Embedding Resilience Engineering in an Applied Patient Safety Research Programme

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SUMMARY

A 5-year applied research project is described, which uses Resilience Engineering principles to design interventions to improve the management of deteriorating patients following surgery. A rigorous stepped-wedge trial design is used to help construct a more persuasive case for the benefit of Resilience Engineering and Human Factors / Ergonomics in healthcare.

KEYWORDS

Patient Safety, Resilience Engineering, Safety-II

Introduction

Considerable effort has been directed at improving patient safety, yet improvements achieved in practice have fallen short of expectations (Wears and Sutcliffe, 2019). Reasons for this shortfall include the narrow focus on specific practices and interventions, such as incident reporting and standardisation, which frequently have been adopted from other industries without proper consideration of their underlying principles (Sutcliffe et al., 2017). More recently however, there has been increasing interest in the contribution that Resilience Engineering and Human Factors / Ergonomics (HF/E) can bring to inform patient safety improvement initiatives (Sujan et al., 2021). In this paper we describe how Resilience Engineering principles are embedded in a 5-year applied research programme to develop and test interventions to improve the management of deteriorating patients following emergency surgery.

Methods

The research programme is structured into three phases:

- Understanding work-as-done (WAD): the initial analysis of the management of deteriorating patients set out to understand WAD using Resilience Engineering thinking (Hollnagel et al., 2019). A FRAM analysis was undertaken in one surgical emergency admissions unit in an NHS hospital (Sujan et al., 2022). In addition, semi-structured interviews with patients who had experienced post-surgical deterioration were carried out to explore patient experiences.
- 2. Developing interventions: using a participatory design approach involving focus groups with staff and patients from three participating NHS hospitals, a set of complementary intervention strands is currently being developed to strengthen resilient performance.
- 3. Evaluation: a stepped-wedge trial (Brown and Lilford, 2006) will be carried out with twenty NHS hospitals. This trial design is a rigorous evaluation approach suitable for testing complex interventions. In the step wedge design, there is no (randomised) control group. Instead, all study sites (clusters) receive the intervention, but they are randomly allocated to one of a series of "steps", which start the intervention at different times during the trial. The

change caused by the intervention is measured by comparing outcome data from before and after intervention begins.

Results

The FRAM analysis provided insights into how healthcare workers identify and manage deteriorating patients by understanding what makes the process work rather than by investigating failures. Numerous everyday dynamic trade-offs were identified, which healthcare workers make in order to balance competing priorities and mismatches in demand and capacity. Analysis of patient interviews suggests that patients are struggling to communicate their concerns and are finding it difficult to be "heard".

Based on this analysis, four interventions strands have been identified: (1) Patient involvement in the management of deterioration by enabling patients to recognise signs of deterioration and by putting in place a system that enables patients to communicate their concerns to someone who will listen and act; (2) collaboration and communication across departmental boundaries by supporting shared ownership and developing a shared language; (3) development of an escalation procedure using Resilience Engineering thinking, i.e., a resilient procedure (Wears and Hunte, 2016); and (4) delivery of teamwork training to support interprofessional communication.

Conclusion

The applied research project addresses a safety-critical problem – the management of patient deterioration – from a Resilience Engineering perspective using a rigorous trial design. The evaluation of interventions informed by Resilience Engineering HF/E more widely, using accepted trial designs, can help construct a more persuasive case for the benefit of Resilience Engineering and HF/E in healthcare and can also be a model for other industries.

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