Title: Post-Incident Analysis of the Health System Response to a Fatal Addiction Treatment Camp Fire in Northern Iran

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Abstract

Objective: Fires in residential addiction treatment facilities are rare but devastating mass casualty incidents that require rapid interagency coordination and an effective health system response. This post-incident analysis examined the health system response to a fatal fire at an addiction treatment camp in Guilan Province, northern Iran, with a focus on operational strengths, response gaps, and lessons for future emergency preparedness.

Methods: This post-incident descriptive case analysis used direct field observations by one of the authors and other members of the emergency response team, together with Emergency Operations Center (EOC) operational reports, Emergency Medical Services (EMS) dispatch records, official incident documentation, and hospital coordination reports. These sources were used to reconstruct the response timeline and identify key operational strengths and challenges.

Results: The incident resulted in 50 casualties, including 32 deaths at the scene and 18 injured patients transported to hospitals, four of whom subsequently died. Rapid activation of the Incident Command System, timely EMS deployment, interagency coordination, early activation of the Emergency Operations Center, expansion of burn care surge capacity, and establishment of a crisis communication team were identified as key strengths of the response. The main challenges were the limited availability of EMS bus ambulances in eastern Guilan Province, the absence of an integrated patient tracking system, and logistical difficulties related to family reunification and patient information management.

Conclusion: This post-incident analysis identified several priorities for preparedness, including fire safety measures, mass casualty preparedness, coordinated incident management, hospital surge capacity, patient tracking systems, and equitable distribution of specialized EMS resources. These lessons may inform planning and response for similar fire-related mass casualty incidents. This case adds practical evidence on health system response to a fire-related mass casualty incident in a residential addiction treatment facility, a setting for which published operational reports remain limited.

Keywords: Mass casualty incident; Emergency Medical Services; Incident Command System; Fire safety; Addiction treatment facility; Disaster response; Burn disaster.

Introduction

Fire-related mass casualty incidents can rapidly overwhelm local emergency medical and hospital resources, particularly when multiple critically injured or burn patients require simultaneous care (1,2). Residential care facilities often accommodate vulnerable individuals who may have impaired physical mobility, cognitive or behavioral limitations, or restricted ability to respond promptly during emergencies, making timely evacuation particularly challenging (3,4). A fire in a residential addiction treatment facility can therefore create substantial evacuation and response challenges and may require coordinated action by multiple agencies.

World Health Organization guidance on mass-casualty management and hospital emergency response identifies command and control, effective communication, standardized triage, coordinated resource mobilization, and hospital surge capacity as core elements of preparedness and response (5,6). Fire and life-safety standards also emphasize appropriate means of egress, fire detection and alarm systems, and automatic sprinkler protection in residential facilities (7). Routine safety inspections, system maintenance, staff training, and regular evacuation drills provide additional measures for reducing fire-related risks in residential care settings (3,8).

When fires escalate into mass casualty incidents (MCIs), the health system response depends on several operational components (1). These include early activation of the Incident Command System (ICS), rapid scene assessment, standardized patient triage, resource mobilization, coordinated patient distribution, and maintenance of hospital surge capacity (1,5,6,9,10). Disaster-response guidance also supports the use of Emergency Operations Centers (EOCs), electronic patient tracking systems, and structured crisis communication to improve situational awareness, continuity of care, family reunification, and coordinated decision-making during large-scale emergencies (5,6,11-13).

Fire safety, hospital disaster preparedness, and emergency medical response have been studied separately, but reports examining the operational performance of the health system during fire-related mass casualty incidents in residential addiction treatment facilities remain limited, particularly in low- and middle-income countries. Published evidence on command and coordination, prehospital operations, hospital surge management, patient tracking, and crisis communication in these incidents is also limited.

On 3 November 2023, a fatal fire occurred at a residential addiction treatment camp in Kumleh District, Langroud County, Guilan Province, northern Iran. The incident resulted in multiple fatalities and injuries and required a large-scale emergency response involving Emergency Medical Services (EMS), hospitals, public health authorities, and other governmental organizations. The event also allowed evaluation of the operational performance of the provincial health system during a real-world fire-related mass casualty incident.

This study examined the health system response to the incident through a post-incident analysis of operational processes, with attention to strengths, challenges, and practical implications for preparedness and management of future fire-related mass casualty incidents in residential addiction treatment facilities.

Methods

Study Design

This study was conducted as a post-incident descriptive case analysis of the health system response to a fatal fire that occurred at an addiction treatment camp in Kumleh District, Langroud County, Guilan Province, northern Iran, on 3 November 2023. The study aimed to evaluate the operational response, identify key strengths and operational challenges, and derive lessons to improve preparedness for future fire-related mass casualty incidents.

Data Sources

The analysis was primarily based on direct field observations made by one of the authors, who participated in the emergency response, together with observations documented by other members of the response team. These observations were supplemented by official operational records, including Emergency Operations Center (EOC) reports, Emergency Medical Services (EMS) dispatch records, official incident reports from Guilan University of Medical Sciences, hospital coordination reports related to patient transfer and surge capacity, and other crisis management documents generated during the response.

Data Collection

Information regarding the incident chronology, command and coordination, EMS dispatch, patient transportation, hospital surge capacity, crisis communication, and post-incident support activities was compiled from direct field observations and official operational records. To improve the accuracy of the findings, information obtained from field observations was cross-checked against official EOC and EMS documentation, and discrepancies were resolved using the official operational records as the primary reference.

Data Analysis

The incident timeline was reconstructed descriptively using verified field observations and official operational records. Operational actions were reviewed across key response domains, including command and coordination, EMS mobilization, patient transportation, hospital surge capacity, crisis communication, and patient information management. The findings were then organized into two categories: operational strengths and operational challenges. No statistical analysis was performed.

Ethical Considerations

This study was based exclusively on official operational reports, administrative documents, and field observations generated during disaster response. No patient interviews were conducted, no identifiable personal information was collected, and all reported data were fully anonymized to protect confidentiality.

Results

The first emergency call reporting a fire at an addiction treatment camp in Kumleh District, Langroud County, Guilan Province, was received by the Guilan Emergency Medical Services (EMS) dispatch center at 05:42 a.m. on 3 November 2023. The fire caused extensive structural destruction to the facility and resulted in a large number of casualties (Figures 1 and 2). Following confirmation of the incident through subsequent emergency calls, the event was recognized as a mass casualty incident, prompting immediate dispatch of the nearest ambulance and mobilization of additional EMS resources. Simultaneously, the Early Warning System was activated, and senior EMS managers, the Emergency Operations Center (EOC), and university authorities were notified.

Figure 1. Interior view of the addiction treatment facility following the fire, illustrating extensive structural damage to the building. **Source:** Islamic Republic News Agency (IRNA), 3 November 2023. Reproduced with attribution in accordance with IRNA's stated website reuse policy.

Figure 2. Interior view of another section of the addiction treatment facility following the fire, demonstrating the severity of fire damage. **Source:** Islamic Republic News Agency (IRNA), 3 November 2023. Reproduced with attribution in accordance with IRNA's stated website reuse policy.

The sequence of major operational events during the emergency response is summarized in Figure 3. The first ambulance arrived at the scene at 05:53 a.m., approximately 11 minutes after the initial emergency call. Initial scene assessment identified more than 30 casualties, including multiple fatalities. The first injured patient was transported to Shahid Hosseinpour Hospital at 05:58 a.m., and additional ambulances from neighboring areas participated in patient transportation and interhospital coordination.

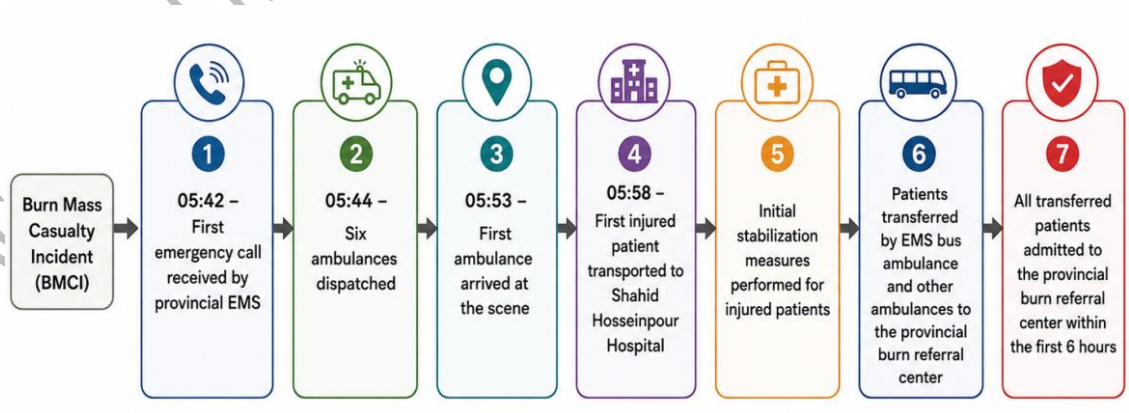

Figure 3. Timeline of the major operational events during the emergency response

The incident resulted in 50 casualties. Of these, 32 victims died at the scene, while 18 injured patients were transported to hospitals for definitive care. Despite hospital treatment, four patients subsequently died, resulting in a total of 36 fatalities and 14 survivors who were discharged following completion of treatment. Operational response measures included activation of the Crisis Command Center of Guilan University of Medical Sciences, expansion of hospital surge capacity through activation of 20 intensive care beds at the provincial burn referral center, deployment of specialist burn care teams, coordinated interhospital transfer of burn patients, and implementation of crisis communication and family support activities.

Discussion

The Kumleh addiction treatment camp fire was a highly fatal fire-related mass casualty incident that placed substantial operational demands on the provincial health system. Analysis of the response identified several practical strengths and gaps that are relevant to preparedness for similar incidents. The EMS response was activated rapidly after the fire was confirmed. The Emergency Operations Center (EOC) was also activated early, senior health authorities were notified, and operational resources were mobilized. Early command and coordination are central to mass casualty incident management because they facilitate resource allocation, communication, and interagency collaboration (5,6,9,10). EMS resources were mobilized quickly, with coordination between prehospital services and receiving hospitals. Additional ambulances from neighboring areas were dispatched, and injured patients were transferred to appropriate hospitals. At the same time, burn care capacity was expanded through activation of additional intensive care beds and mobilization of specialist medical teams. These actions supported the management of multiple critically injured patients and reflected established principles of hospital surge capacity and coordinated emergency response (1,6,14).

WHO standards for burns care in mass casualty incidents emphasize burn-specific disaster planning, specialist burn teams, and scalable surge capacity (15). The expansion of burn care capacity and mobilization of specialist teams during this response reflected these priorities. Similar adaptations were reported after the Formosa Fun Coast dust explosion in Taiwan, where the receiving hospital reorganized personnel, treatment areas, critical materials, and intensive care resources to manage a sudden influx of burn patients (16).

A dedicated crisis communication team was established during the response. Communication among health authorities, hospitals, governmental organizations, and the media supported situational awareness and dissemination of reliable information, in line with emergency-response guidance on structured communication and coordinated decision-making (5,6,9,10). Communication with victims' families was also part of the response and helped reduce uncertainty during the early stages of the incident. Timely patient information and family reunification are also recognized as important components of disaster response (12,13). The response also revealed limitations in the geographical distribution of specialized EMS resources. At the time of the incident, only one EMS bus ambulance was available in Guilan Province, and it was stationed in the provincial capital. The vehicle was subsequently deployed to support the emergency response and interhospital transportation of burn victims (Figure 4). Patient transportation was completed through the coordinated use of conventional ambulances and the EMS bus ambulance; however, broader geographical availability of specialized mass casualty transport resources may improve response capability during future large-scale incidents, particularly in provinces with dispersed populations and seasonal fluctuations in travel.

Figure 4. EMS bus ambulance deployed during the response to the Kumleh addiction treatment camp fire in Guilan Province. At the time of the incident, this was the only EMS bus ambulance available in the province and it was mobilized to support mass casualty transportation and interhospital transfer of burn patients.

The absence of an integrated patient tracking system created difficulties in locating patients and providing timely information to families. These difficulties increased uncertainty among relatives and added to the workload of hospital personnel responding to repeated inquiries. Electronic patient tracking can support continuity of care, coordination among receiving hospitals, patient identification, and family reunification during mass casualty incidents (11-13). Similar problems with patient registration, tracking, and communication were reported after a nursing-home fire in the Netherlands, despite generally effective coordination between prehospital and hospital services (17).

Preparedness for incidents of this type extends beyond the emergency response itself. Residential care facilities may accommodate individuals with limited mobility or those who require assistance during emergency evacuation, making appropriate fire-prevention and preparedness measures particularly important (3,4,8). Building and life-safety requirements, safe means of egress, and the installation and maintenance of automatic fire detection, alarm, and sprinkler systems are therefore important considerations (7). Staff fire-safety education, emergency-response training, routine safety inspections, and regular evacuation drills may further improve preparedness and reduce the consequences of similar incidents (3,8). Although this study focused on the health system response rather than the technical cause of the fire, the scale of the incident also points to the need to integrate preventive fire-safety measures with emergency preparedness planning.

The response demonstrated effective command and coordination, interagency collaboration, EMS mobilization, and expansion of hospital capacity under difficult operational conditions (5,6,9,10). The management of burn patients also reflected established mass-casualty and burn-response principles (1,6,14-16). Further improvements are needed in integrated electronic patient tracking (11-13,17), scalable burn-care capacity (14,15), geographical access to specialized EMS resources, and fire-safety and staff-training programs in residential treatment facilities (7,8).

Study Limitations

This study has several limitations. First, the analysis was based primarily on official operational reports, administrative documents, and field observations generated during the emergency response; therefore, some operational details may not have been documented systematically or completely. Detailed ambulance arrival distributions, hospital-specific transfer times, pre-incident bed occupancy, and changes in hospital capacity following surge activation were not consistently available. Second, interviews with responders, survivors, family members, and hospital personnel were not conducted, limiting exploration of individual experiences and interorganizational challenges. Third, clinical outcomes were not analyzed according to burn severity, triage category, treatment pathway, or hospital destination. Finally, because this report describes a single incident in one province, the findings may not be generalizable to other settings. Nevertheless, triangulation of field observations with EOC, EMS, hospital, and official incident records strengthened the credibility of the reconstructed timeline and operational findings.

Conclusion

This post-incident evaluation examined the health system response to a highly fatal fire-related mass casualty incident in an addiction treatment facility in Iran. Rapid EMS activation, early command and coordination, interagency collaboration, expansion of hospital surge capacity, and coordinated patient distribution were among the main strengths identified during the response.

The incident also revealed areas requiring further improvement, particularly the geographical availability of specialized EMS resources, implementation of integrated electronic patient tracking systems, and preparedness for large-scale fire-related mass casualty incidents.

Preventive fire safety is also an important part of preparedness in residential addiction treatment facilities. Strict enforcement of fire safety regulations, routine inspections, installation and maintenance of automatic fire detection, alarm, and sprinkler systems, and regular evacuation training and drills are essential components of disaster risk reduction for facilities housing vulnerable populations.

Lessons from this incident may help health authorities, emergency planners, and policymakers strengthen emergency preparedness and fire safety measures for future fire-related mass casualty incidents.

Declarations:

Ethics approval and consent to participate: This study was based on anonymized operational and administrative records and field observations and involved no patient recruitment, interviews, or identifiable personal information.

Consent for publication: All authors approved the final manuscript and consented to its publication.

Availability of data and material: The data supporting the findings are available from the corresponding author upon reasonable request and subject to institutional approval and applicable confidentiality restrictions.

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