

Analysis Correlation of Nurses' Level of Knowledge About Fire and Evacuation in Evacuation Decision Making for Fire Disasters in Inpatient Installations at Hospital X

Rihanisa Auliya¹

¹Fire Safety Engineering Study Program, Faculty of Engineering, Universitas Negeri Jakarta, Jakarta, Indonesia
E-mail: rihanisaauliya_1518619009@mhs.unj.ac.id

ABSTRACT

Rihanisa Auliya, 2026. Analysis Correlation of Nurses' Level of Knowledge About Fire and Evacuation in Evacuation Decision Making for Fire Disasters in Inpatient Installations at Hospital X

Hospitals are one of the buildings that have a risk of fire. The evacuation system in hospitals is different from the evacuation system in other public buildings because hospitals contain high-risk patients who must be evacuated. Nurses are one of the greatest resources in a hospital so they must have knowledge about fire and evacuation. Therefore this research aims to analyzing the relationship between the level of nurses knowledge about fire and evacuation on fire disaster evacuation decision making in inpatient installation at Hospital X. This study uses a quantitative method taken with a cross-sectional approach. The sample of this study was nurses in inpatients at Hospital X as many as 35 respondents taken by purposive sampling technique. Data analysis uses Pearson correlation test. Results: The level of knowledge is very high (45%), high (51%), and enough (6%). The evacuation decision making is very high (6%), high (43%), enough (34%), low (14%), and very low (3%). Correlation Pearson Test results obtained p-value = 0,004 ($p < 0.05$) showed a relationship between the knowledge of nurses with the evacuation decision making.

Key Words: Fire, Evacuation, Knowledge, Decision Making

INTRODUCTION

Hospitals are healthcare facilities with distinctive fire-safety challenges because they accommodate large numbers of patients with different degrees of mobility, dependency, and clinical severity. Although fire may occur in many types of buildings, its consequences in hospitals can be particularly serious because some occupants are unable to recognize danger, move independently, or evacuate without assistance. Hospitals also contain electrical and medical equipment, combustible materials, and medical gases that may contribute to the development and consequences of a fire incident. Therefore, hospital fire safety depends not only on fire prevention and protection systems but also on the availability of life-saving facilities, effective evacuation procedures, and the preparedness of healthcare personnel [1]–[3]. These characteristics make fire emergency management in hospitals more complex than in buildings whose occupants are generally capable of self-evacuation.

Evacuation can generally be understood as the process of moving people from an unsafe or potentially dangerous location to a place that provides a greater level of safety. From the perspective of human behavior in fire, the evacuation process includes activities that occur before occupants begin purposeful movement and activities associated with physical movement toward a safe location. The pre-evacuation period involves recognizing warning cues, interpreting the situation, assessing the level of risk, obtaining information, deciding what action should be taken, and preparing to evacuate [4]. The subsequent movement phase involves traveling through evacuation routes toward a designated safe area. These phases are important because delays in recognizing the emergency or initiating movement may substantially influence the overall evacuation time. In hospitals, this process becomes more complicated because patient preparation, transportation equipment, staff availability, route configuration, and patient mobility can affect evacuation performance [5], [6].

Hospital evacuation differs significantly from evacuation in ordinary public or commercial buildings because many hospital occupants cannot evacuate themselves. Bedridden patients, critically ill patients, older adults, patients with disabilities, and patients dependent on medical equipment may require assistance from one or more healthcare workers during evacuation [2], [6], [7]. Furthermore, evacuation may expose critically ill patients to additional clinical risks; consequently, the decision to evacuate must consider both the danger associated with remaining in the affected area and the potential consequences of moving the patient [8]. Depending on the location and severity of the emergency, hospitals may implement horizontal evacuation to another protected area on the same floor, vertical

evacuation to another floor, or complete evacuation outside the building. Therefore, full hospital evacuation is generally a complex option that requires careful assessment of the incident, patient conditions, available personnel, transportation resources, evacuation routes, and continuity of medical care [3], [5], [8].

Hospital X is a large referral hospital serving the East Jakarta area. The hospital consists of five floors, four of which are used for hospital service activities, while the upper floor provides facilities associated with emergency air-ambulance services. The hospital has inpatient care facilities, including ICU and ICCU services, while inpatient units located on the third and fourth floors require particular attention in evacuation planning because patients may have to be transported vertically or progressively toward designated safe areas and assembly points. The inpatient facilities are also supported by fire-protection and life-safety infrastructure. Nevertheless, the availability of physical fire-protection systems alone cannot guarantee effective evacuation. Previous hospital fire investigations have demonstrated that organizational preparedness, communication, emergency procedures, staff coordination, and the functionality of safety facilities are equally important in ensuring an effective response to fire emergencies [1], [9]. Thus, the effectiveness of fire safety management at Hospital X is closely related to both its physical preparedness and the readiness of its personnel.

Among hospital personnel, nurses have an essential role because they maintain continuous contact with patients and are often among the first healthcare professionals required to respond when an emergency occurs. During hospital evacuation, nurses may be responsible for assessing patients, maintaining essential treatment, preparing patients for movement, determining assistance requirements, helping transport patients, communicating clinical information, and coordinating with other members of the emergency response team. Studies of hospital evacuation have shown that staff-related factors—including familiarity with evacuation procedures, communication, previous experience, staffing levels, and the ability to prioritize patients—can significantly influence evacuation effectiveness [10]. Experiences from actual hospital evacuations have also demonstrated that nurses face considerable operational, communication, resource, and patient-care challenges while simultaneously protecting their own safety [11]. Consequently, hospital personnel preparedness for patient evacuation requires effective management, communication, individual readiness, and systematic evacuation training [12].

Adequate knowledge of fire safety and evacuation procedures is therefore an important competency for nurses working in inpatient units. Nurses need to understand fire warning systems, emergency communication, evacuation routes, assembly areas, patient prioritization, transportation techniques, and appropriate actions during the early stages of a fire. Knowledge is particularly important because decisions during fire emergencies frequently have to be made under time pressure and uncertain conditions. A systematic review of hospital personnel preparedness identified training, communication, management, and individual factors as major components affecting the ability of healthcare personnel to evacuate patients safely [12]. Similarly, a study of healthcare workers found a strong relationship between fire-safety knowledge and emergency preparedness, while substantial proportions of healthcare workers had inadequate knowledge and limited participation in fire drills or emergency evacuation exercises [13]. Evidence from hospital fire incidents further indicates that training, clear command structures, and coordinated emergency procedures contribute to more effective response and recovery [9].

Considering the vulnerability of hospitalized patients and the important responsibility of nurses during emergencies, insufficient knowledge of fire safety and evacuation may influence the quality and timeliness of evacuation decisions. Hospital evacuation decisions require personnel to rapidly interpret the severity of the incident, assess patient mobility and clinical conditions, determine evacuation priorities, identify appropriate routes and transportation resources, and balance the risks of evacuation against the risks of remaining in place [2], [8], [10]. Improving nurses' knowledge may therefore strengthen their preparedness and ability to make appropriate decisions during fire emergencies, although this relationship needs to be examined within the specific organizational and clinical context of Hospital X [12], [13]. Accordingly, this study aims to analyze the relationship between nurses' level of knowledge regarding fire safety and evacuation and their fire-disaster evacuation decision-making in the inpatient units of Hospital X.

MATERIALS AND METHODS

This research method uses quantitative with a cross-sectional approach. The population in this study were nurses who worked in the inpatient room, totaling 35 people. The sampling technique used purposive sampling. The place and time of the research was conducted at Hospital X.

Data collection techniques by filling out questionnaires conducted by the respondents themselves. The questionnaire in this study amounted to 37 questions regarding Fire dynamics, Fire propagation, Fire extinguishing, Evacuation management, Evacuation process, Decision based on Patient Condition, and based on Fire Level. The level of knowledge is categorized into five, namely Very High (59-70 total score), High (48-58 total score), Medium (37- 47 total score), Low (26-36 total score), Very Low (14-25 total score). Decision making is categorized into five, namely Very High (52-60 total scores), High (42-51 total scores), Medium (32-41 total scores), Low (22-31 total scores), Very Low (12-21 total scores). Data were analyzed using SPSS with Pearson correlation test to determine the relationship between knowledge level and evacuation decision making among respondents.

RESULTS AND DISCUSSION

Respondent Characteristics

This study is to determine the relationship between knowledge level and evacuation decision making that has been carried out in inpatient installation nurses, while the characteristics of respondents can be seen in Table 1.

Table 1. Respondent Characteristics

Characteristics	n = 35	%
Age (years)		
22–31	24	69
32–41	4	11
42–51	6	17
52–61	1	3
Last Education		
Diploma III (DIII)	27	77
Bachelor/Ners (S1/Ners)	8	23
Years of Service		
< 1 year	6	17
1–3 years	7	20
> 3 years	22	63
Fire Disaster Training		
Ever	29	83
Never	6	17

Based on Table 1, the majority of respondents were aged 22-31 years (69%), had the last education D-III (77%), had a length of work as a nurse in the inpatient installation > 3 years (63%), and had attended fire disaster training (83%).

Knowledge Level Distribution

Table 2. Distribution of Knowledge Variables

Knowledge Level	n	%
Very High	15	43
High	18	51
Medium	2	6
Low	0	0
Very Low	0	0
Total	35	100

Based on Table 2, it can be seen that out of 35 nurse respondents in the inpatient installation, 15 nurses (43%) have knowledge in the very high category, then 18 nurses (51%) have knowledge in the high category, and 2 nurses (6%) have knowledge in the medium category. This shows that in general, the knowledge of inpatient installation nurses at Hospital X is in the high category.

Evacuation Decision Making Distribution

Table 3. Distribution of Evacuation Decision Making Variables

Evacuation Decision-Making Level	n	%
Very High	2	6
High	15	43
Medium	12	34
Low	5	14
Very Low	1	3
Total	35	100

Based on Table 3, the distribution of evacuation decision-making variables shows that there are 2 nurses (6%) in the very high category, 15 nurses (43%) in the high category, 12 nurses (34%) in the medium category, 5 nurses (14%) in the low category, and 1 nurse (3%) in the very low category. This shows that in general, evacuation decision making among inpatient installation nurses at Hospital X is in the high category.

Pearson Correlation Test Analysis

Table 4. Relationship between Knowledge and Evacuation Decision Making among Respondents

Knowledge Level	Very High n (%)	High n (%)	Medium n (%)	Low n (%)	Very Low n (%)	Total n (%)	p-value
Very High	2 (5.7)	2 (5.7)	7 (20.0)	3 (8.6)	1 (2.9)	15 (42.9)	
High	0 (0.0)	12 (34.3)	4 (11.4)	2 (5.7)	0 (0.0)	18 (51.4)	
Medium	0 (0.0)	1 (2.9)	1 (2.9)	0 (0.0)	0 (0.0)	2 (5.7)	
Low	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
Very Low	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
Total	2 (5.7)	15 (42.9)	12 (34.3)	5 (14.3)	1 (2.9)	35 (100)	0.004

Based on table 4, the results of the analysis of the relationship between knowledge and evacuation decision making show that nurses with moderate knowledge are 2 people, where evacuation decision making is categorized as moderate 1 person (2.9%) and high as 1 person (2.9%). High knowledge as many as 18 people, where evacuation decision making in the low category is 2 people (5.7%), moderate as many as 4 people (11.4%), and high as many as 12 people (34.3%). Very high knowledge was 15 people, where evacuation decision making was categorized as very low 1 person (2.9%), low as 3 people (8.6%), moderate as 7 people (20%), high as 2 people (5.7%), and very high as 2 people (5.7%). Statistical test results with Pearson correlation test obtained p-value = 0.004 (<0.05) with the correlation value of the two variables is -0.474, which means that there is a significant relationship between the level of knowledge and evacuation decision making in inpatient installation nurses and has a negative relationship.

Nurses' knowledge of fire and evacuation based on the results of research from 35 nurse respondents mostly had a high score on the fire propagation indicator with a total score of 159 and had a low score on the firefighting indicator based on burning materials with a total score of 103. Although the hospital has a special team in charge of extinguishing fires, knowledge about firefighting is very important for each nurse, especially in inpatient installations in the event of a fire nurses can act quickly and precisely and know what to do in their area. So that in the future it is necessary to deliver material about fire and evacuation more specifically so that the level of knowledge of nurses becomes better. Increased knowledge can also be obtained through information from mass media such as the internet, books, television.

The results of research on evacuation decision-making variables have a low score on the fire level indicator based on the level of fire evacuation in hospitals with a total score of 94 out of an ideal score of 175. According to the World Health Organization, evacuation is only a last resort for hospitals. Evacuation is carried out after preventive and extinguishing measures have failed to extinguish the fire and lives are under threat.[3] However, many nurses at inpatient installations do not know when to evacuate partially and totally. In the event of a fire, nurses should only prepare to evacuate, but not remove patients from the room until further instructions are given. If the hospital needs to evacuate, it will save time and minimize the risk to patients. However, if the hospital does not need to evacuate, no patients are at risk on the way and the evacuation preparation work becomes a good experience for nurses. With that, hospitals should strive to develop a clear, comprehensive and consistent decision-making matrix that can be used when they consider whether or not to evacuate.

CONCLUSION

Based on the results of processing, data analysis, and discussion previously described, the results of the Pearson correlation test analysis obtained a correlation value = -0.474 with a sig value (2-tailed) $0.004 < 0.05$. Based on these results, it can be concluded that there is a real (significant) relationship between the variable nurses' knowledge about fire and evacuation on evacuation decision making at the inpatient installation of hospital X.

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