

Determinants of Emergency Nurse Readiness for Emerging Infectious Diseases

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ABSTRACT

Emerging infectious diseases are infectious diseases that appear and increase so rapidly that they can be said to be epidemics or non-natural disasters. As the front line, nurses are faced with uncertainties that increase the risk of exposure to disease, so preparedness is needed. This study aims to analyze the factors that affect the preparedness of emergency nurses in dealing with patients with emerging infectious diseases. This study is a correlational analytic study involving 109 emergency nurses in Bali. Data were collected through an online survey using a general questionnaire on demographic factors, a questionnaire on nurses' knowledge of EID, and a questionnaire on nurse preparedness in dealing with EID that had been tested for validity and reliability. The results of the bivariate analysis using the Spearman rank test showed that only the availability of personal protective equipment (p-value 0.007, $p < \alpha$ (0.05) and nurses' knowledge had a significant correlation with emergency nurse preparedness in dealing with patients with emerging infectious diseases (p-value 0.005, $p < \alpha$ (0.05). Therefore, it can be suggested to the hospital management in providing opportunities for emergency nurses to receive training related to emergencies in dealing with emerging infectious diseases and increase the assurance of the availability of adequate personal protective equipment (PPE).

Keywords: *Emerging Infectious Diseases; Nurse Preparedness; Emergency Nurse*

ABSTRAK

dengan sangat cepat sehingga dapat dikatakan menjadi wabah atau bencana non-alam. Sebagai garda terdepan, perawat dihadapkan dengan ketidakpastian yang meningkatkan risiko akan paparan penyakit sehingga diperlukan suatu kesiapsiagaannya. Penelitian ini bertujuan untuk menganalisis faktor yang mempengaruhi kesiapsiagaan perawat gawat darurat dalam menghadapi pasien dengan penyakit infeksi emerging. Penelitian ini merupakan penelitian analitik korelasional yang melibatkan 109 orang perawat gawat darurat di Bali. Data dikumpulkan melalui survey secara online dengan menggunakan kuisioner umum mengenai faktor demografi, kuisioner pengetahuan perawat tentang PIE, kuisioner kesiapsigaaan perawat dalam menghadapi PIE yang telah teruji validitas dan reliabilitas. Hasil analisis bivairiate dengan Uji spearmank rank menunjukkan bahwa hanya variabel ketersediaan alat pelindung diri (p-value 0.007, $p < \alpha$ (0.05) dan pengetahuan perawat yang memiliki korelasi secara signifikan dengan kesiapsiagaan perawat

gawat darurat dalam menghadapi pasien dengan penyakit infeksi emerging (p-value 0.005, $p < \alpha$ (0.05). Oleh karena itu hal yang dapat disarankan kepada pihak manajemen RS dalam memberikan kesempatan kepada perawat emergensi untuk mendapatkan pelatihan-pelatihan terkait kegawatdaruratan dalam menghadapi penyakit infeksi emerging dan meningkatkan jaminan akan ketersediaan APD yang memadai.

Kata Kunci: Penyakit Infeksi Emerging; Kesiapsiagaan Perawat; Perawat Gawat Darurat

INTRODUCTION

Emerging Infectious Disease (EID) can be regarded as a non-natural outbreak which is a disease that appears and attacks a population for the first time or has existed before but is increasing very rapidly, both in terms of the number of new cases in a population or its spread to the others region geography (re-emerging) (Omami *et al.*, 2020). Various outbreaks of EID have emerged in various parts of the world, including Ebola Virus Disease (EVD) in West Africa, Middle East Respiratory Syndrome (MERS) in Korea, and COVID-19 in Wuhan, China (Bloom and Cadarette, 2019; Kim and Choi, 2016; Chen, Lai and Tsay, 2020). As the front line with the massive number of health care centers, direct contact is unavoidable because of the involvement with patients for 24 hours emergency nurses handle various challenges. One of the main challenges faced by emergency nurses is the increased but unpredictable risk of infection. For example, the infection status of most Emergency Department (ED) patients is unknown. This uncertainty increases the risk

of exposure of frontline emergency nurses compared to other healthcare professionals during epidemic events (Lam *et al.*, 2020).

Given the important role of nurses in disease management during pandemic emergencies and to anticipate the re-emergence of new viruses in the future, it is crucial for nurses who have direct contact with patients with emerging infectious diseases to understand and have a level of preparedness (Al Thobaity and Alshammari, 2020). In addition, the ED in the hospital is included in the group vulnerable to disasters, it deemed necessary to know the knowledge and attitude, and readiness of the facility nurses towards preparedness (Mahdi, Mudatsir and Nasaruddin, 2014). Nurse preparedness in dealing with patients with EID is an integral part of hospital disaster management (Mahdi, Mudatsir and Nasaruddin, 2014). WHO emphasizes the use of hospital readiness checklists for EID to improve prevention and management among healthcare's professional. Therefore the preparedness component is very

important for frontline nurses (Al Thobaity and Alshammari, 2020).

Preparedness is a series of activities carried out to anticipate disasters through organization and appropriate and efficient steps. Preparedness is an integral part of disaster management and aims to develop operational capacity and facilitate effective response in the event of a disaster (Presiden Republik Indonesia, 2007). One of the important components of preparedness is support from hospitals including the provision of adequate health facilities such as complete Personal Protective Equipment (Laksmi and Susila, 2021).

A literature review explains several recommendations regarding nurse preparedness in dealing with emerging infectious diseases including the knowledge and experience of nurses (Al Thobaity and Alshammari, 2020). From this review, it can be seen that preparedness can develop with components of education, training, and experience. Nurses dealing with patients with infectious diseases are disturbed by negative public perceptions of emerging infectious diseases, personal factors, and a lack of knowledge of hospital institutional policies and plans. (Kim and Choi, 2016; Wilson *et al.*, 2020). Based on the above

phenomena, given the important role of nurses in managing emerging infectious diseases, nurses need to know and identify factors that affect preparedness in the incidence of emerging infectious diseases. Therefore, the authors are interested in conducting research on “Determinants of Emergency Nurse Readiness for Emerging Infectious Diseases (EID)”. The purpose of this study was to obtain a new theoretical concept regarding the determinants of emergency nurse preparedness in dealing with emerging infectious disease outbreaks.

METHOD

The research is a correlational analytic study using a cross-sectional design and a quantitative approach, namely the measurement and observation of the variables are carried out in the same period. The population in this study were all emergency room nurses who were members of the Himpunan Perawat Gawat Darurat (HIPGABI) Bali. The sample size was determined using the formula from Lemeshow *et al.*(1990) with the number of samples being 109 ED nurses. Sampling in this study used a simple random sampling technique where all of them were members of the HIPGABI Bali spread throughout the Government Hospitals in Bali which

became referrals for Covid-19 patients. The variables studied included emergency nurse preparedness as the dependent variable, and independent variables included demographic factors such as age, gender, last education, work experience, knowledge and training history factors, and hospital policy factors such as the availability of personal protective equipment and type of hospital. The research instrument used was a questionnaire on the preparedness of nurses in dealing with emerging infectious diseases, a questionnaire on the level of knowledge of nurses in dealing with emerging infectious diseases, and a general questionnaire regarding demographic factors which had previously been tested for validity and reliability.

The nurse's preparedness questionnaire in dealing with emerging infectious diseases consists of 28 question items measured by a Likert scale with 4 answer options (4) strongly agree (3) agree (2) disagree and (1) strongly disagree. The questionnaire has a Cronbach value > 0.9 and all question items have a calculated R-value $> R$ table compiled based on a preparedness questionnaire from WHO (Laksmi and Susila, 2022), and the questionnaire on nurses' knowledge about EID was developed directly in this study using the Guttman scale with a-Cronbach value (> 0.8) so that

it was said to be valid, and the 12 question items had an R count $> R$ table, which was meaningfully reliable.

This research was conducted in August 2022 by distributing questionnaires online by maintaining ethical principles such as maintaining the confidentiality of names by using only the initials of the respondent, not harming the respondent, and not coercing if they are not willing to become a respondent after prior informed consent has been given. This research has been declared ethically feasible by the Health Research Ethics Commission of STIKES Bina Usada Bali with the number 106/EA/KEPK-BUB-2022. Descriptive statistics included frequency, proportions (%), mean, and standard deviations. Univariate analysis was conducted to describe the characteristics of respondents such as age, gender, position, hospital type, hospital work area, Hospital's Personal Protective Equipment (PPE) availability, and level of knowledge of nurses about EID. Bivariate analysis was carried out using the Spearman Rank test with a level of significance ($\alpha < 0.05$) to determine the relationship between the independent variables and each variable of nurse preparedness.

RESULTS AND DISCUSSION

109 ED Nurses in Bali participated in the online survey, including those from Tabanan, Gianyar, Badung, Bangli, and Denpasar City districts with almost equal proportions of males and females. Of the 109 people who participated in this study, most (66.1%) worked in a Type C hospital.

Most of the respondents were graduates of the nursing profession (55%) and were nurses in the emergency department. The average respondent is 32 years old with more than 7 years of work experience and has a history of emergency training more than 2 times. The following characteristics of respondents are presented in table 1.

Table 1. Characteristics of Research Respondents by Category

Characteristic of Respondent	N (%)
Sex	
Male	56 (51.4%)
Female	54 (48.6%)
Education	
Diploma in Nursing	33 (30.3%)
Bachelor of Nursing	13 (11.9%)
Nurse Profession	60 (55 %)
Master	3 (2.8%)
Type of Hospital	
Type A	3 (2.8%)
Type B	34 (31.2 %)
Type C	72 (66.1 %)
Hospital Work Area	
Denpasar	14 (12.8%)
Badung	27 (24.8%)
Bangli	3 (2.8%)
Gianyar	3 (2.8%)
Tabanan	62 (56.9%)
Availability of PPE in the hospital	
Adequate	64 (58.7%)
Very Adequate	45 (41.3%)
Position	
Associate Nurse	64 (58.7%)
Primary Nurse	22 (20.2%)
Team Head	19 (17.4%)
Head of Room	4 (3.7%)

Table 2. The Average Value of the Characteristics of Research Respondents

Characteristic of Respondent	Mean (SD)
Age	32 (6.217)
Number of Emergency Training History	2.68 (1.45)
Length of Work	7.98 (6.20)
Maintenance Knowledge of PIE	11.37 (1.08)
Nurses' Preparedness for PIE	58.26 (11.69)

Table 3. Correlation Test Results between Nurse Preparedness and Respondents Characteristics

	Nurses Preparedness	
	p-value	R
Age	0.132	0.145
Sex	0.260	-0.109
Education	0.397	0.082
Type of Hospital	0.477	0.069
Hospital Work Area	0.122	-0/149
Availability of PPE in the hospital	0.007	0.255
Position	0.455	0.072
Number of Emergency Training History	0.852	0.018
Length of Work	0.393	0.083
Knowledge	0.005	0.269

Table 2 & 3 also shows that nurses' knowledge of EID can be said to be adequate, with a mean score of 11.37 1.08 (maximum score of 12). This finding is in line with one study in Saudi Arabia which also showed that in general knowledge about nurses in dealing with one of the EIDs, namely COVID-19 was adequate (Al Baalharith and Pappiya, 2021). In this study, it was found that the average value of emergency room nurses' preparedness in dealing with emerging infectious diseases was 58.26 ± 11.69 (maximum score 84). This shows that the preparedness of

emergency nurses in Bali in dealing with emerging infectious diseases is included in the good category. Preparedness is an activity carried out to prevent and recover from the impact of a dangerous event or condition (Azalita, Marlina and Halimuddin, 2021). Emergency preparedness has been addressed in the field of healthcare and disaster nursing for enhancing readiness and increasing response capacity to public health emergencies (Nie *et al.*, 2022).

Nurses' theoretical knowledge, such as the ability to identify signs and symptoms associated with highly infectious biological and chemical agents, is critical to improving disaster preparedness. This knowledge can be obtained through education and training so that nurses can act without hesitation and not harm the patient (Sultan *et al.*, 2020). In this study, it was found that most of the respondents (55%) had a history of recent nursing education and on average had attended emergency training more than two times, but the results of the bivariate test did not show a significant correlation with the preparedness of emergency nurses in dealing with EID.

In addition to knowledge, organizational factors are also important factors in shaping the preparedness of emergency room nurses in dealing with EID. The organizational factors referred to in this study are hospital policies such as providing adequate PPE and facilitating the hospital environment to remain safe. In this study, it was found that from 109 respondents that no one indicated that the PPE in their hospital was inadequate or inadequate, most (58.7%) respondents answered that the PPE provided at the hospital where they worked was adequate and the rest answered very adequate. The results of the bivariate test also showed a

significant correlation between the availability of PPE and the preparedness of emergency nurses in dealing with EID with a p-value $(0.007) < (0.05)$.

This finding also indicates that the availability of adequate PPE greatly affects the preparedness of nurses in dealing with EID. This study also shows that the availability of PPE does not depend on the type and working area of the hospital. Both type A, B, and C hospitals or regional hospitals in districts or cities should provide adequate PPE. During a pandemic, nurses may face difficulties that they cannot solve on their own due to organizational factors such as a shortage of personal protective equipment. In a literature review by Nie *et al* (2022), it was mentioned that there were 4 studies that discussed the importance of PPE in the emergency nurse preparedness response.

CONCLUSION

Based on the results and discussion above, it can be concluded that the knowledge factor about EID and the availability of PPE is significantly correlated with the preparedness of emergency nurses in dealing with EID. Therefore, what can be suggested through this research is organizational improvement in hospitals in

providing opportunities for emergency nurses to receive training related to emergencies in dealing with emerging infectious diseases and increasing assurance of the availability of adequate PPE.

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