

**FACTORS ASSOCIATED WITH KNOWLEDGE,
ATTITUDE, PRACTICE AND PERCEPTION IN
FLOOD DISASTER MANAGEMENT AMONG
CRITICAL CARE NURSES IN THE EAST COAST
HOSPITALS OF MALAYSIA**

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UNIVERSITI SAINS MALAYSIA

2020

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by

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Thesis submitted in fulfillment of the requirements

for the degree of

Master of Science

October 2020

ACKNOWLEDGEMENT

Bismillahirrahmanirrahim, In the name of ALLAH, the most compassionate and the most merciful. Salutations be upon His messenger Muhammad swt (peace be upon him), his family and his champions. Alhamdulillah, with help and success granted by ALLAH, I have successfully completed this dissertation right on time.

This work would be impossible without the support and encouragement of my supervisor, Dr. Zakira Binti Mamat @ Mohamed, Senior University Lecturer in Nursing Programme, School of Health Sciences, Universiti Sains Malaysia (USM). My sincere gratitude goes to her for making this research project possible, for her expertise, kindness and most of all, for her patience. Many thanks to my co-supervisor, Profesor Dato' Dr. Nik Hisamuddin Bin Nik Ab. Rahman (Department of Emergency Medicine, School of Medical Sciences, USM) and Dr. Nur Syahmina Binti Rasudin (Biomedicine Programme, School of Health Sciences, USM) for their continuous support, guidance and readiness to help made my work so much easier.

My appreciation also goes to Ministry of Health (MOH) Malaysia for the scholarship 'Hadiah Latihan Persekutuan' that assist and cover costs of pursuing my study for master's degree. Besides, I would like to acknowledge all my colleagues especially who are working in critical care unit from hospitals that were involved in this research. Also my appreciation to all lecturer in School of Health Sciences, USM.

Last but not least, thanks to my caring husband, Mohd Norazahar Bin Azid, my beloved late parents (Asiah Bt Che Mamat & Ismail Bin Yacob), my parents-in-law (Nurhayati Bt Ismail & Azid Bin Adam) and all my family members for their support and strength throughout my study journey. My highest gratitude to all of them.

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LIST OF ABBREVIATIONS

AOR	Adjusted Odds Ratio
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CI	Confidence Interval
CCN	Critical Care Nurse
CCU	Coronary Care Unit
CRED	Centre for Research on the Epidemiology of Disasters
DF	Degree of Freedom
DPET	Disaster Preparedness Evaluation Tools
DMRC	Disaster Management and Relief Committee
ED	Emergency Department
EFA	Exploratory Factor Analysis
GFI	Goodness of Fit Index
HKK	Hospital Kuala Krai
HKLipis	Hospital Kuala Lipis
HOSHAS	Hospital Sultan Haji Ahmad Shah
HREC	Human Research Ethics Committee
HRPZ II	Hospital Raja Perempuan Zainab II
HSNZ	Hospital Sultanah Nur Zahirah
HTAA	Hospital Tengku Ampuan Afzan
HTM	Hospital Tanah Merah
HUSM	Hospital Universiti Sains Malaysia
ICU	Intensive Care Unit

IQR	Interquartile Range
JEPeM	<i>Jawatankuasa Etika Penyelidikan Manusia</i>
JPAM	<i>Jabatan Pertahanan Awam Malaysia</i>
KUP	<i>Khas Untuk Penyandang</i>
LR	Likelihood Ratio
MLR	Multiple Logistic Regression
MNSC	Malaysia National Security Council
MOH	Ministry of Health
MREC	Medical Research and Ethics Committee
NGO	Non-governmental Organization
NSC	National Security Council
OR	Odds Ration
QN	Questionnaire
RMSEA	Root Mean Square of Error Approximation
RN	Registered Nurse
SD	Standard Deviation
SDT	Self-Determinism Theory
SLR	Simple Logistic Regression
TLI	Tucker-Lewis Index
USM	Universiti Sains Malaysia
WHO	World Health Organization

LIST OF SYMBOLS

$>$	Greater than
$<$	Less than
$=$	Equal to
\approx	Almost equal to
\geq	Greater than or equal to
\leq	Less than or equal to
α	Alpha / Level of statistical significance
β	Beta/ Power of the study
df	Degree of freedom
H_A	Alternative Hypothesis
H_0	Null Hypothesis
%	Percentage
n	Sample size
N	Population Size
P	Proportion
p	p -value or probability of success
Δ	Absolute Precision

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**FAKTOR-FAKTOR BERKAITAN DENGAN PENGETAHUAN, SIKAP,
AMALAN DAN PERSEPSI DALAM PENGURUSAN BENCANA BANJIR
DALAM KALANGAN JURURAWAT PENJAGAAN KRITIKAL DI
HOSPITAL-HOSPITAL PANTAI TIMUR MALAYSIA**

ABSTRAK

Hospital di Pantai Timur Malaysia kerap dilanda bencana banjir setiap tahun yang mana jururawat penjagaan kritikal membentuk majoriti responden barisan hadapan dalam bencana. Mereka mempunyai peranan terutamanya dalam *triage* dan pemindahan pesakit yang tenat semasa bencana. Objektif umum kajian ini adalah untuk mengenalpasti faktor-faktor yang berkaitan dengan pengetahuan, sikap, amalan dan persepsi dalam pengurusan bencana banjir dalam kalangan jururawat penjagaan kritikal di hospital-hospital Pantai Timur Malaysia. Ini adalah kajian kuantitatif dengan reka bentuk kajian keratan rentas deskriptif, yang mana data yang dikumpulkan daripada 250 jururawat penjagaan kritikal di hospital Pantai Timur Malaysia dengan menggunakan borang soal kaji selidik. Analisis kaedah regresi logistik berganda digunakan untuk menentukan faktor-faktor yang berkaitan dengan pengetahuan, sikap, amalan dan persepsi dalam pengurusan bencana banjir. Majoriti jururawat penjagaan kritikal mempunyai pengetahuan dan amalan yang mencukupi, dengan sikap positif dan juga persepsi yang baik terhadap pengurusan bencana banjir. Antara faktor terpilih yang dikaji, tempat kerja berhubung kait secara signifikan dengan skor pengetahuan (AOR 0.185, 95% CI: 0.049, 0.703, $p = 0.013$). Pengalaman respon bencana mempunyai hubungan yang signifikan dengan pengetahuan (AOR 4.048, 95% CI: 1.346, 12.174, $p = 0.013$) dan amalan (AOR 2.697, 95% CI: 1.122, 6.479, $p = 0.027$) tetapi tiada hubungan yang signifikan dengan sikap dan persepsi. Menghadiri latihan/

pendidikan bencana mempunyai hubungan yang signifikan dengan sikap (AOR 4.230, 95% CI: 1.474, 12.144, $p= 0.007$) dan amalan (AOR 4.203, 95% CI: 2.102, 8.402, $p = 0.000$). Tahap pendidikan dan tahun perkhidmatan kedua-duanya tidak menunjukkan hubungan yang signifikan dengan pengetahuan, sikap, amalan dan persepsi. Kajian ini mendedahkan bahawa pengalaman respon bencana sebelumnya dan latihan/ pendidikan bencana sebagai beberapa faktor yang akan memastikan pengetahuan dan amalan yang mencukupi mengenai pengurusan bencana banjir dalam kalangan jururawat penjagaan kritikal. Oleh yang demikian, dicadangkan supaya program pengurusan bencana dimasukkan ke dalam program pendidikan dan latihan berterusan untuk jururawat penjagaan kritikal bagi memastikan mereka bersiap sedia dan bertindak balas dengan cekap apabila berlaku bencana banjir.

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MALAYSIA**

ABSTRACT

The east coast hospitals of Malaysia were regularly stricken by flood disaster, whereby critical care nurses make up the majority of frontline responders in such disaster. They have their roles especially in triage and evacuation of the critically ill patient during a disaster. The general objective of this study was to identify the factors associated with knowledge, attitude, practice, and perception in flood disaster management among critical care nurses in the east coast hospitals of Malaysia. This was a quantitative study with a descriptive cross-sectional study design in, which the data were collected from 250 critical care nurses of the east coast hospitals in Malaysia by using a questionnaire. Multiple logistic regression analysis was used to determine the factors associated with knowledge, attitude, practice, and perception in flood disaster management. A majority of the critical care nurses had adequate knowledge and practice, with a positive attitude and were well-perceived on flood disaster management. Among the selected factors studied, the workplace was significantly associated with knowledge scores (AOR 0.185, 95% CI: 0.049, 0.703, $p = 0.013$). Disaster response experience had a significant association with knowledge (AOR 4.048, 95% CI: 1.346, 12.174, $p = 0.013$) and practice (AOR 2.697, 95% CI: 1.122, 6.479, $p = 0.027$) but no significant association with attitude and perception. Attended disaster training/education had significant association with attitude (AOR 4.230, 95% CI: 1.474, 12.144, $p = 0.007$) and practice (AOR 4.203, 95% CI: 2.102, 8.402, $p =$

0.000). Level of education and years of service both showed no significant association with knowledge, attitude, practice, and perception. This study revealed that previous disaster response experience and disaster training/education as some of the factors that would ensure adequate knowledge and practice in flood disaster management among critical care nurses. Therefore, it is recommended for disaster management programme to be included in continuing education programme and training for critical care nurses so as to ensure them to be well-prepared and respond competently when flood disasters happen.

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

The World Health Organization (WHO) defines a disaster as an occurrence disrupting the normal conditions of existence and causing a level of suffering such as widespread human, material, economic, or environmental losses, which exceeds the capacity of adjustment of the affected community or society to cope using its own resources (WHO, 2002). The world has been affected by the increasing number of major disasters, such as floods, earthquakes, hurricanes, and tsunamis (Ahayalimudin & Osman, 2016). Disaster is typically classified as natural or human-caused events. Natural disasters result from some force of nature, such as floods, earthquakes, hazes, pandemics, and landslides (Veenema, 2013). It disrupts main services and properties such as housing, communications, transportation, sanitation, water, and health care and requires the response of people and organisations outside the community affected.

Locally, Malaysia has faced various disasters over the years and natural disaster is the major disaster events in Malaysia (Noor Hisham, 2015). However, the types of disaster, its scale, and impact have increased over a period of time. Malaysia frequently faces localised disasters, such as floods, landslides, hazes, and pandemics. When they happen, the health care personnel, particularly those who work in hospitals, play active roles in assisting the community affected by disaster (Ahayalimudin & Osman, 2016). The east coast hospitals of Peninsular Malaysia are at high risk of floods disasters. Figure 1.1 below showed the flood prone areas in Peninsular Malaysia (Department of Irrigation and Drainage, 2018). Floods are regular natural disaster that

frequently happens in Peninsular Malaysia, particularly to the east coast states of Peninsular Malaysia which occurs every year during the monsoon season especially between October till December (Nurul Afzan, 2014).

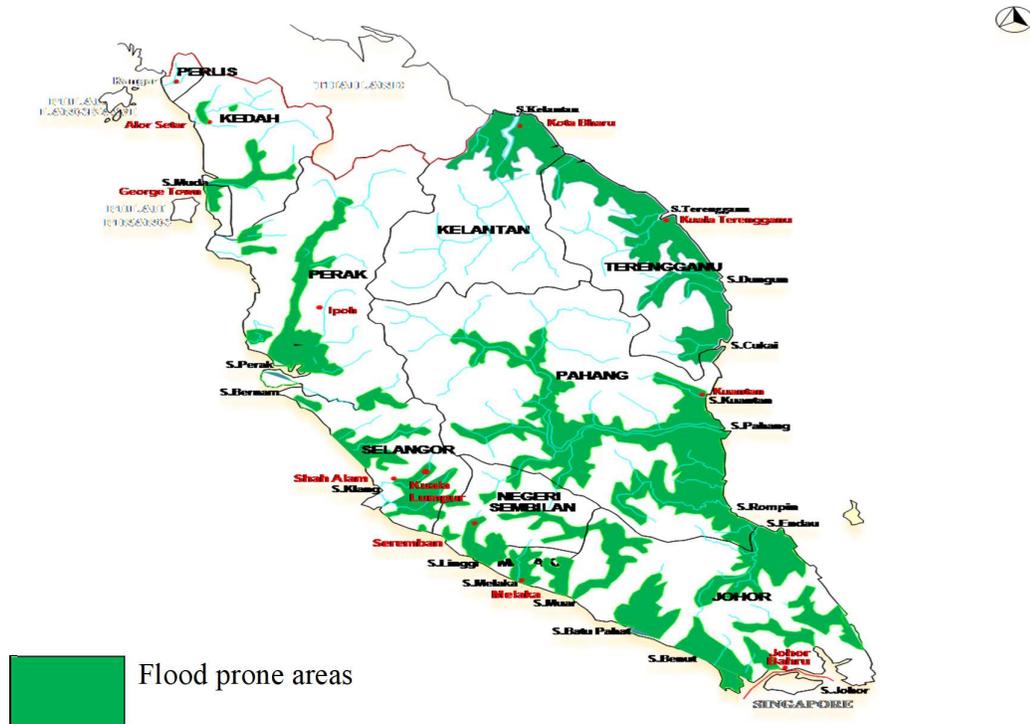


Figure 1.1: Flood Prone Areas in Peninsular Malaysia (Department of Irrigation and Drainage, 2018)

Nurses are the largest population in healthcare services. Therefore, they should be equipped with knowledge and skills related to flood disaster management. They also must be alert about a flood contingency plan and it should be established so that effective management and faster access to services can be triggered when disaster happen. According to Rokkas et al. (2014), nurses are particularly important to ensure that their skills and knowledge are sufficient to respond to such events because they are the majority of frontlines responders in disasters. It has been widely reported that nurses worldwide play an important role in the response to disasters since the earliest

days of the profession (Turale, 2014; Labrague et al., 2017). Nurses also should involve in developing disaster preparedness programmes with their advanced skills and knowledge in cooperating with health and social disciplines, government organisations and the private sector as well as community groups during a disaster.

Critical care nurses included nurses working in intensive care unit and emergency department. They must have adequate knowledge and skills to contribute in the care of victims during flood disaster events especially knowledge and skills related to teamwork and communication, dealing with distressed, resuscitation skills, fluid management, wound care and acute pain management. Adequate disaster preparedness training among critical care nurses may reduce anxiety and confusion when a disaster occurs. Also through training of them, it will help ensure a timely and effective response when flood disaster happens.

From the previous study, there are many factors associated with flood disaster management among nurses included level of education, years of service, workplace, disaster response experience and attended disaster training/ education. This factors will effect on their knowledge, attitude, practice, and perception in flood disaster management. According to a study by Labrague et al. (2017) revealed that disaster response experience and training included as factors that increase preparedness in disaster response. A study done by Usher et al. (2015) also revealed that the significant factors of disaster knowledge, skills and management are disaster experience and education. A study done by Ahayalimudin & Osman (2016) showed that level of education was significantly correlated with increased level of knowledge and practice on disaster management while working experience, involvement in disaster response and attendance of disaster-related education/training were all correlated with increased level of practice on disaster management.

1.2 Problem Statement

Disasters happen every day somewhere in the world with an impact on individuals, families, communities and organisations. Based on the Annual Disaster Statistical Review 2010 as published by The Centre for Research on the Epidemiology of Disasters (CRED), “Major fluctuations in numbers of fatalities, victims or damages caused by natural disasters can be seen from year to year with sudden high-impact events or disasters that are extensive in time and space can bring about changes in disaster impact trends and patterns. Disaster epidemiology brings these tendencies to light and provides information on the temporal and spatial distributions of disasters and their human impact around the world”.

The end year of 2014, in particular, was a difficult year for Malaysia. The past 4 years have witnessed a dramatic tragedy ‘*Bah Kuning*’ occurred in Kelantan. The flood in December 2014 occurred in Kelantan was the worst experienced by Malaysia and have destroyed and damaged almost all the infrastructure included health care facilities; hospitals and clinics thus directly were given the impact to the quality of health care services. A total of 118 healthcare facilities were affected during the flood with 61 facilities were unaccessible due to flooded roads and 57 facilities were submerged (Ahmad Razin, 2015). Hospital Kuala Krai became an island that only accessible by boat and hospital critical system failure required critically ill patient to be transferred by air medevac (Suhaidin et al., 2015). During that event, there were involved 202 staffs worked thru out the flood continuously for 8 days without electricity and limited water supply. The total number of patients in the hospital were 142 included 18 critical patients. From the total number of patients, 16 patients were medevac by helicopter and 69 patients were air lifted (Ahmad Razin, 2020). Despite the challenging air medevac process, none of patient died in Hospital Kuala Krai

demonstrating high standard of care was maintained through the flood disaster (Suhaidin et al., 2015).

Figure 1.2 below showed the affected areas on Yellow Flood 2014, which included the total number of evacuation (235 218 evacuees) and the total number of death (10 deaths) till 30 December 2014 (The Malay Mail Online, 2014). Overall from that events, there are 25 deaths, 541 896 victims, 2076 houses destroyed, 6698 houses damaged, estimated RM 2.85 billion public property damages and 168 government healthcare facilities affected with estimated RM 380 million damages (Lokman, 2015).

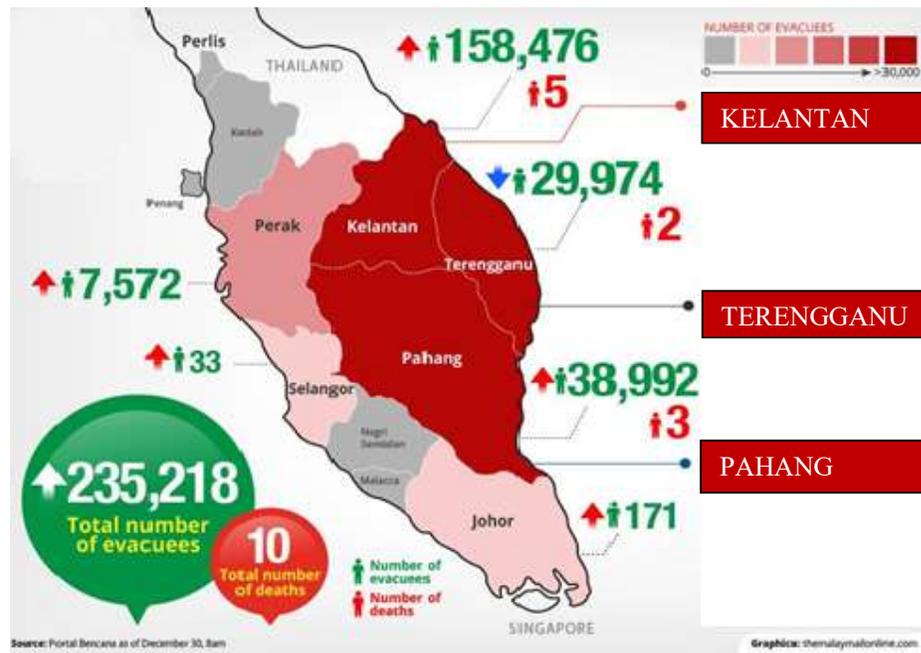


Figure 1.2: Affected Areas on Yellow Flood 2014 (The Malay Mail Online, 2014)

A study done by Baharuddin et al. (2015) regarding flood response during a flood disaster happened in Kelantan in the year 2014 from the medical perspective encountered some problems during the flood events such as the lack of medical personnel and treatment rooms to handle the flood victims. The communication system

was also affected that caused the loss of contact with others. Therefore, they proposed several improvements including flood disaster preparedness and response training to both administration and medical personnel, standard operating procedures for every level of flood disaster responses and third suggestion is the effective communication system to be used during rescue and relief operation (Izham et al., 2018). The role of medical team including nurses are very important to enhance the preparedness to deal with emergency situations during disaster to alleviate the effects of disaster on human lives. There has needed the support from qualified nurses in term of their capability to provide care and perform disaster management activities in each phase of disaster management (Khin et al., 2017).

When a disaster occurs, the health care personnel, in particular, those who work in hospitals and clinics play important roles in assisting the community affected. Nurses as health care professionals have been involved in the care of patients in various disasters over time but the role of critical care nurses has not been well-defined in relation to disaster planning and response activities. Nurses around the world should be equipped with the knowledge and skills for disaster care (Olivia et al., 2009). Although disaster competency guidelines for nurses do exist, a few existing studies have addressed exactly, which skills should be included when training nurses for disasters. Additionally, there are no detailed guidelines of the best approaches for disaster training specifically for critical care nurses.

Nurses in a critical care unit (emergency and intensive care nurses) should be involved in flood disaster response as they also have their roles, especially in triage and evacuation of the critically ill patient during a disaster. The role of public health nurses is already established, namely as the frontline during flood disaster events; there are many studies done among public health nurses as the target population. However,

there is limited specific studies focused on critical care nurses, especially among intensive care nurses. According to Echevarria-Zuno et al. (2013), the triage process and evacuation of patients in intensive care units (ICU) must be considered during disaster. The plan for evacuation of patients from ICU must have a solid and realistic foundation, be constantly updated, and take into account the experiences of previous events. Testing should be done for them, evaluating their weaknesses, and finding good opportunities to be strengthened in order to avoid errors that may cost patients' lives. Therefore, it is important for critical care nurses, either intensive care or emergency nurses, to be aware and prepared for the potential consequences of disasters for the critical care unit.

In Malaysia, a study about disaster management has been done by Ahayalimudin (2012 & 2016), but her emphasis on disaster knowledge, attitude, and practices has only focused on a group of public health nurses, emergency nurses, and medical personnel. Research related to the perception on disaster management among nurses has been done in other countries including Hong Kong (2009), Jordan (2012), Asia-Pacific Region (i.e. Cambodia, Laos, China, Bangladesh, Bhutan, Solomon Islands and Nepal in 2015), Saudi Arabia (2014), Japan (2016), and India (2017). However, there is no study focused on a group of critical care nurses, specifically among intensive care nurses. A study done by Ng et al. (2016) in Kelantan has the objective of assessing nurses' familiarity with disaster preparedness. However, it did not focus on critical care nurses, with less than half of study sample being recruited from the intensive care unit (30%). The study has been done at one tertiary teaching hospital in Malaysia only, which has shown that nurses' workplace is associated with perceived disaster preparedness (Ng et al., 2016). A study by Sharul Azim et al. (2016) has the objective of studying nurses' disaster preparedness and how to be prepared for

impending disaster for other healthcare professionals, as well as essential services, which is also not focused on critical care nurses. Based on the findings, nurses need further training on disaster handling in order to be better equipped for unprecedented and upcoming disasters (Sharul Azim et al., 2016).

Therefore, this study is very important to determine the factors associated with knowledge, attitude, practice, and perception in flood disaster management among critical care nurses in the east coast hospitals of Malaysia. This study is different from previous studies with regards to the study sample population, which is focused on critical care nurses, in order to determine the factors associated with knowledge, attitude, practice, and perception in flood disaster management. It will also compare the difference of nurses' knowledge, attitude, practice, and perception in flood disaster management among different types of hospital. Once the factors associated with knowledge, attitude, practice, and perception in flood disaster management among critical care nurses are identified, it will be useful for future plans of continuous learning and training needed for critical care nurses related to preparedness for flood disaster management. A successful disaster response by critical care nurses can be improved by their preparedness for flood disaster management.

1.3 Research Questions

1. What is the level of knowledge, attitude, practice, and perception in flood disaster management among critical care nurses?
2. Is there any association between selected factors (level of education, years of service, workplace, disaster response experience, and attended disaster training/ education) with knowledge, attitude, practice, and perception in flood disaster management among critical care nurses?
3. Is there any difference in knowledge, attitude, practice, and perception of critical care nurses in flood disaster management between tertiary and district hospitals?

1.4 Objectives of the Study

1.4.1 General Objectives

The aim of the study is to identify the factors associated with knowledge, attitude, practice, and perception in flood disaster management among critical care nurses in the east coast hospitals of Malaysia.

1.4.2 Specific Objectives

1. To assess the level of knowledge, attitude, practice, and perception in flood disaster management among critical care nurses.
2. To determine the association between selected factors (level of education, years of service, workplace, disaster response experience, and attended disaster training/ education) with knowledge, attitude, practice, and perception in flood disaster management among critical care nurses.

3. To compare the difference of knowledge, attitude, practice, and perception of critical care nurses in flood disaster management between tertiary and district hospitals.

1.5 Research Hypothesis

H₀ 1: There is no significant association between selected factors (level of education, years of service, workplace, disaster response experience, and attended disaster training/ education) with knowledge, attitude, practice, and perception in flood disaster management among critical care nurses

H_A 1: There is a significant association between selected factors (level of education, years of service, workplace, disaster response experience, and attended disaster training/ education) with knowledge, attitude, practice, and perception in flood disaster management among critical care nurses

H₀ 2: There is no significant difference in knowledge, attitude, practice and perception of critical care nurses in flood disaster management between tertiary and district hospital

H_A 2: There is a significant difference in knowledge, attitude, practice and perception of critical care nurses in flood disaster management between tertiary and district hospitals

1.6 Conceptual and Operational Definitions

1.6.1 Factors associated

Factors associated means having worked with or having a special relation to others. In this study, factors associated are factors that have a relationship with knowledge, attitude, practice, and perception in flood disaster management among critical care nurses. The selected factors associated in this study are level of education, years of service, workplace, disaster response experience, and attended disaster training/education.

1.6.2 Knowledge, Attitude, Practice, Perception

Knowledge is a familiarity, awareness, or understanding of something such as facts, information, descriptions or skills, which is enhanced through experience or education by perceiving, discovering, or learning the process. In this study, knowledge is the facts and information related to flood disaster management among critical care nurses, which included definition and classification of disaster, phases and levels of flood disaster management, and their action and responsibility once the flood disaster happens in their institution.

Attitude is a predisposition or tendency to respond positively or negatively towards a certain idea, person, or situation. Attitude influences an individual's choice of action and responses. In this study, attitude is how critical care nurses respond positively or negatively to flood disaster management; either they are willing or unwilling to be involved and take responsibility in flood disaster response.

The practice is the actual application of an idea, belief, or skills among critical care nurses relating to flood disaster management. It includes their responsibility and

response during disasters, the process of care, involvement in disaster training/education, and concerns about disaster management plans in their institution.

Perception means the ability to see, or become aware of something through the senses and the way in, which something is regarded, understood, or interpreted (Oxford Dictionary, 2018). Perception also means the ability to interpret the environment depending on the acuteness of the sense; if an ageing person's sense is impaired, their ability to perceive the environment and react appropriately is diminished (Kozier et al., 2008). In this study, perception of disaster management means how critical care nurses perceive, understand, or respond in flood disaster management.

1.6.3 Flood Disaster Management

WHO defines a disaster as a disruption of the functioning of a community or a society causing widespread human, material, economic, or environmental losses, which exceed the ability of the affected community or society to cope using its own resources. Disaster management can be defined as the organisation and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies; in particular, the preparedness, response, and recovery in order to lessen the impact of disasters (IFRC, 2018). According to the National Security Council (NSC) Directive No.20 (revised), there are four phases of disaster management cycle, namely: the mitigation phase, preparation phase, response phase, and recovery phase.

In this study, disaster management focuses on flood disaster management among critical care nurses in the east coast hospitals of Malaysia. In Malaysia, the flood disaster management is based on the National Security Council (NSC) Directive No.20 (Elias et al., 2013; Khalid and Shafiai, 2015). Flood disaster management

should involve four phases which are prevention/ mitigation, preparedness, response and recovery (Hamin et al., 2013; Yahya et al., 2016; Izham et al., 2018). According to Hamin et al. (2013), flood disaster management involves the preparation and planning that must be given more attention before the flooding occurs so that the destruction of property can be definitely reduced.

1.6.4 Critical Care Nurse

Critical Care Nurse is a registered nurse working in critical care settings, provides specialized care of patients whose conditions are life-threatening and who require constant monitoring and comprehensive care. To perform effectively in this position, they require extensive knowledge and specialized training. They care for daily needs of those who are the most vulnerable, give direct one-on-one care, are responsible for making life and death decisions, are at a high risk of injury or illnesses from possible exposure to infections, and their communication skill is very important (Mehta, 2015). Critical care nurses are in a unique position to involve in all aspects of disaster response, including triage, stabilisation, specific care, and evacuation. In this study, the target population is registered nurses (RN) working in the critical care unit in east coast hospitals of Malaysia, which include staff nurse grade U29 and U32 [KUP (*Khas Untuk Penyandang*)], sister grade U32, and matron grade U36 – U42. According to Loke and Fung (2014), the critical care nurses are the first to respond and help victims in disasters; work in high-dependency units, including the intensive care unit and the emergency department”. For this study, the critical care unit includes intensive care unit (ICU), coronary care unit (CCU), and emergency department (ED).

1.6.5 East Coast Hospitals of Malaysia

East coast hospitals of Malaysia are those located in Kelantan, Terengganu, and Pahang. In this study, hospitals included were those from Kelantan, Terengganu, and Pahang, and equipped with a critical care unit (i.e. ED, ICU, and CCU). The east coast hospitals of Peninsular Malaysia were selected for this study as these areas were at a high risk of flood disasters. There were two types of hospital involved in this study, which were tertiary and district hospitals.

A **tertiary hospital** (also called a referral centre) is a hospital that provides tertiary care, which is health care from specialists in a large hospital upon a referral from primary care and secondary medical care. In this study, the tertiary hospitals involved were Hospital Universiti Sains Malaysia (HUSM), Hospital Raja Perempuan Zainab II (HRPZ II), Hospital Sultanah Nur Zahirah (HSNZ), and Hospital Tunku Ampuan Afzan (HTAA).

A **district hospital** is typically the major health care facility in its region, with a large number of beds for intensive care and additional beds for patients who need long-term care facilities. Some hospitals have chronic treatment units while others have outpatient departments. In this study, the district hospitals involved were Hospital Kuala Krai (HKK), Hospital Tanah Merah (HTM), Hospital Sultan Haji Ahmad Shah (HOSHAS), and Hospital Kuala Lipis (HKLipis).

1.7 Significance of the Study

This study was focused on identifying the factors associated with knowledge, attitude, practice, and perception in flood disaster management among critical care nurses. The study findings will prepare critical care nurses in the east coast hospitals of Malaysia for flood disaster response. Adequate disaster preparedness training for critical care nurses may reduce anxiety and confusion when a disaster occurred. Furthermore, through the training, it will help to ensure a timely and effective response when a disaster occurred. Therefore, it is more important that trained nurses are equipped with the appropriate skills or practice, knowledge, attitude, and support to meet the individual needs of each patient safely and competently. The guidelines can be further developed in the future by nurses to educate the critical care nurses and be skilful and knowledgeable in relation to flood disaster management. If critical care nurses are knowledgeable and skilful regarding flood disaster management, it may reduce the morbidity and mortality rates when a disaster event happens, and patients will receive good quality of care and treatment even during flood disaster.

In addition to the benefits discussed above, the research finding will add to the body of knowledge regarding the approaches for disaster training. The outcomes of this study will provide important information to build up future policy development and education implications, as well as ensure that critical care nurses are competent to respond during disasters. Besides, once the level of knowledge, attitude, practice, and perception in flood disaster management among critical care nurses is determined, the Ministry of Health, especially the nursing division, can plan for the need of continuous learning and training for critical care nurses related to flood disaster management. The nursing administrator should also make provisions for in-service education and continuing education for critical care nurses. The nursing administrator can start a

structured teaching programme about disaster management and ensure that nurses working in critical care units are adequately equipped with knowledge and skills in flood disaster management.

While implementing the study, the researcher can explore a lot of knowledge and information that will contribute to effective health care. Quality of nurses that have good knowledge and skills will lead to better achievements when giving nursing care for their patients during a disaster. Nursing research should be conducted to prepare standard guidelines for nursing disaster management among critical care nurses. Most of the previous studies based on the literature review have done more and focused only on a group of public health as respondents. Therefore, the present study would like to focus on critical care nurses, including intensive care nurses, as the focus of study population. The findings of this research may also be shared with other countries and communities interested in disaster training of critical care nurses, which will be useful in disasters.

CHAPTER 2

LITERATURE REVIEW

2.1 Flood Disaster

WHO defines a disaster as an occurrence disrupting the normal conditions of existence and causing a level of suffering such as widespread human, material, economic, or environmental losses, which exceeds the capacity of adjustment of the affected community or society to cope using its own resources. In Malaysia, floods are a regular natural disaster that frequently happens every year in Peninsular Malaysia, particularly in the east coast region, which are Kelantan, Terengganu and Pahang (Izham et al., 2013; Nurul Afzan, 2014; Said Nurumal et al., 2019). Flooding is a major risk in the world and nowadays it is becoming common in Malaysia (Izham et al., 2013) and it has caused loss of lives and destruction of properties (Kourgialas & Karatzas, 2011). Flood disaster that happened in 2014 was stated the most incredible event that seriously affect the community than the previous years (Said Nurumal, 2017).

General flood is a gradually rising inland flood (i.e. rivers, lakes, and groundwater) due to high total depth of rainfall which can be expected at certain locations, such as along rivers, at a significantly higher probability than at others (Guha-Sapir et al., 2011). Floods often occur in Malaysia due to the increase in the frequency of rainfall and the rise of the level of sea in certain parts of the country (Aliagha et al., 2015). Nowadays, the changes of flood trends due to change of climate, use of land, growth of urban and human activities such as deforestation and infrastructure development across the watercourse (Kourgialas & Karatzas, 2011;

Izham et al., 2018). The impacts of flooding include the destruction of housing and healthcare services. “Floods pose specific challenges for emergency response as sometimes, vast areas of land are covered with water, making coordination very difficult. Organising logistics, transport, and distribution of relief goods is complicated since the country's infrastructure is often damaged” (IFRC, 2018). Therefore, the effectiveness of flood disaster management should be given attention so that the damage effects of disasters can be minimised (Othman et al., 2014).

2.2 Flood Disaster Management

Disaster management can be defined as the organisation and management of resources and responsibilities to deal with all humanitarian aspects of emergencies, in particular, the preparedness, response, and recovery in order to minimize the impact of disasters (IFRC, 2018). In view of disaster is unpredictable, the failure of hospitals and emergency service to manage a disaster severely affects the community. Therefore, it is very important to improve disaster planning and preparation with the aim of equipping the needs of healthcare workers in delivering care to victims (Ahayalimudin & Osman, 2016).

Disaster preparedness has been defined by WHO as the set of measures that ensure the organised mobilisation of personnel, equipment, funds, and supplies within a safe environment for effective relief. Literature review has revealed that in the Malaysian context, there is very limited information about disaster management planning, and subsequently, the significance of disaster preparedness plan in Malaysia. This situation is still relatively unclear as the public thoughts the reason why they

should be participated with this kind of situation were not important to them (Rashidi, 2006, as cited by Mohd Shaharudin Shah et al., 2016).

In Malaysia, the government has begun to improve the disaster management plan by establishing the National Security Council Directive No. 20, which details the policy and mechanisms of National Disaster Relief and Management (Ahayalimudin & Osman, 2016). The main policy for disaster management in Malaysia is the Directive No. 20, which guides agencies across the nation in managing disaster and its impact (National Security Council, 2012) included flood disaster management (Elias et al., 2013). The National Security Council (NSC) has responsibility for controlling the national disaster management system and this organisation will provide and effective relief machinery for recovery following flooding disaster (Khalid & Shafiai, 2015).

2.2.1 Flood Disaster Management Phases

In Malaysia, the flood disaster management is based on the National Security Council (NSC) Directive No.20 (Elias et al., 2013; Khalid and Shafiai, 2015) that involves four phases as stated in Figure 2.1 which are prevention/ mitigation, preparedness, response and recovery. Flood disaster management involves the preparation and planning that must be given more attention before the flooding occurs so that the destruction of property can be definitely reduced (Hamin et al., 2013). The disaster prevention/ mitigation and preparedness are the main attention because if these two phases were successfully handled, the burden of the next phases will be alleviated (Izham et al., 2018).

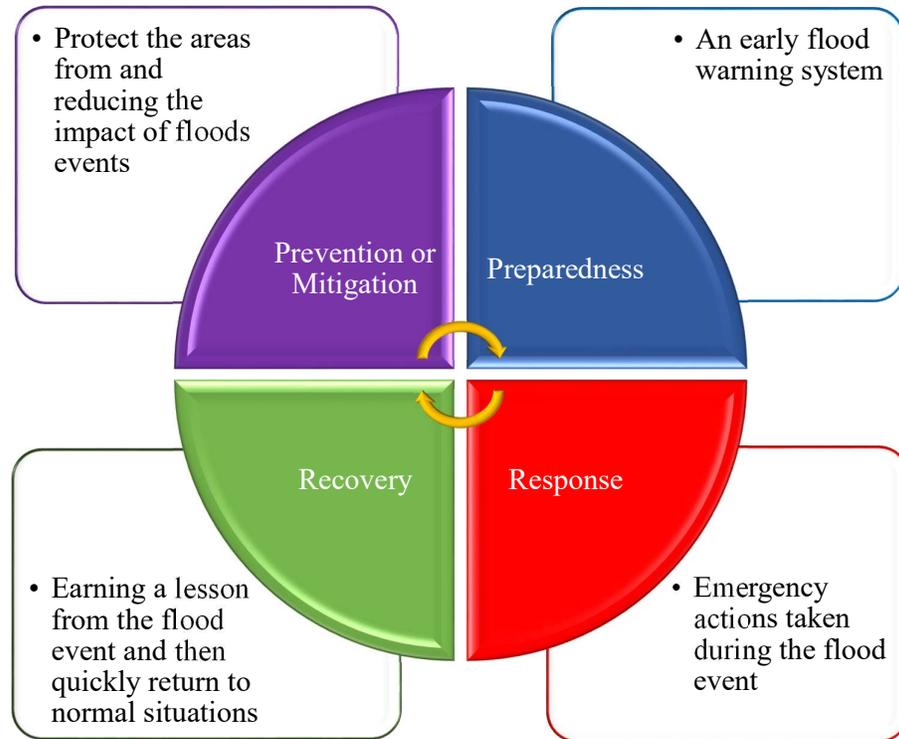


Figure 2.1: Flood Disaster Management Phases (NSC Directive No.20, 2012; Izham et al., 2018)

- Prevention/ Mitigation Phase:** “Involves implementing measures to prevent the future threat of disaster or minimising their impact of unavoidable threat that requires hazard risk analysis and the application of strategies to reduce the likelihood that hazards will become disasters” (Alrein, 2017). Flood prevention or mitigation are the actions including structural and non-structural measures carried out to protect the areas identified as a floods area with the main purpose to reduce the impact of floods on human and others (Khalid & Shafiai, 2015).
- Preparedness Phase:** “Preparedness efforts include plans made in advance of an emergency that assist individuals and communities get ready to either respond or to recover. It aims to achieve a satisfactory level of readiness to respond in any emergency situation through programmes that strengthen the technical capacity of

governments, organisations, and communities (Alrein, 2017). According to Khalid and Shafiai (2015), flood preparedness is an early flood warning system which involves the process of providing relevant flood information to the public especially those who are living in the flood-prone areas so that the public will be more aware about the flood risks and they will know how to react to the flood.

- **Response Phase:** “Disaster response effort includes any actions taken in the midst of or immediately following an emergency, including efforts to save lives and to prevent further property damage. Disaster response involves putting already established disaster preparedness plans into action includes flashing lights, evacuation, search and rescue, and sheltering victims. Healthcare and psychosocial intervention response start in this phase on meeting the basic needs of the victims until a sustainable community has been achieved. This phase may still continue even when the recovery phase can already be started” (Alrein, 2017). According to Khalid and Shafiai (2015), the phase of flood responses involves the emergency actions that will taken during the flood event.
- **Recovery Phase:** “Recovery phase involves rebuilding and restoring the impacted area of disasters that starts after damages have been assessed and adequate response effort is achieved and on-going. It involves actions to return the affected community to its pre-disaster state or better. Recovery activities continue until all systems return to normal or better” (Alrein, 2017). Flood recovery phase refers to the process of review about the past flood event and then back to normal situations quickly as well as mitigate of both the social and economic impacts of the flood event (Khalid and Shafiai, 2015). This phase involves the relief and rehabilitation support to the flood victims which include both material and moral supports (Izham et al., 2018).

2.2.2 Disaster Management Level

Disaster management in Malaysia has three levels and every committee in every level has its own responsibility (Khalid and Shafiai, 2015). According to the NSC Directive 20 (revised) (NSC, 2012), there are three levels of disaster management, namely: Level I Disaster, Level II Disaster, and Level III Disaster. The disaster management handling will be controlled based on the disaster level. Details as shown in Figure 2.2.

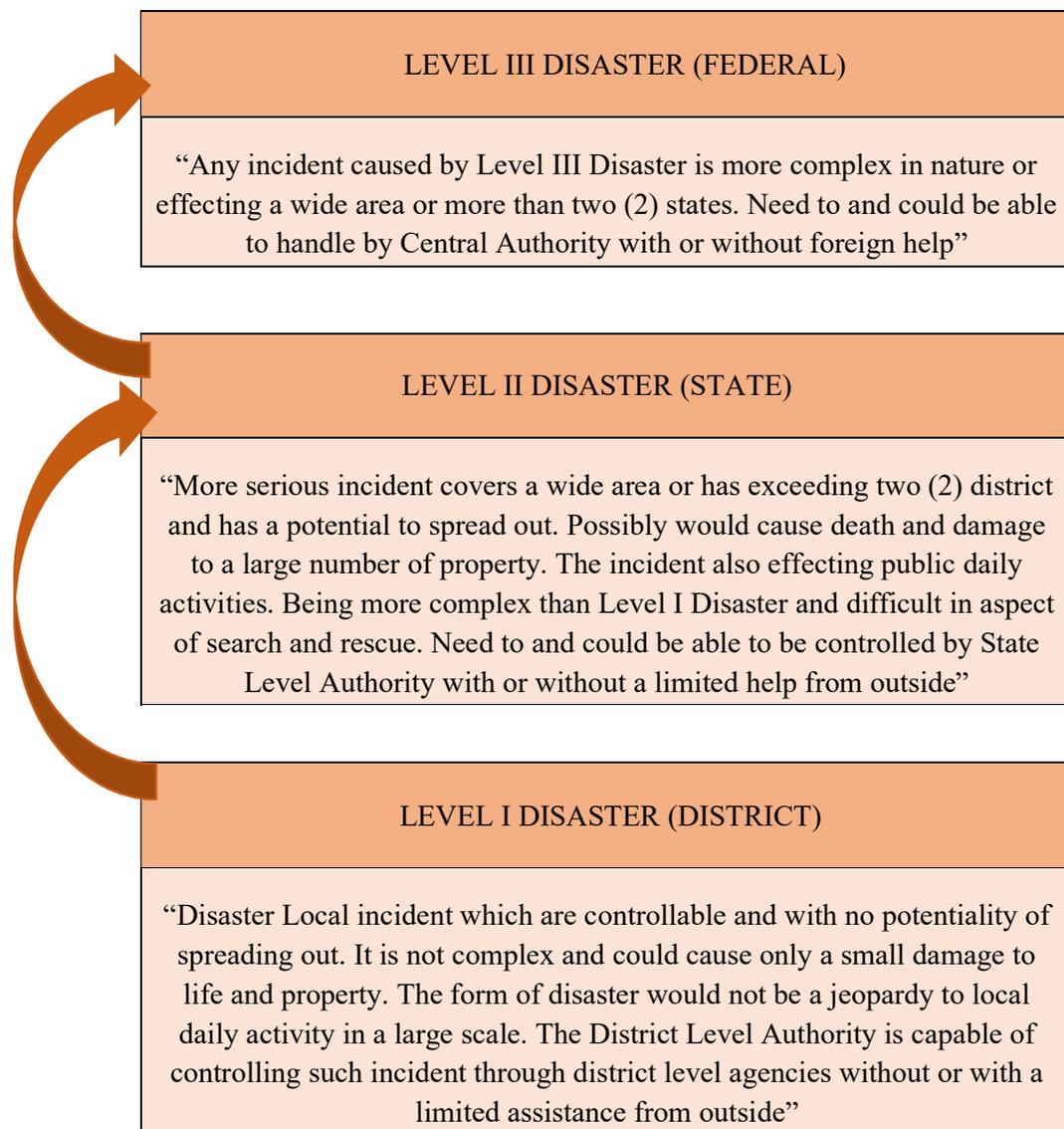


Figure 2.2: Disaster Management Level (NSC Directive 20 (revised), 2012)

In this study, the level of disaster management focused on Level II Disaster. The classification on assessment relied on the district-level authority or state-level authority or federal authority, which decides on its management or suggest any other action of taking over the disaster by another higher authority. Furthermore, the Disaster Management and Relief Committee (DMRC) has been established with the aim of ensuring any disaster event will be managed according to the levels specified. The DMRC will be organized as follows:

- i. District level DMRC for Level I Disaster
- ii. State level DMRC for Level II Disaster
- iii. Federal level DMRC for Level III Disaster

2.3 Factors Associated with Knowledge, Attitude, practice, and Perception in Flood Disaster Management

From the previous studies, there are many factors associated with knowledge, attitude, practice, and perception in flood disaster management among critical care nurses. They include: level of education, years of service, workplace, disaster response experience, and attended disaster training/education; they will affect on the knowledge, attitude, practice, and perception in flood disaster management among critical care nurses.

- **Level of Education**

In healthcare services, nurses are the largest population in the healthcare team. Therefore, it is necessary to prepare themselves with skills and knowledge related to flood disaster management. They must be alert about flood disaster management plan and it should be established to ensure effective management and faster access to

services that can be triggered during a flood disaster. Besides, nurses are the majority of frontline responders in disasters that particularly important to ensure their skills and knowledge are sufficient to respond in disaster events (Rokkas et al., 2014).

A study done by Gladston and Nayak (2017) has revealed that 24.5% have adequate knowledge, 51.1% have moderately adequate knowledge, and 24.5% have inadequate knowledge. Almost 85.1% of the nurses have a moderate perception of disaster preparedness. There is no statistically significant between the perception and knowledge of the participants, while an association is seen between the qualification of the nurses and the perception (Gladston & Nayak, 2017).

According to the findings by Al Thobaity et al. (2015), nurses report slightly more skills and knowledge in disaster management acquired from their graduate courses than from their undergraduate courses, while 29% indicate that they have obtained their skills and knowledge from graduate courses. Furthermore, only 108 (27%) indicate receiving their skills and knowledge in undergraduate courses and 113 (26%) respondents indicate that their source of disaster skills and knowledge is from being involved in an actual disaster.

- **Years of Service**

According to Magnaye et al. (2011), years of service play a significant factor affecting the nurses' roles, preparedness, and management in disaster events. From the findings, it is inferred that the length, quality, and nature of experiences and training affect the variations in terms of knowledge and enhancement of skills and competencies. Landesman (2006) as cited by Magnaye et al. (2011, p.286) has stated that "the less experienced ones are given lighter assignments than those who have been in the field for a long period of time. In the most critical situations, the veterans are