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DOI: [10.31965/infokes.Vol21Iss1.892](https://doi.org/10.31965/infokes.Vol21Iss1.892)Journal homepage: <http://jurnal.poltekkeskupang.ac.id/index.php/infokes>**RESEARCH****Open Access****Preparedness of Emergency Room Nurses After Emerging Infectious Diseases Screening****Ida Ayu Agung Laksmi^{1a*}, I Made Dwie Pradnya Susila^{1b}, Made Ani Suprpta^{1c}**¹ Department of Nursing, Institute of Health Science Bina Usada Bali, Badung, Bali, Indonesia^a Email address: agunglaksmi41@gmail.com^b Email address: dwiepradnya@gmail.com^c Email address: anikajus@yahoo.co.id

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Abstract

Emerging infectious diseases (EID) is one of the leading causes of death worldwide since it initially attacks a population or has existed before but is increasing very rapidly in terms of the number of new cases in a population. Early detection of EID patients refers to early screening. Screening of patients with suspected EID such as Covid-19 or other airborne infectious diseases must be performed at the first contact with suspected patients. This study aims to evaluate the effectiveness of EID screening instrument applied at the Emergency Room (ER). This was a quantitative pre-experimental study with a one-group pretest-posttest design. The sample size consisted of 34 nurses at the ER of Mangusada Hospital, Bali, who were selected using a total sampling technique. The intervention administered in this study was the implementation of EID screening instrument before the patients entered triage for 1 month on June 2022 at the ER of Mangusada Hospital. After ensuring the distribution and homogeneity of the data, a paired t-test was employed for parametric statistical data analysis. The result of the study showed a p-value of (0.004) or $p < \alpha$ (0.05). So, it can be concluded that there was an effect of the screening instrument applied at the ER of Mangusada Hospital on the preparedness of nurses in dealing with EID. Thus, the screening for patients with EID should be implemented in each emergency unit. The study finding can help improve nurse preparedness regarding the prevention of EID. In addition, future study is recommended to assess the competence of nurses regarding the prevention of EID.

Keywords: Emerging Infectious Disease, EID Screening Instrument, Preparedness of Emergency Room Nurses.***Corresponding Author:**

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1. INTRODUCTION

Emerging infectious disease (EID) is one of the leading causes of death worldwide (AK, 2020). It initially attacks a population or has existed before but is increasing very rapidly in terms of the number of new cases in a population. Several diseases considered as EID involve severe acute respiratory syndrome (SARS), avian influenza A (H7N9) to Covid-19 which emerged in the twenty-first century as a new disease that became a special concern for the community (Sikatta, & Adisasmito, 2020).

Southeast Asia is a hotspot for emerging infectious diseases, including those with pandemic potential (Coker et al., 2011). Several WHO countries in the Southeast Asia Region have certain conditions that may lead to the emergence of this disease, many of which are diseases that can be deadly and spread quickly. Scientific research towards 335 new diseases conducted between 1940 and 2004 indicated that some areas in the world may experience the emergence of EID. Some of the global “hotspots” for EID are countries associated with the Indo-Gangetic Plain and the Mekong watershed. The Nipah virus, Crimean-Congo hemorrhagic fever, Avian influenza (H5N1) to Covid-19 are examples of diseases emerged recently and have surrendered to the WHO for the Southeast Asia Region (Sub Directorate for Emerging Infectious, 2023). Population shifts and travels as well as climate change lead to an increase in the spread of emerging and re-emerging infections (Millán et al., 2018). Bali as a world tourist destination in Southeast Asia Region has certain risks and vulnerabilities to emerging infectious diseases.

Clinicians recognize that EID is inevitable and unpredictable (Mcgonagle, 2020). The Emergency Room (ER) as the front door of the hospital in providing health services is the main place for providing acute services, in large numbers and is available 24 hours per day. Since the onset of Covid-19 as one of the EID outbreaks, there has been a significant increase in the proportion of ER patient visits for upper respiratory tract infections, shortness of breath, and chest pain complaints. Patients with complaints resembling Covid-19 symptoms who come to the hospital are directed to the ER, while the ER is also open for emergency patients without Covid-19 symptoms. Such condition is very risky for Covid-19 transmission between patients and healthcare workers. The incident report regarding the emergency room was temporarily closed because it was the locus of transmission of Covid-19. Therefore, it is necessary to have an emergency protocol against outbreaks of infectious diseases.

One of the very important precaution protocols for early detection of patients with EID is screening. Screening of patients suspected of being infected with EID such as Covid-19 or other airborne diseases must be carried out at the first contact (Qadri, Elida, & Larasati, 2021). One of the studies conducted in Saudi Arabia reported hospital readiness and response to triage and screening, and most of the nurses revealed that screening and sorting of infectious patients were so important and hospitals should be facilitated with initial screening areas for temperature checks (Al Baalharith & Pappiya, 2021).

One indicator of the feasibility of a screening instrument is the level of nurse preparedness. Emergency preparedness for hospital nurse epidemiology is a major issue of concern. Furthermore, nurses are considered the first group who can recognize outbreaks of newly emerging infectious diseases as well as important implementers of an emergency plan for the epidemic in hospitals (Nie et al., 2022). However, at the same time, the fact that information about new viruses is discovered later requires the information obtained to be immediately transferred to the implementation area. Such situation has created worry and fear among nurses about how to deal with the virus (El-Monshed et al., 2021).

Nurse preparedness in dealing with patients with EID is an inseparable part of hospital disaster management (Mahdi, & Mudatsir, 2014), (Presiden Republik Indonesia, 2007). WHO emphasizes the implementation of hospital readiness checklists for EID to improve prevention

and management among healthcare professionals. Therefore, the preparedness component is very important for frontline nurses (Al Baalharith & Pappiya, 2021).

Mangusada Regional Hospital is one of the referral hospitals for Covid-19 patients in Bali Province, especially in Badung Regency. Based on the results of a preliminary study conducted on December 20, 2021 through interviews with 6 nurses on duty in the emergency room, 5 people said they were still not ready and were afraid and tense when dealing with EID patients such as Covid-19. In addition, 4 people said that they were not ready if there was an outbreak of other infectious diseases besides Covid-19 and experienced palpitations while managing patients with suspected Covid-19. Such findings indicated that the preparedness of nurses in dealing with patients with EID at the ER of Mangusada Hospital was still in the low level.

Based on the phenomenon found, the hospital realized the need to improve the alert protocol through screening. This study aims to determine the feasibility of a screening instrument for EID patients by analyzing the level of preparedness of nurses at the emergency room of RSD Mangusada and to evaluate the effectiveness of the EID screening instrument at the ER. The current study has a benefit to encourage respondents to be more stringent in using personal protective equipment (PPE) to protect them from the transmission of emerging infectious diseases (EID).

2. RESEARCH METHOD

This was a pre-experimental study with a one-group pretest-posttest design which is an experimental design by means of a pre-test before administering an intervention and a post-test after the intervention. The sample size consisted of 34 nurses at the ER of Mangusada Hospital, Bali, who were selected using a total sampling technique. The independent variable in this study was EID patient screening and the dependent variable was nurse preparedness.

The intervention administered in this study was the implementation of EID screening instrument before the patients entered triage for 1 month on June 2022. This study assessed a screening instrument that focused on the patient screening process in which an individual was evaluated and screened using symptomatic criteria and epidemiological history. The result would determine whether the patient fell into the category of suspected infectious disease outbreak or not with the aim of isolating infected patients. Screening patients suspected of having an infectious disease such as COVID-19 may reduce exposure to other patients, visitors, and hospital staffs, prevent the spread of disease in health facilities, and ensure the use of personal protective equipment (PPE) in accordance with the guidelines (Vinet & Zhedanov, 2011).

The screening process in this study was performed in the ER triage room at Mangusada Hospital using an instrument that provided related information for symptoms of infection (eg, fever and cough) and travel history in the outbreak area which was compiled based on a literature review derived from several empirical studies (WHO, 2018); (Yaffee, Isakov & Wu, 2019). The day before the implementation of the intervention, a pre-test was conducted by measuring the preparedness of the nurses at the emergency room through a questionnaire on the preparedness of nurses in dealing with EID. After the EID screening instrument was implemented, the respondents filled in the same questionnaire as the post-test result.

The nurse preparedness in dealing with EID questionnaire consisted of 28 question items which were divided into 4 dimensions including the knowledge on preparedness for emerging infectious diseases, facility preparedness and response readiness in triage, and effective response of nurses, as well as preparedness and readiness of nurses to use personal protective equipment. Such questionnaire had been tested for validity and reliability in April 2022 among all nurses at the ER of Klungkung Hospital. The results of the person product moment test found that all instrument items were valid and reliable according to Cronbach's alpha value of

>0.90 (Laksmi & Susila, 2022).

The collected data were then analyzed for univariate and bivariate data. Univariate analysis was conducted to provide a description of the respondents' characteristics including age, gender, training history, and years of service at the ER. Bivariate analysis was performed using Paired T-Test with a significance level of ($\alpha < 0.05$) to analyze whether there was a difference in nurse preparedness scores before and after the implementation of EID screening.

In addition, at the implementation stage, the researcher also obtained ethical clearance from the health research ethics committee of Mangusada Hospital. This study was conducted based on ethical principles including informed consent, anonymity, and confidentiality. This study has obtained ethical clearance from the ethics commission through letter number 1488/IV/RSDM/2022 which was valid for one year since first issued on April 27, 2023.

3. RESULTS AND DISCUSSION

The Nurse preparedness in dealing with EID questionnaire was distributed before and after the implementation of EID screening. This study involved 34 nurses at the ER of Mangusada Hospital. The characteristics of respondents are presented in Table 1.

Table 1. Characteristics of respondents.

Characteristic of Respondents	Mean (SD)	n (%)
Age	32.57 (3.8)	
Years of Service	8.83 (3.9)	
Gender		
Male		22 (64.7)
Female		12 (35.3)
Level of education		
Diploma in Nursing		26 (76.5)
Professional Nursing		8 (23.5)

Table 1 revealed that the mean age and years of service of nurses at the ER of Mangusada Hospital were 32 years old and 8 years, respectively. Such findings are in contrast with a study conducted in Korea regarding the characteristics of emergency room nurses, which showed that the mean age and years of service of nurses were 28 years old and 5 years, respectively (Choi & Kim, 2018). However, the study findings are in line with previous study conducted in Bali which showed that the mean age and years of service of nurses were more than 30 years old and more than 8 years, respectively (Laksmi & Susila, 2022). The study findings indicated differences regarding the characteristics of emergency room nurses between countries.

Table 1 also showed the majority of the respondents (64.7%) were male. This is in line with previous study which showed that most of nurses at the ER were male (Alzahrani and Kyratsis, 2017). Furthermore, this study found that most of respondents (76.5%) were graduated from Diploma in Nursing. Several previous studies also showed that most of emergency room nurses in Indonesia had the level of education of Diploma in Nursing (Rochani, 2021; Emaliyawati et al., 2021).

Table 2. Results of the Analysis for Preparedness of Emergency Room Nurses Before and After EID Screening.

Variable	Mean	SD	p-value	t
Nurse Preparedness Value Before the Implementation of EID Screening Instrument	59.21	11.536	0.004	3.062
Nurse Preparedness Value After the Implementation of EID Screening Instrument	66.50	13.621		

Based on table 2 above, it can be observed that there was a difference in the mean nurse preparedness before and after the implementation of EID screening instrument with a p-value of (0.004) or $p < \alpha$ (0.05). Thus, the study hypothesis was accepted which indicated that there was an effect of the EID screening instrument on the preparedness of nurses in dealing with EID at the ER of Mangusada Hospital. Table 2 also revealed that there was a difference in the mean value of preparedness of emergency room nurses in dealing with EID before (59.21 ± 11.536) and after the implementation of EID screening instrument (66.50 ± 13.621). Such finding indicated that there was an increase in nurse preparedness after the implementation of the EID screening instrument at the ER triage of Mangusada Hospital.

The current study focused on evaluating the nurse preparedness before and after the implementation of EID screening. EID is a disease that initially emerges and attacks a population or has existed before but is increasing very rapidly in terms of the number of new cases in a population, which even spreads to new geographic areas (re-emerging) (Sikatta & Adisasmito, 2020). Emerging diseases have been categorized as newly emerging, re-emerging, or deliberately emerging diseases which can be associated with bioterrorism (Morens & Fauci, 2020). This trend will continue due to several factors, including the increased global population, aging, travel, urbanization, and climate change, evolution, and spread of new pathogens (Bloom, Black, & Rappuoli, 2017).

Nurses are healthcare professionals who work across acute care hospitals, long-term care agencies, nursing homes, schools, communities, as well as government healthcare agencies (Chen, Lai, & Shioh-Luan, 2020). As front liners, ER nurses need certain preparedness including early identification and notification to deal with a pandemic. Nurses need a proper protection, including quality PPE for protection and the provision of quality care to patients with emerging infectious diseases including COVID-19 (Al Baalharith & Pappiya, 2021).

Based on the study results, it was indicated that the screening process for EID patients was effective to improve preparedness among Emergency Room nurses. In our study site, screening of patients with EID was implemented in the pre-triage room, in accordance with the EID prevention principle that screening should be carried out at the first contact with patients. In principle, screening serves to avoid potential infectious disease risks as well as help identify health needs (Beeres et al., 2018). Several studies revealed that the screening process for EID patients was very effective in preventing disease transmission. One of the studies indicated a pre-triage screening accuracy of 63.7% (Hensgens et al., 2021).

Nurse preparedness is crucial for preventing EID transmission. This study assessed the mean score of nurse preparedness in dealing with emerging infectious diseases which included: 1) dimension of knowledge on preparedness for emerging infectious diseases, 2) dimension of facility preparedness and response readiness in triage, 3) dimension of the effective response of nurses, and 4) dimension of preparedness and readiness of nurses to use personal protective equipment (Laksmi & Susila, 2022); (Susila & Laksmi, 2022). The results showed that there was an increase in the mean score of nurse preparedness in dealing with EID after the implementation of EID screening instrument at ER Mangusada Hospital (table 2).

A literature review on nurse preparedness in dealing with infectious disease formulates 4 related factors including 1) knowledge and skills, 2) Psychological preparation, 3) External resources, and 4) Attitude and Intention (Nie et al., 2022). In this study, the screening process was one of the factors included in external resources, because it focused on protective equipment, information availability, and a safe environment (Nie et al., 2022). Screening instruments can provide information regarding the initial symptoms of infection, and the patient's travel history so that it may increase the nurse's alertness and ability to prepare a safe environment, provide treatment, and avoid or reduce symptoms and other consequences, as well as improving health outcomes of the population at a reasonable cost (Iragorri & Spackman, 2018). In the current study, the existence of a screening process was found to be effective in

increasing the preparedness of nurses to manage emerging infectious diseases. Moreover, other studies also reported good economic benefits of the screening process (Atkeson, 2020).

One of the strategies recommended to better prepare frontline facilities such as ER is universal screening for symptoms of infection (e.g., fever and cough) and recent travel history (Yaffee, Isakov, & Wu, 2019). In addition, an important component of preparedness is the ability of nurses to rapidly implement an effective screening process for EID (Palagyi et al., 2019). For the prevention of EID cases, screening should be performed towards all travelers since the first time of arrival (Gostic, Kucharski, & Lloyd-Smith, 2015).

This study had several limitations. First, since the intervention administered was EID screening at the ER of Mangusada Hospital which had implemented a specific Covid-19 screening, the value of nurse preparedness before intervention was high (59.21 ±11.536). Second, the study site was only at 1 hospital, so it could not assess preparedness in each domain, especially regarding facility preparedness and response readiness.

4. CONCLUSION

Based on the results and discussion above, it can be concluded that the screening process could effectively improve the preparedness of nurses in dealing with emerging infectious diseases. Therefore, the screening process for patients with EID should be implemented in each ER. The study finding can help improve nurse preparedness regarding the prevention of EID. In addition, future study is recommended to assess the competence of nurses regarding the prevention of EID.

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