Is it time for a non-technical skills approach to prescribing?

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The quality of prescribing continues to cause concern. How to reduce errors is the subject of ongoing debate, following recent studies showing that prescribing errors in hospitals occur in about 7% of prescriptions and a third of patients (EQUIP1 and PROTECT2). Similar error rates have also been seen in the community setting (PRACTICE3).

In prescribing, junior doctors have been the main target of educational initiatives to improve safety. They are heavily involved in hospital prescribing, writing the majority of prescription items. Their error rates are higher than error rates of more senior doctors (in EQUIP, FY1 doctors had an error rate of 8.4%, FY2s 10.3% and consultants 5.9%1; in PROTECT figures were 7.4%, 8.6 and 6.3%2), although the overall number of items written by senior staff is far lower. There are initiatives which aim to improve new prescribers’ knowledge (for example, the Prescribe e-learning project4), and to assure a basic level of competency (the Prescribing Skills Assessment5) for new graduates. The question of how best to teach, and assess prescribing in UK medical schools is high on the agenda, with both the GMC and Medical Schools Council actively supporting these efforts.

Increasing knowledge alone is insufficient to change behaviour and the transfer of knowledge into clinical practice is critical. Moves to improve familiarisation with the workplace for medical students, such as student assistantships and shadowing, may help with this transfer, but there is a limit to what can be done in the undergraduate environment. New doctors will still be prescribing for the first time, although initiatives such as “pre-prescribing” (a system where senior medical students prescribe under supervision) may make this transition easier6. However, while foundation doctors may be a legitimate target group, an exclusive focus on juniors may unhelpfully impute blame and miss wider options for intervention.

Meanwhile, current efforts at the system level are focussed on electronic prescribing which has been shown to reduce prescribing errors, but will not eradicate them, and can produce new types of error7. Similarly, cogent arguments have been made for common drug charts across different hospitals, which may improve the situation, but will not be sufficient alone1,8. Further efforts to decrease error rates in prescribing are needed.

Taking a human factors approach to managing prescribing errors may be valuable. The science of human factors seeks to improve system design to support human performance and addresses the interaction between the work environment, organisational systems and people working in them9. The most recognised model of accident causation in healthcare is Reason’s ‘Swiss cheese model’, which describes latent conditions as ‘pathogens’ in the organisation, as well as individual’s unsafe actions, contributing to human error. It also recognises the role of humans as defences in the system10. The clinical human factors group is one organisation which seeks to apply human factors science in medicine11.

An element of human factor science which is beginning to be implemented in medicine focuses on the non-technical skills (NTS) of clinical staff, also known as crew resource management (CRM) skills which are recognised to be critical in error reduction across a range of industries12. This approach seeks to identify behaviours which mitigate or prevent error and to train staff accordingly9, recognising that staff are often the last defence or instigator of the active failure in the Swiss cheese model10. In medicine, NTS have been described as behaviours in the healthcare setting which are not directly related to the use of medical expertise, drugs or equipment13. They encompass both the social skills of communication, team working, leadership and the cognitive skills of situation awareness and decision making. These have also been shown to be important for pharmacists, especially when dealing with aggressive patients14. Identifying the non-technical skills in prescribing provides a new avenue for interventions to reduce errors. Indeed, particular areas highlighted by recent research into prescribing errors1,2 include: coping with high work load and a lack of time, poor communication (both verbal and written), suboptimal teamwork, impaired physical and mental wellbeing, and a lack of appropriate supervision. These can be mapped to particular non-technical skills and point to the importance of NTS performance of all staff in prescribing error causation and prevention.

One good example of where non-technical skills in prescribing have been recently highlighted is communication around prescribing instructions. Many of the prescriptions written by junior doctors are under the instruction of senior doctors, pharmacists and nurses1,2,15. In one study, as many as 61% of prescriptions written by juniors were under the instruction of a more senior doctor16. Although a high level of variability was seen in practices between wards and specialities, in most situations, the instruction was very general (e.g. drug class or drug name), leaving junior doctors to figure out the details of the prescription. Such non specific communication without confirmation of understanding is vulnerable to error9. Interview data1,2,15 and recent work on difficult prescribing decisions17 suggest that junior doctors may lack time to look up the necessary information, and perhaps more importantly are embarrassed to check (either with the BNF or seniors) on a ward round, as they feel they are expected to know what to do. As well as targeting junior prescribers, could we train registrars and consultants to be more specific about prescribing instructions or to routinely explore with junior doctors their understanding of what is expected for a given patient with respect to starting a new medication (i.e. route of administration, dose, frequency)? Could we train juniors to ask more questions when they perceive the information is insufficient?

Behavioural marker systems have been produced for several medical disciplines and these are used in the training of doctors in these essential skills 11,17,18. This approach is highly attractive as a framework in medical training with a specific focus on prescribing to build up an individual’s non-technical skills, in addition to his or her knowledge and clinical skills.

We believe that a non-technical skills approach can provide an additional valuable framework for training as well as for the design of further studies and interventions around prescribing errors. Moreover as one element of an overall human factors approach, developing a behavioural marker system of the key non-technical skills in prescribing could positively supplement educational efforts and systems changes to mitigate and prevent error. This approach will aid us to design more effective interventions, and to ensure that efforts to improve prescribing are part of an ongoing programme of evidence-based work, rather than one off reactive ventures.

References

1. Dornan T, Ashcroft D, Heathfield H, Lewis P, Miles J, Taylor D, Tully M, Wass V. An in-depth investigation into causes of prescribing errors by foundation trainees in relation to their medical education: EQUIP study. Final report to the General Medical Council. University of Manchester: School of Pharmacy and Pharmaceutical Sciences and School of Medicine. 2009 [cited 4 Apr 2013]. Available from: http://www.pharmacy.manchester.ac.uk/cip/CIPPublications/commissionedreports/prescribing\_errors\_prevalence\_incidence.pdf

2. Ross S, Ryan C, Duncan EM, Francis JJ, Johnston M, Ker J, Lee AJ, Macleod MJ, Maxwell S, McKay GA, McLay J, Webb DJ, Bond CM. Perceived causes of prescribing errors by junior doctors in hospital in-patients: A study from the PROTECT programme. BMJ Quality and Safety 2013.

3. Avery T, Barber N, Ghaleb M, Dean Franklin B, Armstrong S, Crowe S, Dhillon S, Freyer A, Howard A, Pezzolesi C, Serumaga B, Swanwick G, Talabi O. Investigating the prevalence and causes of prescribing errors in general practice: The PRACtICe Study (PRevalence And Causes of prescrIbing errors in general practiCe). Final report to the General Medical Council May 2012. [cited 4 Apr 2013]. Available from: http://www.gmc-uk.org/Investigating\_the\_prevalence\_and\_causes\_of\_prescribing\_errors\_in\_general\_practice\_\_\_The\_PRACtICe\_study\_Reoprt\_May\_2012\_48605085.pdf

9. Carayon, P. (ed) Human Factors and Ergonomics in health care and Patient safety (2nd edition). Boca Raton, Florida: CRC press 2012.

10. Reason J. Human error. Cambridge: University of Cambridge, 1990.

4. Maxwell S, Mucklow J. e-Learning initiatives to support prescribing. British Journal of Clinical Pharmacology 2012; 74(4): 621-631.

5. Mucklow J, Bollington L, Maxwell S. Assessing prescribing competence. British Journal of Clinical Pharmacology 2012; 74(4):632-639.

6. Smith SE, Tallentire VR, Cameron HS, Wood SM. Pre-prescribing: a safe way to learn at work? Clinical Teacher 2012; 9(1):45-49.

7. Koppel R, Metlay JP, Cohen A, Abaluck B, Localio AR, Kimmel SE, Strom BL. Role of Computerized Physician Order Entry Systems in Facilitating Medication Errors. JAMA2005; 293(10):1197-1203.

8. Routledge PA. A national in-patient prescription chart: the experience in Wales 2004–2012. British Journal of Clinical Pharmacology 2012; 74(4):561-565.

11. <http://www.chfg.org/>

12. Flin R, O'Connor P, Crichton M. Safety at the Sharp End: A Guide to Non-Technical Skills. Ashgate 2008.

13. Flin R, Patey R, Glavin R, Maran N. Anaesthetists’ Non-technical Skills. BJA 2010; 105(1): 38-44.

14. Irwin A, Laing C, Mearns K. The impact of patient aggression on community pharmacists: a critical incident study. International Journal of Pharmacy Practice 201 2013; 21(1):20-27.

15. Dean B, Schachter M, Vincent C, Barber N. Causes of prescribing errors in hospital patients: A prospective study. Lancet 2002;359:1373-8.

16. Ross S, Hamilton L, Ryan C, Bond CM. Who makes prescribing decisions in hospital in-patients? An observational study. Postgraduate Medical Journal 2012; 88: 507-510.

17. Lewis P, Tully M. Uncomfortable prescribing decisions in hospitals: the impact of teamwork. Journal of the Royal Society of Medicine 2009;102:481-8.

18. Yule S, Flin R, Maran N, Rowley DR, Youngson GG, Paterson-Brown S. Surgeons' non-technical skills in the operating room: Reliability testing of the NOTSS behaviour rating system. World Journal of Surgery 2008; 32:548-556.

19. Flowerdew L, Brown R, Vincent C, Woloshynowych M. Development and validation of a tool to assess emergency physicians' nontechnical skills. Annals of Emergency Medicine 2012 May;59(5):376-385.

Conflict of Interest

All authors have completed the Unified Competing Interest form at [www.icmje.org/coi\_disclosure.pdf](http://www.icmje.org/coi_disclosure.pdf) (available on request from the corresponding author) and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous 3 years; no other relationships or activities that could appear to have influenced the submitted work.