A Gap Analysis of User Needs and International Standards in Post-Disaster

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Abstract
This study examines the extent to which the needs expressed by users in post-disaster institutional shelter areas align with international minimum standards. Following the 2023 earthquakes in Türkiye, survivor statements reported in the media were selected and analysed through qualitative discourse analysis (MAXQDA). The analysis identified recurring concepts (privacy, hygiene, security, accessibility, information/communication), which were then mapped against international shelter, WASH, and protection standards. Findings include an assessment of each need as "met, partially met, or unmet," illustrated with typical quotations. The study presents three main outputs: (i) a discourse–standard comparison matrix, (ii) a frequency and co-occurrence map of the concepts, and (iii) "prototype service principles" derived from user language. Results reveal systematic gaps particularly in the areas of privacy, inclusive access, and information/feedback. Without moving into furniture- specific recommendations, the study proposes a conceptual framework for standardizing user needs and offers a method that can be rapidly applied in disaster response planning.

Keywords
disaster sheltering, discourse analysis, earthquake, service prototypes, user needs

1. Introduction

In its broadest definition, a disaster is an extraordinary natural or human-made event that causes great harm to the living and non-living environment, and results in significant loss of life and property. As can be understood, disasters can be grouped into two main types: *natural disasters*, which occur due to natural events, and *human-made disasters*, which result from human activities. Throughout human history, many natural and human-made disasters have occurred all around the world [9].

The hazards and threats that cause disasters may develop over days or weeks, or sometimes they emerge suddenly and without any warning. Every year, millions of people face disasters and many frightening consequences of these events. As a result, all kinds of disasters strike different parts of the world throughout the year. While disasters cause great destruction and suffering, they also negatively affect local, national, and regional economies. Consequently, nations that are not properly and sufficiently prepared for disasters fall into a cycle of "destruction and recovery" [6].

Most of the disasters observed on Earth are of natural origin. However, such events turn into disasters because of human activities. For instance, an earthquake is entirely a natural phenomenon. Yet, humans bear primary responsibility for whether its adverse effects occur or not. For example, an earthquake of magnitude 6 on the Richter scale in Japan generally manifests as a natural event with minimal consequences, whereas in Turkey it largely results in significant loss of life and property, thus acquiring the characteristics of a disaster [3].

Another classification of disasters is related to their phases. These phases are defined as: *mitigation*, *preparedness*, *relief and first aid*, *recovery*, and *reconstruction*. Some versions of this classification include fewer or more stages. Reconstruction is often considered as part of the recovery phase [5].When disaster strikes, whether it is the slow onset of drought, exposure to hidden toxic waste, or the sudden impact of an earthquake or chemical leak, it tends to be a totalizing event or process, affecting eventually most aspects of community life [7].

The recovery phase after a disaster is the period when physical and psychological support is provided to help people overcome their traumatic experiences. This process includes both the provision of safe shelter and basic needs, as well as psychosocial recovery. However, after an earthquake, for example,

the constant view of collapsed buildings, the lack of order in daily life, or problems in temporary shelters such as tents and containers can negatively affect the recovery process. The recovery stage is the time when intensive efforts and regulations are needed to reorganize and revitalize daily life after the panic has passed. Recovery activities in the short-term focus on restoring essential infrastructure such as electricity, water, sewage, natural gas, and communication. In the long term, they aim to rebuild systems that will allow affected people to return to normal life [2].

In the evaluation of user needs in post-disaster shelters, it is important to rely on international standards. Sphere Handbook (2018) aims to improve the quality of humanitarian aid in disaster and conflict situations and to ensure accountability of humanitarian interventions to people affected by crises. The Humanitarian Charter and Minimum Standards in Humanitarian Response were developed as the result of the collective experiences of many people and institutions; therefore, they do not represent the opinion of a single organization. In 2016, the Sphere Project was registered as the Sphere Association, and today it is used as a key reference in international humanitarian practices [8].

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Another important source is the WHO WASH Guidelines (2022/2023), which play a critical role in ensuring that health facilities in post-disaster shelters operate in a safe and hygienic way. The World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), through the WHO/UNICEF Joint Monitoring Program for Water Supply, Sanitation and Hygiene (JMP), have produced regular updates on water, sanitation and hygiene (WASH) since 1990. Together, they are responsible for monitoring the 2030 Sustainable Development Goal (SDG) targets related to [11].

The UNHCR Emergency Handbook (2023) provides a comprehensive guide for flexible, effective, and community-based humanitarian responses. This handbook covers important issues such as disaster preparedness, risk monitoring, scenario-based planning, rapid response, and coordination, and serves as guidance for humanitarian actors during crises. A UNHCR guide to agile, effective and community-based humanitarian emergency responses [10].

The Federal Emergency Management Agency (FEMA) in the United States has developed detailed guidelines for shelter design and operation in disaster situations. This manual is intended to provide guidance for engineers, architects, building officials, and property owners to design shelters and safe rooms in buildings. It presents information about the design and construction of shelters in the workplace, home, or community building that will provide protection in response to manmade hazards [4].

Accessibility and equality rights are covered under the Americans with Disabilities Act (ADA). In post-disaster shelters, the ADA requires that facilities be accessible to all individuals, including those with physical, sensory, or cognitive disabilities. This includes accessible entrances, restrooms, sleeping areas, and communication support for people with hearing or visual impairments. The ADA plays a critical role in ensuring that no one is excluded from safety and recovery services during emergencies [1].

All these international standards play a guiding role in addressing the needs of individuals in post-disaster shelters during the recovery process. The requirements for shelter conditions such as tents, container housing, sanitation, privacy, accessibility, and environmental comfort are defined by these various international standards. Compliance with these standards is important to ensure that the recovery period proceeds in a healthy and supportive way.

2. Materials (News Selection)

The empirical material for this study consists of news reports containing survivor quotations published between February 2023 and February 2025 in national and international media outlets. An initial pool of approximately 20–25 articles was identified. To ensure relevance to the research focus, only reports explicitly addressing shelter and space conditions (e.g., tents, container housing, sanitation,

privacy, accessibility, environmental comfort) were included. Articles that focused solely on search-and-rescue operations, political debates, or economic losses without reference to living conditions were excluded. After applying these criteria, a purposive sample of 10–15 articles were retained, representing a variety of media sources (AP News, Reuters, BBC, Anadolu Agency, Medyascope, ANKA, among others). All reports are publicly available and were used exclusively for research purposes; quotations were anonymized or paraphrased when necessary.

3. Methods (Code-Development)

The codebook was developed deductively from international standards including the Sphere Handbook, UNHCR Emergency Handbook, WHO WASH guidelines, FEMA shelter standards, and the ADA (Americans with Disabilities Act), and was then refined inductively based on survivor discourse. Deductively, seven main categories were derived from disaster shelter literature (e.g., Altman's privacy regulation theory, proxemics, universal design, WASH in emergencies, environmental comfort studies) and from international humanitarian standards (Sphere, UNHCR Shelter and Protection Guidelines, WASH standards). Inductively, subcodes were refined during the coding process as new themes emerged in the survivor discourse. For instance, *pest/contamination* under Hygiene and *representation & gender sensitivity* under Safety were added based on repeated references in the data. This hybrid approach ensured that the codes were both grounded in theory and practice and responsive to the actual expressions of survivors. The stages of code development are summarized in Table 1.

Table 1. Code development process

Stage	**Approach**	**Output**
Deductive coding	Sphere, UNHCR, WASH guidelines + literature (privacy, proxemics, universal design, environmental comfort)	7 main categories
Inductive refinement	Survivor discourse in 14 news texts	New subcodes (e.g., pest/contamination, representation & gender sensitivity)
Coding process	Open coding → axial coding → mapping to standards	86 coded quotations
Reliability check	Subset double-coded by second researcher	Validity strengthened (no coefficient calculated)

Codebook was developed deductively from international standards and literature and refined inductively based on the data. While 86 quotations were coded across 14 news texts, not all codes were equally represented. Several categories such as Pets/animal area and Fire safety did not appear in the corpus, which highlights their absence in public discourse rather than irrelevance.
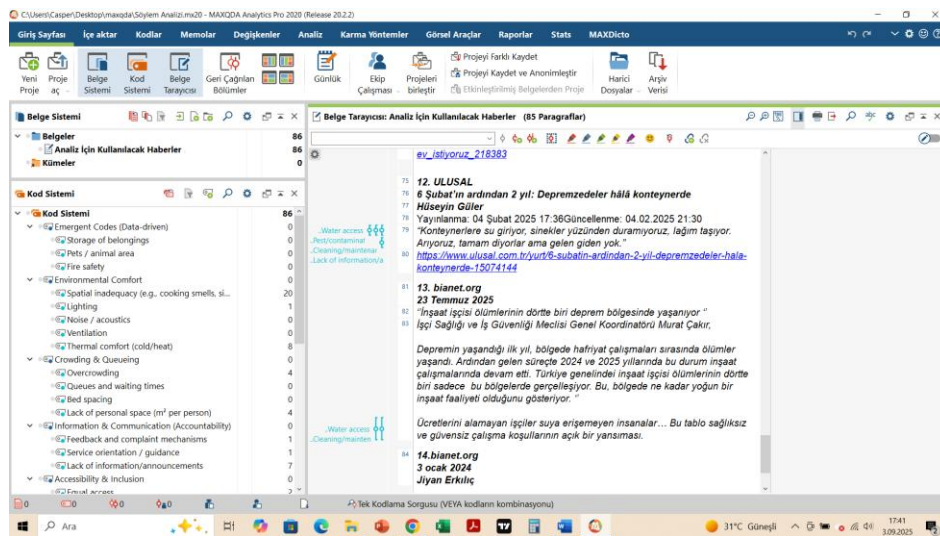

Fig. 1. Coding framework & process in MAXQDA

A qualitative discourse analysis was conducted using MAXQDA 2024. The coding framework was developed deductively from disaster shelter literature and international standards (Sphere, UNHCR, WASH guidelines) and inductively refined during coding. Seven main categories were established—Privacy, Hygiene, Safety, Accessibility, Information, Crowding, and Environmental Comfort—each with subcodes reflecting specific needs. Coding proceeded in three stages: (1) open in-vivo coding of survivor statements, (2) axial coding to group related concepts, and (3) mapping each code to the corresponding international standard clause, assessing alignment as met, partially met, or unmet. MAXQDA outputs included frequency tables, co-occurrence maps, and word clouds. Finally, a discourse-to-standards gap analysis matrix was developed to identify mismatches and derive prototype service principles for improving shelter quality.

To enhance reliability, a subset of the news texts was double coded by a second researcher. Discrepancies were discussed and resolved, which strengthened the internal validity of the analysis, although no statistical inter-coder coefficient was calculated. In addition, the sample size of 14 news articles was deemed sufficient for qualitative discourse analysis, as thematic saturation was reached and the dataset provided both diversity and repetition of critical themes.

The coding process was primarily carried out by one researcher, while a second researcher independently reviewed a subset of the coded material to ensure consistency. Discrepancies were discussed and resolved collaboratively. Although inter-coder agreement was not quantified statistically, this iterative process strengthened the validity and reliability of the findings. Figure 1 illustrates the coding framework and the stages of analysis carried out in MAXQDA.

4. Findings

This section presents the main findings of the discourse analysis. The findings are organized around the frequency of codes, their distribution across the dataset, and the relationships identified through co-occurrence mapping. As a first step, the overall frequency of codes was examined, as summarized in Table 2.

Table 2. Code Matrix Browser

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Emergent Codes (Data-driven)		0	Signage / wayfinding		0
Storage of belongings		0	Needs of elderly and children	■	3
Pets / animal area		0	Accessibility for disabled persons	·	2
Fire safety		0	Safety / Security		0
Environmental Comfort		0	Representation & gender sensitivity	·	2
Spatial inadequacy (e.g., cooking sr	■	20	Women and child protection	·	1
Lighting	·	1	Night safety		0
Noise / acoustics		0	Theft/violence risk		0
Ventilation		0	Lighting		0
Thermal comfort (cold/heat)	■	8	Hygiene (WASH)		0
Crowding & Queueing		0	Pest/contamination	■	3
Overcrowding	■	4	Laundry	·	1
Queues and waiting times		0	Cleaning/maintenance	■	9
Bed spacing		0	Water access	■	9
Lack of personal space (m² per per	■	4	Washing/bathing	■	3
Information & Communication (Acc		0	Toilet access		0
Feedback and complaint mechanisn	·	1	Privacy/Protection		0
Service orientation / guidance	·	1	Family/child separation	■	4
Lack of information/announcements	■	7	Gender-sensitive privacy	·	1
Accessibility & Inclusion		0	Auditory privacy		0
Equal access	·	2	Visual privacy		0
			Σ TOPLAM	86	86

The coding process resulted in a total of 86 discourse units, which were classified under the predefined thematic codes. As shown in Table 2, "Spatial inadequacy" (n=20) was the most frequent code, indicating that spatial shortcomings in shelter areas (single room use, overcrowded spaces, unsuitable layouts) were strongly emphasized in media discourses. This was followed by "Cleaning/maintenance" (n=9) and "Water access" (n=9), highlighting that hygiene and access to safe water emerged as two of the most critical needs frequently reported by users in post-disaster shelter conditions. In addition, the relatively high frequency of "Thermal comfort" (n=8) reflects that extreme cold in winter and excessive heat in summer were major challenges.

Moderately frequent codes included "Lack of information/announcements (n=7)", "Family/child separation (n=4)", "Overcrowding (n=4)", and "Needs of elderly and children (n=3)". These indicate that

communication gaps, crowded living conditions, and the specific needs of vulnerable groups (children, elderly) were partially reflected in media coverage. Likewise, hygiene-related issues such as "Washing/bathing (n=3)" and "Pest/contamination (n=3)" also appeared as notable concerns.

In contrast, codes such as "Fire safety, Storage of belongings, Pets/animal area, Noise/acoustics, Ventilation, Toilet access, Auditory privacy, Visual privacy, Night safety, Theft/violence risk, Signage/wayfinding" showed no occurrences. This absence suggests that certain needs, although defined as critical in international standards, were not visible in media narratives and therefore may lack sufficient public recognition.

It is also noteworthy that several codes, including *fire safety, storage of belongings, pets/animal area, noise/acoustics, ventilation, and toilet access*, did not appear in the corpus at all. The absence of these categories is not to be interpreted as irrelevance, but rather as an indication of blind spots in media narratives and survivor testimonies. Furthermore, the network analysis revealed clusters of interrelated issues: hygiene-related codes (*water access, cleaning/maintenance, pest/contamination, washing/bathing*) formed one dense cluster, while spatial concerns (*spatial inadequacy, overcrowding, thermal comfort*) emerged as another. Vulnerability-related codes (*family/child separation, needs of elderly and children, gender-sensitive privacy*) were present but peripheral, showing weaker ties in comparison.

The Code Matrix Browser also demonstrates the heterogeneity of the dataset. While some texts were almost exclusively focused on hygiene issues such as water access and cleaning, others emphasized spatial inadequacy or overcrowding. This variation shows that survivors' narratives were shaped by context-specific experiences rather than uniformly distributed concerns. At the same time, several codes, including *fire safety, storage of belongings, pets/animal area, noise/acoustics, ventilation, and toilet access*, did not occur at all. Their absence should not be interpreted as irrelevance but as an indication of underrepresented areas in public discourse.
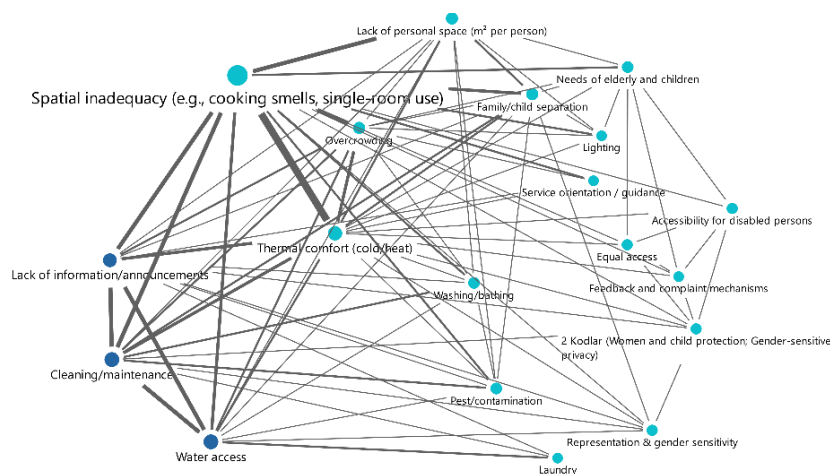

Fig. 2. Detailed Code Co-Occurrence Map Analysis

As illustrated in Figure 2, spatial inadequacy emerges as the most central code, strongly connected to hygiene-related and thermal comfort issues. The co-occurrence map reveals not only the most frequent codes but also the interconnections among user needs. The thickness of the lines indicates the strength of co-occurrence, while node size reflects frequency.

1. ***Central Nodes – Structural Core of the Discourse***
   - *Spatial inadequacy emerges as the most central code, with thick connections to water access, cleaning/maintenance, thermal comfort, and overcrowding. This demonstrates that spatial constraints were often narrated together with difficulties in hygiene and environmental conditions.*
   - *Water access is another strong hub, directly linked to cleaning/maintenance, pest/contamination, and washing/bathing. This highlights that lack of water was not an isolated issue but part of a broader hygiene crisis.*

2. **Clusters of Hygiene and Environmental Health**
   - Codes such as cleaning/maintenance, pest/contamination, washing/bathing form a dense cluster with water access, reflecting that media discourses repeatedly tied water scarcity to sanitary risks and poor living conditions.
   - The co-occurrence of cleaning/maintenance with lack of information/announcements suggests that failures in hygiene were also linked to insufficient institutional response and communication.

3. **Vulnerability and Protection Dimensions**
   - Family/child separation, needs of elderly and children, women and child protection, and gender-sensitive privacy cluster together, though with fewer links. This indicates that while issues of vulnerable groups were mentioned, they appeared less frequently and with weaker interconnections compared to hygiene-related codes.

4. **Thermal and Spatial Pressure**
   - Thermal comfort shows strong ties with spatial inadequacy and overcrowding, reflecting how environmental conditions (cold winters, hot summers) were exacerbated by dense and unsuitable shelter layouts.

5. **Peripheral/Weakly Represented Codes**
   - Some standards—equal access, accessibility for disabled persons, representation & gender sensitivity—are on the periphery, showing weak ties. This aligns with frequency data: they are acknowledged but not deeply interwoven in the media discourse.
   - Notably, fire safety, noise/acoustics, ventilation, auditory/visual privacy remain absent, suggesting blind spots in both reporting and possibly in institutional awareness.

This co-occurrence structure suggests that the media discourse was dominated by immediate physical and hygienic needs (water, sanitation, thermal comfort, spatial adequacy), while social protection dimensions (privacy, vulnerable groups, gender sensitivity) were less central, though present. This imbalance becomes crucial when compared to Sphere, UNHCR, and WHO standards, which emphasize both basic survival needs and dignity, protection, and inclusion. In addition, FEMA and ADA frameworks highlight accessibility, safety, and universal design as essential requirements. Yet, in our dataset, categories such as fire safety and accessibility for disabled persons were either absent or only weakly represented, pointing to a critical gap between these standards and the issues reflected in public discourse.
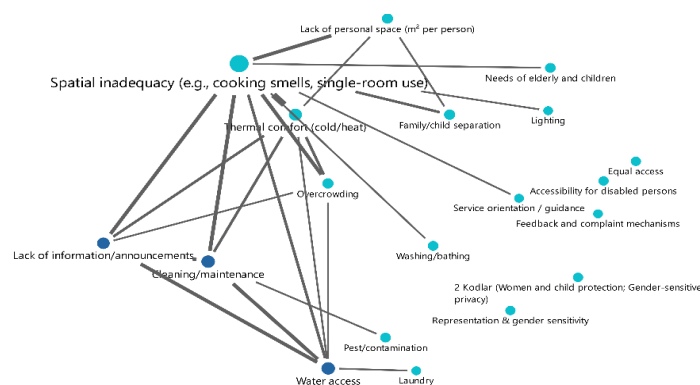

Fig. 3. Simplified Network Map

The simplified code network highlights both the frequency of issues and their interconnections, showing how multiple deprivations compound displacement experiences. Spatial inadequacy emerges as the central node, strongly linked with water access and cleaning/maintenance. This indicates that the lack of adequate living space is often accompanied by hygiene-related challenges, amplifying risks of contamination and disease. Similarly, thermal comfort and overcrowding are clustered with spatial inadequacy, reflecting how limited space translates into poor ventilation, exposure to cold or heat, and insufficient personal privacy. As shown in Figure 3, spatial inadequacy remained the dominant hub, but connections were more clearly clustered around hygiene and overcrowding themes.

Another notable pattern is the link between family/child separation and the needs of elderly and children. This suggests that vulnerable groups are disproportionately affected by the breakdown of spatial and social structures. The relative isolation of codes such as gender-sensitive privacy and representation & gender sensitivity points to the fact that, while these issues were mentioned, they were less frequently embedded in broader narratives of deprivation—highlighting potential blind spots in public discourse and humanitarian response.

Taken together, the network visualization emphasizes that problems in post-disaster sheltering are rarely singular: inadequate infrastructure and limited services interact to create overlapping vulnerabilities. This interconnectedness underscores the necessity of integrated standards and coordinated interventions, in line with Sphere and UNHCR guidelines, which recommend multi-dimensional approaches to shelter, WASH, and protection.

5. Discussion

The discussion interprets these findings considering international humanitarian standards, highlighting both the areas where survivor narratives align with global guidelines and the critical gaps that emerge. To illustrate these mismatches, Table 3 provides a comparative overview of the main requirements of Sphere, UNHCR, WHO, FEMA, and ADA standards alongside the results of this study.

Table 3. Comparison with Sphere, UNHCR, WHO, FEMA, and ADA

Standard	Key Requirement	Findings from Data	Alignment
Sphere (2018)	3.5 m² covered space per person	*Spatial inadequacy* (20 mentions), overcrowding, lack of privacy	✘ Not met
Sphere (2018)	15 L water/person/day	*Water access* (9 mentions), complaints of shortage	✘ Not met
Sphere (2018)	1 toilet/20 people	No references in discourse	? Absent
UNHCR (2023)	Privacy & gender-sensitive protection	*Family/child separation* (4), *Gender-sensitive privacy* (1)	⚠ Weak
UNHCR (2023)	Inclusivity for elderly/disabled	*Needs of elderly/children* (3), *Accessibility for disabled* (2)	⚠ Weak
WHO WASH (2022)	Safe water, pest control, sanitation	*Pest/contamination* (3), *Cleaning/maintenance* (9)	✘ Not met
FEMA (USA)	Fire safety, shelter safety standards	No references in discourse	? Absent
ADA (1990, USA)	Accessibility for disabled persons (universal design)	*Accessibility for disabled* (2 mentions only)	⚠ Weak

According to the Sphere Handbook, everyone should have at least 3.5 m² of covered living space, along with safe access to 15 litters of water per person per day. Our findings, however, show that spatial inadequacy (n=20) and water access (n=9) were among the most frequently reported issues, indicating that these minimum standards were not met in practice. Similarly, Sphere emphasizes the importance of safe sanitation, yet users repeatedly reported problems with cleaning and waste management (cleaning/maintenance, pest/contamination).

The findings reveal critical mismatches when compared to international standards. For instance, the Sphere Handbook requires at least one toilet for every 20 people and safe access to 15 litters of water per person per day, yet testimonies highlighted severe shortages in both areas. The UNHCR Emergency Handbook emphasizes privacy, security, and gender-sensitive design, but these were marginally represented in the discourse. Furthermore, according to WHO WASH guidelines, minimum water quality and sanitation measures are essential to prevent outbreaks, but references to pest and contamination risks in the media suggest that such standards were not adequately maintained.

The UNHCR Emergency Handbook highlights privacy, protection, and inclusivity as fundamental principles, particularly for women, children, elderly persons, and persons with disabilities. In our corpus, however, these needs were only marginally represented (family/child separation, gender-sensitive privacy, accessibility for disabled persons). This discrepancy illustrates a gap between the protection-oriented standards promoted globally and the survival-oriented needs that dominated local narratives.

6. Conclusion

Although 86 discourse units were coded in total, not all categories were represented in the data. Sub-categories such as pets/animal area, fire safety, and storage of belongings did not appear in any of the analysed news texts. This absence reflects their lack of visibility in public discourse rather than irrelevance, as international literature consistently highlights their importance. Instead, public attention was focused on more immediate needs such as hygiene, spatial adequacy, overcrowding, and privacy. Empty codes should therefore be understood as underrepresented but critical areas that require consideration in future disaster planning.

Based on these findings, several policy implications emerge. Humanitarian interventions should align more closely with Sphere and UNHCR standards, ensuring not only survival but also dignity, privacy, and inclusivity. The invisibility of categories such as fire safety, belongings, and accessibility for disabled persons underscores the need for advocacy and awareness. Incorporating systematic user feedback into planning and monitoring can further help bridge the gap between international standards and on-the-ground realities. In practical terms, container and tent settlements should be redesigned to meet minimum international requirements for space, hygiene, and thermal comfort. Institutionalized feedback channels should also be created to capture user needs. Overall, this study demonstrates that discourse analysis can be a valuable tool for identifying mismatches between survivor narratives and international standards, offering a replicable framework for humanitarian planning.

In conclusion, this study contributes to the literature by systematically mapping survivor discourses against international humanitarian standards. Unlike previous research that often evaluates shelter conditions from a technical or institutional perspective, this study foregrounds user voices and identifies the blind spots (e.g., privacy, accessibility, information gaps) that remain underrepresented in public narratives. By developing a discourse–standards comparison matrix and prototype service principles, the research offers both an analytical tool and a practical framework that can be rapidly adapted in disaster response planning.

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