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THE RESILIENCE AND PREPAREDNESS OF NURSES IN DISASTER

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A B S T R A C T

Introduction: Indonesia's vulnerability to disasters highlights the urgent need for efficient disaster response. While nurses play a pivotal role, there exists a notable gap in their preparedness and the influence of resilience on their readiness. **Purpose:** This study aimed to investigate the relationship between resilience and disaster preparedness among nurses, exploring how various resilience dimensions impact their readiness for disaster. **Methods:** Between April and June 2023, 260 nurses from two naval hospitals in Jakarta were surveyed in a cross-sectional study. Participants were selected based on quota sampling and required a permanent registered nurse and minimum nursing diploma. The study utilized the Disaster Adaptation Resilience Scale (DARS) and the Disaster Preparedness Evaluation Tool (DPET) for data collection, analyzed using SPSS v26.0. Variables were categorized as low, medium, or high, with the Chi-Square and Fisher exact test evaluating variable relationships. **Results:** Of the 260 surveyed nurses, most were female diploma holders over 40 years of age, with over 11 years of experience. The average resilience score was 336.16 (SD=26.575). Resilience sub-components: Physical resources at 41.57 (SD=4.091) and social resources at 37.37 (SD=3.671). Disaster preparedness averaged 218.18 (SD=24.238). The total Resilience was significantly correlated with Disaster Preparedness (p=0.000, OR=0.323). Each resilience dimension was consistently aligned with the heightened disaster preparedness levels. **Conclusion:** The correlation between resilience and readiness emphasizes the need for holistic nursing training and revised policies to bolster crisis responses.

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1. INTRODUCTION

Indonesia has been ranked third globally in terms of disaster vulnerability, following the Philippines and India, according to the World Risk Report 2022. This high vulnerability is attributed to the country's geographical location, which is situated within the "ring of fire" and intersects two significant volcanic belts and three converging tectonic plates (BNPB, 2023). In 2019, Indonesia experienced 3,814 disasters, resulting in 478 fatalities as reported by the National Disaster Management Agency (Rosyida et al., 2019). The importance of efficient and swift intervention by professionals in managing the aftermath of such disasters cannot be overstated.

Nurses play a critical role in disaster management, and their numbers and roles have expanded annually, as highlighted by the International Council of Nurses (ICN) in 2019. In 2021, the nursing workforce in Indonesia stood at 511,191, representing a 16.65% increase from the previous year (Annur, 2022). Nurses are essential in upholding preparedness plans at the individual, familial, and professional levels, and they provide critical care during the emergency response phase, through appropriate referral systems, to the rehabilitation phase. Therefore, it is imperative that nurses possess the necessary capacity for preparedness and rapid response to disaster scenarios.

In this research, we emphasize the vital role of preparedness in mitigating disaster risks, as asserted by the 2019 National Agency for Disaster Countermeasure handbook, which posits that preparedness is an essential aspect of safety (Yanuarto et al., 2019). Preparedness encompasses proactive measures such as community engagement and readiness exercises designed to anticipate and address disasters effectively. As defined by the United Nations Office for Disaster Risk Reduction (UNDRR), preparedness entails the acquisition of knowledge and capabilities by stakeholders to adequately respond to disasters (Disaster | UNDRR, n.d.).

Despite the importance of preparedness, previous research indicates that nurses' preparedness levels are generally moderate to low (Martono et al., 2019a; Setyawati et al., 2020; Wang et al., 2023). Various factors contribute to preparedness, including knowledge, education, disaster experience, and resilience (Brewer et al., 2020a; King et al., 2019; Setyawati et al., 2020; Tas & Cakir, 2022). Notably, nurses' knowledge significantly influences their engagement in international publications and disaster training (Tas & Cakir, 2022), while their experience with disasters shapes their knowledge level and resilience to potential future disasters (King et al., 2019).

Resilience, an individual's ability to cope with and recover from adversity, is a critical component of disaster preparedness (Combaz, 2014). Research has established a correlation between resilience and disaster preparedness among disaster survivors, nursing students, and practicing nurses (Gandhi et al., 2021; Weber et al., 2020). High resilience enables nurses to face and bounce back from disaster situations (Gee et al., 2022). Resilience components encompass both physical and psychological aspects derived from both internal and external sources (Afshari et al., 2021; Havnen et al., 2020; Jennifer et al., 2021).

Previous studies on resilience have primarily utilized measures such as the Connor-Davidson Resilience Scale (CD-RISC) and the Brief Resilient Coping Scale (BRS) to focus on psychological resilience (Connor & Davidson, 2003; Gandhi et al., 2021; Turner, 2015; Wenjiao et al., 2023). However, other critical aspects of resilience, including physical and social resilience, have not yet been explored. These factors are significant stressors that affect resilience levels and warrant

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investigation, as physical resources and external stressors significantly affect resilience and nurse decision-making during disasters (Afshari et al., 2021; Alameddine et al., 2021).

Military hospital nurses are crucial responders to disasters, and require adequate preparation (Permenhan RI No.6, 2015). While existing research in the U.S. and Iran indicates that military nurse preparedness remains at a moderate level (Danyalipour et al., 2022; H. King et al., 2019), there is a lack of such studies in Indonesia. Therefore, researching resilience and disaster preparedness is vital to ensuring the deployment of resilient and prepared nurses during crises. To enhance nurses' preparedness in disaster scenarios, it is essential to understand their relationship with resilience. Drawing from the literature reviewed, this study aimed to explore the relationship between resilience and preparedness of nurses in disaster response.

2. METHODS

Research Design

This study used a descriptive quantitative correlational approach with a cross-sectional design, which was deemed appropriate for assessing the relationship between nurses' perceptions of disaster resilience and preparedness from April to June 2023. This design allowed for the simultaneous examination of these perceptions at a specific point in time, making it an efficient choice for this study, as it permitted us to evaluate the current state of these perceptions without the need for longitudinal follow-up. Given the study's objectives, a cross-sectional design was considered the optimal choice.

Population and Sample

The study population was comprised of nurses employed at two naval hospitals in Jakarta. A quota sampling method was used to select 260 nurses from the hospitals. To be included in the study, participants had to meet the following criteria: holding a Registration Certificate (STR), possessing a minimum education level of diploma III in nursing, and being willing to participate as research respondents. Nursing interns, volunteers, and students were excluded from this study.

The Disaster Adaptation Resilience Scale (DARS) and Disaster Preparedness Evaluation Tool (DPET) were employed in this research. The questionnaire was divided into three sections: demographic data of the respondents, DARS for evaluating perceptions of resilience dimensions, and DPET to measure nurses' perceptions of disaster preparedness (Jennifer et al., 2021; Tichy et al., 2009).

The DARS instrument employed a questionnaire devised by Jennifer et al. (2021) comprising 43 inquiries spanning five resilience dimensions: physical resources, social resources, stress regulation, problem-solving, and optimism. The DPET instrument, formulated by Tichy Elaine Bond et al. (2009), comprises 47 questions on three dimensions of disaster preparedness. The DPET evaluated the readiness, response, and recovery capabilities of nurses in relation to disasters, and was further divided into several sub-dimensions. Responses to resilience perceptions were rated on a Likert scale ranging from 0 to 5, while disaster preparedness responses ranged from 0 to 6. Higher scores indicated greater resilience and preparedness. The validity and reliability of the questionnaires were tested, yielding Cronbach's alpha values of 0.967 and 0.986 for resilience and preparedness, respectively.

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Research Procedure

The researchers disseminated questionnaires to various nursing departments, followed by a presentation to the head of the departments regarding the study's objectives, sampling criteria, and nature of the research. Participants who agreed to participate provided written consent by signing the informed consent. The questionnaire results were collected at intervals of five days.

Data Analysis

Data were analyzed using SPSS version 26.0. The results are presented dichotomously, with median values used as the cutoff points for resilience and preparedness variables. These variables were categorized as low, medium, or high, respectively. The chi-squared test was used to identify the significant variables influencing the primary variable relationships. A p-value less than 0.05 was considered significant (Polit & Beck, 2018).

Ethical Clearance

The respondents were fully informed of the study's purpose, benefits, and compensation, and their consent to participate was voluntary. The participants were required to sign informed consent forms, and ethical clearance was obtained from the research ethics committees of two hospitals in Jakarta. The approval numbers for ethical clearance were (B/11/EC/LKS/V/RSMTH/2023) and (09/IV/2023/RSMC).

3. RESULT

The sample consisted of 260 nurses, representing a diverse range of demographics and professional experience. A significant majority (84.2%) of the participants were female, reinforcing the gender demographics commonly observed in the nursing profession. Educationally, 84.6% had completed their diploma, whereas a smaller fraction (15.4%) was identified as Ners (Table 1).

The age distribution provided an interesting insight into the career stages of the participants:31.5% were in the early stages of their career and were under 30 years old. The middle bracket of 31-40 years old comprised 16.2%, while a substantial 52.3% were seasoned professionals over the age of 40. When considering professional tenure, the data revealed that 27.7% had under 5 years of experience, 8.5% were in the mid-range of 6-10 years, and 63.8% had amassed over 11 years in the field. The employment scenario was diversified, with 15% associated with TNI, 52.7% with PNS, and the remaining 32.3% engaged on a contractual basis. In terms of marital demographics, 37.3% of the nurses were either single or had ever married without offspring, compared to 62.7% who were or had been married with children (Table 1).

In the realms of resilience and preparedness, the mean total resilience score stood at 336.16 (SD=26.575, range 262-405). Delving deeper into the sub-components of resilience, the scores were indicative of certain trends: Physical resources averaged at 41.57 (SD=4.091), social resources at 37.37 (SD=3.671), problem-solving skills at 41.02 (SD=3.586), stress regulation at 37.41 (SD=3.207), and optimism at 21.41 (SD=2.056). As for disaster preparedness, the mean score was benchmarked at 218.18 (SD=24.238, range 142-276) (Table 2).

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Table 1. Frequency Distribution of Nurse Characteristics (N=260)

Characteristics	Frequency (n)	Percentage (%)
Sex		
Male	41	41 (15.8)
Female	219	84.2
Education		
Diploma	220	84.6
Ners	40	15.4
Age		
≤30 Years old	82	31.5
31–40 Years old	42	16.2
>40 t Years old	136	52.3
Working experience		
≤5 Years	72	27.7
6-10 Years	22	8.5
≥11 Years	166	63.8
Employment Status		
TNI	39	15
PNS	137	52.7
Contract	84	32.3
Marital Status		
Single/married without children/ever married without children	97	37.3
Married have children/ever married have children	163	62.7
Resilience		
Low	9	3.5
Moderate	197	75.8
High	54	20.8
Preparedness		
Low	65	25
Moderate	181	69.6
High	14	5.4

Table 2. Distribution of Resilience and Preparedness of Nurses in Disaster (N=260)

Variable	Mean	SD	Min-Max	Median	P25,P75
Total resilience	336.16	26.575	262-405	326.00	322,348
Dimensions of Resilience					
Physical resources	41.57	4.091	24-50	40.00	39,44
Social resources	37.37	3.671	14-45	36.00	36,39
Problem solving	41.02	3.586	30-50	40.00	40,42
Stress regulation	37.41	3.207	27-45	36.00	36,38
Optimism	21.41	2.056	15-25	20.00	20,23
Total Preparedness	218.18	24.238	142-276	228.00	202.50,230
Low	184.02	13.106	142-202	186.00	179.50,194
Moderate	226.41	8.851	204-251	230.00	222.00,230
High	265.79	7.909	254-276	273.50	266.25,276

The correlation between Total Resilience and Disaster Preparedness exhibited a clear trend. A low resilience level was found to have a strong positive correlation with moderate levels of disaster preparedness (P-value=0.000), with an Odds Ratio (OR) of 0.323 (Table 3). Conversely, moderate resilience was primarily associated with moderate levels of disaster preparedness. Finally, high resilience was significantly associated with high levels of disaster preparedness, with 22.2% of individuals in this category reportedly being highly prepared for disasters.

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When examining the specific Dimensions of Resilience, each category–physical resources, social resources, problem-solving, stress regulation, and optimism–consistently demonstrated a strong correlation with disaster preparedness, with a p-value of 0.000. For instance, individuals with High Physical Resources were more likely to have a moderate level of disaster preparedness, with 65.1% displaying this level of preparedness. Similarly, those with High Problem-Solving skills had a 68.8% likelihood of being moderately prepared, whereas individuals with High Optimism had a 63.5% likelihood of displaying a moderate level of disaster preparedness (Table 3).

Table 3. Relationship between Resilience and Disaster Preparedness (N=260)

Resilience	Disaster Preparedness						P-value	OR
	Low		Moderate		High			
	n	%	n	%	n	%		
Total Resilience								
Low	4	44.4	4	44.4	1	11.1	0.000	0.323
Moderate	55	27.9	141	71.6	1	0.5		
High	6	11.1	36	66.7	12	22.2		
Total	65	25	181	69.6	14	5.4		
Dimensions of Resilience								
Physical resources								
Low	1	14.3	5	71.4	14.3	14.3	0.000	
Moderate	54	28.4	135	71.1	0.5	0.5		
High	10	15.9	41	65.1	19	19		
Social resources								
Low	6	54.5	5	45.5	0	0	0.000	
Moderate	50	25.9	140	72.5	3	1.6		
High	9	16.1	36	64.3	11	19.6		
Problem solving								
Low	8	72.7	2	18.2	1	9.1	0.000	
Moderate	54	26.9	146	72.6	1	0.5		
High	3	6.3	33	68.8	12	25		
Stress regulation								
Low	5	83.3	0	0	1	16.7	0.000	
Moderate	56	26.7	152	72.4	2	1		
High	4	9.1	29	65.9	11	25		
Optimism								
Low	2	100	0	0	0	0	0.000	
Moderate	49	26.6	134	72.8	1	0.5		
High	14	18.9	47	63.5	13	17.6		

Note. significance ($p<0.05$)

4. DISCUSSION

Demographic Profile and Educational Attainment of Nurses

The current study demonstrated a gender distribution in the nursing profession, with 84.2% of nurses being female, which aligns with international trends in countries such as Sweden, China, Iran, Australia, and previous Indonesian research (Brewer et al., 2020b; Chegini et al., 2022; Lu et al., 2021; Martono et al., 2019b; Murphy et al., 2021; Setiawati et al., 2020). Historically, females have been predominant in nursing because of gender roles associated with care and compassion, as outlined by Watson's theory of caring for Sitzman and Watson (2018) and maternal instinct (Ariga, 2021). However, it is worth noting that Suprayitno et al. (2020) reported the

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majority of male nurses in emergency nursing, suggesting potential specialization-based gender distribution differences.

In this study, a significant number of nurses held Diploma III, consistent with the findings of Saur (2021) and Setiawati et al.(2020). This aligns with the recruitment policies of hospitals, which often require a minimum of Diploma III for nursing positions as stipulated by Permenkes RI No. 26 of 2019. This policy aimed to ensure technical proficiency among nurses (Permenkes RI No.26 Tahun 2019, 2019). However, a trend towards obtaining a bachelor's degree is emerging in cities such as Riyadh, where the prominent Filipino nurse population is 58.7% (Balay-odao et al., 2021; Chegini et al., 2022).

Demographically, the majority of the nurses in this study were older than 40 years. This can be attributed to the hospital's structural composition, with 52.7% of them being civil servants and 15% being military personnel. This leads to prolonged commitments as dictated by the Defense Ministry (Permenhan, 2016). It is worth noting that Chegini et al. (2022) and Saur (2021) primarily observed nurses below 40 years of age, which may reflect regional practices such as Iran's contract-based hiring.

The majority of nurses in this study had approximately 11 years of professional experience, which is consistent with the findings of Alameddine et al.(2021), Brewer et al. (2020), and Murphy et al. (2021). Given the focus of the study on established naval hospitals in Jakarta and the prevalence of civil servant status, influenced by regulations such as Permenhan RI (2016), tenure longevity is expected. In contrast, the dominant trend in Iran is less than five years of service because of its contract-based recruitment (Chegini et al., 2022). Regarding marital status, the observations indicated that most nurses were either married or previously married, which is consistent with findings from Saudi Arabia, Iran, and Turkey (Balay-odao et al., 2021; Chegini et al., 2022; Taskiran & Baykal, 2019). This aligns with Havighurst's (1972) developmental theory, which suggests that individuals around the age of 40 typically marry and have children. However, Labrague et al. (2016) noted that younger nurses (18-25) were mainly single.

Nurses' Resilience and Preparedness in Disaster Contexts

Given the findings of our study, most nurses demonstrated moderate resilience, with 75.8% exhibiting a balanced understanding and application of the core components of resilience. This research provides a unique perspective on nursing resilience studies, highlighting the significant influence of individual factors such as age, years of service, and familial roles on resilience levels. Consistent with the findings of Jennifer et al. (2021), physical resources, particularly the ability to secure stable housing, income, and nutrition, play a fundamental role in enhancing nurses' disaster resilience. Furthermore, Afshari et al. (2021) suggested that nurses working in permanent employment in private healthcare settings tend to possess higher resilience than those in public hospitals under contractual employment.

Furthermore, our study emphasizes the pivotal role of social resources in building resilience. This is consistent with previous findings (Afshari et al., 2021; Alameddine et al., 2021), in which the dynamics of marital status, family, workplace atmosphere, and peer relationships substantially impacted nurses' resilience during disasters. Intriguingly, married nurses without children demonstrated heightened resilience compared with those with children, suggesting the potential complexities of balancing professional and parental roles in disaster contexts (Afshari et al., 2021).

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Additionally, 69.6% of the nurses in our study showed moderate disaster preparedness levels, indicating a commendable base of knowledge, but with ample scope for enhancement. These findings concur with prior studies conducted across various countries, highlighting the need for consistent improvements in disaster preparedness among nurses. Significantly, there was a robust correlation between resilience and disaster preparedness, as reinforced by Palupi and Himawan (2020). The relationship between these two aspects underscores the importance of fostering resilience to bolster disaster preparedness. Skills such as adaptive problem-solving, distress regulation, and optimism greatly enhance this relationship, as noted in various studies (Afshari et al., 2021; Alameddine et al., 2021; Coco et al., 2021; Havnen et al., 2020). Understanding the nuanced factors influencing nurses' resilience and disaster preparedness is crucial. It aids in devising targeted strategies to bolster both, ensuring an optimal nursing response in disaster scenarios.

The data underscore the pivotal role of resilience in disaster preparedness, highlighting the need for comprehensive resilience training for nurses to optimize their readiness for crisis scenarios. By addressing all aspects of resilience, from physical resources to optimism, nurses are better equipped for decision-making and patient care, ultimately fostering improved patient outcomes and a fortified healthcare system during crises. To bolster this, enhancing disaster preparedness through tailored sessions, mock drills, and robust support mechanisms, such as mentorships and counseling, are advised. Moreover, reconsidering employment structures to provide more permanent roles can further augment nurses' resilience and preparedness.

One primary limitation of this study was the dependence on self-reported perceptions. The interpretive nature of perception-based measures may introduce distortions, as participants may exaggerate or underestimate their resilience and readiness levels. Furthermore, perceptions may not always correspond to actual abilities or actions during real-life disaster situations. Future investigations should employ objective metrics or simulations to validate and supplement the results of perception-based assessments.

5. CONCLUSION

This study underscores the critical importance of resilience among nurses, as a substantial proportion of them exhibit moderate resilience. The findings indicate that approximately 69.6% of nurses displayed moderate disaster preparedness, indicating a solid foundation but also ample room for improvement. The significant correlation between resilience and preparedness underscores the need to foster resilience in order to enhance disaster preparedness. Therefore, it is essential to provide comprehensive resilience training and strategies that address the physical, social, and mental aspects of nurses' work to optimize their responses in crisis scenarios. Furthermore, tailored disaster preparedness initiatives in conjunction with restructured employment policies can significantly enhance resilience and response efficacy in the nursing sector.

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