residents' postcall sleep practices varied. A few residents described choosing to sleep "for as long as possible" (R 008), while others deliberately restricted their daytime sleep with the intention of preserving their sleep-wake rhythm:

> There's been a few times where I sleep until 7:00 [a.m.] or so if it's been a really rough night and I'm really exhausted, but generally, I try to get up. It's just because I know if I sleep too long then I won't be able to sleep at night, then I'll be exhausted the next day. (R 009)

There was a pervasive sense in the transcripts that choosing to sleep, or rather, that choosing not to do more immediately productive activities (e.g., studying or continuing to work) warranted further justification. For example, one might earn a break from studying by working long hours: “I don’t do a lot of educational things postcall, I generally find I’m quite tired and I’ve just worked for 30 hours, so I feel like I deserve a small break” (R 022). Whereas other residents simply felt that studying was futile in light of postcall fatigue: “I know that I’m not really capable of good thought at that time if I were to read something or try to learn, it wouldn’t be an optimum time to do it” (R 016).

Many residents felt conflicted about sacrificing valuable educational experiences by leaving the hospital and choosing to sleep or rest:

> I’m of the opinion that the more volume you see and the more … you’ve just got to be there to be able to see these cases because it’s stuff that you can’t read in the textbook … so I try to stay as much as possible. However, if I’m not feeling it, like if I feel like crap and I feel sick or sneezy like I am right now, I’ll forego the [operating room] and I’ll just say tell my seniors or my other juniors that I’m going home, and that’s my choice. I know my role and I know my rights. (R 015)

As this comment implies, anticipated criticism from colleagues further complicates residents’ trade-offs. When residents feel that feeling “sick or sneezy” (R 015) will not be seen as a sufficient reason to choose sleep or rest, invoking the rules is perceived to be necessary for residents to justify their decision.

Postcall trade-offs in this orientation were more likely to be informed by past experience than trade-offs described by residents while oriented toward maintaining a normal life. At times, residents implied that they had learned the consequences of making trade-offs that sacrificed sleep or rest:

> Even though I’m awake and have energy to do things, I’ll know I’m going to get tired so I’ll [*sic*] just rather be at home so I can just fall into bed at that time, rather than being so stuck in a breakfast brunch

> place and then be like, I have to drive home now when I'm not as awake. (R 012)

One resident explained how her priorities similarly shifted toward a fatigue mitigation orientation later in her training, which required deliberate personal trade-offs:

> So, from when I started eight years ago, I think I try to do less now postcall. Before I would try to schedule time with friends, schedule time with [my] boyfriend, go to the gym, study, and I think, now, I've just cleared away all the kind of personal stuff, and just focus on trying to get sleep and study. Whether that's good or not, I don't know, but I just found that I was constantly breaking plans. So, I did not want to be the unreliable person. I would rather just be the person that's not around for a while. (R 018)

Discussion

Residents in our study responded to competing demands on their postcall time by making trade-offs, which can provide insight into what it means for residents to recover. The duty hours literature[5,20,22,29,30] tends to focus exclusively on the recovery of sleep, which can be at odds with the recovery of self.

Recovery of sleep

The orientation toward mitigating fatigue challenges the discussion around recovery in the research and grey (e.g., consensus reports[22]) literatures, in which recovery of sleep is presented as uniformly understood and enacted. The expectation that all residents can and should abide by "healthy sleep habits"[30] and obtain "necessary levels of preventive and recovery sleep"[30] is strongly promoted by the duty hours literature, in spite of conflicting evidence regarding the necessary amount of sleep. Where other studies have assumed that residents may be unwilling or unable to "recover their lost sleep"[31] on postcall days, residents in our study agreed that postcall days were useful (and often necessary) to catch up on sleep. However, there was great variability in how residents translated this into practice.

Even when residents are motivated to reduce their fatigue, some of them believed they got a better night's sleep if they did not go straight to bed postcall. Thus, recovery of sleep is characterized by calculated trade-offs involving decisions around when to sleep, how much to sleep, and when to remain awake, rather than by well-defined, predictable practices that apply to all residents.

Recovery of self

Participants in our study seemed highly motivated to spend their postcall day doing things other than sleeping or resting, which suggests residents are working with a broader notion of recovery. We have named this broader notion of recovery the recovery of self. Within this recovery framework, residents are intending to reconnect with their identities, roles, and relationships that exist outside of the hospital. This resembles the practice of psychological detachment, where one deliberately mentally disengages from work to facilitate recovery from workplace demands.[32] Research on psychological detachment in other high-demand workplaces suggests it may play a significant role in personal well-being and workplace performance.[33] In fact, the inability to psychologically detach has been associated with emotional exhaustion, dissatisfaction, and poor sleep quality.[33] Within residency training, Cranley found that residents tend to struggle with psychological detachment and hypothesized that workload may account for this difficulty.[34] Similarly, based on a survey of residents' nonsleep, nonwork activities, Baldwin et al found a correlation between off-duty social isolation and depression, anxiety, stress, dissatisfaction, and increased rates of having made a self-reported fatigue-related error.[18] This early research suggests recovery of self, through disengaging from work during off-duty hours and seeking opportunities to engage with other aspects of life, may have beneficial implications for residents' on-duty performance and wellness.

Through the recovery of self, residents also tended to the requisite maintenance tasks of adulthood. This resonates with Baldwin et al who propose that one benefit of increased off-duty time lies in providing residents "the ability to better manage their lives."[35] Other research has demonstrated that residents' perceptions about having the ability to secure "personal time away" are positively correlated with less perceived stress and greater career satisfaction.[36] Whereas the recovery of sleep is about feeling less fatigued, the recovery of self is about reclaiming one's life outside of the hospital.

Recovery and studying

Studying did not feature predominantly in residents' accounts of how they spent their postcall time, but we cannot make any inferences about their study practices during other off-duty times. We believe this distinction is critical to avoid making assumptions about trade-offs between self-directed learning and quality of life for residents with reduced work hours. For those residents in our study who raised the issue of studying postcall, they often reasoned that their fatigue precluded them from engaging meaningfully in such a cognitively demanding task. Spending time with loved ones or tending to personal needs was feasible because it did not require the same cognitive resources. This observation fits within the proposed dual recovery model we proposed above to understand residents' postcall decision-making processes, as it suggests residents may not perceive studying as a recovery process, but rather as a task that exceeds their postcall cognitive resources.

Strengths and limitations

Constructivist grounded theory does not make claims of generalizability nor is it intended to represent the entire spectrum of the studied population.[26] While we had a theoretically informed sample of postgraduate years 1–5 residents from six surgical and nonsurgical specialty programs, our

study included a single Canadian medical school, and our findings are situated within the local culture of that school. Therefore, we offer a preliminary dual recovery model whose transferability must be explored through further research in other settings.[26] A single interviewer, who was concurrently enrolled in one of the sampled programs, conducted all of the interviews. In the context of constructivist grounded theory, this is a strength, as her insider status likely encouraged candid interview discussions and her own lived experiences contributed to the analytical insights gained.[37] By engaging in reflexivity through reflective memoing, creating field notes, and participating in collaborative analysis with "outsiders" who offered alternative viewpoints, the interviewer remained attuned to the impact of her insider status.[37]

Implications for future research and policies

An important question for future research is the relationship between the two trade-off orientations and factors such as residents' demographics or program culture. Lopez and Katz identify a tension that exists "between the need for self-health and the professional ideals of altruism and self-sacrifice."[38] Thus, the degree to which psychological detachment and other aspects of recovery of self are commensurate with the professional ethos of medicine also warrants exploration. From a policy perspective, the variability in how residents enact recovery of sleep is problematic. Although professional ideals of self-regulation privilege autonomy, the literature suggests self-assessment of fatigue becomes less accurate with increasing levels of fatigue.[39,40] Genetic differences in sleep requirements further complicate matters.[41] Because no two on-call shifts are alike, variation in recovery of sleep may also reflect adaptations to varying degrees of acute sleep deprivation. Work hour policies have tended to overlook the tension that emerges when residents must choose between abiding by duty hour policies, attending to their own needs, or attending to the needs of their patients. Because recovery of sleep is neither uniformly understood nor universally experienced,

program leaders and the policies they follow should not assume that a sense of duty to recover sleep will necessarily lead to less fatigued, more alert residents.

Conclusions

This study not only addresses the evidence gap involving residents' nonclinical postcall activities but also begins to uncover the needs these activities are serving. We found that residents' used two trade-off orientations—maintaining a normal life or mitigating fatigue—when making decisions about how to use their postcall days. These orientations were not static; residents reported shifting their predominant orientation according to the situation and accrued experience. These findings challenge the dominant viewpoint in the current duty hours literature, which has maintained a singular focus on sleep as the only path to recovering from working long hours. Our study suggests we must broaden the duty hours discussion to include other recovery processes. For the residents in our study, postcall trade-offs were motivated by two distinct and competing forms of recovery—the recovery of sleep and the recovery of self. There is literature to support the importance of both, but further research is required to understand how they relate to one another.

Formulaic models and prescriptive duty hour policies tend to reduce the postcall experience to an accounting of hours of sleep and wakefulness. A dual model of recovery may explain why such policies can fall short of expectations.

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