

EDITORIAL

Fatigue in anaesthesiology

Call for a change of culture and regulations

Nancy Redfern, Federico Bilotta, Igor Abramovich and Ioana Grigoras

European Journal of Anaesthesiology 2023, 40:78–81

Fatigue affects everyone. We all remember feeling as though we are jetlagged in the middle of a busy night, desperately trying to stay awake at 4 a.m. If an emergency happens adrenaline kicks in and we wake up; it's the more routine work in which we know sleep deprivation takes its toll. The nature of our work as anaesthesiologists and intensivists can make fatigue particularly problematic. Our patients are often unconscious, so conversation with them does not help keep us alert. We use potentially lethal cocktails of drugs, which we often draw up and administer ourselves, and sometimes machines or monitors malfunction. A few moments' lack of vigilance or misinterpretation of physiological parameters can very quickly have disastrous results. These problems are compounded by the increasing challenge of interpreting and responding to a changing situation when we are tired. For example, the failure to recognise a patient's allergies or the miscalculation of a drug dose can lead to adverse events for patients. Moreover, communication becomes poorer as fatigue sets in, so it can be more challenging to use the team's wisdom to resolve a clinical problem.¹

Science confirms what our body tells us. After 12 h awake our empathy starts to wane, logical reasoning is harder, vigilance becomes more variable and cognitive and motor skills become worse to a point where, after 16 to 18 h of wakefulness, our performance is as bad as if we were under the influence of alcohol.² Our mood deteriorates, we find it much more difficult to think flexibly and respond to quickly-changing situations, and are more likely to take risks. After the ninth consecutive hour of work the risk of being involved in an accident increases and after a 12 h shift we are twice as likely to crash driving home than after an 8 h shift.³

Fatigue: an occupational hazard

We accept this as an occupational hazard, but other industries have a different approach. Every other safety critical industry, airline, nuclear, electrical, petrochemical, rail and road haulage are required by law to have formal fatigue risk management strategies. This is not because they have a better understanding of sleep physiology, but because they have had to make changes following several high-impact disasters (Chernobyl, Gulf of Mexico oil spill, Challenger accident).¹ The European Board of Anaesthesiology (EBA) Workforce, Working conditions, Welfare (WWW) Standing Committee think it is time for European medicine to change its approach.

Sleep is safety

Potentially, we can capitalise on the general public's interest in our wellbeing, as patient safety is at risk while we are fatigued. It comes as a surprise to an airline pilot that their anaesthesiologist is allowed to administer an anaesthetic after working continuously for 18 h, or to a train driver that a junior doctor is allowed to drive home after a 24 h shift because there are no rest facilities or opportunities to sleep. The cultures are different in these other industries: sleep is safety. We are more likely to earn the respect of the general public, many of whom work in safety critical industries where fatigue risk management systems (FRMSs) are the norm, if we too create a culture where fatigue is seen as a risk to patients and to staff, and systems and resources are put in place to mitigate its effects. Attitudes to work are changing. Many 'generation Y' trainees have a different outlook on work than their 'generation X' and 'baby boomer' consultants. They want a good working atmosphere, a family-friendly approach, and they expect to be well treated, respected and valued as part of the team and get support in their training. They know fatigue impacts on their ability to

From the Newcastle upon Tyne NHS Foundation Trust, Newcastle upon Tyne, UK (NR), Department of Anaesthesiology and Critical Care, Policlinico Umberto I Hospital, La Sapienza University of Rome, Rome, Italy (FB), Department of Anaesthesiology and Intensive Care Medicine, Charité Campus Benjamin Franklin, Berlin, Germany (IA) and Department of Anaesthesiology and Intensive Care, 'Grigore T. Popa' University of Medicine and Pharmacy, Iasi, Romania (IG)

Correspondence to Federico Bilotta, Department of Anaesthesiology and Critical Care, Policlinico Umberto I Hospital, La Sapienza University of Rome, Rome, Italy
E-mail: bilotta@tiscali.it

train and learn. If they are not well managed many generation Y trainees do not stay; they have less loyalty to employers. To them, long hours and working through tiredness are not rites of passage, a sign of being an unbreakable hero or heroine. Generation Z, who will be entering training soon, will interpret such long hours as a sign that the management is out of touch and has not understood basic sleep physiology, or perhaps that management 'do not value their employees sufficiently to provide the resources needed'.⁴ This may be partly true, circadian physiology was not part of the curriculum 20 years ago. Our understanding of the vital role sleep has for both our safety and for patient recovery has advanced in recent years. We now know that outcomes are worse for patients operated on in the early hours and sleep deprivation in intensive care negatively impacts on recovery, but this is relatively new information.⁴ One of the core principles in education is to start where the learners are, so we need to ensure that circadian physiology and good fatigue risk management become a core part of the curriculum and senior anaesthesiologists and intensivists are supported in embedding this learning into their clinical work.

However, attitudinal learning is not just about embedding facts in our brains, we have to integrate and demonstrate appropriate values in everything we do. Like any learning, this happens in stages. First, we have to hear what is being said and then understand this – the impacts of fatigue on thinking make more sense to us than details about the functioning of the suprachiasmatic nucleus. But only after we value the learning, do we start to put it into place when we are not being observed. Hence, attitudinal learning about fatigue must involve changes in behaviour and changes in attitudes to napping, driving and working when tired, for it to be sustained.

Currently, there seems to be a difference in the way learning about sleep physiology is put into practice compared with, for instance, changes in managing ventilation in ICU. One stays only as academic learning, the other is quickly translated into clinical practice. Why is this? ICU ventilators are expensive, much more expensive than sofa beds for staff naps, so it is probably not financially driven. Someone else has to take responsibility while the doctor has a power nap. This might be problematic as we are all understaffed, but it is rare for us to be frantically busy for the whole night. However, organising someone to take the bleep involves creative thinking, planning and negotiating, skills which are much harder as we get more tired, so this may play a role. The ITU ventilator has a direct impact on patient care. In an understaffed environment where the duty to our patients is paramount, the importance of having a power nap in improving the safety of our own clinical practice may be overlooked. We can learn from other industries here, where such behaviour is expected routine practice as part of the FRMS.

A change of culture and regulations

Expectations of senior staff and management probably have a major influence. Safety literature describes the difference between 'work as imagined' by seniors and managers who once worked in more junior roles, 'work as done' by current junior staff (who do take naps but don't report these), 'work as prescribed' by seniors telling the juniors what is and is not allowed and 'work as disclosed' by juniors reporting to seniors what happened.⁵ If 'the boss' expects his or her juniors to soldier on and resist their bodies' urge to sleep, trainees are less likely to nap. Often these expectations stem from the senior's own experience when continuing to work while very fatigued was the norm: 'I managed, why shouldn't you cope?'. Moving from a culture where taking a power nap is seen as weak to one where it is regarded as safe practice, as important as checking the drugs or the machine, would help establish safer working practices. When we take a handover from the night staff, the senior should ask 'Have you had a power nap', and if not, make sure the trainee gets home safely, and review the overnight workload, organisational arrangements and support to see if the situation could be improved.⁵

Some changes have already happened. Efforts have been made in many countries to introduce the European Working Time Regulations to medicine but tighter regulation of working time and better rostering is difficult to achieve with inadequate workforce numbers. In the UK the British Medical Association produced the Fatigue and Facilities Charter and Good Rostering Guide and senior clinicians were appointed to the post of Guardian of Safe Working Hours in every hospital in England.^{6,7} This has had some positive effects for trainees, but may impact on their clinical experience and, if there are fewer doctors on call, can lead to them having a higher clinical workload. Additionally it does not address the most hazardous fatigue-related activity for doctors; driving home tired after night work.⁸ Instead of starting with the regulation of working time arrangements, rota design and more staff, we will be more effective if we measure staff tiredness and manage fatigue-related risk. Frequency, duration and intensity of work, individual clinical experience, level of supervision and support from the wider team all influence fatigue-related risk.⁸ None of this is affected by regulation, but these strategies are known to be effective in the healthcare environment. Many staff do not get the required 8 h sleep per 24 h and are already sleep deprived when they start work. We need to take this into account, ensure they have rest breaks and encourage napping. But most of all we, anaesthesiologists and intensivists, need to acknowledge that fatigue is a patient and staff safety risk, identify and implement strategies that work in our own teams and hospitals to ensure that staff can 'work safely while fatigued'.

Individuals, teams and departments and the wider organisation can all play a part in improving fatigue risk management. A change of mindset and attitude at individual level

is very productive. Looking after ourselves by practicing ‘good sleep hygiene’ (simple measures that assure a restful sleep), ‘banking’ sleep by spending longer than usual in bed before a more challenging session, limiting napping just before work to 30 min to reduce sleep inertia or drinking coffee about 30 min before a challenging anaesthetic case at night, can all be helpful.⁹

Organisational support is an important factor. Hospital or department directors should make working arrangements reasonable, give help when difficulties arise, be constantly concerned about their employees’ physical and mental health, praise the efforts of the team, organise regular teamwork activities – to cultivate the sense of belonging. A good atmosphere of mutual help among doctors is known to improve morale and wellbeing.¹⁰

As a profession, anaesthesiologists and intensivists are compassionate individuals who provide support, healing and encouragement to patients. However, fatigued anaesthesiologists find it difficult to demonstrate our core values – caring for others.

Fatigue risk management systems

FRMSs consist of sets of procedures for the identification and management of fatigue-related safety risks based on continuous risk assessment. These include tracking sleep and work time and using strategies to mitigate the impacts of fatigue on performance.¹¹ Should we follow the lead of other industries that use such a system and develop formal legally binding fatigue risk management regulations in healthcare? At first sight, this might seem attractive, but as Dawson and Thomas⁸ point out, solutions developed for other industries (e.g. tighter regulation, more staff, better rotas, enforced breaks during shifts and compulsory rest periods before or after on-call) are sometimes ill-suited to healthcare: we can’t simply stop work like a lorry driver when he’s done too many hours behind the wheel. Sometimes, as Dawson says ‘a tired doctor is better than no doctor’.⁸ Translating improvements from one setting to another will be relevant only if the work setting, workload, job requirements, cultural and organisational arrangements are properly understood. To implement an intervention successfully, it must be realistic and achievable in the specific organisational context, seen as acceptable, helpful, supported and promoted by senior clinicians and managers. An idea cannot simply be imported from industry: in order to work, careful adaptation and intelligent reinvention are needed.¹²

Dawson suggests that we need a culture change to one where managers and senior clinicians openly acknowledge that fatigue is a patient and staff safety hazard, and put strategies in place to ensure that staff can ‘work safely while fatigued’. We need to build an FRMS using multiple, overlapping layers of defence against fatigue-related incidents, such that an error can only occur when all layers of defence fail.¹³ This is particularly important now with

several safety regulatory procedures being temporarily suspended in worldwide healthcare systems because of the COVID-19 pandemic; for example, work patterns, ICU physician–patient ratios, certification of specialisation, all due to dramatically increased number of ICU patients and shortage of personnel.

Some relatively simple actions have been used in other settings for many years and may be useful to us in healthcare. In the 1980s Dinges and Rosefield showed that a 40-min nap during a long-haul night flight reduced the frequency of lapses in concentration from microsleeps in pilots. This went on to be described as a ‘power nap’; other suggested terms such as ‘prophylactic nap’ or ‘planned nap’ were rejected by the American Federal Aviation Authority as not tough enough for their culture.¹⁴ Examples of such a culture also exist in medicine with free text comments from our trainee surveys noting ‘lead ICU consultant tried to remove on call room’, being told ‘it’s shift work so you shouldn’t need to rest’, or ‘actively dissuaded trainees from resting, including by threatening disciplinary action’.

We could provide quiet dark safe spaces for staff to have a power nap during breaks. Other strategies that could be introduced into the way we manage night shifts include education around driving risk, tools to assess your own fatigue level (e.g. Karolinska Sleepiness Score and Epworth Sleepiness Scale) and fitness to drive home, places to sleep before going home at the end of a shift, and provision of other forms of transport, such as taxis. There should be specific initiatives to protect anaesthesiologists, intensivists and healthcare workers aged more than 55 years involved in overnight work, as the impact of fatigue can worsen with age.¹⁵

Could we institute some of these measures and start to build up an FRMS that works in healthcare settings? Measures could be introduced such as making rest facilities and their usage the norm, minimising the chance of healthcare workers becoming impaired at work through thoughtful rota planning, providing enough staffing and providing education for individuals regarding the impact of fatigue on clinical practice, and additional team effort to detect staff who are overly tired and to support them in an appropriate way.

Would this start to change our culture, ‘the way we do it here’? We do have opportunities. The pandemic has brought into sharp focus the difficulties of excessive workload, understaffing and poor working conditions. Much has been written about impacts on staff wellbeing, there is increased public awareness of the challenges we face and, in many countries, there has been interest in trying to improve matters.^{13,15}

Conclusion

Some will embrace the new; innovators and early adopters who welcome improvement. It only takes

20% of people altering behaviour to start and establish new norms. Others will wait until the ideas become mainstream. A few will remain as laggards, for whom the change is too much of a challenge. The EBA WWW Standing Committee initiated the FATIGUE project in 2019, aiming to raise awareness about the consequences of fatigue both on patient safety and on anaesthesiologists' wellbeing and safety. Collaborating closely with the European Society of Anaesthesiology and Intensive Care and other organisations, the EBA WWW working group aims to promote a change of culture and regulations in our specialty by multiple means: evaluation of current European practice (surveys), educational events, publications. The EBA WWW group is working closely with trainees; it won't be many years before there are enough newly appointed consultants to influence safety education about good fatigue management. Of course, we also have a large group of established consultants who also embrace this approach. Hopefully, there will soon be a change of culture and regulations. After all, why should healthcare not have the same requirement for fatigue risk management as every other safety critical industry?

Acknowledgements relating to this article

The current article was written as a part of the FATIGUE project initiated by the European Board of Anaesthesiology Standing Committee on Work Force, Working Conditions, Welfare. We thank ESAIC NASC, ESAIC Trainee Committee and ESAIC Guideline Committees for their support.

Assistance with the editorial: none.

Financial support and sponsorship: none.

Conflicts of interest: none.

Comment from the Editor: this article was checked and accepted by the Editors, but was not sent for external peer-review.

This manuscript was handled by Patrice Forget.

References

- 1 Wong LR, Flynn-Evans E, Ruskin KJ. Fatigue risk management: the impact of anaesthesiology residents' work schedules on job performance and a review of potential countermeasures. *Anesth Analg* 2018; **126**:1340–1348.
- 2 Williamson AM. Feyer moderate sleep deprivation produces impairments in cognitive and motor performance equivalent to legally prescribed levels of alcohol intoxication. *Occup Environ Med* 2000; **57**:649–655.
- 3 British Medical Association. Fatigue and sleep deprivation – the impact of different working patterns on doctors. January 2018. Accessed 14 April 2022. BMA.org.uk https://www.bma.org.uk/media/1074/bma_fatigue-sleep-deprivation-briefing-jan2017.pdf.
- 4 Cortegiani A, Ippolito M, Misseri G, et al. Association between night/after-hours surgery and mortality: a systematic review and meta-analysis. *Br J Anaesth* 2020; **124**:623–637.
- 5 HUMANISTIC SYSTEMS (blog). 'The varieties of human work.' May 12, 2016. Accessed April 14, 2022. <https://humanisticsystems.com/2016/12/05/the-varieties-of-human-work/>
- 6 Paul RG, Bunker N, Fauvel NJ, et al. The effect of the European Working Time Directive on anaesthetic working patterns and training. *Anaesthesia* 2012; **67**:951–956.
- 7 McClelland L, Holland J, Lomas JP, et al. A national survey of the effects of fatigue on trainees in anaesthesia in the UK. *Anaesthesia* 2017; **72**:1069–1077.
- 8 Dawson D, Thomas MJW. Fatigue management in healthcare: it is a risky business. *Anaesthesia* 2019; **74**:1493–1496.
- 9 Vorona R, Chen I, Ware J. Physicians and sleep deprivation. *Sleep Med Clin* 2009; **4**:527–540.
- 10 UK Psychological Trauma Society. 'Traumatic stress management in high risk environments.', February 14, 2020. Accessed 14 April 2022. <https://ukpts.org/2020/02/14/traumatic-stressmanagement-in-high-risk-environments>
- 11 Queensland Government, Queensland Health. 'Fatigue Risk management systems implementation guideline QH-GDL-401-3.3:2021'. December 3, 2021. Accessed 5 August 2022. <https://www.health.qld.gov.au/system-governance/policies-standards/doh-policy>
- 12 Macrae C, Stewart K. Can we import improvements from industry to healthcare? *BMJ* 2019; **364**:11039.
- 13 Noone P, Waclawski E. Fatigue risk management systems needed in healthcare. *Occup Med (Lond)* 2018; **68**:496–498.
- 14 Walker M. *Why we sleep: the new science of sleep and dreams*. New York: Scribner; 2017.
- 15 Redfern N, Clyburn P, Grigoras I, et al. Getting old. *Eur J Anaesthesiol* 2020; **37**:1081–1083.