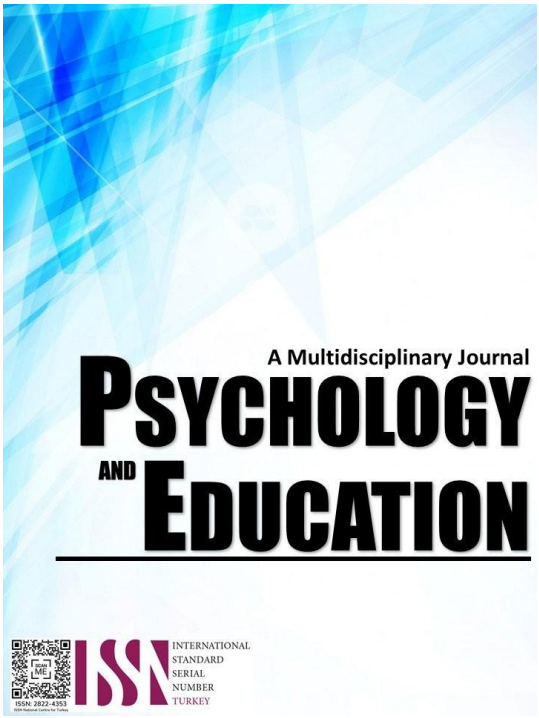
NURSES' EMERGENCY PREPAREDNESS IN DISASTER-PRONE AREAS OF PANGASINAN



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Research Article

Nurses' Emergency Preparedness in Disaster-Prone Areas of Pangasinan

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Abstract

Nurses in disaster-prone areas of Pangasinan are essential for emergency preparedness and response. In Pangasinan is often affected by natural disasters, it is essential to evaluate the preparedness of nurses in managing large-scale calamities. This study examines the present condition of nurses' emergency preparedness in the province, emphasizing their area of practice, years of experience, highest educational attainment, and relevant training attended. This research employed a descriptive-evaluative methodology to assess the preparedness of nurses in Pangasinan. Data were gathered via surveys from 112 nurses across level II healthcare institutions, concentrating on area of practice, years of experience, highest educational attainment, and relevant training attended. Descriptive statistics were utilized to summarize the data, while evaluative approaches were employed to analyze the correlation between training and preparation. The predominant percentage of nurses operated in the Emergency Room (48.2%) and Medical Wards (20.5%), which are vital sectors during disaster response. A majority of nurses have one year or less of experience (36.6%), whereas 85.7% held a Bachelor's Degree. A substantial percentage of nurses lacked specialized disaster training, with 56.3% indicating they had not undergone relevant disaster preparedness training. Merely 29.5% had participated in Emergency Management training. These findings underscore deficiencies in disaster-specific preparedness and training. The findings indicate that although nurses in Pangasinan occupy crucial roles in disaster response, their preparedness is constrained by insufficient specialized training. Mitigating these deficiencies through focused training and resources is crucial for enhancing catastrophe preparedness.

Keywords: *Pangasinan nurses, emergency preparedness, disaster response, training, healthcare*

Introduction

Emergency preparedness is a broad term that encompasses several essential components, including planning, organizing, training, allocating resources, and establishing protocols. Reducing the negative consequences of disasters on communities and health systems requires effective emergency preparedness. Firm emergency plans are essential for protecting public health and ensuring that healthcare systems can endure and recover from catastrophic disasters, according to the World Health Organization (WHO, 2021).

Sustainable Development Goal 13 (SDG 13) emphasizes the need for immediate action to mitigate climate change and its associated impacts. With the increased frequency and severity of natural disasters caused by climate change, nurses' role in emergency preparedness is crucial, especially in disaster-prone areas. During climate-related events, nurses serve as frontline responders, providing critical care, mitigating health risks, and fostering community resilience (WHO, 2021).

Emergency preparedness among nurses is directly tied to SDG 13's target of improving adaptive capacity to climate-related risks. Well-trained nurses reduce death and morbidity during catastrophes by providing prompt medical care and preventing disease outbreaks. Their role extends beyond emergency care by assisting with long-term recovery efforts, such as restoring health systems and providing mental health programs for affected people.

Incorporating climate change awareness into nursing curricula and professional development programs improves nurses' ability to respond effectively to climate emergencies. This preemptive approach ensures that healthcare services remain operational during disasters, safeguarding public health and mitigating the overall impact of climate change on vulnerable populations (Sachs, 2022).

Nurses' emergency preparedness is a crucial aspect of climate action in disaster-prone communities. Healthcare systems become more resilient to climate change by providing nurses with the cognition and skills they need to respond effectively to emergencies. Integrating emergency preparedness into nursing practice not only improves health outcomes but also contributes to SDG 13's overarching aim of creating a safer and more sustainable future for communities globally.

During emergencies, nurses are frequently the first to respond and are positioned at the forefront of the healthcare response. Their responsibilities are crucial because they have to act quickly and wisely, actions that have a significant impact on how patients fare. During emergencies, nurses perform several essential duties, including patient triage, which involves evaluating and prioritizing patients based on the severity of their conditions. This is essential to guaranteeing that people in urgent need of medical assistance get it right away. To support a coordinated response effort, nurses also communicate with emergency services and other healthcare providers and administer treatments, frequently adhering to stringent standards.

In high-stress situations, nurses' efficacy is mainly dependent on their level of preparedness. Being prepared means knowing all the ins and outs of emergency protocols and procedures, which supplies nurses with the knowledge and skills they need to handle a crisis. To ensure a coordinated response, for example, one must be familiar with triage processes, disaster management plans, and communication techniques among other healthcare staff. Well-prepared nurses can carry out their responsibilities with greater assurance and

effectiveness, which in turn improves patient care and outcomes.

Research suggests that inadequate preparation among nurses may result in adverse outcomes. Poor preparation can negatively impact patient outcomes, as nurses who are not adequately prepared may struggle to respond effectively in stressful situations. Moreover, healthcare workers may experience increased stress if they are unable to respond appropriately in an emergency. According to Labrague (2020), this compromises patient care by harming the mental health of nurses and creating a chaotic work environment.

The proficiency and preparedness of the hospital staff are crucial. Healthcare professionals need to be equipped with the right skills and information to deal with a range of emergencies. Preparing employees for real-life situations and helping them respond coolly and decisively under duress involves ongoing education and simulation exercises. Emergency response is crucial for nurses, and they require training in triaging patients, providing critical care, and collaborating with other emergency services. Furthermore, it is essential to cultivate a culture of preparation within the institution. Regular drills, interdepartmental communication, and a clear understanding of duties and responsibilities during emergencies are all critical components in this process. Staff members are more confident in handling emergencies when they are well-versed in emergency procedures and training, which results in more effective and efficient patient care.

Several factors, including institutional policies, years of experience, education, and training, influence nurses' preparedness for emergency response. It has been demonstrated that educational initiatives that prioritize emergency preparedness and simulation training enhance nurses' proficiency and self-assurance in managing emergencies (Yan, 2024). Furthermore, continuing education programs and refresher courses are crucial for keeping nurses current on the latest guidelines and practical techniques in emergency care.

Research has shown that nurses with higher experience levels typically exhibit greater competence and confidence in emergency scenarios (Berdida, 2021). Still, there may be gaps in knowledge, especially for more recent nurses who may not have had much experience with emergency circumstances during their training. Additionally, institutional support—which includes training opportunities and access to resources—plays a significant role in determining how prepared nurses are.

More thorough research is needed to accurately assess the preparedness of nurses, given their vital role in emergency response. Emergency readiness can be enhanced through training programs and institutional policies that consider the factors influencing nurses' understanding of emergency preparedness. This study aims to close this gap by investigating nurses' emergency preparedness and identifying crucial components that support their competency in these high-stakes scenarios.

The Department of Health (DOH) in the Philippines has recognized the urgent need for health security and crisis preparedness, making "Handa sa Krisis" (Prepared for Crisis) a core pillar of its 8-Point Action Agenda. This initiative emphasizes the importance of a proactive approach to public health emergencies, ensuring that the country can effectively respond to disasters, pandemics, and other health crises (Department of Health, 2023).

A crucial component of this agenda is the development of a resilient healthcare system that can handle sudden medical surges. This involves strengthening disease surveillance and early detection systems, enabling authorities to respond swiftly to outbreaks and mitigate risks. Alongside this, enhancing emergency response protocols ensures that frontline health workers are equipped to manage crises efficiently.

Another key aspect is investing in disaster-resilient health facilities. The DOH aims to upgrade hospitals and rural health units to withstand natural calamities such as typhoons and earthquakes, ensuring that medical services remain uninterrupted. Additionally, the stockpiling of essential medical supplies, such as vaccines, emergency medicines, and protective equipment, is prioritized to prevent shortages during crises (DOH, 2023).

Beyond infrastructure and logistics, Handa sa Krisis also focuses on training healthcare professionals in crisis response and management. This includes specialized emergency drills, disaster response training, and cross-agency coordination efforts with local and international partners. By reinforcing the capabilities of healthcare workers, the government ensures that communities receive timely and adequate medical assistance in emergencies.

Ultimately, Handa sa Krisis is committed to protecting public health by building a responsive, well-equipped, and resilient health system. Through strategic investments in preparedness, infrastructure, and workforce development, the DOH aims to ensure that the nation can effectively confront any health emergency and safeguard the well-being of every Filipino.

The significance of preparedness is evident in the Philippines, a nation vulnerable to typhoons, earthquakes, and volcanic eruptions. The Philippines is one of the world's most disaster-prone nations, with an average of 20 typhoons per year and frequent earthquake activity (UNDRR, 2019). In light of this fact, nurses' knowledge and readiness are crucial for ensuring an efficient emergency response and minimizing casualties during disasters.

In the Philippines, nurses play a crucial role in disaster response efforts, as they frequently work in complex environments with limited resources. The Philippines' Department of Health (DOH) recognizes the need for comprehensive training courses focused on disaster planning and response. The necessity of improving healthcare personnel', especially nurses', ability to respond to emergencies is

emphasized by initiatives like the National Disaster Risk Reduction and Management Plan (DOH, 2023).

Several factors influence nurses' preparedness in the Philippine and global contexts. These variables include years of experience, accessibility of training, educational background, and institutional support. Research has shown that nurses with specialized emergency response training exhibit increased confidence and skill in managing emergencies.

However, there are differences in the Philippines when it comes to training and resources, especially in rural areas, where healthcare facilities often lack the necessary staff and infrastructure. Studies indicate that these differences may lead to knowledge gaps among nurses, which can impact their ability to respond appropriately in emergencies (Mata & Cheng, 2021).

Pangasinan ranks among the most hazard-prone provinces in the Philippines, mainly due to its geographical characteristics that expose it to various natural disasters. It is recognized as one of the top 20 provinces nationally vulnerable to both climate and weather-related risks (Valdez, 2025). The province was listed among the top ten provinces at risk of earthquakes due to the Manila Trench in the Mapping Philippine Vulnerability to Environmental Disasters project. Furthermore, as of 2011, Pangasinan was the third most landslide- and flood-prone province in the Philippines, as stated by the DENR and GeoScience Bureau (DENRMGB). This supports the Regional Disaster Risk Reduction and Coordinating Council's (RDRRMC) assertion that Pangasinan is the most flood-prone province in Region 1. In the World Bank's study, "Getting a Grip of Climate Change in the Philippines," Pangasinan was finally identified as one of the provinces having a high risk of floods due to typhoon winds, strong winds, and heavy rainfall.

As a result, disaster preparedness and management training is desperately needed. The Philippine Disaster Risk Reduction and Management Act of 2010, also known as Republic Act 10121, defines disaster management as the process of planning, assessment, physical protection, and response capacity development intended to communicate a paradigm shift from reactive to proactive Disaster Risk Reduction Management (DRRM).

To enhance people's resilience and reduce their vulnerabilities, both men and women are now more aware of and knowledgeable about Disaster Risk Reduction and Management (DRRM). It encompasses a person's knowledge, abilities, and behaviors during a disaster. Despite being a top research priority for the National Unified Health Research (NUHR), National Economic and Development Authority (NEDA), Philippine National Health Research System (PNHRS), and Philippine Council in Industry and Energy Research Development (PCIERD), there are sadly few studies on emergency preparedness carried out in Pangasinan.

To ascertain and evaluate nurses' emergency preparedness in disaster-prone areas of Pangasinan, this study was conducted.

Research Questions

This study aimed to provide actionable insights into nurses' emergency in earthquake-prone areas of Pangasinan. Specifically, it sought to answer the following questions:

1. What is the profile of the respondents in terms of:
    1.1. area of practice;
    1.2. years of experience;
    1.3. highest educational attainment; and
    1.4. relevant trainings attended?
2. What is the level of emergency preparedness of nurses in disaster-prone areas of Pangasinan in terms of:
    2.1. command and control;
    2.2. communication during mass casualty incidents;
    2.3. safety and security during mass casualty incidents;
    2.4. triage during mass casualty incidents;
    2.5. surge capacity during mass casualty incidents;
    2.6. continuity of essential services in mass incidents;
    2.7. human resource during mass casualty;
    2.8. logistics and supply management, and
    2.9. post-disaster recovery?
3. Is there a significant difference between the level of emergency preparedness in disaster-prone areas of Pangasinan across their profile variables?
4. What innovative work plan can be proposed to enhance emergency preparedness in disaster-prone regions in Pangasinan?

Methodology

Research Design

The study used a descriptive-evaluative design. This design describes the variables and the relationships that occur naturally between and among them. A descriptive-evaluative design is a research methodology that integrates two discrete processes: characterizing phenomena or situations in their current state and assessing the influence or efficacy of a program, activity, or intervention. With this methodology, in-depth data on a specific topic are gathered (the descriptive component), and the results or impacts of particular

activities or interventions are evaluated (the evaluative component).

Respondents

The study focused on emergency room nurses working in level II healthcare institutions in Eastern Pangasinan, irrespective of their employment status. The sampling criteria strictly included individuals employed in healthcare institutions within Eastern Pangasinan.

Instrument

A questionnaire adapted from the Emergency Response Checklist of Medina (2021), was utilized. The questionnaire comprises a checklist designed to be a guided response type; respondents only need to check the elements that match the predefined responses they have already selected.

Part I of the questionnaire includes the following: area of practice, years of experience, highest educational attainment and relevant trainings attended while part II are the level of preparedness of nurses in the domains of command and control, communication, safety and security, triage, surge capacity, continuity of essential services, human resources, logistics and supply, and post-disaster recovery.

Experts in the field assessed the significance, relevance, and semantic clarity of each item to ensure the instrument's reliability and content validity.

Procedure

Before the collection of data, the researcher obtained authorization from the Dean of the Institute of Graduate and Advance Studies to do the study. Upon receiving approval from the Institute of Graduate and Advanced Studies, the researcher solicited and coordinated with the Chief of Hospitals through the Chief Nurse to obtain permission to conduct the study. Upon receiving permission, the researcher acquired consent from the respondents. The researcher personally collected the data during the second semester of the 2024-2025 academic year.

The ethical considerations and the interests of the participants are meticulously monitored throughout the investigation. Informed permission is a crucial element, and each participant received information regarding the study, its methodology, and associated risks and benefits before participation.

This method provided individuals with a clear understanding of the expectations if they chose to participate, enabling them to make informed decisions about their involvement. Enhancing clarity fostered participant comfort with research throughout the study, ensuring that the research serves a mutual benefit.

Anonymity and confidentiality were preserved during the research process. Confidentiality safeguards were implemented by excluding participant details from the full data set to ensure that their contributions could not be linked to any individual participants. The data was safeguarded, granting access exclusively to the researcher. The identity of study participants was protected to ensure that nurses could submit comprehensive accounts of their knowledge of emergency preparedness without fear of reprisals against them.

Participants retain the right to withdraw from the study at any point, ensuring their participation is voluntary. It is essential to provide this option due to the sensitivity of the issues being referenced.

Furthermore, approval was obtained from the institutional research ethics committee that adheres to international ethical standards. This review procedure provided an additional safeguard for evaluating the study's design quality, methodology, and potential dangers.

Data Analysis

To answer problem 1, on the profile of the respondents in terms of area of practice, years of experience, highest educational attainment, and relevant training attended, frequency and percentage were utilized.

To answer problem 2, on the level of emergency preparedness of nurses in disaster-prone areas of Pangasinan, mean comparison was used regarding: command and control, communication during mass casualty incidents, safety and security during mass casualty incidents, triage in mass casualty incidents, surge capacity in mass casualty incidents, continuity of critical services during mass incidents, human resources in mass casualties, logistics and supply chain management, and post-disaster recovery. The 4-point Likert Scale was used in assessing the level of nurses' emergency preparedness in disaster-prone areas of Pangasinan.

To tackle Problem 3, which investigates the substantial disparity in emergency preparedness levels across different sectors in disaster-prone areas of Pangasinan, ANOVA (Analysis of Variance) was employed.

Data was gathered according to participants' area of practice, years of experience, highest educational attainment, and relevant trainings attended. The profiles were analyzed across critical domains in terms of: command and control, communication, safety and security, triage, surge capacity, continuity of essential services, human resources, logistics and supply, and post-disaster recovery. ANOVA was subsequently utilized to assess the preparation levels across each domain, identifying the elements that affected emergency preparedness and offering ideas for enhancing disaster response tactics.

Ethical Considerations

This section offers the outcomes and discussion of the study, examining the data gathered and reading the results in light of the research goals and hypotheses. Drawing links to current research and highlighting the consequences of the results, this chapter aims to provide insights into the patterns, trends, and linkages observed.

Results and Discussion

Profile of the Respondents

Area of Practice

Table 1. *Area of Practice*

Area of Practice	*Frequency*	*Percentage*
Emergency Room	54	48.2
Intensive Care Unit	4	3.6
Labor Room	4	3.6
Medical Ward	23	20.5
Neonatal Intensive Care Unit	3	2.7
Obstetrics & Gynecology Ward	2	1.8
Operating Room	5	5.4
Orthopedic Ward	4	3.6
OPD	2	1.8
Pediatric Ward	2	1.8
Dialysis	8	7.1
Total	112	100.0

Table 1 presents the demographic attributes of the respondents, especially regarding their practice areas, and offers significant insight into the allocation of healthcare professionals across various clinical environments. The table below indicates that the predominant percentage of respondents were assigned in the Emergency Room (48.2%), followed by the Medical Ward (20.5%) and Dialysis (7.1%). Additional departments with significant presence comprise the Intensive Care Unit (3.5%), Labor Room (3.5%), and Operating Room (5.4%).

The distribution indicates that the responders primarily operate in emergency and acute care environments, including the Emergency Room. This may indicate the characteristics of healthcare provision in urgent care scenarios where swift action is essential. The representation from sectors such as Dialysis, Intensive Care Unit, and Medical Ward suggests that respondents operate in specialized and critical care settings, necessitating unique skill sets and knowledge.

Years of Experience

Table 2 presents a summary of the respondents' years of experience in the healthcare sector. The experience level distribution indicates that a considerable percentage of respondents are either novices in the profession or possess intermediate experience. A significant proportion of respondents, 36.6%, possess 6 months to 1 year of experience, whilst 29.5% have 2-5 years of expertise. The remaining responders are more uniformly allocated among the advanced experience tiers.

Table 2. *Years of Experience*

Years of Experience	*Frequency*	*Percentage*
6 months to 1 year	41	36.6
2-5 years	33	29.5
6-10 years	24	21.4
11-15 years	11	9.8
Dialysis	8	7.1
Total	112	100.0

The majority of respondents possess limited experience in the healthcare sector, with a notable percentage having 6 months to 1 year (36.6%) or 2-5 years (29.5%) of experience. This indicates an infusion of fresh professionals into the industry, alongside a moderate percentage of healthcare workers possessing intermediate experience. The distribution indicates a reduced representation of responders with extended tenures, suggesting retention difficulties and turnover issues within healthcare professions.

Highest Educational Attainment

Table 3 presents the highest level of educational attainment among the respondents. A substantial percentage of respondents possess a Bachelor's Degree (85.7%), while lower percentages have a Master's Degree (4.5%) and a Master's Degree with additional units (8.9%). A minimal percentage possesses a Doctorate Degree (0.9%). The data indicate that the healthcare workers in this sample predominantly possess undergraduate degrees.

Table 3. *Highest Educational Attainment*

Highest Educational Attainment	*Frequency*	*Percentage*
Bachelor's Degree	96	85.7
With MA Units	10	8.9
Master's Degree	5	4.5
With Doctorate Degree	1	0.9
Total	112	100.0

The data indicates that most healthcare practitioners in the sample possess Bachelor's Degrees, implying that fundamental education is common. Although a minority of healthcare professionals hold postgraduate degrees or supplementary educational credentials, these data suggest that many healthcare professionals, particularly in clinical settings, may prioritize practical experience over the immediate pursuit of further education after completing their undergraduate studies. Nonetheless, there remains a considerable desire to advance education, evidenced by the number of responders with Master's Degree credits.

Relevant Training Attended

Table 4 displays the information concerning the pertinent training participated in by the respondents. A majority of respondents (56.3%) indicated that they had not participated in all the relevant training. Still, others have engaged in numerous specialized trainings concerning emergency management, biohazard disaster response, and critical incident stress management. The data indicates a predominance in Emergency Management (29.5%), but other training programs, including Biohazard Disaster, Mass Casualty Incident, and Critical Incident Stress Management, account for lesser percentages.

Table 4. *Relevant Trainings Attended*

Highest Educational Attainment	*Frequency*	*Percentage*
Biohazard Disaster	5	4.5
Emergency Management	33	29.5
Mass Casualty Incident	5	4.5
Contingency Planning	2	1.8
Critical Incident Stress Management	3	2.7
None	63	56.3
Dialysis w/ peritoneal dialysis, ACLS,BLS	1	0.9
Total	112	100.0

The data indicates a distinct disparity between individuals who have participated in pertinent training programs and those who have not, with the majority of respondents indicating no attendance at specialized training. Individuals trained in Emergency Management are more adept at managing critical and catastrophic scenarios. The findings suggest a need for enhancement in providing ongoing professional development opportunities, especially in Biohazard Disasters, Mass Casualty Incidents, and Critical Incident Stress Management, which are vital for healthcare professionals to respond adeptly during emergencies.

Level of Emergency Preparedness of Nurses in Disaster-Prone Areas of Pangasinan

Command and Control

The table's results underscore multiple facets of hospital readiness in disaster-prone areas of Pangasinan. The average ratings for each indicator, combined with the associated preparation level, provide insights into hospitals' readiness for managing emergencies.

Table 5. *Level of Emergency Preparedness Along with Command and Control*

Indicators	*Mean*	*TE*
1. Designated hospital command center and communication	3.19	MP
2. Appropriate and coordination of related response activities	3.25	HP
3. Structure of hospital incident command system.	3.10	MP
4. Staff roles in emergency response activities.	3.34	HP
5. Contingency plan for hospital command control	3.19	MP
6. Implementation hospital incident command action plan	3.21	MP
Average Mean	3.21	MP

Legend: *3.25 – 4.00 Highly Prepared (HP), 2.50 – 3.24 Moderately Prepared (MP), 1.75 – 2.49 Fairly Prepared (FP), 1.00 – 1.74 Not Prepared (NP)*

Table 5 displays the data collected about the emergency preparedness of nurses in disaster-prone areas of Pangasinan, specifically in the domain of command and control. The outcome is categorized as "Moderately Prepared," indicated by an overall mean of 3.21.

The comprehensive outcome is as follows: Designated hospital command center and communication (M = 3.19); this indicates that although hospitals have established command centers for emergencies, their communication infrastructure may not be entirely optimal. Inadequate communication is a well-documented barrier to effective disaster management. Studies indicate that communication breakdowns can lead to significant delays and errors in disaster response efforts (Lai et al., 2020). Hospitals could better their operations by investing in automated communication tools that improve information dissemination and facilitate swift decision-making. The integration of mobile technologies for real-time updates and staff cooperation could enhance efficiency, ensuring improved

management during critical situations (Li et al., 2021).

The appropriate coordination of related response activities (M = 3.25) indicates that hospitals are excelling in coordinating emergency response efforts. Effective coordination during disasters is essential for the optimal allocation of resources and the alignment of all teams in their efforts. This area continues to benefit from ongoing enhancement. Simulations and drills are crucial for sustaining and improving response coordination (Mayer et al., 2020). Hospitals can enhance their operations by implementing AI-driven decision-making tools to forecast and distribute resources adaptively in response to changing crisis scenarios (Jain et al., 2021).

The structure of the Hospital Incident Command System (Mean = 3.10) indicates that although an incident command system (ICS) exists, its framework may not be entirely practical. An adequate ICS guarantees distinct authority and coordination during emergencies, yet its execution may be inconsistent or inadequately developed in certain regions. Researchers assert that well-defined leadership frameworks and training in Incident Command System positions are crucial for effective emergency operations (Jackson et al., 2020). Hospitals can enhance their Incident Command System by standardizing processes and providing regular, role-specific training to ensure staff are familiar with their responsibilities in emergencies.

Staff Roles in Emergency Response Activities (Mean = 3.34) demonstrate that hospitals are effectively delineating and allocating roles to their personnel during emergencies. This is a crucial element, as ambiguous positions frequently result in confusion and ineffective operations. Hospitals must consistently revise role assignments in response to changing crisis scenarios. To improve this, hospitals should implement gamified training programs that allow staff to participate in interactive simulations evaluating their role-specific responses to diverse catastrophe scenarios (Cheng et al., 2020).

Contingency Plan for Hospital Command and Control (Mean = 3.19), indicating that although some backup plans are in place, they may lack robustness or regular updates. In emergency management, hospitals must design flexible and adaptable strategies for various crisis scenarios. Studies indicate that contingency planning enhances hospitals' agility in addressing dynamic situations (Park et al., 2020). Hospitals could engage in scenario-based planning, wherein diverse teams build customized solutions for various probable situations, thereby assuring comprehensive contingency coverage. Furthermore, coordinated workshops with local government and emergency response teams would augment the thoroughness of these plans.

The implementation of the Hospital Incident Command Action Plan (Mean = 3.21) may be effective, but the strategies may prove inadequate when applied in actual circumstances. Research indicates that strategy must be regularly evaluated and improved using simulated exercises (Taylor et al., 2020). Hospitals could enhance their operations by implementing a continuous feedback loop, wherein the efficacy of the action plan is evaluated following each drill to pinpoint areas for improvement. Real-time testing and iterative enhancements would substantially increase the hospital's preparedness and responsiveness. The findings underscore the need for ongoing enhancements in hospital readiness for emergencies, particularly in disaster-prone areas of Pangasinan. Although hospitals excel in specific domains, the integration of sophisticated technologies, simulation-based training, and inter-agency coordination will enhance readiness, ensuring hospitals are equipped for any catastrophe scenario.

Communication

Table 6. *Level of Emergency Preparedness of Nurses Along with Communication During Mass Casualty Incident*

Indicators	*Mean*	*TE*
1. Appointed public information spoke person	3.04	MP
2. Designated space for press conferences	3.05	MP
3. Key messages in preparation for disaster scenarios.	3.13	MP
4. Mechanisms of information exchange.	3.06	MP
5. Roles and responsibilities within incident action plan	3.22	MP
6. Mechanisms for the appropriate processing and reporting of information.	3.05	MP
7. Availability back- up systems	3.04	MP
Average Mean	3.09	MP

Legend: *3.25 – 4.00 Highly Prepared (HP), 2.50 – 3.24 Moderately Prepared (MP), 1.75 – 2.49 Fairly Prepared (FP), 1.00 – 1.74 Not Prepared (NP)*

Communication is a crucial element of emergency response, particularly during mass casualty events, where the prompt and accurate dissemination of information can save lives. The World Health Organization asserts that effective communication systems enhance cooperation, alleviate fear, and facilitate informed decision-making. Nurses, as primary responders, must be equipped to engage in and encourage these communication processes.

Table 6 displays the data collected about the emergency preparedness of nurses in disaster-prone areas of Pangasinan, specifically in the domain of communication. The outcome is categorized as "Moderately Prepared," indicated by an overall mean of 3.09. The comprehensive outcome is as follows: The appointed PIO spokesperson (M = 3.04). The presence of a designated spokesperson at the hospital suggests that the individual may lack the training or authority to manage public communication effectively in a crisis. Proficient spokespersons are essential for delivering correct and consistent messages to the public and media, hence mitigating uncertainty and disinformation (Kovács et al., 2020). Hospitals can enhance their effectiveness by providing specific media training for spokespersons and by simulating press conference scenarios to equip them for high-pressure situations.

Designated space for press conferences (M = 3.05): This score indicates that hospitals possess a reasonable degree of readiness for press conferences in the event of disasters. A designated press area is crucial for handling media relations in emergencies; nevertheless, the relatively low score suggests that the space may be either inaccessible or underutilized. Emergency communication procedures indicate that a well-defined space facilitates efficient handling of media inquiries (Graham et al., 2020). Hospitals need to allocate and furnish designated facilities for media relations, ensuring that these locations are readily accessible and equipped with essential infrastructure (e.g., internet, power outlets, seating arrangements) for prompt use during emergencies.

Key messages in preparation for disaster scenarios (M = 3.13) indicate a moderate degree of readiness. Crisis communication preparedness entails possessing clear, pre-composed messages that may be modified for various crisis scenarios. The relatively low score suggests that although some message methods exist, they are likely not adequately comprehensive or uniform throughout the organization. McLeod et al. (2020) assert that hospitals should create standardized communication templates for various catastrophe scenarios, which can be easily modified as needed to ensure clarity and consistency in communications.

The mechanism of information exchange (M = 3.06) indicates a moderate level of readiness for information exchange in emergencies. The transmission of information is essential for sustaining situational awareness throughout all tiers of the hospital during a disaster. Nonetheless, the score suggests that the procedures may lack complete efficiency or systematic organization. Research highlights the importance of real-time data-sharing platforms in disaster preparedness, facilitating cooperation across multiple departments (Zhang et al., 2020). Hospitals could enhance operations by implementing cloud-based communication technologies and secure intranet platforms for efficient information exchange during emergencies.

Roles and responsibilities within the incident action plan (M = 3.22) emphasize the importance of measured readiness in clearly delineating roles and duties. The moderate rating indicates that the assignment of roles may lack consistency in clarity or adherence to established standards. An explicit action plan is essential for ensuring that all personnel understand their unique responsibilities and how to do them efficiently during a crisis (Thomas et al., 2020). Hospitals may enhance this by routinely evaluating and optimizing incident action plans and ensuring that all personnel are trained in their designated duties during emergencies. Tabletop exercises simulating diverse crisis scenarios will ensure that workers are proficient in their responsibilities.

Mechanisms for the appropriate processing and reporting of information (M = 3.05) ensure the effective dissemination of essential information to decision-makers, the public, and other stakeholders through prompt reporting systems. Nonetheless, the middling score indicates that existing systems may want optimization. Studies on crisis management emphasize the need for real-time reporting mechanisms and standardized formats for disseminating essential updates (Harrison et al., 2020). Hospitals can improve this by adopting automated reporting systems that facilitate swift documentation and distribution of crucial data during emergencies.

Availability backup systems (M = 3.04) indicate that the hospital's backup systems are well-prepared. Backup systems, encompassing alternative communication methods and data storage, are essential for sustaining activities amid disruptions resulting from calamities. This score suggests that the backup systems may lack complete reliability or fail safety. Hospitals must implement redundant systems, such as data backups and alternative communication lines (Baker et al., 2020). Hospitals can enhance their operations by investing in cloud-based storage and alternate communication technology, such as satellite phones, to ensure continuity during emergencies.

The examination of preparedness indicators suggests that hospitals have made significant progress in their readiness for public communication during emergencies. Nonetheless, considerable potential for enhancement persists in aspects such as communication infrastructure, role clarity within incident plans, and the resilience of backup systems. By implementing innovative technologies, such as cloud-based tools, AI-driven platforms, and scenario-based training, hospitals can enhance their emergency preparedness and information management during disasters.

Safety and Security

The research highlights hospitals' preparedness to manage security, patient flow, and crisis response during disasters, emphasizing both infrastructure and operational protocols. The indicators encompass multiple facets, including security team structure, patient flow administration, crowd management, evacuation protocols, and infection control. The average mean score of 3.21 indicates a moderate level of overall preparation (MP). The following is a comprehensive analysis of each indication based on the stated scores.

Table 7. *Level of Emergency Preparedness of Nurses Along with Safety and Security During Mass Casualty Incident*

Indicators	*Mean*	*TE*
1. Appointed hospital security team	3.18	MP
2. Facility access points, triage sites and other areas of patient flow	3.28	HP
3. Mechanism for escorting emergency medical personnel	3.27	HP
4. Defined measures for safe and efficient hospital evacuation	3.27	HP
5. Defined rules for engaging crowd control	3.13	MP
6. Management of hazardous materials and infectious control	3.19	MP
7. Implemented procedures to ensure the secure collection confidential information	3.31	HP
Average Mean	3.21	MP

Legend: *3.25 – 4.00 Highly Prepared (HP), 2.50 – 3.24 Moderately Prepared (MP), 1.75 – 2.49 Fairly Prepared (FP), 1.00 – 1.74 Not Prepared (NP)*

The appointed hospital security team (M = 3.18) advocates for reasonable readiness by establishing a designated security team. Hospitals may employ security people, yet they may lack sufficient equipment or training to manage large-scale incidents effectively. Effective security management is crucial for maintaining order and ensuring the protection of patients, staff, and visitors in the event of an emergency. Studies demonstrate that proficient security staff can markedly enhance the safety of medical facilities, decrease response times to events, and prevent unauthorized access during emergencies (Miller et al., 2020). Hospitals can improve their capabilities by investing in advanced security training programs that focus on disaster scenarios, as well as implementing security technology solutions, such as AI-driven surveillance systems, to improve crisis management.

Facility access points, triage sites, and other areas of patient flow (M = 3.28) demonstrate the hospital's capacity to efficiently oversee patient triage and facilitate the seamless movement of patients during a disaster. Robust preparedness in this domain is essential as it enables prompt access to care for patients while reducing overcrowding. An efficient patient flow enables medical workers to concentrate on their responsibilities without being burdened by logistical concerns. Research indicates that effectively structured triage systems and defined entry points diminish patient wait times and enhance outcomes in catastrophe situations (Smith et al., 2020). Hospitals can enhance this domain by investing in triage tools and computerized patient tracking systems to refine patient care during emergencies further.

The mechanism for escorting emergency medical personnel (M = 3.27) indicates a high level of readiness within the system for deploying emergency medical personnel to critical locations. This suggests that hospitals have protocols in place to ensure that medical personnel can promptly and securely access their assigned areas during emergencies. This readiness is crucial in preventing delays in patient care and treatment under high-pressure circumstances. Research indicates that well-defined protocols for staff movement and prioritized access routes markedly decrease response times and facilitate prompt interventions (Jones et al., 2020). To improve this, hospitals should deploy automated access control systems that prioritize emergency medical personnel and facilitate their movement within the facility.

Defined measures for safe and efficient hospital evacuation (M=3.27), demonstrating that the hospital possesses well-established evacuation protocols. Effective evacuation is essential in scenarios where patient safety is jeopardized, including fires, natural catastrophes, or other emergencies. Elevated preparation signifies that the hospital possesses dependable methods to guarantee the safe evacuation of both patients and staff from the premises. Whitehead et al. (2020) assert that consistent evacuation drills and training for all personnel markedly enhance the efficiency and efficacy of evacuations. Hospitals could improve evacuation protocols by implementing real-time location tracking to guarantee that all patients and staff are accounted for during an evacuation.

Defined rules for engaging crowd control (M=3.13) indicate a moderate level of readiness in this domain. Although hospitals may use fundamental crowd management tactics, these measures may lack comprehensiveness and widespread application. Large crowds during a crisis can obstruct access to essential areas, disrupt medical operations, and compromise security. Efficient crowd management is a crucial component of disaster response. Research indicates that the implementation of barrier systems, designated waiting spaces, and crowd management professionals can markedly enhance hospital preparation (Baker et al., 2020). Hospitals can enhance crowd management by investing in automated crowd-monitoring systems and doing frequent crowd-control exercises.

Management of hazardous materials and infectious control (M=3.19) is a crucial domain, especially in managing dangerous biological or chemical substances and maintaining infection control during pandemics or chemical spills. Moderate readiness indicates that although protocols exist, they may lack robustness or adequate practice. Experts assert that hospitals must possess specialized isolation units and decontamination areas to manage patients exposed to hazardous materials (Alonzo et al., 2020). To improve readiness, hospitals might allocate resources towards automated decontamination systems, real-time infection monitoring technologies, and consistent staff training on hazardous material management.

Implementing procedures to ensure the secure collection of confidential information (M = 3.31) is crucial for maintaining patient confidentiality and complying with legal requirements. In emergencies, safeguarding patient data is vital, mainly when substantial amounts of sensitive information are being processed rapidly. The elevated score indicates that the hospital has implemented robust measures to protect patient confidentiality. Research shows that data encryption, secure databases, and access control methods are essential for preserving patient privacy during crises (Harris et al., 2020). To enhance operations, hospitals can contemplate implementing blockchain-based systems for secure and immutable data tracking during emergencies.

The analysis indicates that hospitals have a modest degree of preparedness in various essential domains; however, significant opportunities for enhancement exist, especially in security, population management, and hazardous material handling. By integrating new technologies, such as AI-driven surveillance, blockchain for data security, and cloud-based patient tracking systems, hospitals can enhance their readiness and facilitate a more efficient response during large-scale catastrophes.

Triage

The data presented indicate diverse preparation metrics for emergency management protocols in hospitals, specifically about triage, law enforcement collaboration, and the management of mass casualty incidents. An average mean score of 3.24 categorizes overall preparedness as moderate preparedness (MP). This suggests that although hospitals often possess fundamental frameworks, enhancements are required in various essential domains. The following analysis examines each metric, supported by academic sources,

and outlines progressive strategies for improvement.

Table 8. *Level of Emergency Preparedness of Nurses Along with Triage During Mass Casualty Incident*

Indicators	*Mean*	*TE*
1. Defined procedures for integrating local law enforcement	3.12	MP
2. Established area for radioactive, biological and decontamination and isolation	3.12	MP
3. Designated triage officer	3.42	MP
4. Triage area in close proximity to essential resources	3.27	MP
5. Identified entrance and exit routes from triage	3.27	MP
6. Identified contingency site for receipt and triage of mass casualty	3.19	MP
7. Identified alternative waiting area for green cases	3.17	MP
8. Established protocol on mass casualty triage	3.13	MP
Average Mean	3.24	MP

Legend: *3.25 – 4.00 Highly Prepared (HP), 2.50 – 3.24 Moderately Prepared (MP), 1.75 – 2.49 Fairly Prepared (FP), 1.00 – 1.74 Not Prepared (NP)*

Defined procedures for integrating local law enforcement (M=3.12), advocates for intermediate readiness on the incorporation of local police enforcement. Efficient cooperation between hospitals and law enforcement is crucial for ensuring security and order during emergencies, especially in situations involving huge crowds, mass casualties, or civil disturbances. The middling score suggests that although procedures may be established, they may not be thoroughly executed or practiced in reality. Studies indicate that including law enforcement in hospital catastrophe planning enhances the security and efficacy of emergency responses (Graham et al., 2020). Hospitals can improve their readiness by conducting collaborative training exercises with local law enforcement, focusing on coordination during large-scale emergencies, crowd management, and the protection of critical facilities.

Established area for radioactive, biological, and decontamination and isolation (M=3.12) demonstrates modest readiness for establishing zones designated for the decontamination and isolation of hazardous substances (e.g., radioactive, biological, and chemical agents). Hospitals must have designated areas for the confinement of individuals who are contaminated to prevent cross-contamination. The intermediate score indicates that although these areas may be present, their preparedness, capability, or accessibility may require enhancement. Alonzo et al. (2020) assert that designated decontamination zones must be comprehensively equipped with appropriate safety measures and subjected to regular testing during emergency drills. Hospitals should enhance their operations by utilizing automated decontamination systems and ensuring that these locations are readily accessible from triage zones, thereby reducing the duration patients remain in hazardous environments.

Designated triage officer (M=3.42). Although the hospital presumably employs a triage officer, the score indicates that the officer may lack the necessary training or authority to make crucial judgments in a disaster scenario. The triage officer is essential in assessing patient priority according to severity, and their capacity to handle the influx of patients is critical for reducing fatality rates. Research highlights the importance of definitive triage leadership and consistent training for triage officers to facilitate prompt and accurate decision-making during emergencies (Davis et al., 2020). Hospitals should allocate resources towards simulation-based training for triage officers to enhance their decision-making skills under pressure.

A triage area near essential resources (M = 3.27) and proximity to critical resources (e.g., medical supplies, personnel, and equipment) ensures that patients receive prompt care following triage. The middling score suggests that hospitals may not be effectively utilizing their space to minimize treatment delays despite the significance of this in disaster response. Research indicates that the strategic positioning of triage sites about essential supplies markedly enhances response times in mass casualty incidents (Mayer et al., 2020). Hospitals can improve efficiency by conducting space optimization exercises and workflow simulations to position triage zones, thereby enhancing patient care strategically.

Identified entrance and exit routes from triage (M=3.27). In the event of a mass casualty, the prompt relocation of patients is crucial to prevent congestion and ensure that medical personnel can deliver timely assistance. The mediocre score indicates that these routes may not be well-identified or optimized for rapid evacuation. Research highlights the importance of clear signage, personnel awareness, and designated evacuation pathways to prevent delays in patient transport (Li et al., 2020). Hospitals could enhance this by employing digital mapping tools that provide real-time monitoring of patient movement across the facility, thereby assisting personnel during mass casualty incidents.

Identified contingency site for receipt and triage of mass casualty (M=3.19); this site is essential during sudden patient influxes in hospitals since it facilitates rapid triage and priority of care. The middling score suggests that hospitals may have a dedicated site, although it may lack complete equipment or adequate training. Baker et al. (2020) assert that the availability of surge capacity and mobile triage units at contingency sites enables hospitals to manage a substantial influx of victims successfully. Hospitals can enhance their operations by simulating mass casualty scenarios to evaluate the efficacy of contingency locations and formulate response methods.

Identified an alternative waiting area for green cases (M=3.17); this sector is crucial for alleviating congestion in emergency departments. Nevertheless, the mediocre score suggests it may lack sufficient equipment or oversight. Studies indicate that distinct waiting rooms facilitate organization and prioritize patients with more pressing needs (Greenwood et al., 2020). Hospitals can enhance

this domain by deploying automated patient triage systems that categorize patients according to their severity and dynamically allocate them to various waiting areas.

Established protocol on mass casualty triage (M=3.13); although a process is in place, the score indicates that it may lack complete standardization or consistent updates. Efficient triage processes are crucial for categorizing patients according to the severity of their injuries and ensuring that those requiring immediate attention are prioritized. The research highlights the need for explicit, standardized triage protocols to support healthcare professionals during disasters (Taylor et al., 2020). Hospitals should continually modify and update their triage protocols, integrate evidence-based guidelines, and conduct regular staff training to ensure an adequate understanding and implementation of these protocols.

The overall preparation of hospitals is moderate. However, substantial enhancements are necessary, particularly in security, crowd control, and mass casualty management. Integrating AI technology, refining patient tracking systems, and augmenting collaborative training with local agencies might enhance hospitals' response and efficiency during large-scale catastrophes, hence increasing patient outcomes.

Surge Capacity

Table 9. *Level of Emergency Preparedness of Nurses Along with Surge Capacity During Mass Casualty Incident*

Indicators	*Mean*	*TE*
1. Mechanism of hospital emergency response plan used in triage	3.21	MP
2. Protocols on hospital process when disaster plan is activated	3.24	MP
3. Maximal capacity required for patient admission	3.60	HP
4. Available tools and assumption for the increase in demand for hospital services	3.12	MP
5. Methods of expanding hospital inpatient capacity	3.10	MP
6. Designated care areas for patient overflow	3.06	MP
7. Outsource of care of non- critical patient to alternative treatment sites	3.17	MP
8. Availability of vehicles and resources required for patient transportation	3.19	MP
9. Established contingency plan for inter-facility patient transfer	3.16	MP
10. Provisions of medical care on critical and emergent surgical care	3.27	HP
11. Identified additional sites that may convert to patient care units	3.13	MP
12. Protocols on prioritizing and cancelling non- essential services	3.09	MP
13. Available treatment capacity and demand	3.23	MP
14. Designated area for temporary morgue	3.16	MP
Average Mean	3.19	MP

Legend: *3.25 – 4.00 Highly Prepared (HP), 2.50 – 3.24 Moderately Prepared (MP), 1.75 – 2.49 Fairly Prepared (FP), 1.00 – 1.74 Not Prepared (NP)*

The results indicate hospitals' readiness to handle emergency response, patient admissions, overflow, and inter-facility transfers after a crisis. The overall preparation is classified as moderate (MP), with an average mean score of 3.19. The report highlights strengths in maximal patient admission capacity and emergency care for severe surgical requirements while also revealing significant deficiencies in capacity expansion strategies, overflow care facilities, and transportation resources. The following is a comprehensive academic analysis of each indication, accompanied by suggestions for new research ideas.

Mechanism of hospital emergency response plan used in triage (M=3.21): Although a triage mechanism exists, its activation may be inconsistent, and its efficiency may fluctuate. Research highlights the importance of well-defined triage processes and the integration of automated triage systems to improve decision-making and expedite patient categorization (Baker et al., 2020). Hospitals can enhance their operations by investing in digital triage technologies that enable real-time patient prioritization, thereby increasing efficiency during mass casualty incidents.

Protocols on hospital processes when a disaster plan is activated (M = 3.24) suggest that hospitals possess disaster policies; however, these may not be entirely optimized or evaluated across diverse crises. Research indicates that disaster drills and simulations are essential for ensuring the adaptability and proficiency of these protocols (Mayer et al., 2020). Hospitals should implement multidisciplinary simulations that incorporate emergency responders, medical personnel, and hospital administration to ensure comprehension and effective implementation of protocols.

The maximal capacity required for patient admission (M=3.60) indicates that hospitals possess a comprehensive system for overseeing patient admissions in times of calamity. This score means that hospitals are adequately equipped to augment their capacity during emergencies, hence managing heightened patient loads effectively. Research highlights the importance of implementing surge capacity plans, which encompass supplementary beds, personnel, and equipment, to enable hospitals to handle substantial patient surges during emergencies effectively (Jones et al., 2020). Hospitals can enhance their operations by utilizing AI-driven predictive analytics to anticipate patient admissions and allocate resources dynamically.

Available tools and assumptions for the increase in demand for hospital services (M = 3.12) suggest that the hospital may possess some resources; nonetheless, these may be inadequate to address the excessive demand. Studies indicate that hospitals require adaptable resource management systems capable of swiftly responding to fluctuating demand levels (Li et al., 2020). Hospitals can enhance

operations by adopting cloud-based resource management systems that provide real-time monitoring of medical supplies, bed availability, and personnel resources during emergencies.

Methods of expanding hospital inpatient capacity (M = 3.10) suggest that although hospitals may possess solutions, such as transforming specific regions into inpatient units, they often struggle to execute these strategies promptly during periods of high demand. Research indicates that increasing capacity necessitates adaptable infrastructure, such as modular beds and transportable care units, to be utilized as required (Stefanakis et al., 2020). Hospitals can enhance their capabilities by investing in modular healthcare units that can be readily established and incorporated into existing facilities during surges.

Designated care areas for patient overflow (M = 3.06): Although overflow rooms are available, the facilities may lack adequate equipment or personnel to handle a substantial influx of patients. Research highlights the need for rapidly established temporary care units in unconventional locations, such as parking lots or vacant rooms, to manage overflow patients (Greenwood et al., 2020). Hospitals should implement adaptable care units and provide staff training for managing overflow care in these facilities.

Outsource of care of non-critical patients to alternative treatment sites (M=3.17);. However, hospitals may establish collaborations with external clinics or facilities, and the efficacy of these relationships may not be fully maximized. Research indicates that out-of-hospital care alternatives, such as field hospitals and urgent care clinics, may alleviate the burden on hospitals during emergencies, enabling them to focus on critical cases (Taylor et al., 2020). Hospitals should establish formal collaborations with other providers and prearrange logistics for patient transfers to these alternative facilities.

Availability of vehicles and resources required for patient transportation (M = 3.19): Although hospitals may possess some vehicles and equipment, they may not be entirely adequate or conveniently accessible for mass casualty incidents. Research indicates that effective transportation coordination is essential for the timely transfer of patients to appropriate facilities (Smith et al., 2020). Hospitals can enhance operations by implementing specialized transport fleets and incorporating real-time tracking technologies for ambulances and other vehicles.

Established contingency plans for inter-facility patient transfer (M=3.16); although hospitals may possess contingency plans, they may lack the necessary efficiency or resources to manage extensive transfers during emergencies. The research underscores the necessity of prearranged agreements with other hospitals and transportation logistics systems to ensure seamless patient transfers (Davis et al., 2020). Hospitals should establish official mutual aid agreements with neighboring healthcare facilities and install real-time communication technologies to facilitate seamless transfers during emergencies.

Provisions for medical care, including critical and emergent surgical care (M = 3.27), are crucial in this field, as prompt surgical intervention can significantly impact patient outcomes in crises. Elevated readiness in this domain indicates that hospitals are adequately prepared to deliver urgent care during emergencies. Research highlights the importance of specialized surgical teams and expedited surgical response methods in meeting urgent care needs during disasters (Jones et al., 2020). Hospitals can enhance their preparedness by investing in mobile operating units and implementing surgical simulation training.

Identified additional sites that may be converted to patient care units (M=3.13) suggest that although such sites may be available, their preparedness or capability may not be entirely guaranteed during an influx of patients. Studies indicate that temporary care units established in unconventional locations, such as tents or unoccupied structures, are crucial for managing substantial patient volumes during mass casualty incidents (Baker et al., 2020). Hospitals can enhance their capabilities by investing in temporary infrastructure that can be swiftly constructed as required.

Protocols for prioritizing and canceling non-essential services (M = 3.09) are in place, although their efficacy may not be fully optimized or consistently implemented. Research highlights that explicit decision-making frameworks are crucial for allocating essential resources to the most pressing needs (Harris et al., 2020). Hospitals should adopt triage algorithms to facilitate decision-making regarding the prioritization of services during a crisis.

Available treatment capacity and demand (M = 3.23) indicate that although hospitals can manage varying levels of demand, they may lack the necessary resources or procedures to address significant surges effectively. Studies demonstrate that real-time capacity management solutions enable hospitals to monitor patient volume and flexibly allocate resources (Zhang et al., 2020). Hospitals could enhance operations by investing in predictive analytics to anticipate demand and optimize resource allocation.

Designated area for temporary morgue (M=3.16); in instances of mass casualties, hospitals must be prepared to manage deceased individuals. This score indicates that, although a dedicated facility for morgue services exists, it may be insufficiently equipped or too small to accommodate a substantial number of casualties. Hospitals can enhance their operations by establishing modular morgue facilities that can be expanded during emergencies and by implementing temperature regulation and cleanliness protocols to ensure the proper handling of remains.

Although hospitals exhibit intermediate readiness in several critical domains, the incorporation of technology, resource management systems, and adaptable infrastructure will markedly improve their capacity to manage large-scale catastrophes. By focusing on advancements such as artificial intelligence, modular care units, and telemedicine, hospitals can enhance patient flow, augment capacity, and ensure a more efficient response to emergencies.

Continuity of Essential Services

The specified metrics assess hospitals' readiness to manage critical elements of disaster response, including post-mortem care, vital hospital services, evacuation strategies, and collaboration with external health agencies. The mean score of 3.17 classifies the overall preparedness as moderate preparedness (MP). This indicates that although hospitals possess fundamental preparedness plans, there are aspects that need enhancement, particularly regarding resource management and coordination during emergencies.

A contingency plan for post-mortem care (M = 3.19) suggests that hospitals have specific strategies for managing deceased patients during disasters, although these strategies may lack comprehensive development or testing. Post-mortem care is essential in crises involving several casualties, necessitating hospitals to establish specific spaces and guidelines for the respectful and hygienic management of the deceased. Research demonstrates that readiness for post-mortem treatment is crucial to prevent contamination and overcrowding, particularly during significant casualty events (Greenwood et al., 2020). Hospitals should establish specialized post-mortem facilities and collaborate with mortuary services to effectively manage a high volume of deceased individuals during emergencies.

Table 10. *Level of Emergency Preparedness of Nurses Along with Continuity of Essential Services of Mass Casualty Incident*

Indicators	*Mean*	*TE*
1. Contingency plan for post -mortem care	3.19	MP
2. List of hospital services ranked in order of priority	3.24	MP
3. Available resources need to ensure the continuity of essential hospital services	3.16	MP
4. Systematic and deployable evacuation plan	3.12	MP
5. Coordinate with the health authorities, neighboring hospitals and private practitioner	3.22	MP
6. Availability of back-up arrangements for essential resources	3.15	MP
Average Mean	3.17	MP

Legend: *3.25 – 4.00 Highly Prepared (HP), 2.50 – 3.24 Moderately Prepared (MP), 1.75 – 2.49 Fairly Prepared (FP), 1.00 – 1.74 Not Prepared (NP)*

The list of hospital services, ranked in order of priority (M = 3.24), indicates that hospitals possess a degree of preparedness in prioritizing care according to urgency; nevertheless, these processes may not be entirely optimized or consistently implemented. Efficient prioritization of services ensures that essential care sectors, such as emergency departments and intensive care units, have adequate resources during periods of increased patient volume. Research indicates that prioritizing hospital services using real-time data is crucial for hospitals to deliver effective care during large-scale emergencies (Smith et al., 2020). To enhance readiness, hospitals may implement dynamic decision-support systems that autonomously prioritize services based on patient volume and resource availability.

Available resources are needed to ensure the continuity of essential hospital services (M = 3.16), indicating that although hospitals may possess some resources, these may be insufficient to guarantee complete operational continuity during periods of heightened demand, such as pandemics or natural disasters. The research highlights the importance of resource redundancy and contingency planning for critical services, encompassing personnel, medical supplies, and equipment (Zhang et al., 2020). Hospitals can enhance operations by implementing cloud-based inventory management systems and predictive analytics to anticipate resource requirements during emergencies, hence maintaining a proactive stance on demand.

A systematic and deployable evacuation plan (M=3.12) is essential for guaranteeing the safe removal of patients and personnel during emergencies, including fires, earthquakes, or chemical leaks. The intermediate score suggests that these plans may be inadequately planned or rarely practiced, which could result in inefficiencies during a real emergency. Research indicates that regular evacuation drills and staff training are crucial for facilitating effective evacuation procedures (Mayer et al., 2020). Hospitals should adopt simulation-based evacuation training and real-time tracking tools to improve evacuation efficiency.

Coordinate with health authorities, neighboring hospitals, and private practitioners (M = 3.22). Collaboration with external partners is essential for achieving a coordinated response to large-scale disasters, particularly when patient loads surpass hospital capacity. Research emphasizes that inter-hospital collaboration and real-time data exchange are necessary for managing patient surges and guaranteeing optimal resource allocation (Taylor et al., 2020). Hospitals can enhance their operations by establishing formal partnerships with local healthcare providers and integrating communication technology to increase cooperation during emergencies.

The availability of backup arrangements for essential resources (M = 3.15) suggests that although backup resources may exist, they may be inadequate or not readily deployable in times of crisis. Research indicates that hospitals ought to implement redundant systems, including backup generators, spare medical equipment, and alternative supply chains, to maintain continuity during power outages or supply disruptions (Jones et al., 2020). Hospitals can enhance their operations by investing in intelligent resource management systems that automate the oversight of backup resources and their preparedness during emergencies.

The findings indicate that although hospitals possess basic readiness, particularly in inpatient priority and critical care delivery, substantial opportunities for improvement exist in evacuation planning, resource management, and inter-hospital cooperation. By utilizing sophisticated technology, such as artificial intelligence, cloud-based resource systems, and mobile units, hospitals can enhance

their overall readiness, thereby ensuring superior outcomes during disasters.

Human Resources

The outcomes indicate the readiness of hospitals to handle personnel, resources, and logistics in emergencies. The overall preparedness is classified as moderate preparedness (MP), with an average mean score of 3.13. This signifies that, although hospitals have established specific fundamental processes, there are aspects, especially in contingency planning, personnel, and domestic support, that require enhancement to ensure hospital efficiency and worker wellbeing during emergencies.

Table 11. *Level of Emergency Preparedness of Nurses Along with Human Resources During Mass Casualty*

Indicators	*Mean*	*TE*
1. Contingency mechanism for the collection and disposal	3.12	MP
2. Update the hospital staff contact list	3.34	HP
3. Clear policy on staff sick-leave	3.32	HP
4. Contingency plan for the provision of food, water and living space for hospital personnel	3.09	MP
5. Staffing requirements and distribution personnel	3.06	MP
6. Recruitment and training of additional staff	3.07	MP
7. Address liability, insurance and temporary licensing issues for additional staff	3.06	MP
8. Systems on rapidly providing healthcare workers	3.13	MP
9. Provided training and exercises in areas of potential increased clinical demand	3.17	MP
10. Domestic support measures	2.99	MP
11. Adequate shift rotation and self-care for clinical staff	3.20	MP
Average Mean	3.13	MP

Legend: *3.25 – 4.00 Highly Prepared (HP), 2.50 – 3.24 Moderately Prepared (MP), 1.75 – 2.49 Fairly Prepared (FP), 1.00 – 1.74 Not Prepared (NP)*

Contingency mechanism for collection and disposal (M=3.12): Effective waste management is crucial during catastrophes to prevent contamination and maintain a sanitary environment for patients and healthcare personnel. Moderate readiness signifies that although procedures exist, they may lack sufficient development or robustness for extensive emergencies.

Research highlights the significance of comprehensive waste management systems that incorporate secure disposal procedures, especially for hazardous or biohazardous substances (Harris et al., 2020). Hospitals can enhance their operations by adopting automated waste tracking systems and disposal units for dangerous materials that are compatible with emergency scenarios.

The update to the hospital staff contact list (M = 3.34) indicates that hospitals are effectively maintaining an up-to-date personnel contact directory. This is crucial for preserving communication during emergencies, particularly when staff may be dispersed or inaccessible. Research indicates that precise contact information facilitates effective communication during a disaster, ensuring rapid reachability of all essential personnel (Smith et al., 2020). To improve readiness, hospitals might incorporate digital platforms that facilitate real-time updating of contact information and enable emergency communication systems to warn staff promptly.

A clear policy on staff sick leave (M = 3.32) is imperative for hospitals to establish explicit protocols for overseeing worker health and absenteeism. This score indicates that hospitals are proficiently managing ill leave rules, thereby mitigating burnout and ensuring adequate personnel levels. Studies demonstrate that clearly articulated ill-leave policies are crucial for preserving worker stability during crises (Kovács et al., 2020). Hospitals can enhance operations by employing AI-driven workforce management technologies that monitor staff availability and optimize schedules, thereby ensuring that the right people are supported during emergencies.

Contingency plan for the provision of food, water, and living space for hospital personnel (M = 3.09). Although hospitals may possess contingency preparations for sustenance, hydration, and accommodation, the modest grade suggests that these plans may lack comprehensiveness or regular testing. Research indicates that providing hospital personnel with sustenance, hydration, and rest facilities is essential for preserving performance during prolonged emergency operations (Greenwood et al., 2020). Hospitals can enhance operations by establishing mobile supply units that provide food and water directly to personnel, as well as temporary rest spaces for staff recuperation throughout shifts.

Staffing requirements and distribution personnel (M = 3.06) suggest that hospitals may possess staffing plans; nevertheless, these may lack the necessary flexibility or responsiveness required for catastrophic situations. The allocation of staffing is crucial to ensure that vital sectors, such as emergency departments and intensive care units, are adequately staffed. Research indicates that hospitals should utilize dynamic staffing models that can adapt to real-time demand (Li et al., 2020). Hospitals can enhance operations by incorporating predictive analytics to anticipate personnel requirements through crisis simulations and historical data analysis.

Recruitment and training of additional staff (M=3.07). Although a recruitment process exists, the score suggests that training or preparation for onboarding new personnel during emergencies may not be optimal. Research indicates that swift recruitment and onboarding of healthcare personnel are essential for sustaining operations during major disasters (Jones et al., 2020). Hospitals can enhance their operations by forming pre-employment agreements with temporary personnel and developing virtual training platforms that enable new hires to acclimate to hospital processes and norms quickly.

Address liability, insurance, and temporary licensing issues for additional staff (M=3.06) indicate that hospitals may lack comprehensive or thoroughly proven protocols for addressing legal and administrative matters when onboarding new personnel during emergencies. Studies demonstrate that pre-established liability coverage and provisional licensing agreements are crucial for mitigating risks associated with rapid personnel growth during emergencies (Taylor et al., 2020). Hospitals can enhance operations by collaborating with insurance companies to optimize coverage and expedite licensure for temporary healthcare workers.

Systems for rapidly providing healthcare workers (M = 3.13) are available, although hospitals may also include mechanisms to mobilize healthcare personnel quickly. However, these systems may lack the necessary efficiency to manage the increased demand during significant crises. Research highlights the importance of fast-deployment systems that enable the swift mobilization of personnel across departments in response to changing requirements (Baker et al., 2020). Hospitals can enhance their operations by investing in automated staffing technologies that allocate personnel based on real-time data and availability.

Provided training and exercises in areas of potential increased clinical demand (M = 3.17). Hospitals likely offer some training; however, the score suggests that this training may not be sufficiently comprehensive to equip staff for the increased clinical demand adequately. Training in high-demand fields, such as emergency care and critical care units, is crucial for maintaining staff readiness in the event of disasters. Research indicates the necessity of scenario-based drills and clinical simulations to equip personnel for managing heightened clinical demand (Harris et al., 2020). Hospitals should increase the frequency and complexity of mass casualty simulations to prepare their personnel for such events adequately.

Domestic support measures (M = 2.99), including domestic assistance such as childcare, mental health services, and familial support, are crucial for maintaining staff wellbeing during crises. This intermediate score suggests that hospitals may lack sufficient resources or initiatives to support personnel beyond their work responsibilities. Research indicates that employee wellness initiatives focusing on family issues, mental health, and work-life balance are crucial for maintaining hospital functionality during prolonged crises (Mayer et al., 2020). Hospitals can enhance their operations by implementing comprehensive wellness programs that offer physical and mental health support for workers, along with family aid initiatives.

Adequate shift rotation and self-care for clinical staff (M = 3.20). While hospitals may implement procedures to address staff exhaustion, the score indicates that these policies may not be fully optimized or enforced. Effective fatigue management is crucial in crisis scenarios to ensure that personnel can maintain optimal performance over extended periods of time. Studies indicate that sufficient rest intervals, rotation schedules, and self-care services can mitigate burnout and enhance staff performance in emergencies (Jones et al., 2020). Hospitals can improve operations by using automated shift management systems and offering mental health tools to safeguard staff wellbeing.

Hospitals exhibit intermediate readiness in managing personnel and resources during disasters; however, there is substantial potential for improvement. By integrating technology such as AI-driven staffing systems, mobile wellness units, and cloud-based family support, hospitals can enhance their capacity to manage large-scale disasters and ensure that both staff and patients receive the necessary support.

Logistics and Supply Management

The data provided illustrates essential metrics of readiness and operational capacity within a hospital or healthcare institution, especially during crises or periods of elevated demand. Each indicator assesses multiple facets of hospital operations, encompassing psychosocial support, inventory management, and equipment maintenance. The results analysis relies on the supplied mean values for each indicator.

Table 12. *Level of Emergency Preparedness of Nurses Along with Logistics and Supply Management*

Indicators	*Mean*	*TE*
1. Availability of multidisciplinary psychosocial support teams	3.04	MP
2. Inventory of all equipment, supplies and pharmaceuticals	3.21	MP
3. Provision of essential medication supplies	3.15	MP
4. Access for hospital storage and stockpiling of additional supplies	3.13	MP
5. Hospital pharmacy role in providing pharmaceuticals	3.14	MP
6. Mechanism exists for the prompt maintenance and repair of equipment	3.06	MP
Average Mean	3.13	MP

Legend: *3.25 – 4.00 Highly Prepared (HP), 2.50 – 3.24 Moderately Prepared (MP), 1.75 – 2.49 Fairly Prepared (FP), 1.00 – 1.74 Not Prepared (NP)*

Availability of multidisciplinary psychosocial support teams (M=3.04), considering the pivotal importance of mental health and emotional wellbeing in patient care and staff efficacy, particularly in emergencies like pandemics or natural disasters, the score suggests that although psychosocial support exists, it may lack the comprehensiveness or accessibility required to satisfy demand in crisis scenarios.

Inadequate mental health services might result in heightened burnout among healthcare personnel and deteriorate patient outcomes, especially in high-stress settings (Pfefferbaum et al., 2020). Institutions may establish a telehealth service for mental health to enhance accessibility for patients and staff, particularly during peak or essential times. And the establishment of specialist psychological teams capable of rapid mobilization during crises. These teams ought to comprise psychologists, social workers, and spiritual counselors.

The inventory of all equipment, supplies, and pharmaceuticals (M = 3.21) indicates that the hospital's inventory management system

is generally effective, although it remains susceptible to further enhancements. Effective inventory management is crucial for ensuring the continuous availability of key supplies, equipment, and medications, especially during emergencies. The intermediate score suggests possible difficulties concerning inventory precision, stock transparency, and replenishment intervals (Seitz et al., 2020). Hospitals may utilize AI-driven algorithms to forecast demand for supplies and medications, leveraging historical data and current trends. This can enhance inventory management and minimize waste (Seitz et al., 2020). Utilization of automated inventory management systems that can initiate reorder requests when stock levels fall below a critical threshold, ensuring prompt replacement.

The provision of essential medication supplies (M=3.15) indicates that the availability of necessary medicine supplies is reasonably sufficient but could be improved. In critical circumstances, such as disease outbreaks or increased patient numbers, the availability of required pharmaceuticals is crucial to patient care. The score suggests that although essential pharmaceuticals are somewhat available, there may be intermittent shortages or delays in maintaining a consistent supply (O'Neill et al., 2020). Institutions may establish stockpiles of critical pharmaceuticals, ensuring frequent rotation to prevent expiration while maintaining availability for prompt use in crises (O'Neill et al., 2020).

Access to hospital storage and stockpiling of additional supplies (M = 3.13) indicates that the hospital's capacity to store and accumulate supplementary supplies is moderately effective. In emergencies, the rapid availability of essential medical supplies can significantly impact survival outcomes. The score reveals deficiencies in storage capacity, organization, or the hospital's ability to effectively accumulate resources, which may result in delays in resource distribution during critical periods (Hussein et al., 2020). Hospitals can utilize advanced systems to monitor storage conditions (e.g., temperature-sensitive materials) and ensure that inventory is maintained optimally, thereby reducing spoilage and waste.

The hospital pharmacy's role in providing pharmaceuticals (M = 3.14) suggests that the hospital pharmacy serves a relatively successful function in dispensing medications. Nevertheless, inefficiencies may arise, such as delays in drug delivery or inadequate tracking of pharmaceutical inventory, particularly during periods of high demand. The pharmacy's function in inventory management, timely medicine provision, and healthcare personnel education are essential for patient care (Grissinger, 2020). Establish a comprehensive pharmacy management system integrated with the hospital's electronic health records (EHR) to optimize prescription management and minimize drug mistakes.

Augment training programs for pharmacy personnel on disaster preparedness and crisis management to ensure they are adequately trained to address emergencies (Grissinger, 2020). The mechanism exists for the prompt maintenance and repair of equipment (M=3.06), indicating that mechanisms for maintaining and repairing equipment are in place, although they are not fully optimized. Prompt equipment maintenance is essential, particularly in vital areas like the ICU or emergency rooms, where equipment malfunction could impede treatment. The moderate score indicates that enhancements are necessary to minimize downtime and augment the efficiency of maintenance and repair procedures (O'Reilly et al., 2020).

To improve, hospitals can establish a centralized system for documenting and monitoring equipment concerns, allowing maintenance teams to prioritize and resolve issues more efficiently. Conduct regular equipment audits to verify that all essential instruments are functioning correctly and are calibrated for precise use.

In conclusion, although the hospital's readiness and operational systems are effective, they are only moderately advanced. Investing in advanced technologies, such as artificial intelligence for inventory forecasting, telehealth for mental health support, blockchain for pharmaceutical transparency, and predictive maintenance for equipment, will enhance operational efficiency and strengthen the hospital's preparedness for both routine operations and crisis management.

Post-disaster Recovery

The indicators' results provide valuable insights into the operational readiness and preparedness of the hospital or healthcare facility, particularly in the context of responding to and recovering from a catastrophe. The average score of 3.10 signifies a moderate level of preparation, indicating that although the facility has implemented emergency response and recovery systems, there are aspects that want further enhancement to improve efficiency and effectiveness. The following is a scholarly analysis of each indicator, accompanied by creative strategies to enhance hospital operations.

The contingency for transportation strategy with a prehospital network (M = 3.09) indicates that the transportation approach utilizing a prehospital network is relatively practical. A robust transportation system, especially in catastrophe situations, is essential for facilitating the prompt transfer of patients from the site to the hospital and among hospitals, if necessary. Although the hospital possesses a degree of preparation, there may be deficiencies in quick deployment, inter-hospital coordination, or sufficient transportation resources (Lindell & Perry, 2020).

To improve, hospitals should formulate formal agreements with local government entities, emergency responders, and other healthcare institutions to optimize patient transfer during emergencies. In addition, hospitals should allocate resources to mobile healthcare units capable of rapid deployment to disaster locations to deliver emergency medical assistance and stabilize patients for transfer.

Appointed hospital recovery operations (M=3.13) demonstrate a moderate degree of efficacy in the appointment of hospital recovery operations. Practical recovery activities are crucial for restoring hospital functions after a tragedy. This includes personnel management,

resource allocation, and the swift restoration of services. Although certain recovery activities are established, there may be deficiencies in readiness for extensive or extended outages (Gustavsson et al., 2020). Hospitals can form specialist recovery teams within the hospital, equipped to manage specific responsibilities, including infrastructure repair, resumption of patient care, and oversight of the supply chain.

Table 13. *Level of Emergency Preparedness of Nurses Along with Post-Disaster Recovery*

Indicators	*Mean*	*TE*
1. Contingency for transportation strategy with prehospital network	3.09	MP
2. Appointed hospital recovery operations	3.13	MP
3. Processes for incident demobilization and system recovery	3.09	MP
4. Organized team of hospital staff to facilitate post-action hospital inventory assessment	3.15	MP
5. Evacuation area and location and inventory of equipment and supply	3.10	MP
6. Provide post-action report	3.06	MP
7. Organized personnel conducting debriefing for staff	3.06	MP
8. Post-disaster employee recovery assistance programmed	3.08	MP
9. Appropriate services during disaster response and recovery	3.11	MP
Average Mean	3.10	MP

Legend: *3.25 – 4.00 Highly Prepared (HP), 2.50 – 3.24 Moderately Prepared (MP), 1.75 – 2.49 Fairly Prepared (FP), 1.00 – 1.74 Not Prepared (NP)*

Moreover, Consistent recovery planning drills, modeling several crises to enhance coordination and ensure all recovery methods are thoroughly rehearsed. Furthermore, hospitals can establish a cohesive communication system that facilitates prompt updates and coordination during recovery, ensuring that essential workers are aware and can respond efficiently.

Processes for incident demobilization and system recovery (M = 3.09) suggest that incident demobilization and system recovery procedures are moderately effective. The capacity to rapidly demobilize resources and restore systems post-incident is essential for a swift return to normal operations. The score suggests that although processes are in place, there may be inefficiencies or delays in their complete implementation when required (Baum et al., 2020). Hospitals can improve by incorporating demobilization into their recovery plans to facilitate a seamless transition from emergency response to standard operations. This includes executing drills aimed at the prompt reinstatement of critical systems (e.g., IT, patient records, supply chains), ensuring that all procedures are rehearsed and effective.

An organized team of hospital staff to facilitate post-action hospital inventory assessment (M=3.15) indicates that the hospital possesses a relatively well-structured staff to conduct post-action inventory evaluation. Precise inventory evaluation is essential post-disaster to guarantee the hospital's uninterrupted provision of services. The score indicates that the process is operational, although it may not be entirely optimized to address urgent and extensive demands (Alsharif et al., 2020). Hospitals can improve by implementing real-time inventory management systems that can swiftly evaluate stock levels and notify staff of shortages during a crisis. In addition, hospitals can facilitate consistent training for personnel to enable prompt and precise evaluation of hospital inventories under duress.

The evacuation area and location, as well as the inventory of equipment and supplies (M = 3.10), demonstrate moderate efficacy in organizing evacuation zones and managing equipment and supplies. Evacuation strategies, along with the availability of vital equipment and supplies, are crucial for safeguarding patients and personnel during a crisis. The score suggests potential deficiencies in evacuation protocols, equipment accessibility, or supply inventory optimization (Barton et al., 2020).

For enhancement, hospitals can implement regular evacuation drills that include both personnel and patients to ensure comprehensive familiarity with emergency routes and protocols. Furthermore, incorporating technology, such as digital mapping of the hospital, can enhance evacuation routes and guarantee the safe relocation of staff and patients during emergencies.

Provide post-action report (M=3.06); post-action reports are available; however, there is potential for enhancement regarding their timeliness, accuracy, or comprehensiveness. Post-action reports are crucial for assessing the effectiveness of the response and identifying areas for improvement (Lindell & Perry, 2020).

To improve, the institution can utilize a centralized digital platform for storing and disseminating post-action reports, facilitating rapid access for decision-making and enhancing interdepartmental communication. Develop a systematic procedure for evaluating post-action reports with key stakeholders, identifying lessons learned, and implementing enhancements to improve future readiness.

The organized personnel conducting debriefings for staff (M = 3.06) indicate that debriefing sessions should be held, although there may be inefficiencies or deficiencies in their organization. Debriefing is crucial for evaluating disaster response and providing emotional support to personnel, particularly following stressful or traumatic incidents (Pfefferbaum et al., 2020). Hospitals can improve by establishing a consistent debriefing protocol that ensures comprehensive support for all staff members and facilitates the documentation of key insights and lessons learned. Moreover, incorporate mental health professionals in debriefing sessions to offer support for personnel experiencing trauma or stress.

The post-disaster employee recovery assistance program (M = 3.08) demonstrates that post-disaster recovery support for employees is marginally successful. An effective employee recovery program is essential for safeguarding the wellbeing of healthcare professionals

during a disaster and facilitating their physical and mental recovery (Gustavsson et al., 2020). Institutions can improve by broadening employee recovery initiatives to encompass counseling, leave, and financial assistance for anyone who needs help following a disaster and by establishing wellness programs that assess the physical and mental wellbeing of employees, especially during high-stress intervals.

Appropriate services during disaster response and recovery (m = 3.11) exhibit moderate efficacy in delivering suitable services during catastrophe response and recovery. This suggests that the hospital is generally capable of providing essential services; however, certain aspects of care provision may require improvement, particularly during prolonged or extensive disasters (Baum et al., 2020).

To improve, institutions can establish a telemedicine service during disaster recovery to enhance access to healthcare for patients who are unable to attend the hospital in person. Moreover, it enhances interdepartmental cooperation (e.g., emergency, pharmacy, ICU) to enable efficient service delivery and optimal patient care.

The hospital demonstrates moderate readiness in various essential operational domains related to disaster response and recovery. Although systems exist, substantial enhancements can be implemented to improve efficiency, optimize resources, and guarantee swift recovery. Through the adoption of novel technology, enhancement of coordination, and investment in staff support, the hospital may more effectively manage disasters while prioritizing patient care and staff welfare in high-pressure scenarios.

Significant Difference Between the Level of Emergency Preparedness in Disaster-Prone Areas of Pangasinan

Area of Practice

The significant difference in communication suggests that focused treatments enhance communication readiness, a crucial factor in emergencies. Nurses may require enhanced training, resources, and systems for proficient communication during emergencies. This demonstrates that communication tactics or practices vary considerably among the groupings. This suggests that effective communication methods could be a critical emphasis for enhancing disaster response (Pfefferbaum et al., 2020).

Table 14 displays the data collected about the emergency preparedness of nurses in disaster-prone areas of Pangasinan, specifically in the domain of area of practice.

Table 14. *ANOVA Results on the Significant Differences Between the Level of Emergency Preparedness Across their Area of Practice*

Indicators		*Sum of Squares*	*Df*	*Mean Square*	*F Value*	*Sig*	*Level of Significance*
Command and control	Between Groups	7.033	11	.639	1.707	.082	NS
	Within Groups	37.826	101	.375			
	Total	44.859	112				
Communication	Between Groups	7.828	11	.712	2.135	.024	S
	Within Groups	33.664	101	.333			
	Total	41.491	112				
Safety and Security	Between Groups	4.793	11	.436	1.133	.344	NS
	Within Groups	38.834	101	.384			
	Total	43.626	112				
Triage	Between Groups	5.650	11	.514	1.419	.176	NS
	Within Groups	36.555	101	.362			
	Total	42.205	112				
Surge Capacity	Between Groups	5.753	11	.523	1.195	.300	NS
	Within Groups	44.218	101	.438			
	Total	49.971	112				
Continuity of Essential Services	Between Groups	6.623	11	.602	1.632	.101	NS
	Within Groups	37.264	101	.369			
	Total	43.888	112				
Human Resource	Between Groups	5.043	11	.458	1.196	.299	NS
	Within Groups	38.700	101	.383			
	Total	43.743	112				
Logistics and Supply	Between Groups	5.079	11	.462	1.324	.222	NS
	Within Groups	35.224	101	.349			
	Total	40.303	112				
Post-Disaster Recovery	Between Groups	6.464	11	.588	1.646	.097	NS
	Within Groups	36.059	101	.357			
	Total	42.523	112				

Legend: The mean difference is significant at the 0.05 level. Significant (S), Not Significant (NS)

Table 15. *Tukey HSD (Communication)*

Indicators	*Area of Practice*	*Mean*	*F value*	*Sig.*	*TE*
1. Appointed public information spoke person	Emergency Room	3.15	2.681	.005	S
	Intensive Care Unit	3.50			
	Labor Room	3.25			
	Medical Ward	3.04			
	Neonatal Intensive Care Unit	3.33			
	Obstetrics & Gynecology Ward	3.00			
	Operating Room	2.00			
	Operating Room	3.00			
	Orthopedic Ward	3.50			
	OPD	4.00			
	Pediatric Ward	2.50			
	Dialysis	2.33			
	Total	3.04			
2. Key messages in preparation for disaster scenarios	Emergency Room	3.24	2.744	.004	S
	Intensive Care Unit	3.75			
	Labor Room	3.25			
	Medical Ward	3.04			
	Neonatal Intensive Care Unit	3.33			
	Obstetrics & Gynecology Ward	3.50			
	Operating Room	2.60			
	Operating Room	3.00			
	Orthopedic Ward	3.50			
	OPD	3.50			
	Pediatric Ward	3.00			
	Dialysis	2.33			
	Total	3.13			
3. Mechanisms of information exchange	Emergency Room	3.15	1.864	.053	S
	Intensive Care Unit	3.75			
	Labor Room	3.00			
	Medical Ward	3.00			
	Neonatal Intensive Care Unit	3.33			
	Obstetrics & Gynecology Ward	3.00			
	Operating Room	2.80			
	Operating Room	3.00			
	Orthopedic Ward	3.50			
	OPD	3.00			
	Pediatric Ward	3.00			
	Dialysis	2.33			
	Total	3.06			

Legend: The mean difference is significant at the 0.05 level. Significant (S), Not Significant (NS)

The analysis reveals substantial disparities in crisis preparedness and communication strategies among hospital departments, particularly in the designation of public information spokespeople and the delivery of critical messages. The Intensive Care Unit (ICU) and Orthopedic Ward exhibited superior performance, perhaps owing to the high-pressure, rapid environment of their care delivery. Nevertheless, departments such as Dialysis, the Operating Room, and the Pediatric Ward had diminished scores, indicating a need for improvement in disaster communication and information dissemination.

For improvement, institutions can establish standardized communication standards and appoint public information representatives in all departments.

Formulate emergency preparedness communications tailored to each department, guaranteeing they are thorough and implementable. Allocate resources to centralized systems and provide training to enhance the dissemination of real-time information, thereby mitigating fragmentation during disasters.

By focusing on these aspects, the hospital can enhance its overall disaster readiness, facilitating improved coordination and more efficient responses during emergencies.

The research indicates that although the majority of emergency preparation indicators among nurses in Pangasinan yield consistent findings, communication emerges as a critical area that needs improvement. Enhancing communication infrastructure, training, and resources for nurses is expected to yield improved outcomes in disaster response. In other domains, sustaining and improving existing practices will facilitate ongoing preparedness during catastrophes.

Years of Experience

The data presented includes an Analysis of Variance (ANOVA) that evaluates disparate hospital preparation metrics among several departments. The assessed indicators are Command and Control, Communication, Safety and Security, Triage Surge Capacity, Continuity of Essential Services, Human Resources, Logistics and Supply, and Post-Disaster Recovery. The Sum of Squares, Mean Square, F-value, and p-value (Significance) are utilized to ascertain the presence of significant variations among groups for each indicator.

The p-value of 0.058 approaches the 0.05 threshold, indicating a potential trend toward significant differences in Safety and Security among the departments. The F-value of 2.359 signifies variability in the implementation of safety and security measures. This suggests that departments with high patient volumes or high-risk operations, such as the Emergency Room or ICU, may have more stringent safety protocols than others (Pfefferbaum et al., 2020).

A p-value of 0.054 suggests that the differences in Logistics and Supply practices are approaching significance. The F-value of 2.407 indicates that there is variation among departments, with certain ones demonstrating greater preparedness or capability in managing logistics and supplies during a disaster. This suggests that logistics systems require improvement to facilitate superior coordination and resource allocation (Pfefferbaum et al., 2020).

Mann et al. (2021) emphasize the necessity of incorporating disaster logistics into standard training curricula for healthcare professionals, proposing that an emphasis on practical, experiential training in resource and supply management during mass casualty incidents can enhance preparedness, particularly for novice nurses.

Table 16. *ANOVA Results on the Significant Differences Between the Level of Emergency Preparedness Across their Years of Experience*

Indicators		*Sum of Squares*	*Df*	*Mean Square*	*F Value*	*Sig*	*Level of Significance*
Command and control	Between Groups	2.118	4	.529	1.338	.261	NS
	Within Groups	42.742	108	.396			
	Total	44.859	112				
Communication	Between Groups	1.167	4	.292	.782	.539	NS
	Within Groups	40.324	108	.373			
	Total	41.491	112				
Safety and Security	Between Groups	3.505	4	.876	2.359	.058	S
	Within Groups	40.121	108	.371			
	Total	43.626	112				
Triage	Between Groups	2.823	4	.706	1.935	.110	NS
	Within Groups	39.382	108	.365			
	Total	42.205	112				
Surge Capacity	Between Groups	.962	4	.240	.530	.714	NS
	Within Groups	49.009	108	.454			
	Total	49.971	112				
Continuity of Essential Services	Between Groups	2.250	4	.563	1.459	.220	NS
	Within Groups	41.638	108	.386			
	Total	43.888	112				
Human Resource	Between Groups	2.956	4	.739	1.956	.106	NS
	Within Groups	40.787	108	.378			
	Total	43.743	112				
Logistics and Supply	Between Groups	3.299	4	.825	2.407	.054	S
	Within Groups	37.004	108	.343			
	Total	40.303	112				
Post-Disaster Recovery	Between Groups	2.377	4	.594	1.599	.180	NS
	Within Groups	40.145	108	.372			
	Total	42.523	112				

Legend: The mean difference is significant at the 0.05 level. Significant (S), Not Significant (NS)

Table 17. *Tukey HSD (Safety and Security)*

Indicators	*Years of experience*	*Mean*	*F value*	*Sig.*	*TE*
1. Facility access points, triage sites and other areas of patient flow	6 months to 1 year	3.32	2.426	.052	S
	2-5 years	3.41			
	6-10 years	3.29			
	11-15 years	3.00			
	16 years & above	2.33			
	Total	3.28			
	6 months to 1 year	3.34	2.642	.038	S
	2-5 years	3.38			

2.	Implemented procedures to ensure the secure collection confidential information	6-10 years	3.46
		11-15 years	2.82
		16 years & above	2.67
		Total	3.31

Legend: The mean difference is significant at the 0.05 level. Significant (S), Not Significant (NS)

The p-value of 0.052 suggests a significant disparity in the management of facility entrance points, triage locations, and patient flow among hospitals over various time intervals. Although the p-value marginally exceeds the standard 0.05 threshold, it approaches significance, indicating potential variability in patient flow management among departments or hospital systems over time. Departments or systems with a more extensive history (e.g., 2-5 years and 6-10 years) generally achieve higher scores (3.41 and 3.46, respectively). In contrast, facilities with over 16 years exhibit the lowest score (2.33), potentially reflecting a deficiency in modernization or adaptation to contemporary patient flow models (Baum et al., 2020).

Hospitals can establish a versatile infrastructure model that facilitates swift adjustment to varying patient volumes. This may encompass scalable triage and treatment zones that can be augmented during peak demand periods, especially for institutions with antiquated systems. In addition, utilize patient flow simulation tools to represent diverse catastrophe or emergency scenarios. This can help identify bottlenecks in patient mobility and optimize facility layout to ensure uninterrupted patient flow during peak periods. Lastly, consistently evaluate the efficacy of facility entry points and patient flow management to confirm adherence to current best practices. Hospitals should upgrade these systems in response to increasing patient volume or the introduction of new technology.

Table 18. *Tukey HSD (Logistics and Supply)*

	Indicators	*Years of Experience*	*Mean*	*F value*	*Sig.*	*TE*
1.	Availability of multidisciplinary psychosocial support teams	6 months to 1 year	3.27	3.295	.014	
		2-5 years	2.94			
		6-10 years	3.13			
		11-15 years	2.45			S
		16 years & above	2.67			
		Total	3.04			
2.	Inventory of all equipment, supplies and pharmaceuticals	6 months to 1 year	3.34	2.502	.047	
		2-5 years	3.21			
		6-10 years	3.29			S
		11-15 years	2.73			
		16 years & above	2.67			
		Total	3.21			
3.	Provision of essential medication supplies	6 months to 1 year	3.29	3.122	.018	
		2-5 years	3.21			
		6-10 years	3.17			S
		11-15 years	2.64			
		16 years & above	2.33			
		Total	3.15			
4.	Access for hospital storage and stockpiling of additional supplies	6 months to 1 year	3.24	1.282	.282	
		2-5 years	3.12			
		6-10 years	3.17			S
		11-15 years	2.73			
		16 years & above	3.00			
		Total	3.13			

Legend: The mean difference is significant at the 0.05 level. Significant (S), Not Significant (NS)

A p-value of 0.014 indicates that the presence of interdisciplinary psychosocial support teams varies significantly across different periods. The F-value of 3.295 suggests that departments with 6 months to 1 year of experience achieve better scores (3.27), whilst those with 11-15 years and 16 years or more experience attain lower scores (2.45 and 2.67, respectively). This suggests that contemporary systems or facilities may have enhanced access to psychosocial support teams, potentially due to the recent adoption of current care models; however, older systems may not have properly adapted to these newer practices (Pfefferbaum et al., 2020).

A p-value of 0.047 signifies that the management of inventories for equipment, supplies, and medications exhibits considerable variation overtime periods. The category of 6 months to 1 year has the highest mean (3.34), whereas the group of 16 years and above displays the lowest mean (2.67). The F-value of 2.502 corroborates this finding, indicating that facilities equipped with more contemporary systems are typically more proficient in inventory management (Seitz et al., 2020). Older facilities may encounter difficulties due to antiquated inventory management systems or the absence of real-time tracking.

A p-value of 0.018 indicates significant disparities in the provision of vital medicine supplies over the specified timeframes. The category of 6 months to 1 year has the most excellent mean (3.29), whereas the 16 years and beyond category displays the lowest mean (2.33). This indicates a deficiency in the accessibility of vital pharmaceuticals, probably attributable to outdated systems that may lack optimal procurement or distribution procedures (O'Neill et al., 2020).

A p-value of 0.282 indicates no significant variations in hospital storage access and stockpiling of additional supplies across various dates. This suggests that the hospital's capability for storing and stockpiling remains consistent, irrespective of its years of operation. Nonetheless, opportunities for enhancement may exist, especially with the optimization of storage systems (Baum et al., 2020).

Modernizing antiquated systems, particularly in legacy departments, with contemporary inventory tracking, pharmaceutical management, and psychosocial support frameworks.

Utilizing technology, including predictive analytics, RFID systems, and telemedicine, to improve service delivery across these essential variables. Training and capacity-building to ensure personnel are adequately equipped to oversee and execute enhancements in these domains.

The data indicate that interdisciplinary psychosocial support teams, inventory management, and the supply of necessary medications exhibit considerable diversity across various periods, with newer departments typically outperforming older ones. These disparities underscore the need for modernization and ongoing improvement in areas such as patient support, supply chain management, and pharmaceutical accessibility.

Highest Educational Attainment

Table 19 displays the data collected about the emergency preparedness of nurses in disaster-prone areas of Pangasinan, specifically in the domain of highest educational attainment.

The absence of notable disparities in preparedness across several domains (command and control, communication, safety, and security, etc.) indicates that emergency preparedness training for nurses is predominantly practical, irrespective of educational attainment. The uniformity in preparation levels among groups may suggest the effective implementation of continuing education and standardized training programs.

The analysis indicates that there are no substantial disparities in the emergency readiness levels of nurses in disaster-prone districts of Pangasinan, regardless of their highest educational qualifications. This suggests that educational attainment, whether a bachelor's degree or greater, does not significantly influence nurses' preparedness for disaster response. Continuous, standardized disaster preparedness training may be a crucial element in maintaining uniformity among various nursing groups.

Table 19. *ANOVA Results on the Significant Differences Between the Level of Emergency Preparedness Across their Highest Educational Attainment*

Indicators		*Sum of Squares*	*Df*	*Mean Square*	*F Value*	*Sig*	*Level of Significance*
Command and control	Between Groups	.479	3	.160	.392	.759	NS
	Within Groups	44.380	109	.407			
	Total	44.859	112				
Communication	Between Groups	.929	3	.310	.832	.479	NS
	Within Groups	40.563	109	.372			
	Total	41.491	112				
Safety and Security	Between Groups	1.005	3	.335	.857	.466	NS
	Within Groups	42.621	109	.391			
	Total	43.626	112				
Triage	Between Groups	.321	3	.107	.279	.841	NS
	Within Groups	41.884	109	.384			
	Total	42.205	112				
Surge Capacity	Between Groups	.636	3	.212	.468	.705	NS
	Within Groups	49.335	109	.453			
	Total	49.971	112				
Continuity of Essential Services	Between Groups	.342	3	.114	.285	.836	NS
	Within Groups	43.546	109	.400			
	Total	43.888	112				
Human Resource	Between Groups	.408	3	.136	.342	.795	NS
	Within Groups	43.335	109	.398			
	Total	43.743	112				
Logistics and Supply	Between Groups	.226	3	.075	.205	.893	NS
	Within Groups	40.077	109	.368			
	Total	40.303	112				
Post-Disaster Recovery	Between Groups	.646	3	.215	.561	.642	NS
	Within Groups	41.876	109	.384			
	Total	42.523	112				

Legend: The mean difference is significant at the 0.05 level. Significant (S), Not Significant (NS)

Relevant Training Attended

Table 20. *ANOVA Results on the Significant Differences Between the Level of Emergency Preparedness Across their Relevant Trainings Attended*

Indicators		*Sum of Squares*	*Df*	*Mean Square*	*F Value*	*Sig*	*Level of Significance*
Command and control	Between Groups	4.416	7	.631	1.638	.133	NS
	Within Groups	40.443	105	.385			
	Total	44.859	112				
Communication	Between Groups	4.815	7	.688	1.969	.066	NS
	Within Groups	36.676	105	.349			
	Total	41.491	112				
Safety and Security	Between Groups	5.202	7	.743	2.031	.058	S
	Within Groups	38.425	105	.366			
	Total	43.626	112				
Triage	Between Groups	5.360	7	.766	2.182	.042	S
	Within Groups	36.845	105	.351			
	Total	42.205	112				
Surge Capacity	Between Groups	6.748	7	.964	2.342	.029	S
	Within Groups	43.222	105	.412			
	Total	49.971	112				
Continuity of Essential Services	Between Groups	5.100	7	.729	1.972	.066	NS
	Within Groups	38.788	105	.369			
	Total	43.888	112				
Human Resource	Between Groups	4.559	7	.651	1.745	.106	NS
	Within Groups	39.183	105	.373			
	Total	43.743	112				
Logistics and Supply	Between Groups	7.125	7	1.018	3.221	.004	S
	Within Groups	33.178	105	.316			
	Total	40.303	112				
Post-Disaster Recovery	Between Groups	4.312	7	.616	1.693	.119	NS
	Within Groups	38.211	105	.364			
	Total	42.523	112				

Legend: The mean difference is significant at the 0.05 level. Significant (S), Not Significant (NS)

The data presented underscores the performance of three essential indicators in hospital preparedness across multiple departments, specifically emphasizing facility access points, triage locations, and patient flow; hospital evacuation protocols; and methods for safeguarding the collection of confidential information. The analysis employed ANOVA (Analysis of Variance) to assess the statistical significance of differences among groups in various domains, focusing on the F-value and p-value to determine the importance of diversity between departments.

Table 21. *Tukey HSD (Safety and Security)*

Indicators	*Relevant Trainings Attended*	*Mean*	*F value*	*Sig.*	*TE*
1. Facility access points, triage sites and other areas of patient flow	Biohazard Disaster	2.40	2.793	.010	S
	Emergency Management	3.58			
	Mass Casualty Incident	3.20			
	Contingency Planning	3.50			
	Critical Incident Stress Management	3.67			
	None	3.19			
	Dialysis w/ peritoneal dialysis, ACLS,BLS	3.00			
	BLS	3.00			
	Total	3.28			
2. Defined measures for safe and efficient hospital evacuation	Biohazard Disaster	2.40	1.730	.110	S
	Emergency Management	3.42			
	Mass Casualty Incident	3.20			
	Contingency Planning	3.50			
	Critical Incident Stress Management	3.67			
	None	3.24			
	Dialysis w/ peritoneal dialysis, ACLS,BLS	3.00			
	BLS	3.00			

		Total	3.27			
		Biohazard Disaster	2.40	2.277	.034	S
		Emergency Management	3.55			
3.	Implemented procedures to ensure the secure collection confidential information	Mass Casualty Incident	3.20			
		Contingency Planning	3.50			
		Critical Incident Stress Management	3.67			
		None	3.25			
		Dialysis w/ peritoneal dialysis, ACLS,BLS	3.00			
		BLS	3.00			
		Total	3.31			

Legend: The mean difference is significant at the 0.05 level. Significant (S), Not Significant (NS)

The F-value of 2.793 and p-value of 0.010 signify a statistically significant disparity in the management of facility access points, triage locations, and patient flow among various practice areas. The Biohazard Disaster category received the lowest score (2.40), indicating that departments managing biohazard disasters may encounter greater difficulties in successfully planning patient flow during these incidents. Conversely, Critical Incident Stress Management (CISM) and Emergency Management departments exhibit the highest mean scores (3.67 and 3.58, respectively), indicating a more systematic approach to overseeing patient flow during crises (Seitz et al., 2020).

The p-value of 0.110 exceeds the 0.05 threshold for statistical significance, indicating that the differences in the specified measures for hospital evacuation among departments are not statistically significant. Some departments, such as Critical Incident Stress Management (CISM) and Contingency Planning, exhibit higher scores (3.67 and 3.50, respectively). In contrast, others, including Biohazard Disaster and Dialysis, receive lower scores (2.40 and 3.00, respectively), suggesting that hospitals may lack uniformly established evacuation protocols across all practice areas. This highlights the need for standardized practices, particularly in high-risk environments such as biohazard scenarios (O'Reilly et al., 2020).

A p-value of 0.034 indicates a substantial disparity in the processes for the secure acquisition of private information among departments. The Critical Incident Stress Management (CISM) and Contingency Planning departments received the highest scores of 3.67 and 3.50, respectively, signifying robust data protection protocols. Conversely, the Biohazard Disaster and Dialysis departments had lower scores (2.40 and 3.00, respectively), indicating a potential lack of prioritization or practical implementation of robust data security measures during crises. This inconsistency may render the hospital vulnerable to data breaches, particularly in high-pressure situations where personal patient information is jeopardized (Pfefferbaum et al., 2020).

The findings reveal substantial disparities among hospital departments in the management of facility access points, patient flow, evacuation protocols, and processes for the secure collection of personal information. Biohazard Disaster departments consistently receive poorer scores across all metrics, indicating a need for improved systems and practices in managing these high-risk scenarios.

To improve, hospitals can facilitate continuous training on crisis management, evacuation protocols, and data security for all hospital personnel. Concentrate on divisions such as Biohazard Disaster and Dialysis, where performance metrics are suboptimal, to enhance their readiness via customized protocols and supplementary resources. Invest in technology for real-time patient tracking and secure data management, ensuring the hospital operates efficiently and securely during disaster response scenarios.

Table 22. *Tukey HSD (Triage)*

Indicators	*Relevant Trainings Attended*	*Mean*	*F value*	*Sig.*	*TE*
	Biohazard Disaster	2.562	.018	2.562	S
	Emergency Management	3.52			
	Mass Casualty Incident	3.20			
	Contingency Planning	3.50			
1. Triage area in close proximity to essential resources	Critical Incident Stress Management	3.33			
	None	3.24			
	Dialysis w/ peritoneal dialysis, ACLS,BLS	2.00			
	BLS	2.00			
	Total	3.27			

Legend: The mean difference is significant at the 0.05 level. Significant (S), Not Significant (NS)

A p-value of 0.018 indicates that the disparities in the positioning of triage regions relative to key resources are statistically significant. The F-value of 2.562 indicates a moderate degree of variability among the groups. The Biohazard Disaster category has the lowest average score (2.562), signifying that hospitals managing biohazard disasters encounter difficulties in situating triage sites near vital resources. Conversely, Emergency Management departments achieved the highest grade (3.52), indicating a well-coordinated strategy for triage placement in emergencies.

The diminished scores for the Biohazard Disaster, Dialysis with peritoneal dialysis, ACLS, BLS, and BLS departments may indicate challenges in tailoring triage areas to the distinct requirements of these high-risk or specialized cases, where prompt access to essential resources may be constrained (Pfefferbaum et al., 2020). This outcome is vital as situating triage zones in proximity to critical supplies is imperative for swift and efficient emergency response.

Establish transportable or adaptable triage stations that may be readily repositioned according to the prevailing emergency. These triage stations must be furnished with vital medical instruments and pharmaceuticals that may be readily accessed.

Allocate resources to the design of hospital layouts featuring scalable and adaptive emergency response zones. This should involve establishing designated areas for swift patient evaluation and ensuring that essential resources, such as personnel, equipment, and medications, are immediately accessible.

Consistently educate healthcare workers on proficient triage management, particularly in biohazard and high-risk situations, to guarantee their familiarity with the facility's layout and their ability to swiftly transfer patients to designated locations equipped with the necessary tools.

The findings indicate that the positioning of triage spaces about critical resources differs significantly among departments, with Biohazard Disaster and specialist units, such as Dialysis and BLS, receiving lower scores. This indicates a necessity for enhanced spatial planning and infrastructure reconfiguration in these regions to optimize the efficacy of emergency responses. Emergency Management departments are performing comparatively better, as a higher score signifies more effective mechanisms for integrating triage with resource availability.

Tukey HSD (Surge Capacity)

A p-value of 0.028 indicates statistically significant differences in the implementation of catastrophe protocols among departments. The Biohazard Disaster departments had the lowest grade (2.60), suggesting difficulties in implementing and complying with disaster protocols during biohazard incidents. Conversely, departments such as Emergency Management, Contingency Planning, and Critical Incident Stress Management received better scores (3.48, 3.50, and 3.33, respectively), indicating the presence of robust catastrophe processes. The diminished score for Biohazard Disaster suggests that these departments encounter distinct obstacles in executing successful protocols under highly specialized conditions (Pfefferbaum et al., 2020).

Table 23. *Tukey HSD (Surge Capacity)*

	Indicators	*Relevant Trainings Attended*	*Mean*	*F value*	*Sig.*	*TE*
1.	Protocols on hospital process when disaster plan is activated	Biohazard Disaster	2.60	2.364	.028	S
		Emergency Management	3.48			
		Mass Casualty Incident	3.20			
		Contingency Planning	3.50			
		Critical Incident Stress Management	3.33			
		None	3.19			
		Dialysis w/ peritoneal dialysis, ACLS,BLS	2.00			
		BLS	2.00			
		Total	3.24			
2.	Provisions of medical care on critical and emergent surgical care	Biohazard Disaster	2.40	2.899	.008	S
		Emergency Management	3.42			
		Mass Casualty Incident	3.00			
		Contingency Planning	3.50			
		Critical Incident Stress Management	3.67			
		None	3.29			
		Dialysis w/ peritoneal dialysis, ACLS,BLS	2.00			
		BLS	2.00			
		Total	3.27			
3.	Identified additional sites that may convert to patient care units	Biohazard Disaster	2.40	2.168	.043	S
		Emergency Management	3.30			
		Mass Casualty Incident	3.00			
		Contingency Planning	3.50			
		Critical Incident Stress Management	3.67			

		None	3.11			
		Dialysis w/ peritoneal dialysis, ACLS,BLS	2.00			
		BLS	2.00			
		Total	3.13			
		Biohazard Disaster	2.40	2.670	.014	S
		Emergency Management	3.42			
		Mass Casualty Incident	3.00			
		Contingency Planning	3.50			
4.	Available treatment capacity and demand	Critical Incident Stress Management	3.33			
		None	3.24			
		Dialysis w/ peritoneal dialysis, ACLS,BLS	2.00			
		BLS	2.00			
		Total	3.23			
		Biohazard Disaster	2.40	2.115	.048	S
		Emergency Management	3.33			
		Mass Casualty Incident	2.80			
		Contingency Planning	3.50			
5.	Designated area for temporary morgue	Critical Incident Stress Management	3.33			
		None	3.17			
		Dialysis w/ peritoneal dialysis, ACLS,BLS	2.00			
		BLS	2.00			
		Total	3.16			

Legend: The mean difference is significant at the 0.05 level. Significant (S), Not Significant (NS)

A p-value of 0.008 signifies a statistically significant disparity in the delivery of medical treatment for critical and emergency surgery cases among departments. The Biohazard Disaster departments had the lowest grade (2.40), indicating potential difficulties in delivering sufficient medical care for essential cases during biohazard incidents. In contrast, Critical Incident Stress Management (CISM) had the highest score of 3.67, suggesting that departments engaged in high-stress scenarios may possess more developed frameworks for delivering immediate care. This discrepancy indicates that further specialist disaster preparedness may be necessary for Biohazard Disaster departments to address essential and urgent surgical requirements (Seitz et al., 2020).

The findings highlight significant disparities in the preparedness of hospital departments for various catastrophe scenarios, particularly in biohazard emergencies. These departments generally exhibit lower scores across multiple metrics, indicating difficulties in readiness. By employing innovative strategies such as adaptable infrastructure, targeted training, and real-time monitoring technologies, hospitals can enhance their preparedness for high-risk incidents.

Implement uniform catastrophe protocols across all departments, especially for biohazard incidents, and establish adaptable hospital infrastructures that can respond to evolving requirements. Allocate resources for staff training in the management of high-volume disasters, especially within specialist areas.

Utilize technology to facilitate catastrophe response, improve resource allocation, and augment real-time communication among departments.

Tukey HSD (Logistics and Supply)

A p-value of 0.005 signifies a statistically significant disparity in the inventory management of equipment, supplies, and medications among various practice areas. The Biohazard Disaster departments received the lowest score of 2.20, whilst Emergency Management achieved a score of 3.36, and Contingency Planning attained the highest level of 3.50. The diminished score in Biohazard catastrophe may indicate difficulties in resource management during high-risk and specialized catastrophe situations, where inventory requirements can be erratic (Pfefferbaum et al., 2020).

A p-value of 0.011 indicates significant disparities in the distribution of vital drug supplies among departments. The Biohazard Disaster departments received the lowest grade (2.20), signifying challenges in securing needed pharmaceuticals during biohazard situations. Conversely, Emergency Management (3.39) and Contingency Planning (3.50) had superior performance, indicating more resilient systems for drug delivery in these domains (Seitz et al., 2020). A p-value of 0.010 indicates significant disparities in the storage and distribution of supplies among hospital departments. The Biohazard Disaster departments received the lowest grade (2.20), indicating insufficient room and methods for stockpiling additional supplies during catastrophes. Emergency Management (3.39) and Contingency Planning (3.50) had the highest scores, signifying superior systems for stockpiling and resource management (Gustavsson et al., 2020).

A p-value of 0.047 indicates significant disparities in the hospital pharmacy's role in pharmaceutical provision compared to other departments. The Biohazard Disaster departments received the lowest grade (2.40), reflecting difficulties in promptly providing medications during biohazard emergencies. Conversely, the Emergency Management (3.33) and Contingency Planning (3.50) departments achieved superior scores, indicating a more effective function for the pharmacy in these domains (O'Reilly et al., 2020).

Table 24.

	Indicators	*Relevant Trainings Attended*	*Mean*	*F value*	*Sig.*	*TE*
1.	Inventory of all equipment, supplies and pharmaceuticals	Biohazard Disaster	2.20	3.080	.005	S
		Emergency Management	3.36			
		Mass Casualty Incident	3.40			
		Contingency Planning	3.50			
		Critical Incident Stress Management	2.67			
		None	3.24			
		Dialysis w/ peritoneal dialysis, ACLS,BLS	2.00			
		BLS	3.00			
		Total	3.21			
2.	Provision of essential medication supplies	Biohazard Disaster	2.20	2.775	.011	S
		Emergency Management	3.39			
		Mass Casualty Incident	3.20			
		Contingency Planning	3.50			
		Critical Incident Stress Management	2.67			
		None	3.13			
		Dialysis w/ peritoneal dialysis, ACLS,BLS	2.00			
		BLS	3.00			
		Total	3.15			
3.	Access for hospital storage and stockpiling of additional supplies	Biohazard Disaster	2.20	2.835	.010	S
		Emergency Management	3.39			
		Mass Casualty Incident	3.20			
		Contingency Planning	3.50			
		Critical Incident Stress Management	3.00			
		None	3.08			
		Dialysis w/ peritoneal dialysis, ACLS,BLS	2.00			
		BLS	3.00			
		Total	3.13			
4.	Hospital pharmacy role in providing pharmaceuticals	Biohazard Disaster	2.40	2.127	.047	S
		Emergency Management	3.33			
		Mass Casualty Incident	3.20			
		Contingency Planning	3.50			
		Critical Incident Stress Management	3.00			
		None	3.11			
		Dialysis w/ peritoneal dialysis, ACLS,BLS	2.00			
		BLS	3.00			
		Total	3.14			
5.	Mechanism exists for the prompt maintenance and repair of equipment	Biohazard Disaster	2.20	1.898	.077	S
		Emergency Management	3.21			
		Mass Casualty Incident	3.40			
		Contingency Planning	3.50			
		Critical Incident Stress Management	2.67			
		None	3.05			
		Dialysis w/ peritoneal dialysis, ACLS,BLS	2.00			
		BLS	3.00			
		Total	3.06			

Legend: The mean difference is significant at the 0.05 level. Significant (S), Not Significant (NS)

The p-value of 0.077 approaches the 0.05 threshold, indicating potential diversity in equipment maintenance and repair among departments, while the result lacks statistical significance. The Biohazard Disaster departments received the lowest score (2.20), indicating potential challenges in maintaining and repairing essential equipment during high-risk incidents. Emergency Management (3.21) and Contingency Planning (3.50) received superior scores, indicating the presence of more efficient procedures for equipment maintenance (Hussein et al., 2020).

The findings reveal substantial disparities in the readiness of different hospital departments, particularly in areas such as inventory management, pharmaceutical supply, and resource stockpiling. Biohazard Disaster departments typically had lower scores in these domains, underscoring difficulties in guaranteeing resource availability and preparedness during these particular high-risk incidents. Conversely, Emergency Management and Contingency Planning received higher scores, indicating superior mechanisms for resource management and emergency response.

Allocate resources towards infrastructure enhancements, encompassing modular storage solutions, automated drug dispensing systems, and predictive maintenance for essential equipment.

Enhance collaboration between the pharmacy department and emergency response teams to facilitate a more rapid response to drug needs during emergencies.

Consistently train personnel across departments, particularly in Biohazard Disaster zones, to enhance readiness and guarantee the availability of resources and equipment as required.

By addressing these deficiencies, hospitals can enhance their preparedness for emergencies and other high-risk incidents, assuring improved resource management, patient care, and the continuity of key services during emergencies.

Conclusions

Based on the findings of the study, several conclusions were drawn. The workforce is largely concentrated in the Emergency Room and Medical Ward, with many personnel having less than one year of experience, highlighting a younger and less experienced group. A significant portion (56.3%) of respondents had not received any formal emergency preparedness training, despite its availability, indicating a critical gap that may impact emergency readiness. Most personnel hold a Bachelor's Degree, but access to advanced education like Master's or Doctorate programs is limited, potentially hindering specialization in emergency management. While nurses show competence in staff duties and coordination under command and control, improvements are needed in communication systems, disaster planning, and the command center itself. Communication protocols exist, but gaps remain in spokesperson designation, press briefings, and contingency communications. Safety and security protocols are strong in evacuation and access control but weak in crowd control and hazardous materials management.

In terms of triage, progress is evident, particularly in the appointment of a designated officer, though law enforcement integration and decontamination efforts still require attention. Nurses show solid surge capacity in critical care and emergency surgery, yet patient overflow management and transportation logistics need strengthening. Essential services are moderately sustained, but comprehensive evacuation and contingency plans are still lacking. Human resource management is sufficient in terms of communication and leave management, but faces challenges in staff welfare during emergencies. Logistics and supply chains are generally maintained, particularly in pharmaceutical inventory, but more attention is needed for psychological support and equipment maintenance. Post-disaster recovery planning is in place, but transportation, debriefing, and recovery support systems must be enhanced to ensure holistic recovery.

Regarding differences in emergency preparedness, the Intensive Care Unit and Orthopedic Ward show high levels of readiness, particularly in communication and coordination, while the Operating Room and Dialysis Unit fall behind, requiring urgent attention. Those with 6 months to 1 year of experience often demonstrate better preparedness, possibly due to recent training, while staff with over 16 years of experience exhibit notable deficiencies, possibly due to outdated knowledge or lack of refresher training. There were no significant differences in preparedness across levels of educational attainment, indicating a consistent application of readiness protocols across qualifications. In terms of training, those who attended biohazard disaster training scored lower than those who underwent emergency management or critical incident stress management training, suggesting the latter are more comprehensive and effective.

In light of these findings, several recommendations are made. Institutions should implement improved, tailored emergency preparedness training and encourage advanced education among staff. Mentorship programs can help bridge the experience gap by pairing less experienced staff with veterans. Improvements are needed across all emergency domains, from enhancing communication systems and security protocols to refining triage procedures and managing surge capacity. Hospitals should strengthen plans for continuity of essential services and human resource strategies, especially in supporting staff welfare. Logistics should include better psychological support systems and equipment maintenance, while post-disaster recovery must focus on transportation, debriefing, and mental health support. Uniform training should be enforced regardless of educational background, and training programs—especially those on biohazard preparedness—must be improved. Finally, the adoption of an innovative work plan is recommended to improve the emergency preparedness of nurses in disaster-prone areas of Pangasinan.

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