

THE PSYCHOSOCIAL CHALLENGES OF CARING FOR PATIENTS WITH EBOLA VIRUS DISEASE

Matthew W. Smith, Philip W. Smith, Christopher J. Kratochvil, and Shelly Schwedhelm

Caring for highly infectious patients in biocontainment units is a new phenomenon, and little is known about the behavioral health of workers in this setting. This is a qualitative study exploring the unique experiences of workers involved in the care of patients with Ebola virus disease (EVD) at Nebraska Medicine during the 2014 Ebola outbreak. Twenty-one in-depth interviews were conducted focused on topics of personal memories, interpersonal experiences, stress response, and patient management. Five themes were identified: (1) positive experiences were emotional while challenges were technical; (2) a significant percentage of workers encountered interpersonal stressors, with 29% of respondents having feelings of isolation, 33% having alterations in home life, and 25% experiencing at least 1 episode of discrimination; (3) physicians and nurses had stressors primarily related to patient care; (4) mental health was an important supportive service, with 45% of respondents using behavioral health counseling; and (5) working in the biocontainment unit during activation was more stressful than everyday work for 60% of respondents. Differences were also noted based on employee occupation and leadership level: nurses, physicians, and members of the leadership team tended to focus on emotional experiences and were more likely to utilize behavioral health counseling services than support staff and nonleadership personnel. These findings provide a framework for thinking about the unique aspects of caring for highly infectious patients, and understanding these issues will improve training, enable management to better support staff, and provide insights to those establishing biocontainment units.

Keywords: Psychological impacts, Public health preparedness/response, Viral hemorrhagic fevers

THE WEST AFRICAN EBOLA VIRUS DISEASE (EVD) outbreak that began in 2014 was the worst on record, with more than 11,000 deaths and an estimated fatality rate of 50% to 70%.^{1,2} As a disease with both high infectivity and high virulence, Ebola poses significant risks to healthcare workers; a report from West Africa found that in 2014 health workers were 20 to 30 times more likely than the general population to get infected with EVD.³ Direct contact with highly infectious patients is concomitant with stress in healthcare workers.⁴ During the SARS outbreak of 2003, over 30% of hospital workers experienced high levels of stress,⁵ and the 1995 Kikwit

Matthew W. Smith is a student, College of Medicine and College of Public Health; Philip W. Smith, MD, is Professor Emeritus, College of Public Health; and Shelly Schwedhelm, MSN, RN, is Executive Director, Emergency Preparedness and Infection Prevention; all are at the University of Nebraska Medical Center, Omaha, Nebraska. Christopher J. Kratochvil, MD, is Associate Vice Chancellor for Clinical Research at the University of Nebraska Medical Center, and Vice President for Research at Nebraska Medicine, Omaha, Nebraska.

Ebola outbreak demonstrated the need to protect the emotional well-being of workers.⁶ While there is much to be learned about the psychological components of previous disease outbreaks, healthcare worker morbidity and mortality differ based on treatment setting, type of healthcare worker, and organism characteristics.⁷ Thus, lessons learned from non-EVD diseases (eg, SARS) and from different treatment settings (eg, West Africa) are different when compared to treatment of EVD in the United States, particularly in biocontainment units.

In a typical healthcare setting, the factors associated with stressors among healthcare workers include long work hours, high workload, and jobs with little latitude in decision making.^{8,9} However, patient care in dedicated biocontainment units is a relatively new phenomenon; there were very few such biocontainment units in the United States in 2014, and each had limited activation experience. Thus, there is minimal knowledge about how stress in this environment differs from the normal stressors of working in health care. One study found that workers in tertiary care centers with direct EVD patient contact did not have a lower health-related quality of life when compared to other hospital staff, but they did experience greater social isolation.¹⁰ This general exploration of well-being is a step toward understanding how to better protect the mental health of workers, but a more detailed examination of staff behavioral health is still needed.

Understanding the primary stressors encountered by hospital personnel in this setting enables leadership teams to design interventions and training to proactively reduce and manage stress and to better meet the needs of their staff. A multitude of biocontainment facilities are in development in the wake of the recent EVD outbreak,¹¹ and knowledge about worker behavioral health is needed now more than ever to help optimize the functionality of highly effective healthcare teams. This study's primary aim was to explore broad concepts of behavioral health in healthcare workers caring for highly infectious patients at a tertiary care center in the United States.

METHODS

The study was conducted exclusively at the Nebraska Biocontainment Unit (NBU) among staff members who participated in the care of patients with EVD and also among those in leadership positions associated with operational accountability of the NBU during the 2014 unit activation. Design was qualitative in nature, with in-depth interviews as the source of data. All research was approved by the IRB of the University of Nebraska Medical Center.

Interviews were conducted in a semistructured format, using a topic overview to guide the conversation. The topics and topic subquestions were developed through discussion with multiple members of the NBU leadership team and

were designed to explore several dimensions of behavioral health. Broad topic areas included:

- Background information
- Personal memories
- Interpersonal experiences
- Stress
- Patient management

In total, 21 interviews were conducted during the spring of 2016. Eligible participants included any staff member who participated in the care of the EVD patients who were treated at the NBU during 2014; the total pool of eligible staff members was 37. Each interview lasted 20 to 60 minutes, with a median time of 30 minutes. Interviewees were categorized based on their role in the NBU in order to create analytic subsets: 1 categorization was based on leadership level (member of the leadership team vs. not a member of the leadership team), and the other categorization was based on primary occupational responsibility (physician vs. nurse vs. support staff). Support staff included managers, laboratory/radiological technicians, personal protective equipment (PPE) specialists, research specialists, and behavioral health counselors. All interviews were conducted in private sessions on the campus of Nebraska Medicine by 1 male interviewer, a trained public health student who was not affiliated with the NBU staff. Participation was voluntary, and recruitment was conducted through mass email via the staff listserv. Three recruitment emails were generated during a 3-month period, with recruitment ceasing when data saturation was achieved.

Interviews were recorded using a standard handheld audio recording device and subsequently transcribed verbatim, with the transcription data organized by topic area. Following this process, all quotes were sanitized to remove any identifying information, including names and personal details, in order to promote confidentiality. Following data cleaning, the major themes of each topic area were derived

Table 1. Participant Characteristics ($n=21$)

<i>Variable</i>	<i>N (%)</i>
Gender	
Male	4 (19)
Female	17 (81)
Primary occupation at NBU	
Physician	3 (14)
Nurse	8 (38)
Support staff	10 (48)
Leadership involvement	
Leadership	6 (29)
Nonleadership	15 (71)
Time in health care	
0-9 years	3 (14)
10+ years	18 (86)

post-hoc from the data by 1 data coder and subsequently categorized to facilitate analysis. No software was used for data management. Where topic responses were categorized as “emotional,” they related primarily to abstract concepts and personal feelings (eg, joy, sorrow, worry, personal sat-

isfaction, feelings of failure, etc). “Technical” topic responses focused on occupational issues (eg, physical discomfort, novelty of work, successes and failures of patient care, etc). The discussion about coping mechanisms was organized by local strategies (conversations with fellow

Table 2. Findings by Occupational Role, Leadership Involvement

Theme	Total (n, %)	Occupational Role			Leadership Involvement	
		Physician (n, %)	Nurse (n, %)	Support Staff (n, %)	Leadership (n, %)	Staff (n, %)
Most rewarding things						
Emotional	14 (78)	2 (100)	7 (88)	5 (63)	5 (83)	9 (75)
Technical	4 (22)	0 (0)	1 (12)	3 (37)	1 (17)	3 (25)
Hardest things						
Emotional	7 (33)	2 (67)	5 (63)	0 (0)	3 (50)	4 (27)
Technical	14 (67)	1 (33)	3 (37)	10 (100)	3 (50)	11 (73)
Different treatment by hospital workers						
Yes	8 (40)	2 (67)	4 (50)	2 (22)	3 (50)	5 (36)
No	12 (60)	1 (33)	4 (50)	7 (78)	3 (50)	9 (64)
Alterations in home life						
Yes	7 (33)	2 (67)	3 (50)	2 (20)	2 (33)	5 (33)
No	14 (67)	1 (33)	5 (50)	8 (80)	4 (67)	10 (67)
Feelings of isolation						
Yes	6 (29)	1 (33)	4 (50)	1 (10)	0 (0)	6 (40)
No	15 (71)	2 (67)	4 (50)	9 (90)	6 (100)	9 (60)
Episodes of discrimination						
Yes	5 (25)	1 (33)	3 (43)	1 (10)	0 (0)	5 (33)
No	15 (75)	2 (67)	4 (57)	9 (90)	5 (100)	10 (67)
Felt reengaged in work						
Yes	9 (64)	1 (50)	5 (100)	3 (43)	3 (75)	6 (60)
No	5 (36)	1 (50)	0 (0)	4 (57)	1 (25)	4 (40)
Major source of anxiety						
Patient care-related	9 (45)	2 (67)	5 (63)	2 (22)	3 (60)	6 (40)
Outside of patient care	11 (55)	1 (33)	3 (37)	7 (78)	2 (40)	9 (60)
Increased anxiety related to Dallas incident?						
Yes	6 (33)	3 (100)	3 (43)	0 (0)	2 (33)	4 (33)
No	12 (67)	0 (0)	4 (57)	8 (100)	4 (67)	8 (67)
Most emotionally taxing moment						
Death of patient	10 (50)	2 (67)	6 (86)	2 (20)	2 (40)	8 (53)
Other	10 (50)	1 (33)	1 (14)	8 (80)	3 (60)	7 (47)
Primary coping mechanism						
Conversations with staff	4 (21)	1 (33)	2 (29)	1 (11)	2 (33)	2 (15)
External	10 (53)	2 (67)	4 (57)	4 (44)	4 (67)	6 (46)
None identified	5 (26)	0 (0)	1 (14)	4 (44)	0 (0)	5 (38)
Experienced compassion fatigue						
Yes	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
No	19 (100)	2 (100)	8 (100)	9 (100)	3 (100)	16 (100)
Utilized behavioral health counseling services						
Yes	9 (45)	3 (100)	5 (63)	1 (11)	5 (83)	4 (29)
No	11 (55)	0 (0)	3 (37)	8 (89)	1 (17)	10 (71)
Comparative stress						
NBU > regular work	12 (60)	3 (100)	2 (29)	7 (70)	4 (80)	8 (53)
NBU ≤ regular work	8 (40)	0 (0)	5 (71)	3 (30)	1 (20)	7 (47)

staff members) and external strategies (exercise, familial support, etc).

RESULTS

The interview results are shown in Tables 1 and 2. Table 1 outlines the characteristics of the interviewees, and Table 2 quantifies thematic findings. Note that in Table 2 the responses do not necessarily add up to 21, since not all interviewees answered every question. From these results, 5 major themes were identified:

- *Positive experiences were emotional, while challenges were technical.*

When discussing the most rewarding aspect of the entire experience, 14 out of 18 interviewees (78%) focused on emotional topics, such as the joy of seeing the patients improve, the positive team environment, and the satisfaction of overcoming a difficult challenge.

People were anxious on the first day, but the minute they met their patient they knew that it was their patient. Everybody took a lot of pride in being able to be safe and hold each other accountable. It was very much a team effort. The other rewarding piece was working with the patients' families and feeling a sort of camaraderie.

In contrast, when asked about the hardest aspect of the entire experience, 14 out of 21 participants (67%) focused on technical issues rather than emotional ones. Commonly cited issues were learning to take care of a patient while wearing PPE and the novelty of the patient care.

I'd read about Ebola in a book, but I had never seen an Ebola patient before, and no one I knew had ever seen an Ebola patient. ... When I see patients in the hospital I generally have an idea of how to treat them. But with this nobody really knew because prior to 2014 most of these patients were being taken care of in Africa where they didn't have the ability to check lab work and monitor in the way we were able to.

- *A significant percentage of workers encountered interpersonal stressors.*

The interpersonal domain was assessed with questions about alterations in home and social life, feelings of isolation, and episodes of discrimination. Within each of these domains, there existed a consistent presence of interpersonal stress. Seven participants (33%) reported alterations in their home or social life; these alterations were exclusively negative and included intolerant family members, having to sleep in the basement, being uninvited from family gatherings, and having reduced involvement in social activities. Six participants (29%) reported feeling isolated during the

period of activation, and 5 (25%) experienced at least 1 episode of discrimination as a result of their involvement.

I went down to take care of my sister in [a southern city] while she was having surgery. My sister tends to babble when she is stressed. ... I was in the waiting room and the next thing I know 3 people came up to me and said they wanted to talk to me. They pulled me into one of the consultation rooms and ... I think it was the manager of the OR ... expressed her concern about my presence. I'm here to take care of my sister, and it had been over 14 days since I had taken care of an active patient ... and they asked me to leave! I said I'm sorry this is a big deal to be with my sister. I asked them to call my manager. They ended up not calling her.

- *Physicians and nurses had stressors primarily related to patient care.*

Participants were asked to discuss their major sources of anxiety, and a major theme that emerged was related to patient care—in particular, the direct acquisition of EVD. This fear was primarily realized by those with the highest level of patient contact, the nurses and physicians.

I don't think I really realized how much stress was actually involved in the real patient care. ... I remember one situation ... I picked up a red pen and I wrote on the dry-erase board in the patient room and I showed it to my doffing partner. ... Then we were just talking and I looked down and I saw red on my gloves and I had this adrenaline rush and I thought, "Oh my god, what have I touched, what have I been doing?" because I immediately thought it was blood ... and then I realized it was from the red pen.

Similarly, those with the highest level of patient contact were more likely to have their anxiety increased after the incident in Dallas in which 2 nurses contracted EVD. Six workers (33%) reported increased anxiety from this incident, and all 6 were either physicians or nurses.

I remember having a sympathetic response to Dallas ... my heart was pounding, I couldn't sleep. ... I was officially nervous for the first time. It was at that moment that I realized we are not immune to this and somehow that had escaped me. It mattered that they were at a hospital trying to do the same thing as us.

The proximity to the bedside also manifested as emotional concern for the patients. Ten interviewees (50%) identified the death of the third patient with EVD (the only patient to die at the NBU) as the most taxing experience of the whole ordeal, and 8 of those 10 were nurses or physicians.

That will forever be the worst day of my career. He came to us and ... his kidneys weren't working, it was falling apart, and I couldn't do anything to stop it.

- *Mental health was an important supportive service.*

Discussion of mental health focused on compassion fatigue and use of the behavioral health counseling services available to all staff members during unit activation. Staff universally reported an absence of compassion fatigue and cited personal interest, group training activities, and successful patient care as contributing factors.

Biopreparedness people are kind of adrenaline junkies. I suspect that if the state department called today and said, "There's a Lassa fever patient that needs to be transferred, should we go for it?" people would say, "Yes! Bring it on!"

A trained mental health practitioner with disaster-response experience mingled with staff and was available to discuss issues privately or in a group on a voluntary basis. Nine workers (45%) reported utilizing and benefiting from this informal counseling, and those who did not use the counselor felt it was a useful service to have available.

I wasn't used to talking with someone because I've never had to do it before, but I think that was really helpful. It was an important part of the functionality of our team to have a person trained to deal with people who were in disasters.

- *Working in the biocontainment unit during activation was more stressful than everyday work for most but not all workers.*

Participants were asked to directly compare the stress of their normal work to the stress of working in the biocontainment unit during activation using a 10-point scale, and 12 participants (60%) rated their NBU work as more stressful than their regular work. The major group that rated their NBU work as equally stressful or less stressful than their normal job was nurses with lengthy ICU experience. They cited high patient volume and managerial challenges as reasons why their normal occupation was more stressful.

Our most critical patient ... he was one sick guy. [At one point] he was on 13 drips ... but I've had the same things or more [on my ICU job], and I've also gotta get them to the CT scanner. Here it was self-contained, so it was less of a challenge in terms of coordination of care ... so I've definitely felt more stressed taking care of other patients.

DISCUSSION

This case study of workers caring for patients with EVD in Nebraska provided several interesting findings. Regarding stress, we hypothesized that a larger percentage of staff would have felt increased anxiety following the infection of 2 Dallas nurses with EVD in October 2014. This event occurred in the midst of the NBU activation and called into question the preparedness of the United States with regard to EVD.¹² Despite this, only 33% of NBU workers felt increased anxiety following the incident; a common senti-

ment among respondents was a strong belief in the strength of the PPE protocols in place at the NBU as well as the feeling of preparedness following extensive drilling and training prior to activation.

Having a behavioral health worker available for counseling and informal conversations was viewed favorably by the majority of participants. The 45% participation rate can be attributed to a need for these services, ease of access to the services, and provision of services by a trusted and long-standing member of the team. In addition there was a complete absence of reported compassion fatigue among workers. After 3 months of near-continuous activation, it was expected that more workers would have experienced burnout. This finding may be due to a combination of the presence of counseling services, the fact that all employees were volunteers, and the behavioral health training exercises that were provided prior to activation. Mental health has long been recognized as an important element in a biocontainment unit occupational health program,^{13,14} and the experiences of the NBU activation are in accordance with this notion.

It was expected that almost all staff would have found their biocontainment unit experience more stressful than their everyday work, yet only 60% did. One explanation for this certainly relates to the presence of highly experienced ICU nurses, who tended to report the high workload of their normal job as more stressful than the single-patient care of the biocontainment unit. In addition, the behavioral health support and extra PPE protocols are support measures not typically present in a normal hospital work environment, and these factors likely served to mitigate stress.

Stratification by occupation and leadership role provided additional insight into the differences in experiences between workers of different backgrounds. Members of the leadership team had fewer episodes of discrimination and fewer feelings of isolation, which indicates that a certain degree of protection was gained through involvement in the leadership team. Another finding was that nurses, physicians, and leaders tended to focus on emotional experiences and were also more likely to utilize the counseling services. This may be commensurate with increased involvement and subsequent buy-in to the processes of the NBU for leaders as well as those with more direct patient contact.

Strengths and Limitations

The number and depth of interviews were an important strength of this study. Over half of the workers (21 out of 37) involved in the 2014 NBU activation participated, with proportionate involvement among each occupational and leadership role. Given the elective nature of our study, it is conceivable that those who did not participate shared certain characteristics (eg, negative experiences, compassion fatigue, etc), and response bias in the study is a possibility. Having a semistructured interview format allowed for advanced interpretation of answers and deep exploration of

topics, yet this depth also made distilling information more challenging. The greater than 12-month time gap between activation and interviews was important to ensure adequate reflection, but this lengthy delay may have influenced the study results through recall bias.

Our study, while not providing the comprehensive analysis necessary for immediately establishing policy guidelines for preparedness, does bring to light important questions about how biocontainment units should be structured as well as establishing key psychosocial and ethical issues experienced by staff. When thinking about establishing biocontainment units in the United States in the future, important considerations include whether service in biocontainment units should be voluntary or mandatory, how to best screen psychological fitness for duty, how to ensure appropriate access to mental health support among staff, and how to best surveil for the signs and symptoms of psychological problems brought on by the stress of working in a hazardous patient-care setting. Based on our results, it seems likely that voluntary recruitment reduces compassion fatigue and having behavioral health counseling services available promotes psychological well-being of workers.

CONCLUSION

The dearth of information about behavioral health among workers in biocontainment units in the United States makes any information about this topic valuable. While healthcare workers are often at risk of contracting diseases like hepatitis B and HIV, the potential exposure to highly lethal infectious diseases is a unique feature of biocontainment unit patient care. This case study of the NBU provides a glimpse of the complex experiences of workers caring for highly infectious patients and how these experiences differ by occupation and position. Further exploration of these topics will aid training, reduce burnout, and provide important insight to leaders of biocontainment units.

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Address correspondence to:

Matthew W. Smith
College of Medicine & College of Public Health
University of Nebraska Medical Center
Omaha, NE

E-mail: matthew.smith@unmc.edu