# Letter to the editor
# Fire Safety Challenges in Hospital Safety Index (HSI)

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## ABSTRACT

Hospitals are a symbol of social welfare and the last refuge of patients, which is the most important issue of the health system. Patient safety is the first and most important issue for the health system. Before COVID-19, the World Health Organization (WHO) defined the Hospital Safety Index (HSI) to measure hospital preparedness for disasters. During the COVID-19 crisis, hospitals faced many problems, including safety. Governments and health officials need to pay attention to fire safety. In the Covid-19 crisis, different conditions were experienced in hospitals, and the number of patients, inpatients, medical staff, equipment, and machinery in these critical conditions has increased significantly. This article in the form of a letter to the editor tries to point out the challenges and opportunities of hospital safety index tools to reduce hospitals' vulnerability to improve their performance and resilience to disasters.

## Dear Editor

COVID-19 is a crisis that now affects countries, governments, and health systems, especially hospitals. Hospitals are a symbol of social well-being that need to have health facilities to save lives, provide emergency care and help the community safely. Hospital safety is so sensitive, morally and legally because they are the last refuge of disaster victims [1].

During the outbreak peak of the COVID-19 epidemic, the number of patients referred, hospitalized, health care workers, equipment, and machinery increased dramatically. In this situation, the number of hospitals was not enough to meet the needs of COVID-19-infected patients, and compensating for this shortage, even in the provision of field hospitals, was very costly, time-consuming, and so difficult. In such circumstances, it was impossible to replace a hospital that had caught fire and the occurrence of such catastrophes showed that having a safe hospital will make the controlling of COVID-19 as soon as possible. The increased number of fire accidents in various hospitals such as Sina Athar Clinic in Iran (with 19 victims) and Baghdad Hospital (with 82 victims) showed that hospital safety is a critical point in the health system management that could impact qualitative health service, especially in a biological disaster such as COVID-19 with an increase in a load of the patient.

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Accordingly, the loss of a hospital in accidents and disasters is a crisis because it may lead to a loss of public security and trust in governments. As regards the occurrence of severe disturbances such as fire that could lead to numerous damages in human, materials, and economic and environmental dimensions, strengthening risk assessment tools as the heart of management systems will be an opportunity to improve health policies [2, 3].

It is very important as emphasized by the WHO to have a tool to assess the health and safety of the hospital, especially during biological disasters [2, 4]. One of the tools to measure the readiness of hospitals in facing disasters is the Hospital Safety Index (HSI) which is defined by World Health Organization (WHO) and shows the hospital's ability to prepare and continue services in an emergency or disaster and is widely used in different countries [2].

At the moment, the HSI consists of a checklist, which is divided into four main modules that include hazards affecting the safety of the hospital and the role of the hospital in emergency and disaster management, structural, non-structural safety, and emergency and disaster management [2, 3].

Regarding fire safety, only in the third module non-structural safety entitled "Fire protection system" has been assigned a limited ward with 5 items to assess the safety of the hospital that are presented in numbers 62-66 (Table 1). This is one of the challenges in the HSI tool because it has evaluated only a few protective items and it seems that this measure is insufficient to assess the fire risk in a hospital.

It is valuable to mention that the existence of other systems in this tool indirectly emphasizing fire safety is desirable because 7 systems with a total of 13 items in module 3 as non-structural safety have indirectly evaluated fire safety (Table 1), but their dispersion during the instructions has weakened the focus of this indicator on fire safety [2].

A summary of the specifications of these items is provided in Table 1.

Since the main goal of WHO in the publication of HSI is to reach inherently safer hospitals, it is necessary to deal with safety on a larger scale that covers the occupants, residents (staff and patients), buildings, and the economic value of the hospital. Attention to the above-

**Table 1.** Summary of related fire safety sections and items in the Hospital Safety Index (HSI)

| Sub-Module Name | System Name | Item Name |
|---|---|---|
| 3.3 Critical systems | 3.3.1 Electrical systems ** | 41. Condition and safety of electrical equipment, cables, and cable ducts |
| | 3.3.2 Telecommunications systems ** | 53. Safety of sites for telecommunications systems |
| | 3.3.3 Water supply system** | 56. Water reserves for hospital services and functions |
| | 3.3.4 Fire protection system* | 62. Condition and safety of the fire protection (passive) system<br>63. Fire/smoke detection systems<br>64. Fire suppression systems (automatic and manual)<br>65. Water supply for fire suppression<br>66. Emergency maintenance and restoration of the fire protection system |
| | 3.3.6 Fuel storage systems (e.g. gas, gasoline, and diesel)** | 73. Condition and safety of above-ground fuel tanks and/or cylinders<br>74. Safe location of fuel storage away from hospital buildings |
| | 3.3.7 Medical gases systems** | 77. Location of storage areas for medical gases<br>78. Safety of storage areas for medical gas tanks and/or cylinders |
| | 3.3.8 Heating, Ventilation, and Air-Conditioning (HVAC) systems** | 84. Safety of enclosures for HVAC equipment<br>85. safety and operating condition of HVAC equipment (e.g. boiler, exhaust)87. Condition and safety of pipes, connections, and valves.<br>89. Operation of air-conditioning system (including negative pressure areas) |
| 3.4 Equipment and supplies | 3.4.2 Medical and laboratory equipment and supplies used for diagnosis and treatment** | 95. Condition and safety of laboratory equipment and supplies<br>99. Condition and safety of equipment and supplies in the sterilization services<br>102.Condition and safety of medical equipment for nuclear medicine and radiation therapy |

* Direct relation to fire safety; ** Indirect relation to fire safety.

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mentioned points shows that in addition to non-structural safety, it is necessary to pay attention to structural safety such as evacuation time, residential rescue, fire load, fire propagation speed, hospital area, ventilation, the height of floors, accessibility, available exit units, residents' mobility, number of residents, and the economic value of the hospital [3, 5]. Thus, attention to these important factors in an international tool such as the HSI strengthens patient safety and hospital accreditation. Another challenge in the current version of the HSI is the existence of a qualitative assessment which can be replaced with a quantitative evaluation and provide an opportunity to strengthen this tool. Quantitative evaluations can make the prioritization of the evaluated units clear with greater accuracy.

Another shortcoming is related to the data collection process for completing HSI forms. The data will not be collected by safety experts to gather relevant data, which can lead to the collection of insufficient, incomplete, unrelated data, and ultimately unreliable results in HSI. Therefore, the use of fire safety, fire fighting, or occupational safety specialists in the assessment team is another matter that must be met to obtain accurate and reliable assessments [2].

Based on the above, the development of the HSI index tool can both play an effective role in changing health policies and bring it closer to the great goal that the hospital is inherently safe. So, strengthening these tools can help government officials to reduce hospital vulnerabilities, improve performance, resilience, and reliability in providing safe services and finally, promote the management of health systems [6]. Also, this can help the hospital to attract medical tourists and play an effective role in the economic growth of hospitals and governments in natural situations.

## Ethical Considerations

### Compliance with ethical guidelines

There were no ethical considerations to be considered in this research.

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### Authors' contributions

Both authors equally contributed to preparing this article.

### Conflict of interest

The authors declare no conflict of interest.

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