Examining cognitive tasks in the emergency department

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SUMMARY

Applied Cognitive Task Analysis is an appropriate method to investigate challenging cognitive tasks and the role of expertise in healthcare contexts.

Healthcare needs to support the accelerated development of decision-making skills in its novices and also create the optimum conditions in which to make decisions.

KEYWORDS

Patient safety, decision-making, cognitive task analysis

Introduction

Emergency Department (ED) clinicians are often faced with patients with non-specific symptoms. Incorrect decisions can result in harm from missed or delayed diagnoses. A pulmonary embolism (PE), a blockage in the arteries of the lung, is one example of a diagnosis that can be challenging. The Healthcare Safety Investigation Branch (HSIB) undertook a review of incidents where there was a delayed or missed diagnosis of PE in EDs. The review highlighted the challenges faced by less experienced decision makers (referred to as novices in line with the analysis method used) when attempting to make a diagnosis. As a result, HSIB examined the diagnostic decision making of ED clinicians when faced with non-specific symptoms, and the role of expertise in decisions.

Method

The Applied Cognitive Task Analysis (ACTA) (Militello & Hutton, 1998) was used, supported by one of its developers, to examine diagnostic decision making. ACTA is a pragmatic approach to consider how expertise support cognitive tasks. It can help to understand how decision making differs between expert and more novice clinicians. The investigators first identified cognitive tasks of interest in two EDs with expert and novice clinicians who identified the tasks that require greater levels of expertise. The terms expert and novice were used as per the original ACTA; to distinguish novices and experts, Dreyfus' model of skill acquisition (Dreyfus, 2004) was used.

The Knowledge Audit method (the interview part of ACTA) was used to focus on cognitive tasks that require a greater level of expertise and to expose aspects of judgment, assessment and decision making where novices struggle (Klein & Militello, 2004). Interviews were undertaken across six EDs with over 30 clinicians. ACTA 'probes' were used to examine elements such as understanding the past and anticipating the future, maintaining the bigger picture, and noticing subtle cues (Militello & Hutton, 1998). A Cognitive Demands Table was developed and informs this paper.

Results

ED clinicians identified several cognitive tasks that benefit from expertise. For the purpose of this paper, the most commonly identified task has been focussed on – clinical assessment. The clinical

assessment is undertaken by clinicians with varying backgrounds and experience, and includes history taking, physical examination and review of test results. The clinical assessment will occur after baseline tests have been requested by the staff admitting/triaging the patient when they first arrive in ED. The clinical assessment in the context of the tests ordered will inform subsequent decisions on the potential diagnosis, the need for further tests and the need to initiate treatment.

The clinical assessment task incorporates pulling together available information to differentiate between potential diagnoses. The findings from the ACTA showed that expertise is required to reliably identify symptoms and understand their significance in light of test results. The Knowledge Audit interviews identified how expert decision making differs from novice. For example, experts:

- were suspicious and less tolerant of unexplained symptoms and signs.
- had a low tolerance for saying they were unsure and requesting further tests.
- recognised the risk of fixating on certain pieces of information early.
- sought opportunities to challenge their decisions including through peer review.
- were more able to recognise when their cognitive abilities were being affected.
- used various strategies to resolve the assessment challenges identified.

Discussion

Healthcare is behind other industries in its recognition of the importance accelerating novice decision-making skills (Hoffman et al., 2013). This investigation heard of limited support for novices to help them understand the facets of expert decision making; reflect on their own decisions; and access learning environments, such as simulation, to practice making decisions. Workplace psychological safety also needs to support novices to seek help with their decisions.

It is recognised that focussing on individual skills is only part of the answer to improving diagnostic decision making. Fundamentally, the contexts within which the decisions are made need to be supportive and the ACTA identified how the system can influence the ability of clinicians to make decisions. At the time, COVID-19 was at its peak and the investigators heard that at the beginning of the pandemic, everyone became a novice. Other factors that were felt to undermine decision making in EDs included significant increases in ED demand, limited capacity and resource, non-standardised processes and work procedures that were difficult to access and follow. Beyond EDs, the ACTA also identified national factors limiting the development of decision-making skills including limitations in medical training with decision making being an assumed skill, and no national standards for simulation-based training to practice and develop skills.

Healthcare needs to do more to develop the decision-making skills of novices and create supportive environments for their application and further development.

References

Dreyfus, S. E. (2004) ‘The Five-Stage Model of Adult Skill Acquisition’, *Bulletin of Science Technology & Society*, vol. 24, no. 3, pp. 177–181.

Hoffman, R. R., Ward, P., Feltovich, P. J., et al. (2013). *Accelerated expertise: Training for high proficiency in a complex world.* Psychology Press.

Klein, G., & Militello, L. (2004). The knowledge audit as a method for cognitive task analysis. In H. Montgomery, R. Lipshitz, & B. Brehmer (Eds.). *How professionals make decisions* (pp. 335-342). CRC Press.

Militello, L. and Hutton, R. J. (1998) ‘Applied cognitive task analysis (ACTA): a practitioner’s toolkit for understanding cognitive task demands’, *Ergonomics*, 41 11, pp. 1618–1641.