Fatigue and Patient Safety

**ABSTRACT:** It has long been recognized that fatigue can affect human cognitive and physical function. Although there are limited published data on the effects of fatigue on health care providers, including full-time practicing physicians, there is increasing awareness within the patient safety movement that fatigue, even partial sleep deprivation, impairs performance.

A safe and effective health care system must be structured to minimize error and confusion. Individuals who are tired are more likely to make mistakes. Reducing fatigue may improve patient care and safety as well as improve health care provider’s performance satisfaction and increase communication. One of the most significant limitations in evaluating fatigue is the absence of an available metric for accurately measuring fatigue and its subsequent effect on patient care.

Physicians are expected to offer safe and effective care to their patients. For clinicians, maturity requires recognition that medicine is a human endeavor. While individuals develop their clinical skills, they become aware of their own unique strengths and weaknesses. Professionals regularly seek consultations when a problem exceeds their experience or expertise. Seeking assistance when one is fatigued is beginning to be seen in a similar light. Fatigue may affect a health care provider’s skills and abilities, communication, and possibly outcomes. Because of a lack of research on the subject, there are no current guidelines placing any limits on the volume of deliveries and procedures performed by a single individual or the length of time one may be on call and still perform procedures. Physicians at all stages in their careers need to be cognizant of the demands placed on them professionally and personally and should strive to achieve a balance that will not lead to excessive fatigue or overcommitment.

In July 2003, the Accreditation Council for Graduate Medical Education enacted resident duty-hour limits to promote high-quality learning and safe care in teaching institutions. In December 2008, the Institute of Medicine Committee on Optimizing Graduate Medical Trainee (Resident) Hours and Work Schedules to Improve Patient Safety published a report entitled *Resident Duty Hours: Enhancing Sleep, Supervision, and Safety.* Among the various recommendations, a 5-hour protected sleep interval following 16 continuous hours on call was suggested (1). Revised Accreditation Council for Graduate Medical Education duty-hour recommendations that began in July 2011 established new limits on resident duty hours and also emphasized the importance of faculty supervision, hand-over processes, and management of alertness. Duty periods for first-year residents must not exceed 16 hours. Although intermediate-level and senior residents may be scheduled for a maximum of 24 hours of continuous duty, programs must encourage residents, as professionals, to use alertness-management strategies to maintain alertness in the context of patient care responsibilities (2).

The National Sleep Foundation recommends 8 hours of sleep per night for an adult (3). The average U.S. adult sleeps only approximately 7 hours per night. Sleep deprivation can be caused by insufficient sleep or fragmented sleep or both. Although there is wide variation in sleep needs, individuals do not get accustomed to less sleep than what is biologically required. One cannot store up sleep. Recovery from a period of insufficient sleep requires at least two or three full nights of adequate uninterrupted sleep (3).

A number of uncontrolled studies have analyzed the effect of sleep restriction on cognitive function (4–6). The authors of one small study compared reaction times and performance on a driving simulator between residents who had ingested alcohol but were rested and residents who were on a call rotation every fourth night and found that performance was comparable (4). Emergency department physicians who were rested have been compared with others on sequential night call (7, 8). The disruption...
of sleep produced by shift work had a significant effect on both visual memory and cognitive performance. Another study that examined the risk of complications by attending physicians after performing nighttime procedures found an increased rate of surgical complications when physicians had sleep opportunities of less than 6 hours (9). For the obstetrician cohort, the authors concluded that a larger study with increased statistical power would be necessary to further explore the effects of sleep deprivation on the population of physicians managing labor and delivery patients after being on call.

Several reviews of the medical literature show that even a single night of missed sleep measurably affects cognitive performance (10–13). When adults do not sleep at least 5 hours per night, language and numeric skills, retention of information, short-term memory, and concentration all decrease on standardized testing. Speed of performance may be affected more than accuracy. For example, surgeons operated more slowly in simulated procedures when sleep deprived and emergency department physicians took longer to intubate a mannequin.

In other industries, fatigue often is invoked as a cause of error and accident. The National Transportation Safety Board rates excessive sleepiness as the second leading cause of driving accidents in the United States (14). A study by the Federal Railroad Administration showed that human factor errors are responsible for almost 40% of all train accidents over the past 5 years and that fatigue played a role in approximately 25% of the accidents (15). However, there is no clear evidence in health care that restricting work hours improves patient outcome. Several potential explanations for this exist. In the residency setting, work-hour restriction has often resulted in utilizing a night-float system, which has not been shown to decrease fatigue. Repeated episodes of working at night may result in sleep deprivation because physicians find themselves unable to rest during the day. Even a single night of complete sleep loss can require up to 3 days for recovery (8, 16).

Memory consolidation and insight formation require sleep. Sleep-deprived adults tend to exhibit impaired complex problem solving skills and continue with solutions that do not work (17). The need for sleep, like the need for food, can affect decision making. Fatigue may drive individuals to avoid work responsibilities to address sleep deprivation. Safe and effective care requires mindful communication between the patient and the physician and between the physician and other caregivers. Mood may be even more affected by sleep deprivation than cognitive or motor performance and may have a significant effect on a physician’s ability to communicate effectively (12).

Office medical directors and chairs of hospital departments of obstetrics and gynecology should consider developing call schedules and associated policies that balance the need for continuity of care and a health care provider’s need for rest. If patient care responsibilities preclude scheduled rest, alertness-management strategies may be helpful. Consideration can be given to the following guidelines suggested by the National Highway Traffic Safety Administration (14):

- Structure work to take advantage of circadian influences.
- Recognize that the urge to sleep is very strong between 2 AM and 9 AM, and especially between 3 AM and 5 AM. Avoid unnecessary work at that time.
- Sleep when sleepy.
- Provide for backup during times impairment is likely.
- Go to sleep immediately after working a night shift to maximize sleep length.
- Apply good sleep habits. The sleep environment should be quiet and dark. It should have adequate ventilation and a comfortable temperature to allow daytime sleep.
- Recognize behavioral changes such as irritability that may indicate dangerous levels of fatigue.
- Use naps strategically. A 2-hour nap before a night shift will help prevent sleepiness. If a 2-hour nap cannot be scheduled, then sleep no more than 45 minutes to avoid deep sleep and subsequent difficulty with arousal.

From an individual perspective, health care providers should ask themselves the following questions when considering their schedules:

- Should I work a half day or a full day in the clinic after a night on call? Should I be at work for any length of time after a night on call?
- Should I perform surgery if I have been awake most of the previous night or should the procedure be rescheduled?
- What backup system is available if I recognize a worrisome level of fatigue?
- What adjustments should be made to my call schedule to avoid a worrisome level of fatigue?

Because physicians may not easily be able to assess the degree of their own fatigue, it also may be prudent for groups or departments to consider processes that provide backup care when physician fatigue may diminish the quality of care. Physicians may consider postponing tasks that can be performed more safely at a later time. Departments and groups also should recognize that fatigue might arise from obligations outside the workplace. Some departments have systems that encourage collaboration between practices when a health care provider has not had a sufficient period of uninterrupted sleep. Physicians should not fear economic or other penalties for requesting assistance.

Although the implication of the studies mentioned is that quality of care may be enhanced by increased physician rest, there is no current evidence that proves this premise. Additional research on the effects of fatigue...
on experienced practicing obstetrician–gynecologists is necessary before specific national guidelines that are evidence-based can be promulgated to improve overall patient safety and care. Although there are limited published data on the effects of fatigue on health care providers, including full-time practicing physicians, there is increasing awareness within the patient safety movement that fatigue, even partial sleep deprivation, impairs performance. Because of the issues of patient safety, practicing physicians can consider evaluating the effects that fatigue has on their professional and personal lives (eg, adjust workloads, work hours, and time commitments to avoid fatigue when caring for patients.)

**Resource**

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**References**


