[Editorial] Human factors in medicine – the art of common sense at work

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Editorial

Human factors in Medicine – the Art of Common Sense at Work

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Invited Editorial: Human factors in Medicine – the Art of Common Sense at Work

We all make mistakes, mostly with little or no adverse impact or consequence. However, in medicine and other high-risk organisations (HROs) such as aviation any error can be catastrophic. Direct comparison of other HROs with healthcare should not be made as they are diverse professions. However, we should embrace the concepts of learning from HF as an effective mechanism in reducing errors and HF awareness should begin early in undergraduate training and continue throughout any medical career.

The scale of the problem

1 in 10 UK hospital admissions involve some form of error, and while most are minor, the risk of death from a major error is 1 in 300 (Young & O'Regan, 2010). There are estimated to be 4,000+ deaths/year due to medical error, and Never Events continue to occur despite initiatives such as the WHO checklist. The Swiss Cheese Model, where ‘holes’ align to cause error is now well recognised (Reason, 1995). Doctors are often blamed for error, yet many incidents are a consequence of ‘systems’ errors – for example, overbooked clinics or staffing issues in operating theatres significantly increasing the likelihood of error. Human Factors is increasingly recognised as contributing to medical error. Much of HF awareness is simple common sense, but repeated occurrence of serious adverse events demonstrate a lack of appreciation, and progress in addressing many of the these issues.

Optimising our own performance.
The oxygen mask briefing before every commercial flight is familiar to most of us - please put your own mask on first before helping others. This is a fundamental HF principle: to give our patients the best care and reduce the chance of error, we must also look after ourselves. Yet healthcare professionals often forget to take regular breaks, drink inadequate fluid or miss meals citing that they are ‘too busy’ caring for patients.

Many doctors experience prolonged periods without food and drink, exacerbated in some cases by omitting breakfast. With limited opportunity for catching up on nutrition and hydration during the working day, some will be under hydrated or inadequately fed to optimise their own energy, concentration and performance thereby raising their risk of error.

**Hydration and nutrition at work**

Water accounts for over 60% of body mass and in health is regulated to within 0.66% of bodyweight (Cheuvront et al, 2004). Even small water deficits impede physical performance. Children’s learning and academic performance is adversely affected when they do not eat breakfast. Regularly missing this important meal leads to a reduction in metabolic rate with fewer burned calories, lower energy and motivation (Adolphus et al, 2013). When assessed in full motion aircraft simulators, pilots’ working memory, spatial awareness, and flying accuracy is adversely affected when dehydrated (equivalent to a 1 to 3% loss of body mass, Lindseth et al, 2013). Worsening dehydration causes headache, sleepiness, impatience and apathy. How many colleagues come home with a headache because of a lack of fluid drunk during the day? Doctors may not have considered that poor hydration affects performance or thought about why their urine is so concentrated at the end of a busy shift.
Thirst cues usually present before the ill effects of low hydration yet a study of junior doctors working in ITU found they were more likely to be oliguric than the patients they were caring for! (Solomon et al, 2010). Individual fluid requirements vary considerably, with a minimum intake of 2L per day recommended for healthy adults. Clinical teams could agree to take regular fluid breaks when planning long ward rounds or all day operating lists and Trusts should provide readily available sources of drinking water.

Omitting lunch should be discouraged as performance is impaired while overall hunger is increased, resulting in eating more at the next meal. Fast/processed food is also linked to poorer performance (Florence et al, 2008), but doctors working under pressure frequently resort to eating a sugar fix (such as a chocolate bar) while rushing to the next task. In addition to not satisfying hunger, this raises insulin levels and can paradoxically reduce performance. We recommend eating both before the start of the working day and healthily while at work, ensuring no meals are missed because we are too busy to take a short break (Brennan et al, 2019).

**Tiredness**

Tiredness is a significant cause of accidents in routine activities such as driving as well as at work. Many HROs have guidelines for taking regular breaks. Most of us would stop every few hours when driving but can we say we do the same when we come to work? The value of a short break (10-15 minutes) every 2-3 hours while working is immense - it enhances performance, team morale and aids subsequent concentration and completion of clinical
tasks in a more effective manner. The time ‘lost’ by taking a short break is usually more than made up as a result. Shift rotas can completely change our circadian rhythms especially going from a day to a night rota or vice versa. Provision of rest facilities by employers is important both during and following shifts – for instance where a worker has to drive home after a night shift. (ref for this- there was an article in BMJ)

**Situational awareness (SA)**

In simple terms SA means ‘what has happened, what is happening now, and what might happen in future’. SA and perception changes constantly and sometimes suddenly. Good SA can be developed and improved over time. Tunnel vision, losing track of time, or relying on wrong information to confirm what we think is correct (reinforcement bias) are all areas leading to SA loss. It is good to ask team members to look out for each other, and loss of SA can often be recognised before any serious harm occurs. We recommend asking the ‘What if?’ question at the start of clinical sessions so that all possible complications are considered. The mnemonic HALT reminding us to stop if Hungry, Angry, Late or Tired is useful to help regain SA. It is also worth reminding senior colleagues that less experienced doctors reach cognitive saturation more quickly, particularly when learning new or complex medical procedures.

**Communication and challenging hierarchy**

Safe and effective communication between team members is essential to patient safety and to ensure information is understood and acted upon by the recipient(s). This is one reason why the use of pronouns (this, that, they, he, she, it) is discouraged when confirming vital information and formal names or sides are preferred. We also advise repeat back to make sure information is heard and understood
Steep hierarchy still exists in medicine, with some feeling unable to question colleagues about potentially wrong decisions. There should always be a gentle gradient between trainee and consultant (FIGURE 1). Team briefs are a good opportunity to actively encourage anyone to speak up or challenge without fear if they have any patient concerns. Trainees should also be given opportunities to lead briefing and debriefing sessions. The first response to any “challenge” should be “thank-you” from the team leader (which immediately diffuses any anxiety) followed by an open response such as ‘Let’s stop. Why do you think that?’ The recent CQC report has stated that adopting a just culture across medicine will reduce many preventable errors (Care Quality Commission, 2018).

Other ways to reduce hierarchy are to use first names and informal debriefing sessions, perhaps over a cup of coffee. The power of ‘thank you’ to others cannot be emphasised enough. Kind words of appreciation encourage more junior colleagues to feel empowered to raise concerns, in contrast to intimidating hierarchies that discourage raising the alarm.

Conflict of interest: none
Key points

We all make mistakes

Human error is often multifactorial

Look after yourself and your colleagues to care for patients better

Hierarchy forms a barrier to communication

Good communication improves patient safety

HALT if Hungry, Angry, Late, Tired


Solomon AW, Kirwan CJ, Alexander ND, et al; Prospective Analysis of Renal
Compensation for Hypohydration in Exhausted Doctors (PARCHED) Investigators. Urine
output on an intensive care unit: case-control study. BMJ. 2010;341:c6761.
Figure 1 – a gentle hierarchy exists on the flight deck to improve such that the most junior pilot can challenge a senior captain without fear. Can we say the same occurs throughout medicine?