American Journal of Infection Control ■■ (2018) ■■-■■

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Major Article

Enacting high reliability principles while caring for people with Ebola Virus Disease

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Key Words:
Infection control
High reliability
Qualitative research

Background: Fear surrounds Ebola Virus Disease (EVD) because it is highly infectious. Yet members of the Serious Communicable Diseases Unit (SCDU) at Emory University Hospital (EUH) had to overcome that fear when caring for patients with EVD.

Purpose: The analysis reported here illustrates how the members of EUH's SCDU tacitly enacted high reliability (HR) principles while caring for patients with EVD.

Methods: A qualitative study was conducted to describe the experience of members of the EUH SCDU who worked with EVD patients in 2014. We completed 17 semi-structured interviews involving registered nurses, physicians, and support personnel (eg, laboratory technicians). Interview recordings were transcribed and analyzed using conventional content analysis. Exploring HR principles was not among the questions guiding this exploration, but the participants repeatedly described concepts related to HR.

Results: The goal of the SCDU team was to save patients' lives while protecting their own lives. Rigorous training and meeting high standards were required to make the team. The fear surrounding EVD set in motion the enactment of HR principles. HR principles served to alleviate failures or breakdowns in infection prevention and control, thus keeping patients and staff safe.

Conclusions: These findings illustrate that it is possible to move HR principles from theory to practice in high-risk situations. HR principles were essential to safety and to infection prevention and control.

As noted by The Joint Commission and the World Health Organization, infection prevention and control (IPC) procedures play a unique role in patient safety as a way to limit the spread of diseases.[1] Every care encounter between staff and patients involves the dynamics of IPC.[2] The usefulness of hand hygiene, an essential component of IPC, was first demonstrated in the mid-1800s by Simmelweis, the "father of infection control."[3] Today, more than 200 years later, compliance with hand hygiene remains suboptimal.[4,5] Although IPC is grounded in individual accountability, breaks in IPC often represent system failures, too. As such, high reliability principles may be useful to establish an IPC culture of safety.[6]

The concept of high reliability is traceable to the work of Charles Perrow who proposed Normal Accident Theory, in which he asserted that some high-risk organizations were so dangerous they should be closed.[7] Investigators from other fields took a more optimistic stance, focusing on ways to use high reliability principles to minimize errors and maintain safety[8] by creating an organizational culture of mindfulness and safety.[9] Mindfulness pertains to being "acutely aware that even small failures in safety protocols or processes can lead to catastrophic adverse outcomes (p. 563)."[10] Mindfulness and the safety culture are exhibited through the 5 high reliability principles depicted in Table 1. Moving these principles into healthcare, however, remains elusive.[10-14]

The analysis reported here illustrates how high reliability principles were enacted when caring for patients with Ebola Virus Disease

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Conflicts of interest: None to report.
Funding: This work was funded by the American Nurses Foundation as the Stryker Medical Research Award Scholar and the Sayre Memorial Scholar in 2015 (ANF 5087): B. Jennings, PI. We had additional funding support from the Alpha Epsilon Chapter of Sigma Theta Tau International, awarded to K. Yeager.

0196-6553/
https://doi.org/10.1016/j.ajic.2018.04.208

Table 1
List of the high reliability principles with examples and definitions

Principle	Definition*	Example
Preoccupation with failure	Adopting a reliability-seeking orientation derived from unease with the status quo. All failures are treated in a non-punitive and transparent way, using them as learning opportunities.	Offering immediate feedback about missed steps or near-misses through implementing a buddy system where the buddy serves as a second set of eyes to see possible problems Using daily huddles to create a bond and shared commitment to each other and a culture of safety
Deference to expertise	Flattening the chain of command to maximize often untapped individual expertise, shifting authority, reducing dependency, and supporting dynamic and flexible decision-making.	Creating an egalitarian approach to work where knowledge and expertise take precedence over professional ranks and hierarchy
Reluctance to simplify	Remaining sensitive to even weak signals of developing problems, thereby avoiding oversimplification or explaining away issues. Potential difficulties are remedied, therefore, before they become catastrophic.	Accomplishing work in a methodical, mindful way to reduce variation and avoid simplification
Sensitivity to operations	Achieving flexibility among frontline workers who have an enhanced awareness of their environment. Avoiding rigidity by making changes as real-time information becomes available.	Remaining vigilant, adaptable, and flexible to determine which processes were working, which needed improvement, and making adjustments quickly
Commitment to resilience	Developing the capability to cope with unexpected events and recovering from failures quickly.	Changing protocols in real-time to deal with unanticipated events Maintaining a log of near-misses as the basis of learning as well as adapting protocols

*Definitions were adapted from many sources, including Weick, K.E. & Sutcliffe, K.M. (2007). *Managing the Unexpected* (2nd Ed). John Wiley & Sons: San Francisco, CA.

(EVD). The intent of the study was to describe the experience of members of the Emory University Hospital Serious Communicable Diseases Unit (SCDU) who worked with EVD patients in 2014. Exploring high reliability principles was not a purpose of this exploration, but the study participants repeatedly described concepts related to high reliability. Due to the extreme danger associated with EVD, the care team knew their lives were "on the line." If left untreated, the average fatality rate for EVD was 50% (range, 25%–90%).[15] The purpose of the analysis reported here is to illustrate how the members of the SCDU tacitly enacted high reliability principles to save patients' lives and to protect their own lives.

METHODS

Setting

The Emory SCDU was established in 2002 in cooperation with the Centers for Disease Control and Prevention.[16] In 2014, it was 1 of 4 such units in the United States. Membership in the SCDU is voluntary. The core members are registered nurses (RNs), infectious disease medical doctors (MDs), and support staff (eg, laboratory technicians and environmental services [EVS] personnel). The core staff participates in biannual training related to managing serious communicable diseases.

The SCDU physical space includes 2 patient care rooms, each with its own bathroom, and an anteroom between the patient rooms (Fig 1). A window allows visual access between staff in the anteroom and the patient rooms.

Sampling

Study participants were recruited purposefully[17] to reflect the perspectives of the RNs, infectious disease MDs, and support staff. During the interviews, we learned of biosafety experts who were regarded as essential to the team; they were added to the list of possible participants. Our goal was to achieve a sample that was both appropriate with regard to the sources and quality of data and adequate—reflecting saturation, the elicitation of variation in data that "are rich, full, and complete (p. 149)."[18]

Data collection

After institutional review board approval, the SCDU coordinator provided the principal investigator with a list of the 39 SCDU team members still employed by Emory Healthcare in 2015. For members who agreed to participate, the project assistant arranged a date and time for a face-to-face interview with 1 of 3 skilled qualitative researchers.

Study participants were assured that only the interviewers would have access to the interview data and that their participation would remain confidential. Other investigators, who were nurse executives, would have access only to de-identified, aggregate data. The interviews began with a broad question: "Tell me about your experience working with patients with EVD," followed by questions concerning lessons learned, returning to home units, how the group become a team, and decisions to use full personal protective equipment (PPE). The interviewers used probes to derive information-rich data and pursue participants' ideas. Participants were offered a $50 gift card as compensation for their time.

Of the 24 individuals who expressed interest in participating, 17 completed an interview in 2016: 10 RNs, 2 MDs, and 5 support staff (ie, EVS, laboratory, and biosafety personnel). The interviews lasted 42–84 minutes (mean, 60 minutes). All interviews were digitally recorded and transcribed by a professional transcription service.

Analysis

Data were methodically analyzed by the 3 qualitative researchers. First, the researcher who conducted the interview proofread and de-identified the transcript. Second, the transcripts were read by all 3 qualitative researchers, who each wrote reflexive statements and memos to annotate their initial hunches and thoughts.[19] Memoing continued throughout the analysis. And third, the researchers analyzed each transcript using conventional content analysis[20] to derive an inductive coding structure (naming segments of data with labels). Data matrixes, with links to the original transcripts, were created to facilitate systematic comparisons within and between cases at a conceptual level.[19,21,22]

After the first 3 interviews, the qualitative researchers held weekly analytic meetings, returning to the data to substantiate our interpretations and determine whether there were alternate points of view.[23] During the analytic discussions, we discovered a pattern in the data concerning high reliability. No participants mentioned high reliability by name until one of the last interviews; that interview was affirmation of the findings reported here. Quotation marks in the findings reflect the participants' words as data to support the interpretations.