

When is it Time to Stop Working Due to Fatigue?

A Simple Human Factors (HF) Self-Assessment Test

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Dear Sir

The role of human factors (HF) in medical error is now widely acknowledged although there are few publications that deal with pathology specific HF issues. A definition of HF that is widely accepted is as follows '*.. environmental, organisational and job factors in human and individual characteristics which influence behaviour at work in a way which can affect health and safety*'¹. HF analysis has been widely applied in aviation and aerospace industries but has been increasingly seen as important in medicine, particularly in critical care and acute medical settings to explain and reduce rates of clinical error and improve decision making in areas that are of high clinical risk²⁻⁴. There has been little discussion of the role of HF in diagnostic specialties such as cytology, pathology, or radiology. Published HF studies in diagnostic specialties have primarily addressed the HF aspects of care involving either handovers from clinical teams to pathology⁵ or aspects of HF involved in multidisciplinary case discussion which are common to other clinical specialties and not just pathology and radiology⁶. While it is accepted that cellular pathology and cytology are subject to significant error, one of the major factors in operator error is undoubtedly operator fatigue. The definition of fatigue used by The International Civil Aviation Organization is. '*a physiological state of reduce mental or physical performance capability resulting from sleep loss or extended wakefulness, circadian phase, or workload (mental and/or physical activity) that can impair a crew members alertness and ability to safely operate an aircraft or perform safety-related duties*'⁷. There are various ways of assessing fatigue. Various well-established subjective measures are available including visual analogue scales (VAS), the Samn-Perelli seven point fatigue scale (SPS)⁸, and the Karolinska Sleepiness Scale. Visual analogue scales have the advantage of simplicity but points along the fatigue scale line are not clearly defined making comparison with other studies difficult. The SPS⁸ scale has the advantage that it is it is quick and easy to administer and causes minimal disruption, although like all subjective measures its disadvantage is that it may not always reliably reflect objective performance, it may lack validity and it can be readily gamed or cheated as the results are based on self-assessment rather than objective assessment of operator performance⁷. Other forms of assessment include sleep diaries, measuring sleep using Actiwatches or polysomnography⁷. Simple performance tests e.g. the psychomotor vigilance task (PVT) is comparatively simple to administer but require at least 5 to 10 minutes to conduct without disturbance.

Having briefly reviewed the relevant literature for self-assessment of fatigue⁹ we think that the SPS⁸ scale might be a useful way of self-assessing fatigue during microscopy. We would therefore suggest that the pathologist could reasonably apply the SPS as a quick visual check at regular intervals during the working day. If the pathologist or cytologist scored five or above on the SPS test, this will be reasonable indication of fatigue and would therefore be time to take a break or stop completely.

Aircrew scoring 5 or more on the SPS self-assessment of fatigue are not recommended to fly an aircraft⁸. While clearly pathology or cytology diagnosis is not an identical task many of the processes involved including visual attention and decision-making are similar while undertaking microscopy. HF assessment of operator fatigue in pathology and cytology needs further investigation. It is suggested that pathologists could use this simple tool to assess their own level of fatigue at the microscope and take appropriate action if scoring five or above.

The Samn-Perelli (SPF) Seven Point Scale¹

1. Fully alert, wide awake
2. Very lively, responsive, but not at peak
3. Okay, somewhat fresh
4. A little tired, less than fresh
5. Moderately tired, let down
6. Extremely tired, very difficult to concentrate
7. Completely exhausted, unable to function effectively

References

1. Human factors in patient safety review of topics and tools. Report for methods and measures working group of WHO 2009.
2. Hudson P. Applying the lessons of high risk industries to health care. *Qual Saf Health Care*. 2003;12 Suppl 1:i7-12.
3. Leape LL, Berwick DM. Five years after To Err Is Human: what have we learned? *JAMA*. 2005;293(19):2384-2390.
4. Carayon P. Human factors in patient safety as an innovation. *Appl Ergon*. 2010;41(5):657-665.
5. Brennan PA, Brands MT, Caldwell L, et al. Surgical specimen handover from the operating theatre to laboratory-Can we improve patient safety by learning from aviation and other high-risk organisations? *J Oral Pathol Med*. 2018;47(2):117-120.
6. Oeppen RS, Davidson M, Scrimgeour DS, Rahimi S, Brennan PA. Human factors awareness and recognition during multidisciplinary team meetings. *J Oral Pathol Med*. 2019;48(8):656-661.
7. Millar M. Measuring Fatigue. Paper presented at: Asia-Pacific FRMS Seminar 2012; Bangkok, Thailand.
8. Samn S.W., Perelli, L.P. Estimating aircrew fatigue: A technique with application to airlift operations. In: *Medicine USoA*, ed. Brooks Air Force Base, Texas: Air Force Research Laboratory; 1982:1-26.
9. Gawron. VJ. Overview of Self-Reported Measures of Fatigue. *The International Journal of Aviation Psychology*. 2016;26:120-131.