



## EDITORIAL

### Fatigue in anesthesia workers



One of the inescapable elements of medical practice is long hours and night work. In recent years, research has demonstrated the impacts of fatigue on our clinical work and on our health. We know from experience that as we become more tired, we find it harder to take in and learn new information, to think flexibly and do complex calculations. We might notice lapses in vigilance and concentration, that we are less dextrous at practical procedures, and that we are less empathic.<sup>1</sup> Our teams might notice our mood getting worse or that we are more likely to take risks. All of these are well recognized signs of fatigue, and they all have detrimental effects on the care we deliver to patients.

But night shift work has negative impacts on our own health as well. Hypertension, myocardial infarction, stroke, type II diabetes, breast, bowel and prostate cancer, and depression are all more common in night shift workers and we are more prone to accidents.<sup>2,3</sup> We are twice as likely to have a car crash driving home after a 12-hour shift than an 8-hour shift. If we drive after being awake for 18–20 hours our performance behind the wheel is as bad as if our blood alcohol is over the legal limit for driving.<sup>4</sup> Fatigue induces spontaneous, unrecognized “sleep lapses” or “microsleeps”, and doctors, nurses and other healthcare workers have had serious accidents or died as a result of a microsleep when driving. In many European countries it is illegal to drive when critically tired; why do the same rules not apply to clinical practice?

Night working, acute sleep deprivation, chronically shortened sleep, and high work intensity all cause fatigue and impact on the safety and effectiveness of the care we deliver.<sup>5</sup> There are physiological reasons for this. Two processes control sleep, one homeostatic and one circadian. While we are awake, substances called somnogens such as adenosine build up in our brains, promoting sleep. This is counteracted by the circadian alerting signal during daylight hours. We have two circadian nadirs, one at about 3–4 pm and one at night between 3 and 6 am when we are most likely to make errors. After dark, the effects of increasing levels of somnogens makes us increasingly tired, to a point where we need to sleep.<sup>6</sup> If we ignore this, our ability to

function effectively deteriorates; this reduced physiological performance is called fatigue. Left unchecked this eventually leads to exhaustion, an inability to respond to emotional or physical stressors.<sup>7</sup> Emotional exhaustion is one part of the triad of burnout, together with depersonalization and a reduced sense of personal accomplishment, an increasingly common condition affecting healthcare workers.

Many organs other than the brain have circadian processes, such as the pancreas, kidneys and cardiovascular system, and these are active during the day (diurnal). This may be why night-shift workers are more prone to the diseases mentioned above; for instance, we are less able to metabolize a high calorie meal at night.<sup>8</sup> To shift our internal body clock “phase” by 1 hour takes about 24 hours, so rotating day and night shift work is difficult, and we are often tired on night shifts and struggle to sleep during the day.<sup>9</sup>

As we age, the quality of our sleep can become poorer and we may sleep for less time.<sup>10</sup> However our need for sleep does not diminish, and we find night shift work more difficult. Responsibilities grow as we become more senior and have families; mothers of young children are some of the most sleep-deprived workers.<sup>11</sup>

Until now, healthcare has seen tiredness and fatigue as occupational hazards, not recognizing their impacts on our clinical performance and on driving home safely. Management of fatigue has been left up to the individual. In contrast, other high-hazard industries such as airline and petrochemical have regulations requiring good fatigue risk management, so organizations have to identify fatigue-related errors, provide rest facilities and run safe rotas. We need to learn from other high-hazard industries and establish good fatigue risk management as part of our overall safety culture in healthcare.

Several strategies used in other safety-critical industries can also work in clinical practice. Examples include 20-minute “power naps” taken during a quiet spell or a break during a long shift or a night shift. You need 15 minutes to get to sleep, and somewhere quiet dark, safe and flat to lie down. Some airlines advise their workers to have a cup of coffee before going to sleep as the caffeine will be taking effect as

you wake from the nap. Caffeine works by blocking the effects of adenosine, a key somnogen, on our brain.

Good teams discuss how tired each person is at the start of a night shift and make sure those who are the most tired get their power naps early in the shift. They are especially vigilant at the circadian nadir (3–6 am and 2–4 pm) double checking critical decisions and drugs with other team members. And they support each other, watching out for signs of fatigue, and encouraging a culture where this is discussed and seen as part of safe practice.

Rotas are also carefully managed; those on night shifts never work more than 12 hours and never more than 3 nights in a row. Rolling rotas always work forward, so everyone works early shifts then late shifts, then nights, with enough time to recover after a shift. For those on call, the maximum length of work is 24 hours and there are contingency plans in place to call others in if they are working for 16–18 hours continuously.

In Europe we are beginning to put some of these practices into action as we recognize the impacts staff fatigue has on patient safety and on our own safety and well-being. Brazil may be ahead of us here, with regulatory frameworks that make 12-hour shifts the norm and facilities provided for sleep during the night shift. This is part of a bigger European project, raising awareness, identifying good practice from other industries, and developing effective fatigue risk management systems through organizations and influencers, including patient groups.

Fatigue Risk Management Systems are frameworks and formal processes designed to systematically identify areas where fatigue poses a risk and to manage the risk effectively through appropriate control measures. Principles of systems-based thinking typically used in health safety and well-being management systems are applied to fatigue risk management. Successful implementation of a risk management system requires planning, commitment, consultation, clarity of roles and responsibilities, documentation, monitoring, review, and evaluation.<sup>12</sup>

In Europe, we realized that many clinicians and managers know little about circadian physiology and the scientific basis for good fatigue risk management. We started to raise awareness with surveys of trainees and trainers.<sup>13,14</sup> These showed that many of us are chronically sleep restricted and have examples of fatigue related errors and near misses from our own practice. Ninety two percent of the 1500 consultants who responded to our survey, from 32 European countries, experienced work-related fatigue.<sup>14</sup> Causes included their working patterns, clinical and non-clinical workload, staffing issues and excessive hours worked. Over 70% reported that work-related fatigue negatively impacted physical and mental health, personal well-being, and safe commuting. Other impacts described by trainees included effects on their ability to do their job (53%) to study (88%), manage exam revision, do projects (82%), and on their job satisfaction (61%).<sup>13</sup> Most consultants and trainees did not feel supported by their organization to maintain good health and well-being, including a lack of support from hospitals and management for recovery during and after night shifts.

In Europe, 37% of trainees have had an accident or near miss driving home, and although 40% describe feeling too tired to drive, some do so anyway. Seventy percent have

access to post-shift rest facilities for a power nap before driving home but 40% do not use these as they “prefer to get home”. Earlier UK studies showed that 57% of trainees and 45% of consultants described accidents or near misses driving tired, 75% used cars or motor bikes, 84% of trainees and 60% of consultants knew they were too tired to drive but did so because they had limited access to on shift rest facilities.<sup>15</sup>

Realizing we have a big problem, the European Board and the European Society of Anaesthesiology and Intensive Care are working to address this. We provide educational material and do talks and workshops to help anesthesiologists to understand the problem and identify ways of mitigating its impact. Each one of us has a part to play. We should adopt good sleep hygiene principles as individuals, making sure we rest before and between night shifts, having power naps during nightshift breaks, talking about fatigue, and double checking any work we have to do during our circadian nadir [3–6 am]. Teams and departments should discuss fatigue, especially during night shift ward rounds, watch out for colleagues who are getting tired and make sure everyone gets breaks. They should ensure there are facilities available for people to lie down somewhere quiet dark and private for power naps, and that during the night, only life or limb saving surgery is done, and no routine work or stocking up is permitted. Organizations should ensure staff are educated about fatigue and how to mitigate its impacts, and provided with the resources and facilities to ensure both patients and staff are safe when working long hours and overnight. We should regard fatigue as a patient and staff safety risk, have it on the risk register, implement and promote strategies that mitigate its impact.

## Conflicts of interest

The authors declare no conflicts of interest.

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