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Determinants of Disaster Preparedness among Healthcare Workers in the Sukabumi Coastal Area: The Mediating Role of Resilience and Perception

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ABSTRACT

The preparedness of healthcare workers to respond to disasters in coastal areas is a crucial aspect that must be optimally developed. This preparedness is influenced by various factors, such as government policy, perceptions and resilience. This study aims to analyse the direct and indirect effects of government policy, perceptions and resilience on the preparedness of healthcare workers to respond to earthquakes and tsunamis in the coastal areas of Sukabumi Regency. This study employs a quantitative design with a cross-sectional approach involving 512 respondents, selected using total sampling. Data were collected via a structured questionnaire measuring government policies, perceptions, resilience, and disaster preparedness. All instruments underwent validity and reliability testing and were found to be valid and reliable. Data analysis was conducted using the SEM-PLS method to test the direct and indirect relationships between variables. The results of the study indicate that there is a significant direct effect of government policy on disaster preparedness (O=0.348, t=7.265, p=0.000), perceptions of disaster preparedness (O=0.296, t=7.785, p=0.000), and resilience to disaster preparedness (O=0.227, t=5.870, p=0.000). There is an indirect effect of government policy on disaster preparedness via perception (O=0.176, t=7.206, p=0.000), government policy on disaster preparedness via perception and resilience (O=0.116, t=2.120, p=0.036), and government policy on disaster preparedness through resilience (O=0.118, t=2.113, p=0.040). Based on the modelling results, government policy, perception, and resilience were identified as important determinants of healthcare workers' disaster preparedness in the coastal areas of Sukabumi Regency. These findings highlight the need to strengthen disaster training, improve understanding of disaster policies, and enhance the psychological resilience of healthcare workers to support preparedness.

Key Messages:

This study shows that the preparedness of health workers in dealing with disasters is influenced by government policies, perceptions, and resilience, where government policies through training and disaster simulations play a role in shaping positive perceptions and strengthening the resilience of health workers so that preparedness can be improved.

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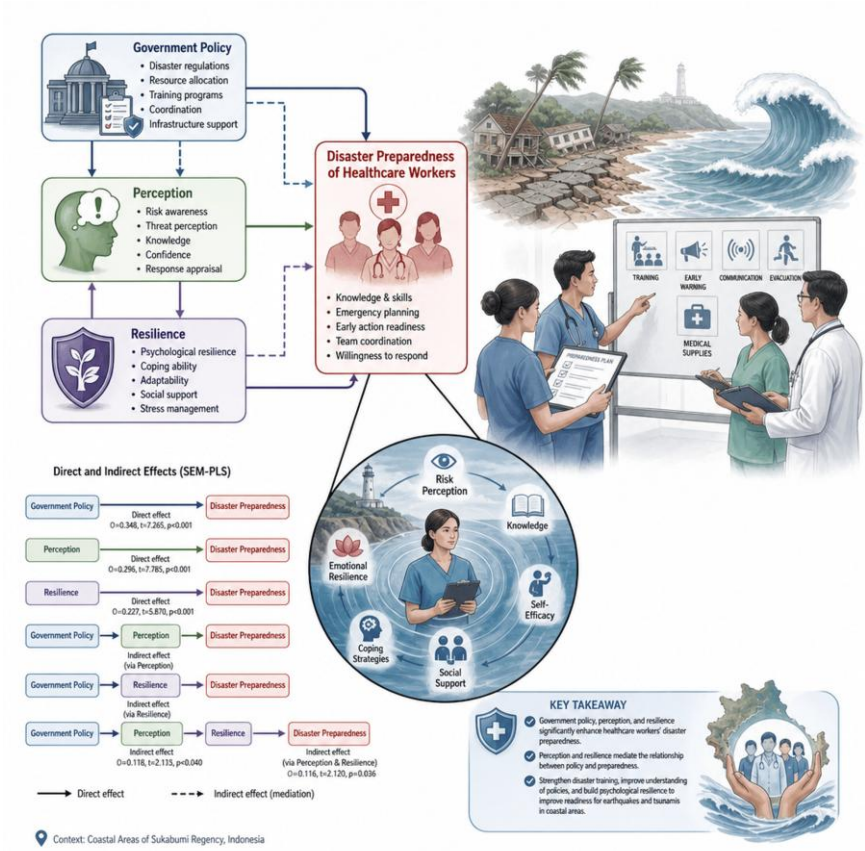
GRAPHICAL ABSTRACT



INTRODUCTION

Natural disasters are events that have destructive impacts, such as injuries and deaths, as well as significant economic losses. Over the past decade, an average of 417 natural disasters have been recorded each year worldwide (1). Indonesia is one of the countries with the highest number of natural disasters in the world, given its geographical location in the Pacific Ring of Fire, an area in the Pacific Ocean filled with active volcanoes, which often causes earthquakes and volcanic eruptions. In addition, Indonesia's natural disaster risk index for tsunamis is also relatively high (2). In the past ten years, there have been five earthquakes and tsunamis in Indonesia that have had a significant impact. Cumulatively, these events have resulted in 4,141 deaths, 705 missing persons, and 4,438 injuries, as well as damage to 110,214 homes and 2,258 public facilities (3).

Earthquakes occur due to the movement of tectonic plates that build up pressure along faults until it is suddenly released (4). Tsunamis are most often triggered by earthquakes on reverse faults in subduction zones when one plate is pushed under another. Most tsunami events in Indonesia are triggered by tectonic earthquakes that occur in subduction zones and active seismic areas. Between 1600 and 2000, there were 105 recorded tsunami events, with about 90% caused by tectonic earthquakes, 9% by volcanic activity, and 1% triggered by landslides (5,6). Previous studies have shown that disaster preparedness among health workers is influenced not only by external institutional factors, such as government policies and disaster management systems, but also by internal psychological factors, including individual perceptions and resilience. Therefore, analyzing these factors simultaneously is important to obtain a more comprehensive understanding of disaster preparedness among health workers, particularly in disaster-prone coastal areas (3).

Disaster mitigation is a key preventive measure in reducing the impact of disasters. Mitigation is part of a series of efforts that include policy formulation, prevention, emergency response, and rehabilitation with the aim of minimizing losses, ensuring rapid and appropriate assistance, and accelerating the recovery process. One important form of mitigation is increasing preparedness through planned, organized, and effective actions (7). Although previous studies have examined disaster

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preparedness among health workers, most studies tend to focus on single factors independently, such as institutional support, perception, or resilience alone. Limited studies have comprehensively modeled the simultaneous relationship between external institutional factors and internal psychological factors in influencing disaster preparedness, especially among health workers in high-risk megathrust coastal areas. In addition, findings from previous studies regarding the influence of government policies and psychological factors on preparedness remain varied, indicating the need for further investigation using a more integrative analytical approach (7).

The government plays a major role in disaster preparedness efforts, one of which is by strengthening the readiness of health workers in high-risk areas. Health workers, as part of the government system, hold strategic responsibilities and play a direct role on the front lines of disaster management (6). Health worker preparedness is influenced by various factors, including government policy support, individual perceptions, and resilience (8–10). These variables were selected because they represent both external institutional support and internal psychological capacities that are theoretically interconnected in shaping preparedness behavior. In the context of disaster preparedness, psychological approaches such as Protection Motivation Theory explain that an individual's perception of risk and coping ability can influence adaptive preparedness behavior, while institutional support through policies and regulations can strengthen individual readiness and response capacity.

Government policies greatly influence the preparedness of health workers, (11)as they are concrete efforts in implementing disaster preparedness activities, which include public education, emergency planning, early warning systems, and resource mobilization. Government policies facilitate the formation of disaster response teams, the deployment of resources/health workers, and the use of available facilities and infrastructure (8). The next factor that affects disaster preparedness among health workers is perception. Perception is the basis of a person's understanding of disaster preparedness. The perceptions of health workers are the first important point in assessing their ability to respond to disasters. In risk management studies, individual perceptions of risk are increasingly becoming a focus of attention because knowing how people view the risks they face affects the efficiency of disaster risk management activities (8,12,13). Resilience also contributes significantly to the preparedness of health workers. Resilience is the ability to build, maintain, or regain the capacity expected in facing difficulties and positive challenges . Resilience enables individuals to build and maintain a positive attitude that can be continuously developed. Through resilience, individuals are able to make sense of life experiences and utilize their prior knowledge and experiences as preparation for facing various difficulties, including disasters, in a more appropriate and adaptive manner (14).

The coastal areas of Sukabumi Regency are highly vulnerable to earthquakes and tsunamis. This condition is influenced by its location at the meeting point of the Indo-Australian Plate and the Sunda Strait Megathrust system in the southern part of Java Island. A number of seismic modeling studies on seismic faults indicate a significant potential for tsunamis, with extreme scenarios estimating maximum wave heights of around 20 meters and 12 meters, and an average height of around 4.5 meters along the southern coast of Java. In addition, the Sukabumi region is also affected by the presence of the active Cimandiri Fault, which has the potential to cause earthquakes. These conditions indicate that health workers in coastal Sukabumi face substantial disaster risks and are required to have optimal preparedness capacities to respond effectively during emergency situations. However, evidence regarding how government policies, perceptions, and resilience interact in influencing disaster preparedness among health workers in this high-risk megathrust area remains limited. Therefore, this study aims to investigate how internal psychological factors, namely perception and resilience, mediate the relationship between external institutional factors, namely government policies, and disaster preparedness among health workers in coastal areas of Sukabumi Regency. To capture both direct and indirect relationships among variables simultaneously, this study applies the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach, which is considered suitable for analyzing complex mediation pathways in disaster preparedness models.

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METHODS

Design Study

This study is a quantitative study with a correlational study design and a cross-sectional approach. This study was conducted in the coastal area of Sukabumi Regency. The population in this study was health workers at community health centers in the coastal area of Sukabumi Regency, with a sample of 512 respondents using total sampling. The inclusion criteria were health workers who were willing to be respondents and had worked at community health centers for at least one year, while the exclusion criteria were health workers who were on sick leave during the research process and on leave from work during the data collection process.

Instrument

After expressing their willingness to participate, respondents filled out a questionnaire containing demographic information, including age, gender, education, length of employment, employment status, marital status, previous experience with earthquakes and tsunamis, and disaster training history. The variables measured in this study were government policy, perception, resilience, and preparedness.

The data collection method used a questionnaire consisting of 6 items on government policy, 10 items on perception, 20 items on resilience, and 25 items on preparedness, which referred to the Likert scale and the Guttman scale. The government policy, perception, and resilience variables used a Likert scale ranging from strongly disagree to strongly agree, while the preparedness variable used the Guttman scale with dichotomous answer choices. In the PLS-SEM analysis process, Guttman scale responses were coded into binary numerical data to enable estimation within the variance-based structural model. The government policy variable measured respondents' perceptions regarding institutional support, disaster regulations, emergency planning, resource mobilization, and implementation of disaster preparedness programs. The perception variable assessed respondents' understanding and awareness of disaster risks, vulnerability, and preparedness capacity. The preparedness variable measured disaster response readiness, evacuation planning, emergency communication, and participation in disaster preparedness activities.

The results of the validity test for the variables of government policy, perception, and preparedness as a whole showed $p < 0.05$, and the reliability test results showed $p > 0.7$, so all variables were declared valid and reliable. Construct validity testing was conducted using Pearson product-moment correlation analysis, with correlation coefficient values ranging from 0.421–0.812 for the government policy variable, 0.438–0.845 for the perception variable, and 0.452–0.884 for the preparedness variable, indicating that all questionnaire items were valid ($p < 0.05$). Reliability testing using Cronbach's alpha showed values above 0.70 for all variables, indicating acceptable internal consistency reliability. Meanwhile, the validity and reliability tests for the resilience variable refer to the standard instrument, namely the Connor Davidson Resilience Scale (CD-RISC 20), with confirmatory factor analysis results having a factor loading > 0.7, which is considered valid, and a Cronbach's alpha of 0.952, which means it is very reliable. The CD-RISC 20 instrument was selected because it provides a more comprehensive assessment of resilience dimensions compared to shorter versions such as CD-RISC 10 and CD-RISC 2, particularly in assessing adaptability, emotional regulation, and coping capacity in stressful situations. In addition, the Indonesian version of CD-RISC 20 has previously demonstrated good psychometric properties and has been validated in the Indonesian population (15).

Operational Definition of Variables

Government policy in this study refers to respondents' perceptions of institutional regulations, disaster preparedness policies, emergency response procedures, availability of disaster guidelines, and government-supported preparedness programs implemented at community health centers. Perception refers to the cognitive understanding and awareness of health workers regarding disaster risks, vulnerability, and preparedness needs in earthquake and tsunami situations. Resilience is defined as the ability of health workers to adapt, recover, and maintain psychological stability when facing stressful conditions and disaster situations. Preparedness refers to the readiness of health workers in responding to

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disasters, including emergency response planning, evacuation readiness, communication systems, and participation in disaster preparedness activities.

Data Analysis

The data were analyzed using IBM SPSS software version 29 for univariate analysis and SmartPLS 3.0 for structural equation modeling analysis. Respondent Characteristics data were analyzed using frequency distribution and percentages. Univariate variable analysis was conducted in this study to describe the characteristics of the respondents and the distribution of each research variable. For variables measured using a 1–5 Likert scale, the mean values were interpreted using the three-box method, which divides the score range into intervals of 1.00–2.33 for the low category, 2.34–3.66 for the moderate category, and 3.67–5.00 for the high category. Meanwhile, variables measured using a Guttman scale of 0 to 1 are categorized as 0.00–0.33 for low, 0.34–0.66 for moderate, and 0.67–1.00 for high. Mean values and standard deviations were used to describe the central tendency and data distribution, while the three-box method categorization was used to facilitate the interpretation of respondents' levels of perception, government policies, resilience, and disaster preparedness.

To answer the research questions, Partial Least Square Structural Equation Model (PLS-SEM) analysis was used with SmartPLS 3.0 software. The PLS-SEM analysis was conducted in two stages, namely evaluation of the measurement model (outer model) and evaluation of the structural model (inner model). The measurement model evaluation included assessment of internal consistency reliability using Cronbach's alpha and composite reliability, convergent validity using factor loading and Average Variance Extracted (AVE), and discriminant validity using the Fornell-Larcker criterion and cross-loading analysis. Multicollinearity testing among predictor constructs was conducted using the Variance Inflation Factor (VIF). The structural model evaluation included analysis of path coefficients (β), coefficient of determination (R^2), predictive relevance (Q^2), and effect size (f^2) to assess the predictive capability and explanatory power of the model. Hypothesis testing was conducted using bootstrapping procedures to evaluate the significance of direct and indirect effects between exogenous and endogenous variables. The significance level used in this study was 0.05. Furthermore, structural relationships between independent (exogenous) and dependent (endogenous) variables were analyzed using variance-based path modeling in the PLS-SEM framework to examine both direct and mediating effects among variables.

CODE OF HEALTH ETHICS

Ethical approval for this study was obtained from The Highest School for Health Sciences of Sukabumi with ethics number No: 002534/KEP STIKES SUKABUMI/2023. This study was conducted in accordance with ethical norms, and there were no known risks associated with it. During the study, the confidentiality and anonymity of each participant was maintained, and they were given written consent as a form of agreement to participate in the study.

RESULTS

Characteristics of Respondents

The majority of respondents were under 45 years old, totaling 391 people (76.4%), female, totaling 369 people (72.1%), with a Diploma III education, totaling 331 people (64.6%), working for ≥ 5 years, totaling 364 people (71.1%), were non-civil servants, totaling 374 people (73.0%), were married, totaling 471 people (92.0%), had experienced earthquakes and tsunamis, totaling 413 people (80.7%), and had participated in disaster training, totaling 390 people (76.2%) (Table 1).

Univariate Variables Analysis

Based on the results of the univariate analysis in Table 2, the perception variable had a mean value of 3.587 (SD=0.85) and was categorized as moderate, indicating that healthcare workers had a fairly good perception regarding disaster risk and preparedness. The government policies variable obtained a mean value of 0.715 (SD=0.452) and was categorized as high, reflecting that disaster-related policies and institutional support had been well implemented and perceived positively by respondents. The resilience

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variable showed a mean value of 3.302 (SD=1.336) and was categorized as moderate, suggesting that the adaptive and psychological coping capacities of healthcare workers were adequate but still varied among respondents. Meanwhile, disaster preparedness had a mean value of 0.843 (SD=0.364) and was categorized as high, indicating that healthcare workers generally demonstrated good readiness in disaster response, evacuation planning, emergency communication, and participation in disaster preparedness activities.

Table 1. Characteristics of Respondents

Respondent Characteristics	n	%
Age (Years)		
< 45	391	76.4
≥ 45	121	23.6
Gender		
Male	143	27.9
Female	369	72.1
Education		
Diploma III	331	64.6
Bachelor's/Master's Degree	181	35.4
Length of Service (Years)		
< 5	148	28.9
≥ 5	364	71.1
Employment Status		
Non-civil servant	374	73.0
Civil servant	138	27.0
Marital Status		
Single	34	6.6
Widowed/Divorced	7	1.4
Married	471	92.0
Experience of Earthquakes and Tsunamis		
Yes	413	80.7
No	99	19.3
Experience of Disaster Training		
Yes	390	76.2
No	122	23.8

Table 2. Univariate Analysis

Variables	Item	Mean	SD	Category
Perception	10	3.587	0.85	Moderate
Goverment Policies	6	0.715	0.452	High
Resilience	20	3.302	1.336	Moderate
Disaster Preparedness	25	0.843	0.364	High

Multicollinearity Test

The multicollinearity assessment indicated that all exogenous constructs were within the acceptable range, with VIF values from 1.027 to 1.556. These values are far below the cutoff of 5, showing that the predictor constructs were sufficiently distinct and did not distort estimation in the structural model.

Assessment Measurement Model

The measurement model showed satisfactory psychometric performance. All constructs met the recommended thresholds for internal consistency, convergent validity, and discriminant validity, with outer loadings exceeding 0.700, composite reliability above 0.70, Cronbach's alpha above 0.70, and AVE above 0.50.

Construct Reliability

All indicators loaded adequately on their intended latent variables, with outer loading values ranging from 0.700 to 0.909. The reliability indices were also acceptable, indicating that the items consistently represented government policy, perception, resilience, and disaster preparedness.

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Convergent, Discriminant Validity

Convergent validity was confirmed because all AVE values exceeded the recommended minimum of 0.50. This means that each construct explained more than half of the variance of its indicators. Discriminant validity was supported by the Fornell-Larcker criterion, as the square root of each construct's AVE was greater than its correlations with other constructs. This indicates that the four constructs were empirically distinct.

Structural Model Assessment

The structural model was evaluated using path coefficients, R^2, Q^2, and f^2. In the PLS-SEM framework, these indices were used to assess the explanatory power, predictive relevance, and practical magnitude of the hypothesized relationships, while significance testing was performed using bootstrapping.

Measuring the Coefficient of Determination Values (R^2), the Effect Size (f^2), Predictive Relevance (Q^2)

Government policy explained 35.2% of the variance in perception and 26.6% of the variance in resilience, whereas the full model explained 42.4% of the variance in disaster preparedness. This indicates that the model has moderate explanatory power for preparedness, while additional contextual and individual factors likely contribute to the remaining variance.

The effect size results indicated that the significant structural relationships had small to moderate practical contributions. This suggests that government policy and the psychological variables meaningfully contribute to preparedness, although they do not fully account for it. Blindfolding showed that the model had predictive relevance because Q^2 values were greater than zero for all endogenous constructs. The predictive relevance for perception and disaster preparedness was moderate, whereas the value for resilience was weak but still acceptable.

Direct and Indirect Effect Analysis

Bootstrapping results showed significant direct effects of government policy on perception ($\beta = 0.593$, $t = 21.513$, $p < 0.001$), resilience ($\beta = 0.164$, $t = 2.347$, $p = 0.028$), and disaster preparedness ($\beta = 0.348$, $t = 7.265$, $p < 0.001$). Perception also had a significant direct effect on resilience ($\beta = 0.115$, $t = 2.148$, $p = 0.032$) and disaster preparedness ($\beta = 0.296$, $t = 7.785$, $p < 0.001$), and resilience significantly affected disaster preparedness ($\beta = 0.227$, $t = 5.870$, $p < 0.001$).

The indirect effects were also significant, including government policy through perception, government policy through resilience, government policy through perception and resilience, and perception through resilience. Because the direct effect of government policy on disaster preparedness remained significant after the mediators were included, the mediation in this model was partial rather than full.

These indirect pathways show that perception and resilience transmitted part of the influence of government policy on disaster preparedness. This supports a serial mediation pattern in which institutional support shapes cognitive appraisal and adaptive capacity before influencing preparedness.

Table 4. Path Coefficient Result

Path Relationship	Hypothesis	Original Sample (O)	T Statistics (|O/STDEV|)	p-value	Decision
GP → PC	H1	0.593	21.513	0.000	Supported
GP → RS	H2	0.164	2.347	0.028	Supported
GP → DP	H3	0.348	7.265	0.000	Supported
PC → RS	H4	0.115	2.148	0.032	Supported
PC → DP	H5	0.296	7.785	0.000	Supported
RS → DP	H6	0.227	5.870	0.000	Supported
GP → PC → RS	H7	0.068	2.130	0.034	Supported
GP → PC → DP	H8	0.176	7.206	0.000	Supported
GP → PC → RS → DP	H9	0.116	2.120	0.036	Supported
GP → RS → DP	H10	0.118	2.113	0.040	Supported
PC → RS → DP	H11	0.076	2.115	0.038	Supported

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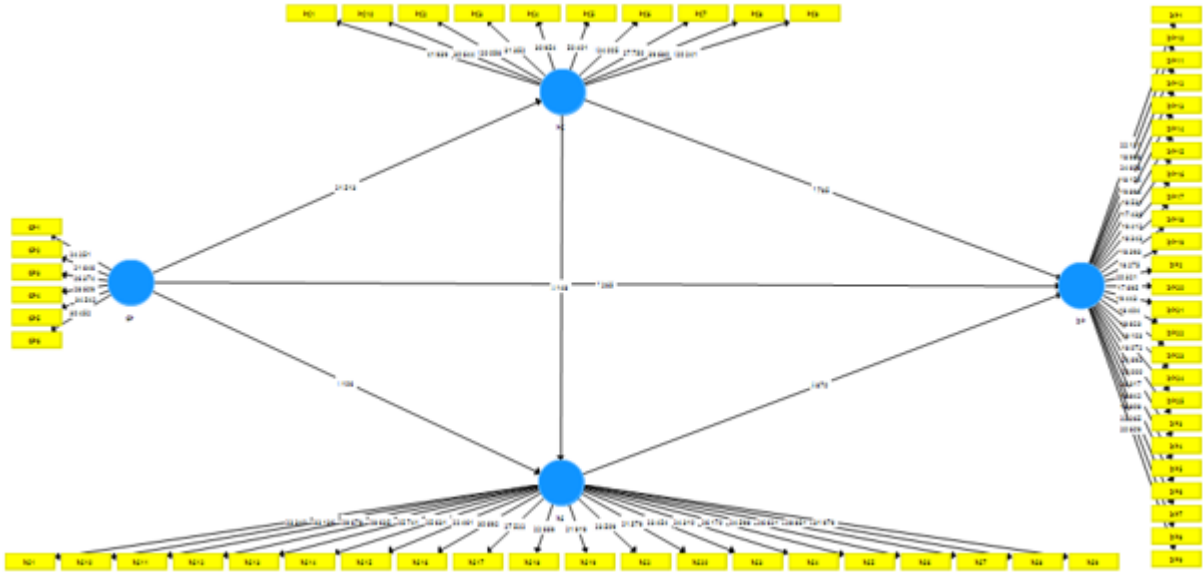

Figure 1. Measurement Model Test

DISCUSSION

Based on the analysis model developed, it appears that government policy, individual perceptions, and resilience have an impact on preparedness. These findings are in line with the research conducted by Unmehopa et al. (16) which shows that government policy support plays a role in improving preparedness for disaster emergencies. In addition, the results of research by Susila et al. (9) reinforces that individuals' perceptions of disaster conditions also influence the preparedness of health workers. Resilience has also been shown to contribute to preparedness, as reported in a study by Yulianti et al. (14) which emphasizes that the ability to adapt and survive under pressure is an important factor in improving disaster preparedness.

Government policies have a positive and significant impact on disaster preparedness. These findings indicate that effective and well-implemented government policies contribute to higher preparedness among health workers. Government policies in the context of disaster management include regulatory frameworks, preparedness guidelines, early warning systems, emergency response planning, and institutional coordination, all of which shape preparedness behavior. Clear policies, consistent enforcement, and easily accessible disaster information increase trust and compliance, thereby facilitating preparedness measures such as participation in disaster drills, compliance with evacuation protocols, and preparedness planning. Policies supported by adequate resources, interagency coordination, and ongoing public communication are more likely to strengthen preparedness outcomes (16–18). Perception of disaster risk also has a positive and significant influence on disaster preparedness. These findings indicate that individuals who have a higher perception of disaster risk tend to exhibit better preparedness behavior. Disaster risk perception reflects individuals' awareness and understanding of potential hazards, vulnerabilities, and possible impacts of disasters, which play a critical role in motivating preparedness actions. Higher disaster risk perception encourages individuals to engage in preparedness activities, such as designing evacuation plans, obtaining emergency supplies, and increasing knowledge of emergency response procedures (19,20). Similarly, resilience has an impact on the preparedness of health workers in dealing with disasters. Resilience is an individual's ability to withstand and reduce stress and destructive forces through a process of resistance or self-adjustment (21). Health workers with good resilience tend to be better able to effectively manage stress, emotional pressure, and increased workloads in emergency situations (22). The ability to adapt quickly to crisis conditions enables them to continue performing their professional roles, make the right decisions, and provide maximum health services despite facing various limitations and risks (23).

The significant influence of disaster risk perception on preparedness among healthcare workers in this study can also be understood within the specific geographical context of the Sukabumi coastal area, which is highly vulnerable to earthquakes and tsunamis due to its proximity to the Sunda Strait Megathrust

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and the active Cimandiri Fault. Previous seismic modeling studies have estimated tsunami wave heights of up to 20 meters in extreme scenarios along the southern coast of Java, indicating that healthcare workers in this region are exposed to a well-recognized and potentially catastrophic disaster threat (24). If policies are perceived positively, for example as clear, fair, and enforceable, health workers tend to demonstrate higher levels of preparedness, have strong motivation, and take responsibility for implementing preparedness procedures (25). Conversely, negative perceptions, such as the assumption that policies are unrealistic or not supported by adequate facilities and infrastructure, can reduce readiness even if the policies have been formally established (26). Perception acts as a mediating variable that explains how government policy can indirectly influence readiness. The quality of a policy is determined not only by its substance and objectives, but also by how it is understood and accepted by those who implement it in the field (27).

Government policy showed a significant direct effect on disaster preparedness, and this effect is substantively meaningful in the context of coastal health services. In disaster-prone settings, policy does more than regulate behavior. It provides operational guidance, clarifies responsibilities, institutionalizes training, and legitimizes preparedness as part of professional duty. For health workers in Sukabumi, where earthquake and tsunami risk is structurally embedded in the local environment, such policy signals are likely to reduce ambiguity and strengthen adherence to preparedness procedures. This helps explain why policy remains a direct determinant even after psychological variables are introduced into the model (28–30).

Resilience plays a significant role in mediating the influence of perceptions on disaster preparedness. Individual perceptions play an important role in building preparedness, especially among health workers when facing disaster conditions (31). Positive perceptions of disaster threats, professional responsibility, and personal capabilities in emergency situations influence how individuals understand and respond to the pressures they face (32). Positive perceptions of challenges and disaster situations contribute to strengthening resilience, enabling health workers to manage stress better, adapt to rapid changes, and maintain performance under stressful conditions (33). Increased resilience not only helps individuals survive psychologically, but also improves mental and emotional readiness in carrying out disaster management tasks (34). Health workers with positive perceptions and high levels of resilience tend to have more optimal preparedness, which is reflected in their ability to make appropriate decisions, perform their professional roles well, and provide maximum health services even when faced with various limitations and risks (35).

The structural model showed that government policy explained 35.2% of the variance in perception and 26.6% of the variance in resilience, indicating that although the model demonstrated adequate predictive capability, a substantial proportion of these psychological factors was influenced by variables outside the model. This finding suggests that perception and resilience among healthcare workers are not formed solely through institutional policies, but are also strongly influenced by personal experiences and individual exposure to disaster situations. In this study, most respondents had previously experienced earthquakes and tsunamis and had participated in disaster training programs, which may have contributed substantially to the development of disaster risk perception and adaptive psychological capacity. Previous disaster experiences can increase individuals' awareness of vulnerability and potential hazards, thereby strengthening preparedness-oriented perceptions. Similarly, disaster training may enhance confidence, coping mechanisms, and emotional readiness when facing emergency situations. These conditions indicate that direct exposure to disasters and repeated preparedness activities may function as experiential learning processes that shape perception and resilience more strongly than formal policy implementation alone. Therefore, although government policy remains an important institutional driver, the development of psychological preparedness among healthcare workers appears to be multidimensional and influenced by both structural support and personal disaster-related experiences.

The demographic profile of respondents also provides an important contextual lens. The predominance of female, married, non-civil servant, and experienced health workers suggests that preparedness behavior may be influenced by both professional role and social obligations. Non-civil servant status, in particular, may affect how strongly workers perceive institutional support, job security,

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and policy access. Although these demographic differences were not tested statistically in the present model, they deserve consideration in future work because they may modify how policy and psychological resources are translated into preparedness. For this reason, future studies should use longitudinal designs, incorporate additional contextual variables, and consider mixed-method approaches to capture how health workers actually interpret and operationalize preparedness in disaster-prone settings.

Despite these strengths, several limitations should be acknowledged. First, the use of total sampling among healthcare workers in the coastal area of Sukabumi Regency limited the contextual variation of the sample, particularly because the study did not include comparisons with healthcare workers from non-coastal, urban, or lower-risk disaster areas. Second, perception and resilience were measured only quantitatively using structured questionnaires, which limited the ability of the study to explore deeper qualitative aspects, such as how healthcare workers personally interpret disaster policies, develop adaptive coping strategies, or construct resilience through lived experiences during disaster events. In addition, there may be other unmeasured factors outside the model, such as organizational culture, leadership support, workload, previous trauma exposure, and interprofessional collaboration, which could also contribute to healthcare workers' preparedness, perception, and resilience in disaster situations.

CONCLUSION

The results of this study indicate that government policy, perception, and resilience, both directly and indirectly, influence disaster preparedness among healthcare workers in the coastal areas of Sukabumi Regency. These findings demonstrate that disaster preparedness is a multidimensional construct shaped not only by institutional policy support but also by internal psychological factors that influence how healthcare workers interpret and respond to disaster risks. Based on these findings, local governments and healthcare institutions in disaster-prone coastal areas should prioritize integrated preparedness programs that combine technical disaster training with psychological resilience strengthening. Considering that most respondents had previous disaster experience and disaster training exposure, preparedness programs should be developed through periodic simulation-based exercises, scenario-based tsunami evacuation drills, and structured resilience-support interventions specifically designed for frontline healthcare workers in high-risk coastal areas. Future research should prioritize longitudinal studies to examine how resilience and perception develop over time following repeated disaster exposure and preparedness interventions. In addition, qualitative or mixed-method approaches are recommended to explore more deep on this topic.

DECLARATION OF THE USE OF AI

The authors declare that no artificial intelligence (AI), AI-assisted technologies, or large language models (LLMs) were used in the conception of the study, data analysis, or the drafting, writing, and editing of this manuscript. The only exception is the graphical abstract, which was created using the design platform Illustrae (https://illustrae.co/). The authors take full responsibility for the content and accuracy of the graphical abstract and the entire manuscript

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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