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Integrating Hospital Safety Index, HRM, and Balanced Scorecard for Flood Preparedness

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Flooding is a recurrent environmental health hazard that disrupts hospital operations and threatens patient safety in disaster-prone regions of Indonesia. This study examines hospital safety conditions, analyzes the role of human resource management in disaster preparedness, and proposes an integrated preparedness model linking safety assessment with performance-oriented management. A qualitative case study was conducted at a regional public hospital in flood-prone Bekasi Regency. Data were collected through in-depth interviews with hospital leaders and frontline staff, focus group discussions, staff questionnaires treated as qualitative inputs, and document analysis. Hospital safety assessment tools were used to identify functional vulnerabilities. Qualitative data were analyzed using SWOT-TOWS to determine strategic priorities and interpreted through a Balanced Scorecard perspective to align preparedness initiatives with organizational performance dimensions. Findings show that preparedness is largely shaped by human and organizational factors. Key challenges during flood events included limited staff training, weak emergency coordination, and inadequate logistics management. In contrast, stronger leadership involvement, clearer role allocation, and more consistent workforce development supported more adaptive and coordinated responses. These results indicate that safety assessments alone are insufficient without effective human resource management to translate identified risks into operational actions. The study concludes that integrating hospital safety assessment with human resource management within a performance-based framework can strengthen disaster preparedness in flood-prone healthcare settings. By emphasizing human capacity, coordination, and continuous performance alignment, the proposed qualitative model offers practical guidance for enhancing hospital resilience to environmental health hazards, nationwide applicability.

Keywords: Hospital Safety Index, Human Resource Management, Flood Disaster Preparedness, Hospital Resilience, Flood Hazard

INTRODUCTION

Flooding is a chronic environmental health risk that repeatedly interrupts hospital services and jeopardizes the safety of patients within disaster-prone areas of Indonesia, such as Bekasi Regency. Hospitals in flood-prone areas must not only be structurally sound but also remain operational and maintain a properly trained staff during times of crisis(Usta & Torpuş, 2024; Yazdani et al., 2022). Yet, the evidence from flood-related events to date demonstrate that many hospitals are experience service disruptions, have delayed resource matching and work force restraints which challenge them in sustaining basic health care during emergencies(Naru et al., 2025; Purba et al., 2024).

The core issue we focus on in this paper is that the majority of disaster preparedness assessments in hospitals remain primarily focused on the structural and technological dimensions, with human resource-related capacities which determine functional readiness not adequately operationalized within the assessment frameworks currently available. Safety assessments as a result tend to serve as 'static' diagnostic, rather than actionable preparedness tools (Ali et al., 2021; Lestari, Paramitasari, Fatmah, et al., 2022b; Samei et al., 2023).

The Hospital Safety Index (HSI) commonly used as a tool to evaluate hospital preparedness in the structural, non-structural and functional aspects was created by international health organization(Lestari, Paramitasari, Fatmah, et al., 2022a; PAHO/WHO, 2019; Rafida et al., 2024). HSI gives hospitals an overall safety score to identify where they are most vulnerable and where they may need to improve. Despite this, assessment in HSI often focuses on safety status and does not directly operationalize the results of these assessments, particularly with respect to staff competencies(Muchsam, Arafah, Deasy Aseanty, et al., 2024), coordination mechanisms, and performance accountability during recovery, towards working to make system-centered processes safer(Khalil et al., 2022; Nisaa et al., 2024; Sarla, 2025).

Human resource management (HRM) is crucial to hospital disaster preparedness because it shapes workforce planning, training, deployment, communication, and decision-making during emergencies (Gowing et al., 2023; Liu et al., 2020). Despite the recognized importance of human resources in disaster response, HRM is often treated as a contextual or secondary dimension rather than as an integral and measurable component of hospital safety (Hung et al., 2021). Consequently, many studies using the Hospital Safety Index continue to emphasize infrastructural and logistical readiness, while HRM-related factors are discussed only descriptively and without operational integration. Evidence from hospital settings also indicates that relational HRM practices can enhance employee productivity and performance, underscoring the role of workforce management in strengthening organizational resilience(Muchsam, Arafah, Aseanty, et al., 2024). This imbalance limits hospitals' ability to translate safety assessment findings into systematic workforce preparedness (Mojtahedi et al., 2021; Samei et al., 2024).

The research gap that the present study contributed to fills is in the lack of an integrated framework for linking hospital safety assessment to human resource management and performance monitoring systems. Current literature does little to explain how HRM can be institutionally woven through HSI findings in a systematic manner to detail the path for strategic planning and ongoing improvement preparedness(Khalil et al., 2022; Khatri et al., 2023; Lamine et al., 2023). In addition, limited studies offer a clear path connecting safety diagnostics to strategies that can be implemented and quantifiable performance outcomes in the context of hospitals exposed to flooding.

Research on hospital disaster preparedness has tended to examine safety assessment, workforce capacity, and performance management as separate areas of inquiry, leaving limited guidance on how these dimensions can be operationally integrated in practice(Ali et al., 2021; Khalil et al., 2022). The Hospital Safety Index offers a comprehensive framework for evaluating structural, non-structural, and functional readiness (Lestari, Paramitasari, Kadir, et al., 2022; PAHO/WHO, 2019), yet its findings are frequently used as diagnostic outputs rather than as a basis for coordinated workforce planning and organizational performance improvement, particularly in hospitals exposed to recurrent flooding risks(Hung et al., 2021; Samei et al., 2023). As a result, safety evaluations often fail to translate into sustained preparedness actions that involve staff capability, leadership coordination, and institutional learning processes (Forsgren et al., 2022). Empirical studies that explicitly connect safety diagnostics with human resource management and strategic performance perspectives remain scarce, especially within the context of environmental health hazards in Indonesia(Lamine et al., 2023; Nisaa et al., 2024). In response to this gap, the present study seeks to assess hospital safety status using the Hospital Safety Index, analyze how human resource management practices shape functional disaster preparedness, and formulate an integrated preparedness model linking safety assessment results with workforce strategies and performance-based monitoring to enhance hospital resilience in flood-prone settings.

METHODS

Study Design and Setting

This study employed a qualitative case study design to explore hospital disaster preparedness in a flood-prone healthcare setting, an approach suitable for examining complex organizational processes within real-life contexts (Mehri et al., 2022; Yin, 2018). The study was conducted at a regional public hospital (RSUD) in Bekasi Regency, Indonesia, an area that experiences recurrent flooding and hydrometeorological hazards. This setting provided a relevant context for examining how environmental risks interact with institutional safety, workforce readiness, and service continuity.

Participants and Data Sources

Participants were selected through purposive sampling, focusing on hospital personnel directly involved in disaster preparedness and emergency response. This sampling strategy enabled the inclusion of informants with relevant knowledge and decision-making roles in disaster management contexts (Sheikhbardsiri et al., 2020). Fifteen key informants participated in in-depth interviews and focus group discussions, representing senior management, emergency coordinators, physicians, nurses, logistics officers, infrastructure personnel, and occupational safety representatives. In addition, a structured questionnaire was distributed to staff working in clinical and support units to capture perceptions and experiences related to preparedness practices. Twenty-five completed questionnaires were included as qualitative supporting data and were treated as narrative inputs rather than as quantitative survey responses. Documentary sources, including disaster response reports, internal regulations, training records, and Hospital Disaster Plan documents, were also reviewed to contextualize institutional preparedness practices.

Analytical Focus

The analysis focused on three interrelated domains: hospital safety conditions, human resource management practices, and disaster preparedness. Hospital safety conditions were examined using an adapted framework derived from the Hospital Safety Index to identify functional, non-structural, and organizational vulnerabilities relevant to flood preparedness (PAHO/WHO, 2019). Human resource management practices were analyzed in relation to workforce capacity, training, leadership, communication, and decision-making during emergencies, reflecting established perspectives on workforce preparedness in health emergency management (Hung et al., 2021). Disaster preparedness was conceptualized as an organizational capability emerging from the interaction between safety conditions and workforce practices and interpreted through strategic analytical perspectives, including SWOT–TOWS and the

Balanced Scorecard (Abu Jaber & Nashwan, 2022; GÜREL, 2017).

Data Collection

Data were collected through four complementary qualitative techniques: in-depth interviews, focus group discussions, staff questionnaires used as qualitative prompts, and document analysis. Interviews and group discussions explored participants' experiences in disaster preparedness, coordination mechanisms, and operational challenges during flood events. Questionnaires were used to elicit perceptions related to staff competency, communication flow, and readiness, with responses interpreted qualitatively to identify patterns of agreement and concern. Document analysis examined institutional policies, preparedness plans, and operational reports to provide contextual evidence. Credibility of the findings was strengthened through triangulation across data sources, member checking with participants, and peer debriefing among the research team, strategies commonly used to enhance trustworthiness in qualitative research (A. Stahl & King, 2020).

Data Analysis

Qualitative data analysis was conducted through an iterative process. Hospital safety documentation and narrative data were interpreted to identify key functional and organizational vulnerabilities related to flood preparedness. A qualitative SWOT analysis was used to map internal strengths and weaknesses alongside external opportunities and threats influencing preparedness, and the findings were synthesized through a TOWS framework to generate strategic response options (GÜREL, 2017). The Balanced Scorecard perspective was subsequently applied as an interpretive framework to organize strategic implications across learning and growth, internal processes, service continuity, and resource management dimensions (Abu Jaber & Nashwan, 2022).

Model Development and Validation

The study generated a conceptual model integrating hospital safety assessment and human resource management perspectives within a strategic performance framework. Rather than statistically testing a hypothesis, the model was developed through analytical comparison between empirical findings and relevant theoretical insights(Yin, 2018). An expert review process was conducted to assess the model's credibility and applicability. The model was evaluated by a panel consisting of hospital administrators and disaster management experts to determine its operational feasibility and potential relevance for regional public hospitals facing similar environmental risks.

RESULT AND DISCUSSION

The study was conducted at a regional public hospital (RSUD) in Bekasi Regency, which is widely recognized as being vulnerable to flooding due to its proximity to the Bekasi River. As a referral hospital serving a large catchment area, the facility plays a critical role in maintaining health service continuity during environmental emergencies.

These findings are broadly in line with previous studies highlighting the importance of workforce capacity and coordination in hospital disaster preparedness (Gowing et al., 2023; Hung et al., 2021). However, while earlier research often positions human resource management as a supporting element, this study suggests that it plays a more central mediating role in translating safety assessments into operational readiness. In contrast to studies conducted in well-resourced health systems that emphasize infrastructure readiness (Khalil et al., 2022; Samei et al., 2023), the present findings indicate that in flood-prone and resource-constrained contexts, preparedness is more strongly shaped by leadership engagement, training continuity, and communication practices. This perspective reinforces the view of preparedness as a dynamic organizational capability and provides a more context-sensitive understanding of how hospitals adapt to recurrent environmental hazards.

Data were generated through in-depth interviews with hospital managers, department heads, physicians, nurses, logistics officers, and emergency coordinators, all of whom possessed substantial experience in disaster-related hospital operations. The presence of informants with long-term involvement in emergency management enabled a rich exploration of institutional practices, decision-making processes, and preparedness challenges. Two focus group discussions further enriched the data by capturing shared experiences and collective reflections from staff across different units.

The findings suggest that hospital safety conditions alone did not determine preparedness outcomes. Instead, human resource management practices acted as a mediating mechanism that translated safety diagnostics into operational readiness. Where safety gaps were accompanied by structured training, clear role allocation, and leadership engagement, hospitals demonstrated greater adaptive capacity during flood events. Conversely, in the absence of integrated HRM practices, similar safety conditions resulted in fragmented coordination and delayed responses.

Hospital Safety Conditions and Functional Vulnerabilities

Qualitative interpretation of hospital safety documentation and stakeholder narratives indicated that the hospital demonstrated a moderate level of overall safety, with functional preparedness emerging as a key area of concern. While physical infrastructure was generally perceived as adequate to withstand flooding events, informants consistently emphasized vulnerabilities related to staff training, emergency coordination, and logistics management.

Participants highlighted that limited and irregular disaster training reduced staff confidence and role clarity during flood response. Several informants noted difficulties in mobilizing additional personnel, coordinating across units, and maintaining communication under emergency conditions. These challenges constrained the

hospital's ability to respond adaptively during surge situations, despite the presence of formal emergency structures.

Table 1.
Qualitative Classification of Hospital Safety Conditions by Domain

HSI Domain	Qualitative Safety Classification	Key Vulnerabilities Identified
Structural Safety	Moderately adequate	Flood-resistant structure present, but limited redundancy
Non-Structural Safety	Needs improvement	Equipment anchoring and utilities protection
Emergency & Disaster Management	Moderately adequate	Gaps in surge staffing and coordination

Sources: Authors' qualitative analysis

Human Resource Management and Preparedness Practices

Findings from interviews, focus group discussions, and qualitative interpretation of staff questionnaires revealed that disaster preparedness was strongly shaped by human resource management practices. Units that reported clearer leadership roles, more consistent training initiatives, and stronger internal communication were perceived as better prepared to manage flood-related disruptions. Conversely, preparedness was weaker in units where disaster planning was less integrated into routine human resource practices.

Discussion of Findings

This study shows that hospital disaster preparedness is influenced not only by safety conditions but also by how human resource management practices transform safety assessments into practical readiness. Safety evaluations provide important information about institutional vulnerabilities; however, the findings suggest that such diagnostics alone do not guarantee effective emergency response. In the hospital examined, preparedness was shaped by the ability of leaders and staff to translate identified risks into coordinated actions, training activities, and clear operational roles. This indicates that workforce-related processes play a critical role in determining whether safety assessments become actionable preparedness measures or remain administrative exercises.

Previous studies have highlighted the role of non-structural and functional components in hospital disaster preparedness (Elmahal et al., 2022; PAHO/WHO, 2019). The present findings support this view but further suggest that these components become effective only when supported by consistent human resource management practices. Consistent with research emphasizing workforce capacity, training, and coordination as central to hospital resilience (Gowing et al., 2023; Samei et al., 2023), the constraints observed in this flood-prone context were primarily related to staff preparedness rather than infrastructure limitations. Informants repeatedly emphasized challenges in maintaining training continuity, leadership stability, and inter-unit coordination, indicating that human resource readiness may be a more decisive factor than physical resources in sustaining hospital operations during disasters(Hasan et al., 2023).

The findings also differ from studies conducted in well-resourced settings where preparedness is often associated with structural adequacy. In this case, non-structural and functional elements did not operate independently but depended on deliberate organizational efforts to develop staff capacity and coordination mechanisms. Infrastructure readiness appeared meaningful only when accompanied by continuous training, adaptive leadership, and opportunities for organizational learning. This suggests that disaster preparedness should be understood as a dynamic organizational capability shaped by ongoing workforce development rather than as a static condition achieved through compliance with safety standards.

From a theoretical perspective, these findings contribute to the literature on organizational resilience by clarifying how preparedness capabilities are operationalized in hospital settings. Organizational resilience emphasizes the capacity of institutions to anticipate, adapt, and sustain performance during disruptions (Duchek, 2020; Forsgren et al., 2022). In this study, hospital safety assessment functions as an initial diagnostic tool, while human resource management enables adaptive responses through workforce mobilization, training, and coordination, consistent with evidence highlighting the central role of workforce capacity in disaster preparedness(Hung et al., 2021). Strategic alignment mechanisms, such as those reflected in the Balanced Scorecard perspective, further support the integration of preparedness into routine management processes and performance systems. Together, these elements illustrate how hospitals can move beyond reactive emergency response toward proactive resilience building, particularly in environments characterized by recurrent hazards.

Overall, the findings suggest that preparedness should not be understood as a static outcome of safety assessment alone, but as a dynamic organizational capability shaped by continuous interaction between diagnostic processes, human resource practices, and institutional learning. This perspective reinforces arguments that effective disaster preparedness depends not only on infrastructure readiness but also on coordinated workforce strategies and adaptive governance mechanisms (Samei et al., 2023).

Integrating Safety Assesment and Strategic Preparedness

The integration of hospital safety assessment with human resource management perspectives provided a deeper understanding of preparedness as an organizational capability rather than a static condition. Through qualitative SWOT and TOWS analysis, internal strengths and weaknesses were contextualized alongside external flood-related risks, enabling the identification of strategic response patterns.

The Balanced Scorecard perspective was used to organize these qualitative insights into learning and growth, internal process, service continuity, and resource management dimensions. This interpretive approach supported the translation of safety and workforce-related findings into coherent strategic directions, emphasizing continuous learning, coordination, and leadership engagement as core components of disaster preparedness.

SWOT and TOWS Analysis

The SWOT analysis identified the following core elements based on triangulated data:

Table 2.
Qualitative SWOT Analysis of Hospital Disaster Preparedness

Submodule	Strengths (S)	Weaknesses (W)	Opportunities (O)	Threats (T)
1. Emergency and Disaster Coordination	The hospital has an established disaster coordination team and a designated focal point for emergency response.	Coordination among units remains partial and lacks integration during real-time incidents.	There is policy support from the Ministry of Health and regional health offices to strengthen hospital disaster preparedness networks.	Overlapping authority between hospital departments and external agencies can delay coordinated action.
2. Disaster Preparedness and Response Planning	The hospital has a written Hospital Disaster Plan (HDP) and standard operating procedures (SOPs) for flood response.	The existing HDP is not regularly updated, and some staff are unaware of their assigned roles.	Availability of national guidelines and training programs under HDP 2023–2026.	Frequent leadership rotation and changes in management affect plan continuity.
3. Information and Communication Management	A basic communication network is available using radio and WhatsApp groups for early warning.	No integrated communication system or redundant channels for backup during power outages.	Potential to develop digital dashboards and early warning integration using hospital information systems (HIS).	Power failures and loss of internet connectivity during flooding.
4. Human Resource Capacity and Training	Competent health workers with multi-disciplinary background and previous disaster response experience.	Limited disaster-specific training and lack of staff surge strategy.	Government support for continuous professional development and hospital-based training modules.	High staff turnover and uneven distribution of skilled personnel.
5. Logistics and Infrastructure Support	Basic logistics warehouse available with emergency medical stockpile.	No automated tracking for logistic flows; supplies often delayed during flood.	Support from regional BPBD (Disaster Management Agency) and donor agencies for logistics aid.	Recurrent flooding can isolate access roads, hampering supply chains.
6. Patient Care and Continuity of Essential Services	Critical care units (ICU, ER) are functional and have backup generators.	Limited isolation capacity and patient evacuation routes within the facility.	Opportunities to upgrade patient evacuation procedures and redundancy of critical units.	Increased patient surge during flood events may exceed capacity.
7. Evacuation, Security, and Access Control	Security team trained for crowd control and perimeter safety.	Evacuation signage is incomplete, and staff lack routine drills.	Government regulation mandates periodic safety simulation in hospitals.	Public panic and infrastructure damage may disrupt access and security operations.

Sources: Authors' qualitative analysis

From these results, four TOWS-based strategies were formulated:

Table 3.
TOWS-Based Strategic Directions for Hospital Disaster Preparedness

No	Strategy Type	Summary of Strategic Actions
1	SO Strategies (Strengths + Opportunities)	• Enhance capacity for essential clinical services by referral between hospitals and training. • Use logistical and financial support to create emergency stockpiles, as well as technology-dependent monitoring systems. • Use current internal–external communication infrastructure to integrate digital systems and emergency apps. • Enhanced security protocols and PPE adherence via combined evacuation/decon programs.
2	WO Strategies (Weaknesses + Opportunities)	• Establish detailed and unified SOPs using full fledged simulation exercises and multiagency coordination. • Attend To Limited Surge Staffing through ongoing training, mobilizing volunteers and building academic partnerships. • Strengthen staff psychosocial support through counseling services and other amenities. • Enhance digital communications platforms that incorporate mobile apps and external response networks.
3	ST Strategies (Strengths + Threats)	• Continue emergency medical care during times of large-scale disasters to prevent patients from overwhelming the system. • Use safety and personal protective equipment to prevent possible exposure of chemical, radiation or infectious agents. • In situation where normal communication networks inaddition to those associated with AFVs and support assets can be used to predict possible network interruptions: secondary communication areanuts (radio, satellite). • Count on qualified health staff to help respond well even if staffers become fatigued or stay home.
4	WT Strategies (Weaknesses + Threats)	• Reduce ineffective evacuation risks with adjusted planning and frequent evacuation drills. • Enhance delivery and distribution logistics through the development of emergency mechanisms and dedicated reserves. • Minimize stress on workers with rotation schedules and psychological-support networks in times of crisis. • Reduce your digital exposure with frequent cyber security auditing and system back-ups

Sources: Authors' qualitative analysis

This integrative analysis demonstrates that coupling hospital safety assessment with human resource management perspectives can transform static diagnostic findings into strategic improvement plans, helping to bridge preparedness gaps identified in previous studies(Goniewicz et al., 2023).

Balanced Scorecard (BSC) Based Strategic Aligment

The Balanced Scorecard was used as an interpretive framework to align the strategic directions derived from the TOWS analysis with key organizational perspectives. Rather than developing quantitative performance indicators, this approach organized qualitative insights into four interrelated perspectives to support strategic decision-making and continuous preparedness improvement.

Table 4.
Balanced Scorecard Perspectives and Qualitative Strategic Priorities.

Balanced Scorecard Perspective	Strategic Focus	Qualitative Strategic Directions
Learning and Growth	Workforce preparedness and well-being	Strengthening disaster-related training, leadership capacity, and psychosocial support to enhance staff readiness and resilience

Balanced Scorecard Perspective	Strategic Focus	Qualitative Strategic Directions
Internal Processes	Emergency operations and coordination	Improving integration of disaster response procedures, evacuation planning, and inter-unit coordination during flood events
Service Continuity	Patient safety and essential services	Ensuring continuity of critical clinical services and minimizing patient and staff exposure risks during emergencies
Resource Management	Logistics and financial readiness	Enhancing logistics preparedness, emergency stock management, and allocation of dedicated resources for disaster response

Sources: Authors' qualitative analysis

The integration of human resource management within the hospital safety assessment process enabled the identification of critical capacity gaps and informed strategic priorities to strengthen organizational preparedness. Viewed through a Balanced Scorecard perspective, these priorities provide a structured foundation for aligning workforce development, operational processes, service continuity, and resource readiness in disaster-prone hospital settings (Seyghalani Talab et al., 2024; Sunindijo et al., 2020).

Model Validation and Hypothesis Confirmation

The qualitative findings of this study provided support for the proposed conceptual proposition that hospital disaster preparedness is strengthened through the interaction between hospital safety conditions and human resource management practices, when aligned within a Balanced Scorecard perspective. Rather than confirming a statistical hypothesis, the analysis demonstrated how safety diagnostics, workforce practices, and strategic alignment collectively shape organizational preparedness.

Triangulated evidence from interviews, focus group discussions, staff narratives, and document analysis indicated that hospital units characterized by more structured training practices, clearer role allocation, and stronger leadership engagement exhibited more coherent and adaptive preparedness patterns. In contrast, units with less integrated human resource planning experienced greater challenges in coordination and response during flood-related disruptions.

An expert review process further reinforced the credibility and applicability of the proposed HIS-HRM conceptual model. Feedback from hospital administrators and disaster management specialists suggested that the model was contextually grounded, operationally feasible, and relevant for regional public hospitals facing similar flood-related risks. These insights align with previous international studies emphasizing that integrated safety assessment and human-centered management approaches enhance organizational adaptability and resilience in healthcare settings(Ali et al., 2022; Iflaifel et al., 2019)(Lestari, Paramitasari, Fatmah, et al., 2022a).

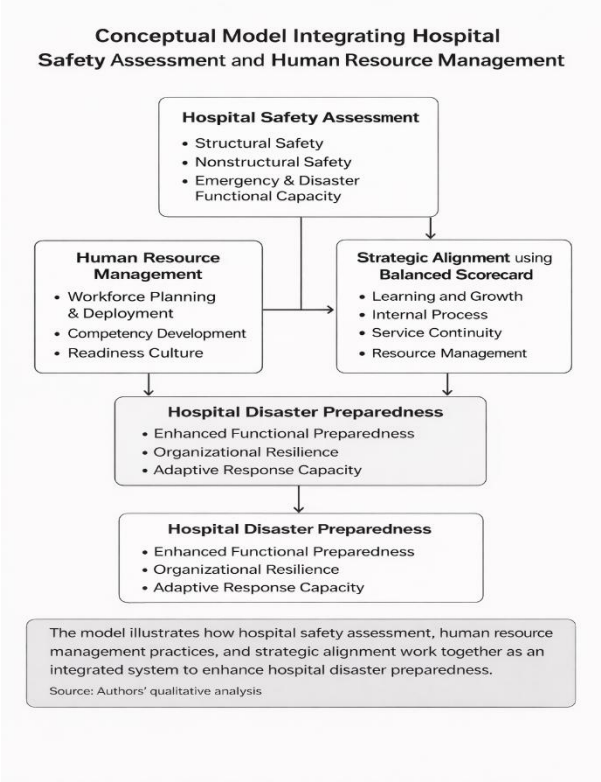

Figure 1. Conceptual Model Integrating Hospital Safety Assessment and Human Resource Management
Source: Authors

The conceptual model illustrates how hospital safety assessment, human resource management practices, and strategic alignment interact as a continuous cycle. Hospital safety assessment serves as an initial diagnostic process to identify critical vulnerabilities. These insights activate human resource management mechanisms, including workforce planning, competency development, and the cultivation of preparedness-oriented organizational culture. The Balanced Scorecard perspective provides an integrative structure to align learning, internal coordination, service continuity, and resource management. Together, these interconnected elements highlight disaster preparedness as a dynamic, human-centered organizational capability rather than a purely technical requirement.

Limitations

Despite its contributions, this study has several limitations that should be considered when interpreting the findings. The research was conducted as a single qualitative case study in a flood-prone regional hospital, which may limit

the transferability of the results to hospitals operating in different hazard environments, resource conditions, or governance contexts. In addition, the study focuses on organizational processes and perceptions at a specific point in time, without longitudinal observation of preparedness performance across multiple disaster events. As a result, the findings capture how preparedness is constructed and experienced by hospital actors, but cannot fully assess how these practices would perform under future or large-scale emergencies. These limitations suggest that the proposed framework should be understood as a context-sensitive model that highlights mechanisms linking safety assessment and human resource management, rather than as a universally generalizable solution.

CONCLUSIONS

This study demonstrates that hospital disaster preparedness in flood-prone settings cannot be adequately understood through safety assessment alone. The findings reveal that human resource management serves as a critical mediating mechanism that translates safety diagnostics into operational readiness through workforce mobilization, training continuity, leadership coordination, and effective communication. Preparedness therefore emerges not as a static outcome of assessment tools, but as a dynamic organizational capability shaped by continuous interaction between safety conditions, human resource practices, and strategic alignment.

By integrating the Hospital Safety Index, human resource management, and Balanced Scorecard perspectives, this study offers a comprehensive understanding of how hospitals can move from reactive emergency response toward proactive resilience building. The results highlight the importance of prioritizing human capacity, coordination, and institutional learning to sustain healthcare services during recurrent environmental hazards, particularly in resource-constrained contexts. This integrated perspective provides practical insights for hospital leaders and policymakers seeking to embed disaster preparedness into routine management processes rather than relying solely on infrastructure-based indicators.

This study is limited by its single qualitative case design, which may constrain the transferability of the findings to other hospital settings and hazard contexts. Future research should examine the applicability of the proposed framework across multiple hospitals, different types of disasters, and diverse health system environments using comparative or longitudinal approaches. Further studies may also explore how digital health systems, inter-organizational collaboration, and policy environments influence the development of preparedness as an evolving organizational capability.

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SUGGESTION

This study recommends that hospitals strengthen the integration of Hospital Safety Index–based assessments with human resource management practices and a Balanced Scorecard perspective to support sustainable and people-centered disaster preparedness. Rather than treating safety assessment as a standalone diagnostic exercise, hospitals should embed preparedness within routine workforce planning, training, and coordination mechanisms.

At the organizational level, hospitals are encouraged to institutionalize regular disaster preparedness training, strengthen cross-unit coordination, and provide psychosocial support for staff to enhance adaptive capacity and environmental health resilience.

From a research and policy perspective, further studies are needed to examine the applicability and transferability of the proposed model across different hospital contexts and hazard settings. Policymakers may also consider incorporating human resource–oriented preparedness criteria into hospital disaster preparedness frameworks to better align safety assessment with operational readiness.

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