Disaster Medicine and Public Health Preparedness

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Hazard Vulnerabilities Analysis in the Low-Resourced Global Setting

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Brief Report

Cite this article: Dinberu MT, Kebede S, Berkowitz T and Greenky D (2025). Hazard Vulnerabilities Analysis in the Low-Resourced Global Setting. *Disaster Medicine and Public Health Preparedness*, **19**, e78, 1–3
https://doi.org/10.1017/dmp.2025.81

Received: 25 November 2024
Accepted: 10 March 2025

Keywords:
global preparedness; hazard vulnerabilities analysis; disaster preparedness

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Abstract

A hazard vulnerabilities analysis (HVA) is an exercise used by institutions to identify potential threats and is required for credentialing hospitals in the US. To date, there is no documentation of HVA completion in low/middle income countries (LMIC) in the literature. American physicians working together with local physicians and staff from a major referral hospital in Addis Ababa, Ethiopia conducted an HVA in the LMIC setting. Using the Kaiser HVA template, the tool and exercise were tailored to the needs and resources of the LMIC setting. The exercise prompted rich discussion and facilitated the development of a framework to address local hospital threats. Many threats were considered sub-acute or chronic problems that had potential to acutely worsen, putting hospital operations and patient care in jeopardy and impacting staff. Ongoing threats were addressed creatively by the hospital administration, caregivers, and staff, a testament to the resiliency of the system and those working in it. Nonetheless, the hospital benefited from the HVA framework to improve future preparedness. Conducting an HVA in the LMIC setting is feasible, and this example can serve as a basis for HVA completion by other hospitals in similar settings.

A hazard vulnerabilities analysis (HVA) is an exercise used by institutions to identify potential threats systematically. Based on the degree of challenges to operations, it prioritizes planning, mitigation, response, and recovery activities. An annual HVA is required by both The Joint Commission and Centers for Medicare and Medicaid Services for hospital accreditation in the US. It has also been used in Europe, Japan, and China, however, there is no documentation in the literature of HVA completion for hospitals in low/middle income countries (LMIC). In addition, there is no known validation of the HVA tool in any setting.[1–4]

In August 2024, emergency medicine physicians from Emory University School of Medicine in Atlanta, GA collaborated with staff from Tikur Anbessa Specialized Hospital (TASH) in Addis Ababa, Ethiopia to complete an HVA in a low resource setting. TASH is a 700 bed academic referral hospital for both adult and pediatric patients, one of the largest in Ethiopia; and is the primary teaching hospital for Addis Ababa University.[5] Ethiopia has been working to increase investment in its health care sector locally and externally and has made progress in recent years improving capacity, equity, and infrastructure in its health care system. Still, many challenges remain.[6,7] Although considered one of the most capable and highest resourced hospitals in Ethiopia, TASH faces persistent challenges to operations compared to hospitals in higher resourced settings. These challenges include the procurement of supplies and equipment, ensuring adequate staffing, maintaining adequate and reliable infrastructure, and support from external resources.

Methods

Working with hospital leaders, participants were identified at TASH to join the HVA process. This group included the medical director of the hospital, a vice president of the medical school, physician and nursing leadership, physician leadership from the pediatrics department, trainee physician leaders, the pharmacy director, engineering services, a representative from the city health department, and a representative from the national disaster deployment team. None had previously participated in an official HVA.

Two weeks prior to the HVA exercise, a document explaining the basic definition and process of completing an HVA was sent to participants. The document included a survey that asked participants to name and rank the issues they perceived most threatening to hospital operations. The HVA leadership team reviewed the survey results, and then chose the most pressing threats to address in the HVA exercise at TASH.

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The updated Kaiser Permanente HVA tool was utilized for the exercise, a well-regarded and ubiquitous HVA tool. The tool is downloadable without cost and allows for customization of hazards facing a hospital. Inputs to the tool include "event likelihood," "human impact" (possibility of death or injury), "property impact" (physical losses and damages), "business impact" (interruption of services), "institutional preparedness" (preplanning), "internal response capabilities" (time, effectiveness, resources), and "external response capabilities" (community/mutual aid, staff, and supplies). The tool contains an embedded algorithm to calculate the relative risk of each hazard to the hospital.[8] The relative risk is not meant to provide a benchmark for comparison against other facilities or even historically within the same institution, but instead is only relative to the other hazards assessed within the tool at that time.

The HVA exercise was conducted over 3 days with a different group of participants each day. Participant groups were strategically formed to promote honest dialogue at the suggestion of local leaders. For example, junior staff were not paired with senior hospital administrators, out of concern they may not fully express their opinions if administrators were listening. Each meeting lasted approximately 3 hours. The scale in the Kaiser HVA uses numbers to approximate "low," "moderate," and "high" ratings for each category. The HVA team created objective definitions for "low," "medium," and "high" for increased continuity and objective scoring. The HVA was facilitated by an Emory team member familiar with the HVA process. Of 10 hazards initially identified by stakeholders, the top 4 were reviewed with each participant group due to time constraints. At the beginning of each meeting, the purpose and process of the HVA was reviewed and an example hazard was filled out for the group. The group was reminded that the purpose of the HVA was not to be critical, but to identify hazards to hospital operations and promote opportunities to address them. Further, it was stressed that relative strengths would also be uncovered during the discussions and would be important to leverage when addressing hazards.

Results

Details of the uncovered hazards are not reviewed in this article to maintain confidentiality of proprietary hospital information at the request of the hospital leadership. Of the 4 hazards discussed, 1 was environmental, 2 were disruptions to hospital infrastructure/supplies, and 1 was related to surge volumes. The infrastructure hazards were categorized as chronic problems that had the potential to acutely worsen.

"Human impact" was deemed to be high for many of the hazards, although ongoing solutions to address chronic hazards help mitigate the impact. Physician burnout was mentioned numerous times as being exacerbated by these hazards, as providers stated they had that these hazards had an impact on the quality of their time at work and their work-life balance. "Property" and "business impact" were constant concerns of participants, and chronic infrastructure problems were mentioned numerous times as negatively impacting these categories.

Discussion

The HVA exercise was deemed a success both by the HVA team and participants, especially hospital administrators. There was good discussion throughout the HVA exercise. There were some participants less willing to participate initially; however, overall participation improved throughout each day, especially after facilitator prompting. At times, the facilitator needed to guide the discussion to remain on the category at hand and remind participants of the HVA process during the exercise. Overall, the participants were engaged and seemed to understand the HVA process and goals.

During the discussions, it became clear that hazards to the hospital were already being addressed in creative ways to preserve hospital operations, especially the chronic hazards, a testament to the resiliency of the hospital system and its providers. While official hazard or disaster preparation plans may not have been in place or were outdated, during the discussion it was apparent that actual events when they occurred were fluid, and that the hospital was adept to maintaining operations in challenging situations. This includes things like optimizing resource allocation and staff scheduling or preemptively addressing maintenance issues. Likewise, although coordination with external partners were not always formalized, there was collaboration with local partners to address hazards, which was summed up nicely by a participant who noted "we figure it out." It was also mentioned that in this setting, it was difficult to set aside emergency resources as all existing resources are often required to maintain daily operations. Given that infrastructure issues were categorized as chronic problems that had the potential to acutely worsen, it was discussed that in future HVAs in this setting the chronic baseline problem and an acute worsening event could be treated as 2 distinct hazards, given the different approach and solutions required for each. The chronicity of hazards and challenges of working in the LMIC setting is not without consequences, and physicians stated numerous times that identified hazards impacted physician burnout levels, which is consistent with studies that have shown that workplace environment informs levels of physician burnout.[9] It has also been reported that poor conditions in hospitals have led to harm to family members of health care workers, and this was also raised as a concern during the discussions.[10] Providers pointed to specific hospital events that have impacted their families, however detailed information remains proprietary at provider request.

Feedback from participants about the HVA exercise was overwhelmingly positive. Many participants—and especially hospital administrators—noted that the exercise was "eye opening" and allowed them to think about the hazards in new ways, both in understanding the hazard at hand and crafting solutions. Participants reiterated that while the ranking of hazards was useful, more important was the discussion throughout the HVA. Often the participants asked the facilitator about how similar hazards were addressed at the facilitator's institution, and collaborative discussions ensued. Multiple participants noted the value they perceived when discussing threats within the HVA framework and hearing the viewpoint of others in an open forum. Having the variety of people from varying levels and services in the hospital present was noted to be important to discover underlying knowledge of the problems, especially since certain existing hazards were not previously documented. The HVA team prepared a summary of the HVA exercise, which was shared with the hospital. The summary collected and synthesized the scores and discussion throughout. TASH now plans to conduct an HVA annually.

Conclusion

Based upon this experience, it is believed that conducting a hospital HVA in the LMIC setting is both a feasible and useful

https://doi.org/10.1017/dmp.2025.81 Published online by Cambridge University Press

exercise that can help hospitals build structure in their preparedness and disaster response activities. Conducting HVAs in LMIC settings may also expose the creativity and resiliency of these hospitals in maintaining operations in difficult circumstances. Future documentation of detailed changes and progress in annual HVAs in LMIC could help hospitals in similar settings improve resiliency and preparedness. It is our hope that this experience and its outcomes can be used as a guide for others to conduct an initial HVA in a low-resource setting.

Author contribution. MD – writing, analysis, editing; SK – editing, brainstorming study; TB – writing, editing, helped conceptualize study; DG – writing, editing, conceptualized study.

Acknowledgements. The team would like to acknowledge Dr. Brent Kaziny and Dr. Nichole Davis for their guidance during this project.

Funding statement. "EGHI Rapid Response Grant funding provided by the Emory Global Health Institute. The content is solely the responsibility of the authors and does not necessarily represent the official views of the Emory Global Health Institute."

Competing interests. The author(s) declare none.

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