



Assessment

TRACEing the roots: A diagnostic “Tool for Retrospective Analysis of Critical Events”

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ABSTRACT

Objective: The lack of interdisciplinary clarity in the conceptualization of medical errors discourages effective incident analysis, particularly in the event of harmless outcomes. This manuscript integrates communication competence theory, the criterion of reasonability, and a typology of human error into a theoretically grounded *Tool for Retrospective Analysis of Critical Events* (TRACE) to overcome this limitation.

Methods: A conceptual matrix synthesizing foundational elements pertinent to critical incident analysis from the medical, legal, bioethical and communication literature was developed. Vetting of the TRACE through focus groups and interviews was conducted to assure utility.

Results: The interviews revealed that TRACE may be useful in clinical settings, contributing uniquely to the current literature by framing critical incidents in regard to theory and the primary clinical contexts within which errors may occur.

Conclusion: TRACE facilitates a comprehensive, theoretically grounded analysis of clinical performance, and identifies the intrapersonal and interpersonal factors that contribute to critical events.

Practice implications: The TRACE may be used as (1) the means for a comprehensive, detailed analysis of human performance across five clinical practice contexts, (2) an objective “fact-check” after a critical event, (3) a heuristic tool to prevent critical incidents, and (4) a data-keeping system for quality improvement.

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1. Introduction

Recent developments in the health care environment encourage open and transparent communication in response to critical incidents in medicine. For example, the Institute of Medicine (IOM) mandates reporting of all serious and preventable adverse events [1], the Joint Commission requires hospitals to disclose all unanticipated outcomes to patients [2], and the National Quality Forum recommends “safe practice” guidelines to support health care professionals in responding to adverse events [3].

Among the many challenges faced by medical practitioners and institutions in competently performing a critical incident analysis is a lack of conceptual clarity in regard to error-related terminology. Few clinicians appreciate the important but fine distinctions that are made by legal and medical experts in the field when using such terms as mistakes, slips, lapses, near misses, harmless hits, close calls, accidents, and complications or the ambiguity associated with key moderators such as preventability, predictability, controllability and intentionality. The resulting confusion can easily intimidate and discourage any type of critical incident analysis.

Beyond conflicting reporting guidelines and confusing terminology, interpersonal communication has received far less attention in the existing literature than its importance would merit. Communication has been shown to be a significant element in patient safety incidents [4–9] and malpractice claims [10,11], but investigations infrequently address the specific clinical context (i.e., medical history assessment, diagnosis, treatment planning, treatment execution, and post-treatment care) within which communication errors may have taken place as a precursor to a critical event. Moreover, current incident analyses merely examine communication as a dichotomous variable.

The purpose of this manuscript is a systematic integration of the existing interdisciplinary literature to facilitate the development of a practical assessment tool that overcomes these limitations, with the ultimate goal of supporting a more effective and comprehensive identification and analysis of critical incidents in medicine. Such a tool needs to advance a clearer conceptualization of medical errors and assesses all types of critical events, including those that cause little or no harm. Furthermore, it needs to integrate theories from different academic fields to facilitate a grounded, interdisciplinary evaluation of critical events. It is in this arena that our proposed *Tool for Retrospective Analysis of Critical Events* (TRACE) may be seen.

2. Methods

2.1. Organization of terminology and conceptual integration underpinning TRACE

The first author conducted a systematic review of the comprehensive existing literature on critical incidents to organize and integrate the related terminology as a first step toward creating the TRACE. The full body of literature from the fields of medicine, psychology, and communication were included. The search terms encompassed all related terminology (i.e., “critical incident(s)”, “critical event(s)”, “adverse event(s)”, “near miss(es)”, and “error(s)”; each in combination with the term “medicine”). The second step entailed the integration of medical performance in regard to intrapersonal and interpersonal activities into the TRACE using three theoretical frameworks from the psychological, ethical and communication literature: (1) Reason’s typology of human error [12], (2) Banja’s criterion of reasonability [13], and (3) Spitzberg and Cupach’s communication competence theory [14,15].

2.1.1. Typology of human error

Reason [12] argues that human errors occur during three cognitive stages: (1) planning (i.e., errors in identifying a goal and deciding on the means to achieve it), (2) storage (i.e., lapses), and (3) execution (i.e., slips). Based on this contention, Reason conceptualizes human error as the failure of actions to be completed as intended (i.e., “errors of execution”, which entail slips and lapses), and (2) the use of a wrong plan to achieve an aim (i.e., “errors of planning”, which include mistakes). From this conceptualization, Reason derives a threefold typology of human errors: (1) skill-based slips and lapses (execution failures in the implementation of the stored plan), (2) rule-based mistakes (failure of expertise that caused a plan to be applied inappropriately), and (3) knowledge-based mistakes (lack of expertise or resource limitations that force a plan to be worked out from first principles).

2.1.2. Criterion of reasonability

Banja [13] argues that existing definitions of errors in medicine disregard the occurrence of factors that lie beyond a provider’s reasonable control. He suggests that a valid conceptualization of medical errors needs to integrate whether or not there was anything a provider could have *reasonably* done to avert the mishap, other than not to perform the action at all. Based on this contention, Banja introduces a *standard of care* criterion and conceptualizes human error in medicine as “an unwarranted failure of action or judgment to accommodate the standard of care” (p. 7).

2.1.3. Theory of communication competence

According to Spitzberg and Cupach [14,15], optimal communication is perceived as effective (i.e., achieving preferred outcomes) and appropriate (i.e., conforming to normative expectations) in a given context. A person’s motivation, knowledge, and skills facilitate such an impression. Thus, a person who is motivated, has the skills, and knows how to communicate appropriately and effectively will be perceived as more competent than others. At the same time, these three factors serve as a diagnostic tool when things go wrong, implying that negative outcomes are always attributable to deficiencies in a person’s motivation, knowledge, and/or skills [14].

2.2. Vetting TRACE through stakeholder focus groups and interviews

The first author conducted two focus groups with a total of 12 volunteering attending physicians in the area of family medicine at a large teaching hospital in a Southeastern United States to test the applicability of the TRACE in medical practice. The physicians were recruited by the department chair. All focus group participants had experienced at least one medical error. None of them had actively conducted any research on this topic area.

At first, the participants were given a handout with a visual presentation of the TRACE, along with a detailed verbal introduction. The focus group participants were asked to write out a case study of a harmful or harmless critical incident that involves more than one of the matrix components. The physicians then analyzed their case studies in peer group interactions in an attempt to find out whether the TRACE worked in defragmenting and identifying the contributing factors of their incidents. In a subsequent group discussion, examples were brainstormed for each matrix cell and potential applications of the TRACE were discussed.

In addition, in-depth interviews were conducted with three local health lawyers to validate the applicability of the TRACE to legal practice. After a detailed introduction of the TRACE components, the lawyers were asked to apply the TRACE to some legal scenarios. Finally, expert conversations were conducted with

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