A STUDY ON KNOWLEDGE, ATTITUDE AND CONFIDENCE LEVEL ON PRE-HOSPITAL AIRWAY MANAGEMENT AMONG PRE-HOSPITAL CARE PROVIDERS IN PERAK

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by

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LIST OF ABBREVIATIONS

ADEC	Advanced Diploma in Emergency Care
AEPBC	Accident & Emergency Post- Basic Certificate
AEMTC	Advanced Emergency Medicine and Trauma Course
ALS	Advanced Life Support
ATLS	Advanced Trauma Life Support
ACLS	Advanced Cardiac Life Support
ATLS	Advanced Trauma Life Support
AMO	Assistant Medical Officer
AMOTeX	Assistant Medical Officer Technical Expert
BLS	Basic Life Support
BTLS	Basic Trauma Life Support
BPL	Bahagian Pengurusan Latihan
BVM	Beg Valve Mask
CMA	Certificate of Medical Assistant
DMA	Diploma in Medical Assistant
EMRS	Emergency Medical Rescue Services
ED	Emergency Department
ETT	Endotracheal tube
EMT	Emergency Medical Team
HTG	Hospital Taiping
HTI	Hospital Teluk Intan
HSM	Hospital Sri Manjung
HSR	Hospital Slim River
HT	Hospital Tapah
HSS	Hospital Sg. Siput
HK	Hospital Kampar
HBG	Hospital Batu Gajah
HKK	Hospital Kuala Kangsar
HCM	Hospital Changkat Melintang
HG	Hospital Grik
HPB	Hospital Parit Buntar

HS	Hospital Selama
ICU	Intensive Care Unit
IPS	Institut Pengajian Siswazah
KPI	Key Performance Index
LMA	Laryngeal Mask Airway
MECC	Medical Emergency Coordinator Centre
MFAM	Medication-Facilitated Airway Management
NPHCALSCE	National PHCS ALS Competency Examination
OT	Operating Theatre
OBE	Outcome Base Education
PDRM	Force Royal Malaysian Police
PSE	Perceived self-efficacy
RSI	Repeat Sequence Intubation
TLS	Trauma Life Support Course
USM	Universiti Sains Malaysia

KAJIAN MENGENAI TAHAP PENGETAHUAN, SIKAP DAN KEYAKINAN TERHADAP PENGURUSAN SALUR PERNAFASAN PRA HOSPITAL DI KALANGAN PENGAMAL PENJAGAAN PRA HOSPITAL DI PERAK

ABSTRAK

Pengurusan Salur Pernafasan Pra-Hospital (PHAM) adalah aspek penting dalam penjagaan pesakit di luar kawasan hospital. Pengamal Penjagaan Pra Hospital harus menguasai kemahiran PHAM untuk merawat pesakit dengan selamat. Objektif kajian adalah menentukan tahap pengetahuan, sikap, dan keyakinan tentang PHAM dalam kalangan Pengamal Penjagaan Pra Hospital di Unit Pra Hospital dan mengenalpasti faktor-faktor yang mempengaruhi tahap pengetahuan, sikap, dan keyakinan diri berkenaan PHAM. Kajian keratan rentas ini telah dijalankan di 14 hospital di bawah Kementerian Kesihatan Malaysia di Perak menggunakan soal selidik digital yang telah disahkan mengandungi profil demografi, pengetahuan, sikap, dan keyakinan melibatkan 118 responden. Daripada 3 skor domain yang dianalisa, domain pengetahuan; 35.6% (n = 42) adalah baik. Domain sikap; 89.8% (n = 106) adalah baik, dan domain keyakinan diri; 31.4% (n = 37) adalah baik. Kajian juga mendapati terdapat faktor-faktor yang mempengaruhi domain pengetahuan iaitu pengalaman kerja (95% CI (1.31, 9.10), p = 0.012); domain sikap adalah menghadiri kursus PHAM (95% CI (1.75, 44.84), p = 0.008); domain keyakinan adalah mendapat latihan yang mencukupi (95% CI (1.21, 7.06), p = 0.018). Hasil kajian mendapati hanya domain sikap adalah baik. Pengkaji mencadangkan Pendidikan Perubatan Berterusan (CME) dan penglibatan yang kerap dalam Latihan Simulasi yang berkaitan dengan PHAM untuk meningkat pengetahuan, sikap dan keyakinan diri.

A STUDY ON KNOWLEDGE, ATTITUDE AND CONFIDENCE LEVEL ON PRE-HOSPITAL AIRWAY MANAGEMENT AMONG PRE-HOSPITAL CARE PROVIDERS IN PERAK

ABSTRACT

Pre-Hospital Airway Management (PHAM) is an important aspect of patient care outside the hospital setting. Pre-Hospital Care (PHC) Providers should master PHAM skills to treat patients safely. The objective of the study is to determine the level of knowledge, attitude, and confidence about PHAM among PHC Provider in the PHC Unit and to identify the factors that affect the level of knowledge, attitude, and self-confidence about PHAM. This cross-sectional study was conducted in 14 hospitals under the Malaysian Ministry of Health (MOH) in Perak using a validated digital questionnaire consists of demographics profile, knowledge, attitudes, and self-confidence involving 118 respondents. From the 3 domain scores analysed, the Knowledge domain; 35.6% (n = 42) were good. The other two which are Attitude domains; 89.8% (n = 106) and Confidence domain; 31.4% (n = 37) both were good. The study also found that there are factors that influence the domain of knowledge, which is work experience (95% CI (1.31, 9.10), p = 0.012); attitude domain factor is attending PHAM courses (95% CI (1.75, 44.84), p = 0.008); while confidence domain factor is getting enough training (95% CI (1.21, 7.06), p = 0.018). The results from this study found that only the attitude domain was good. Researchers suggest Continuous Medical Education (CME) and frequent involvement in Simulation Training related to PHAM to increase knowledge, attitude, and self-confidence.

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Pre-Hospital Airway Management (PHAM) is a crucial component of emergency responders and continue to remain as an essential task in the global Pre-Hospital Care (PHC) system (Fadden & Prior, 2017). According to Jacobs & Grabinsky, (2014a) and Steinmann, Ahne, Heringhaus, & Goebel, (2016), the most advanced airway management techniques involving the placement of oropharyngeal airways are the Laryngeal Mask Airway (LMA) and Endotracheal tube (ETT) techniques. Though the Emergency Department (ED) is usually the first place where a patient often receives the initial assessment and treatment for various illnesses (Asmee S.A, 2014), effective airway management is not only crucial at the intensive care unit (ICU) and operating theatre (OT), but also in Pre-Hospital Care (PHC).

1.2 Problem Statement

Nowadays, the current format of PHC provider knowledge and training curriculum is inadequate for training PHAM, and improving training for PHC provider is not considered feasible. This is because of difficulties in delivering the training and operational reasons. According to Outcome Base Education (OBE) Curriculum Diploma in Medical Science and Health, BPL KKM (2019 & 2022), the majority PHC provider trainee of those managing patients' airways component in the PHC course instead of Endo Tracheal Tube (ETT), they are trained to insert a Supraglottic Airway Device (SAD). For selected providers, ETT should be developed as a specialist skill, and it should include the provision of drug-assisted intubation. Significant

improvements in initial and ongoing training as well as education would be required to develop this as an autonomous specialist skill.

In attitude context among PHC Provider, by using simulation with a mannequin some of the basic intubation skills can be accomplished. Simulators are not a complete substitute for the training required on real patients although they are improving all this time. Refresher courses that include mannequin training may help for skill retention. Intubation is a complex motor skill, and that requires adequate initial training and sufficient ongoing experience in order to maintain competency. Currently, UK paramedic training was examined against the limited evidence and data for training requirements. Most studies have demonstrated that to be competent in the procedure, initial training requires the successful placement of 50-60 tracheal tubes. This new requirement might be needed compared with the 25 that currently practised. There were also concerns conveyed to authorities, that paramedics mostly do not have satisfactory ongoing intubation experience to remain skilled and qualified in the procedure.

PHC service should consider confidence trained PHC providers to care for those with PHAM. PHAM should only be conveyed when appropriately skilled PHC providers are accessible. According to Alberti (2007), PHC service ensure that competence PHC provider are seen in the right place, at the right time, and by staff with the most pertinent skills. PHAM requires remarkably more training and education than that currently provided for PHC Provider with applicable training in advanced airway skills. PHAM that will be introduced into PHC services should ensure that both academic curriculum and service PHC providers receive sufficient initial and ongoing training and coaching, in the use of these devices. For the introduction of any changes in PHC provider practice, the timescale should be determined at a local or national

level. PHC services will need to review any changes to train and practice in both SAD and ETT use, and best to decide the most appropriate way forward.

More pre-hospital research is pressingly needed to understand the factors influencing knowledge, attitude, and confidence in association to PHAM. More significant improvements in education, initial and ongoing training would be required to establish this as an autonomous specialist skill. Although this would require a more long-term approach, this may be best accomplished through a physician-based system. From The National Confidential Enquiry into Patient Outcome and Death (NCEPOD, 2007) review of trauma management, it has found that 13.7% of patients with major trauma arriving by ambulance did so with a partially or completely obstructed airway. This implying that present paramedic training does not equip them with sufficient skills and tools to handle these patients sufficiently. Meanwhile in 28.6% cases, patients were not intubated when experts believed that it should have been initiated.

Failing to accomplish airway control can lead to complications and even death, and the PHC provider is expected to be equipped with this essential clinical skill to provide safe care to the patient. According to statistics on the causes of death in Malaysia (2020), ischaemic heart disease remained the principal cause of death amounting to 15.0 per cent or 109,164 medically certified deaths in 2019. This was followed by pneumonia (12.2%), cerebrovascular diseases (8.0%), transport accidents (3.8%) and malignant neoplasm of the trachea, bronchus, and lungs (2.4%). As for the state of Perak, it recorded the 3rd highest number of deaths (2156 cases) due to ischemic heart diseases (IHD), after Selangor and Johor. A survey on pre-hospital airway management (PHAM) administered by PHC providers in the Perak indicated a requirement for a continuous clinical practice assessment to identify the level of knowledge, attitude, and confidence among Perak PHC providers.

PHC providers acknowledge that the gold standard for airway management is the ETT (Kuvaki, 2011; Gunning, Perkins, Crilly, & von Rahden, 2013; D. J. Lockey, Crewdson, & Lossius, 2014). Studies have shown that there is a lack of confidence on PHAM among PHC providers. Therefore, it is important to train PHC providers to improve SAD and PHAM for the sake of patient safety and survival. According to a prospective cross-sectional study involving ambulance paramedics working at a PHC unit (Hafis, Johar, Mahathar, & Saiboon, 2014), it was found that paramedics possessed adequate positive attitudes, knowledge and demonstrated excellent respiratory device application skills (Sanjaikumar, 2016; Kwak et al., 2013). However, the lack of confidence especially when making decisions; to initiate and troubleshoot potential complications were the main obstacles hindering its use.

1.3 Research Question

a. What is the level of knowledge on Pre-Hospital Airway Management among PHC Providers in Perak?
b. What is the attitude on Pre-Hospital Airway Management among PHC Providers in Perak?
c. What is the level of confidence in Pre-Hospital Airway Management among PHC Providers in Perak?
d. What are the factors that contribute to the level of knowledge, attitude, and confidence in Pre-Hospital Airway Management among PHC Providers in Perak?

1.4 Objectives of the Study

1.4.1 General Objective

To determine the level of knowledge, attitude, and confidence on Pre-Hospital Airway Management among Pre-Hospital Care providers in Perak.

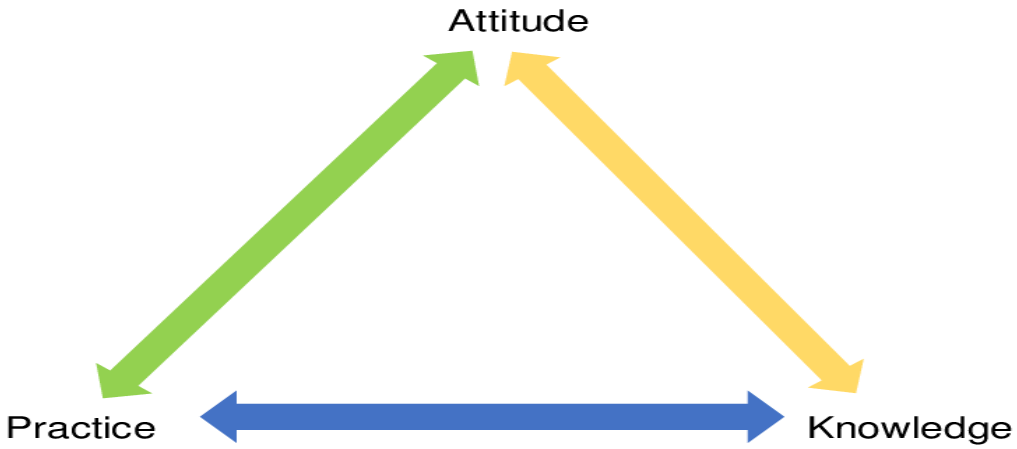
1.4.2 Specific Objective

a. To determine the level of knowledge on Pre-Hospital Airway Management among PHC Providers in Perak.
b. To determine the attitude on Pre-Hospital Airway Management among PHC Providers in Perak.
c. To determine the level of confidence in Pre-Hospital Airway Management among PHC Providers in Perak
d. To determine factors contributing to the level of knowledge, attitude, and confidence on Pre-Hospital Airway Management among PHC Providers in Perak.

1.5 Null Hypothesis

There are no influencing factors that contribute to the level of knowledge, attitude, and confidence on Pre-Hospital Airway Management among PHC Providers in Perak.

1.6 Conceptual and Operational Definitions



(Modified as Confidence)

The Knowledge-Attitude-Practice Model (Bano et al., 2013) (Schwartz, 1976) Implication for personal measurement of the advantage of KAP model. This KAP survey method is simple to conduct. It is based on the impression that increasing personal knowledge will influence behavioural change. Results obtained from using this method are relatively simple and straightforward to describe and interpret, and as a rational model in health it provides a concise presentation of the KAP. (WHO, 2012).

On the other hand, the Confidence Model is likely to be the most used term for these related concepts outside of psychological research. However, there is still some confusion about what exactly self-confidence is. “Believing in oneself” is one of the most quoted sources about self-confidence (Bénabou & Tirole, 2002). Self-efficacy is what many psychologists turn to cite especially when seeing an individual’s beliefs about their essential qualities and experience concerning a specific task or set of tasks. Meanwhile self-confidence is more often referred to as a more stable and broader trait concerning an individual’s awareness of overall competence.

1.6.1 Definition of Knowledge

The “information, understanding, and skills that are gained through education or experience" is the definition of knowledge by The Oxford English Dictionary (Oxford Advanced American Dictionary, 2021).

Sun Yet et al. (2017) revealed that each of these elements have important challenges although it was well-established in paramedic education. Academic teaching helps to establish the core foundation of knowledge about intubation. As for example, physiology, relevant anatomy, and the basics of laryngoscopy. However, it does not demonstrate the physical implication of the procedure. Newer versions of human simulators and task-training mannequins offer learning platforms and reinforce the intubation techniques and physical basics of laryngoscopy. However, mannequins do not precisely mirror the feel of a real live airway structure, or the discrepancy of airway anatomies experienced in clinical practice. Mannequins also restraining students' abilities to evaluate their performance because mannequins do not provide feedback.

1.6.2 Definition of Attitude

The way one feels and thinks about something, or somebody is described as attitude; the way one behaves towards something or somebody that shows how to feel and think (Oxford Advanced American Dictionary, 2021b). An attitude is a way of feeling or thinking about the needs that determine pre-hospital airway management, such as the Pre-Hospital Care Responders' views about managing a patient’s airway in the PHC area.

It is necessary for them to know what PHAM is and understand that airway management is important for them to learn. Thus, in order to be good at managing a patient with a difficult airway, one must know whether to call for help at a particular time, prepare a rescue technique for securing an airway, assessing a patient’s airway before attempting intubation, and determine views about post-intubation care. These are some of the important questions that need to be answered.

Some of the authors have questioned whether for specific clinical disciplines, airway management courses should be made mandatory (Timmermann et al., 2005; Eich C. et al., 2006; Rose DK, 1996). Data from this study support the justification for such courses. Russo *et al.*, (2007) determined that participants considered the airway management course to repeat frequently is impractical and, indeed, 67% of them favored repeating the course within 36 months. Similar suggestions are consistent with this time interval and found in several of the literatures above (Nargozian C., 2004). Attitude can be changed, and it is usually affected by a personal experience gained through years of working and attending related courses. However, Dyson et al., (2017) mentioned about the enormous challenges posed by the gaps in paramedic intubation training. Although intubation knowledge and experience is not associated with out-of-hospital cardiac arrest outcomes, first-pass intubation success is akin with greater odds of a return in spontaneous circulation (AOR 1.52; 95% CI 1.35 to 1.72) and survival, which ends to a hospital discharge (AOR 1.26; 95% CI 1.06 to 1.50). From these findings, it has directed the authors to recommend that the results "may be associated with the proficient performance of intubation", rather than number of intubations attempts or years of experience.

1.6.3 Definition of Confidence

Confidence is described as somebody or something that we trust, believe, and fell assured about the abilities or good qualities. Another definition of confidence is a belief in one's own ability to do things and be successful (Oxford Advanced American Dictionary, 2021c). This self-confidence can be gained and consolidated through previous successful experiences.

On the other hand, an individual's level of self-confidence in the perceived ability to accomplish successful completion of a task describe as Perceived self-efficacy (PSE). Self-efficacy theory upholds the concept that an individual's view of their capability to be

successful boost them in bring about success. During complex decision-making situations, self-efficacy beliefs assist in competent analytic thinking (Youngquist et al., 2008). One of the factors has been identified in the success rate of competent skill acquirement in High-Fidelity Simulation (HFS) simulator teaching is the concept of self-efficacy (Sinclair & Ferguson, 2009).

After an extensive search for a meta-analysis of recent literature regarding knowledge, attitude, and confidence levels regarding rapid sequence intubation in pre-hospital airway management, only one research was identified. The research was carried out by K. Crewdson. *et al.* (2017) regarding, the overall achievement rate of intubation performed in a pre-hospital setting has expanded. However, this meta-analysis of the recent literature shows a significant difference between physician and non-physician providers with or without drugs. Therefore, the finding that less trained personnel perform below par is not unexpected. However, since there is considerable evidence that poorly performed intubation carries a significant morbidity and mortality rate, careful reflection should be given to the level of experience and training required to safely deliver this pre-hospital intervention. However, the study did not explore pre-hospital providers' confidence in selected pre-hospital airway management using other tools, procedures, and management protocols.

When appropriately skilled pre-hospital personnel are available, then only the advances airway management should be delivered. Otherwise, cautious attention should be paid to perform high-quality basic airway interventions (Rehn M et al, 2016, Lockey DJ et al, 2017, Hossfeld B et al, 2016, O'Connor RE., 2006)

1.6.4 Definition of Pre-Hospital Airway Management (PHAM)

One of the twelve agencies within the U.S. Department of Health & Human Services which is The Agency for Healthcare Research and Quality, (AHQR,2020), defined PHAM as one of the most crucial aspects of prehospital care. It influences the possibility for recovery from injury or rising illnesses and it is vital for patient survival. Airway management includes

ventilation assistance to support oxygenation and may include safeguarding against aspiration, depending on the management approach. Historically, endotracheal intubation has been considered the gold standard for airway management. The primary objective in a prehospital setting is to reassure the patient is ventilated until the patient is transported to a hospital or emergency department (ED).

However, PHAM remains a controversial subject. There are mixed views about whether advanced interventions are beneficial or detrimental (Hussmann et al., 2011). However, what is clear is that there is a small but identifiable group of patients with recognised indications for intubation, in whom, basic airway manoeuvres are not sufficient to maintain adequate oxygenation, and advanced airway interventions are warranted at an early stage (D. J. Lockey et al., 2015).

1.6.5 Definition of Pre-Hospital Care Provider

The Farlex Medical Dictionary (2009) defines a Pre-Hospital Care Provider as, "a health care provider trained and certified or licensed by the state, who practices emergency assessment and care in an out-of-hospital setting". The Medical Dictionary for Health Professions and Nursing (2012) reported that a PHC Provider is synonymous with a paramedic, who is defined in the UK as a leading, and often the first, ambulance service healthcare professional at the place of medical emergency or an accident. Paramedics may work alone when positioned in a motorbike, car, or bicycle or with the provision of an ambulance technician or emergency care assistant. The paramedic scop practices are emergency van provider and disaster field triage, resuscitate, provide advanced life support, or stabilise the patient using the equipment. The element of emergency tools including spinal and traction splints, IV drips, defibrillators, ETT, SAD, drugs, and oxygen.

1.6.5(a) Assistant Medical Officer (AMO)

Both, Mahmud, A. (2018) and Michau *et al*. (2009) had defined an Assistant Medical Officer (AMO) as a profession that plays a major role in emergency medical services, including stabilizing patients and the provision of initial emergency treatment before referring them to a medical officer (MO). Furthermore, they also mentioned that the AMO, who is involved in emergency services and PHC, is known as a paramedic because of the paramedic's role in other countries, such as USA, United Kingdom, Canada, and Australia.

In 2018, the Assistant Medical Officer (AMO) to patient ratio in Malaysia was 1:1,800 (Ministry of Health Malaysia, 2019 and Medical Assistant Board, 2018). As for Perak, there were 1367 AMOs with a ratio of 1:1550 in multiple disciplines like Emergency, Pre-Hospital Care Service, Public Health, Orthopaedic, Psychiatry, Internal Medicine, Respiratory Medicine, Surgical, Cardiology, Neurology, Anaesthesiology, Paediatric, Gynaecology, Forensic Unit, and others. This study's population involved both male and female Assistant Medical Officers (AMO) from multiple Emergency Departments in Perak.

According to the 2019 PHC providers' records, it was estimated that 320 AMOs are serving in the Perak PHC services. The Medical Emergency Coordinator Centre (MECC) based in Hospital Raja Permaisuri Bainun's (HRPB) ED in Ipoh controls the entire PHC service in Perak. Besides PHC services, they also work in the Triage Unit, Asthma Bay Unit, Procedure Unit, Semi Critical Unit (Yellow Zone), Critical Care Unit (Red Zone) and in MECC based on the shift and roster system while being supervised by ED AMO managers. They also possess clinical experience, knowledge, attitude, and self-confidence in emergency airway management, medication management, and ventilator management while under the observation of medical officers or emergency specialists.

1.6.5(b) PHC Provider Education

Majority of PHC providers in Malaysia comprise AMO (Mahmud, A., 2018), who had graduated with a diploma or certificate in Medical Assistant Training from several Ministry of Health Training Institutions (ILKKM), such as ILKKM Sultan Azlan Shah, Perak, ILKKM Seremban, ILKKM Alor Star, ILKKM Johor Baharu, ILKKM Kota Kinabalu and ILKKM Kuching. Some of them had graduated from private colleges, such as UniKL University, MSU University, PICOMS International University College, Lincoln University College, Murni International College and Widad University College (MAB Report, 2018).

According MAB Report (2018), some of them had graduated with multiple qualifications (Degree and Masters) in areas such as Science of Emergency Medicine and Psychology (UKM), Disaster Risk Management (UTM), Science of Public Health, Nursing or Health Practice (MAHSA & Northumbria University), Occupational Safety & Health Management (UUM) as well as Medical and Health Sciences (OUM).

1.6.5(c) PHC Provider Credentialing and Privileging (C&P)

As for the Credentialing and Privileging (C&P) by KKM (2021), only the Pre-Hospital Care Services and Emergency Medicine & Trauma Services (Ministry of Health Malaysia, 2018a) certificates are accepted. According KKM's Annual Report 2017, other certificates, such as Pre-Hospital Care, Basic Life Support Course (BLS), Advanced Diploma in Emergency Care (ADEC) / Accident & Emergency Post-Basic Certificate (AEPBC), Trauma Life Support Course (TLS), Advanced Life Support Course (ALS), National PHCS ALS Competency Examination (NPHCALSCE), Advanced Trauma Life Support (ATLS) and Advanced Cardiac Life Support (ACLS) certificates are all accepted. In addition, Paediatric Advanced Life Support (PALS),

NRP and Disaster Management certificates are also accepted. As of today, there are no studies on PHAM specialized training or competency in Malaysia. This present study will explore the Supraglottic Airway Device (SAD), Endo Tracheal Intubation (ETI), Repeat Sequence Intubation (RSI) and Bag Valve Mask (BVM).

1.6.6 State of Perak

Perak, located in the central region of Peninsular Malaysia, which has a total land area of 20,976 square kilometres (8,099 sq. mi), is bordered by Thailand in the North, Selangor in the South, Pahang and Kelantan in the East, the Straits of Malacca in the West, and Kedah and Penang in the Northwest. The 2015 Malaysian Census reported Perak's population to be 2,477,700, with a non-citizen population of 74,200, conclude it the fifth most populated state in Malaysia. The Malaysian population comprises 1,314,400 (53.0%) Malays, 713,000 (28.0%) Chinese, 293,300 (11.0%) Indians, and 72,300 (2.9%) identified as 'other' Bumiputera (Department of Statistics Malaysia, 2019).

Once the most populous state during the British administration under the Federated Malay States (FMS), Perak has yet to recover from the decline of the tin-mining industry (Azrai et al, 2012). The state had large mineral deposits and once claimed a position of having one of the world's largest resources of tin (Tang Ruxyn, 2017; Richard Beck, 1909; National Library of Malaysia, 2000). It can be estimated that the people of Perak are multi-racial and dynamic which can describe the people of the whole of Malaysia. This causes the state of Perak most dynamic policy in state of Malaysia according suitable apply new rehearsal, exercise, guideline, and policy especially in sociological and legislative (Bernauer et al, 2014).

Perak's population density is mainly concentrated in lowland and coastal areas as the state has a very challenging demographic profile. This is because Perak has the most challenging geography and demographics such as mountains, limestone caves, rivers and islands. Malaysia's longest highway, the North–South Expressway (PLUS) and Electric Train Service (ETS) operation by Keretapi Tanah Melayu (KTM), connects Perak with Federal Territories and the other West coast states. Therefore, this facilitates the travel network to carry out activities multiple economy activity such as plantation, transportation, maritime, and industry. Because of this, the risk of trauma, injuries and motor vehicle accidents (MVA) easily happen to the community. Health services and pre-hospital care are very necessary to overcome the issue, especially in the districts and rural areas of the state of Perak.

In Kinta valley (according to Perak state), the first private hospital was built in 1880 called the Yeng Wah Hospital, now known as Taiping Hospital, which was set up by the Chinese Mining Community. The first government hospitals were the Prison and Police Hospitals that were opened and run by Mr Thomas Prendergast, a qualified 'Apothecary'. Therefore, Hospital Taiping was a first hospital used health technology in Malaysia with use x-ray and ambulance facility for patient (Cartwright, H. A., Wright, A., 1989 & Taiping Heritage Culture, 2008). According recorded by Jabatan Kesihatan Negeri Perak (2021), the construction of Bahagia Ulu Kinta Hospital, Perak was completed in 1911 and Dr. W. F. Samuels was appointed the first Medical Superintendent. This shows that the progress of the country's health system has been moving forward for a long time, especially to the earliest health system in Perak. So, there is significant the health system of the state of Perak is made a batch mark and the main study for researchers.

Although early medical education is recorded as beginning at King Edward VII Medical College, Singapore since 1911 (ES Teo, 2005). However, after Malaysia's independence, many medical and health institutions were built in Malaysia. Among them in Perak state such as the Royal College of Medicine (UniKL), ILKKM Sultan Azlan Shah (Allied Health & AMO Trainee) and Quest International University (QIU). There are institutions providing comprehensive education with the primary objective to transform aspirants to successful healthcare professionals and compassionate leadership qualities. It also designed to integrate medical and health curriculum enhanced by the underlying principles Malaysian elements necessary for a successful healthcare system. The production of trainees from the institutions above especially ILKKM, is very appropriate in this study in order to be able to assess the ability of PHAM knowledge among Perak PHC providers to further increase the level of knowledge, attitude and level of confidence of PHC trainees and curriculum in the future.

PHC's scope of research in Perak focuses mainly on hospitals in Taiping, Tapah, Teluk Intan, Sg. Siput, Sri Manjung, Slim River, Parit Buntar, Selama, Kuala Kangsar, Kampar, Ipoh, Changkat Melintang, Grik, Batu Gajah. There is only one psychiatric hospital in Perak, namely Hospital Bahagia in Ulu Kinta. Other public health clinics, such as rural clinics and the KKM community clinic, are scattered throughout the state. There are several established private hospitals, including the Ar-Ridzuan Medical Centre, Anson Bay Medical Centre, Apollo Medical Centre, Fatimah Hospital, Colombia Asia Hospital, Kinta Medical Centre, Ipoh Specialist Centre, Ipoh Pantai Hospital, Sri Manjung Specialist Hospital, Manjung Pantai Hospital, Perak Community Specialist Hospital, Ulu Bernam Jenderata Group Hospital and Taiping Medical Centre.

1.7 Significance of the Study

Today, Pre-Hospital Care & Ambulance Service (PHCAS) has been adopted as one of the National KPIs and monitored by the KKM according to the 'Healthy Together Policy 2030' vision statement, which is consistent with the Malaysian Shared Prosperity Vision 2030. Besides, KKM will improve the response time during emergency situations, overall ambulance services and pre-hospital care especially in terms of its coverage and capacity and this agenda was included in the 4th Focus Area under Programme Strategy 1 which is to Strengthen Healthcare Service Delivery. This is from Strategic Framework of Medical Programme, Ministry of Health Malaysia 2021 – 2025 (Medical Development Division KKM, 2020). The MERS 999 system is a very important, effective, and high-quality system for PHC services. The Medical Assistant Board (MAB, 2020) has accepted AMO Dispatch and Ambulance Preparedness Services rendered in less than 5 minutes during a primary response as a KPI for AMOs. It is certain that the implementation of this KPI is comprehensive to all states in Malaysia, especially the PHC system in the state of Perak.

According to the AMO Service Branch (2020) in KKM, the MAB had developed the Assistant Medical Officer Technical Expert (AMOTeX) as a plan for Professional Assistant Medical Officers according to the Assistant Medical Officer Profession Development Plan (6P) 2016 -2030, which will empower knowledge, skill, and quality to the Assistant Medical Officer Profession until 2030. This program was registered in recognition of AMOs' performance of clinical tasks and other initiatives under the 12th Malaysian Plan (Medical Program). Furthermore, the development of 9 new disciplines for credentialing purposes includes Emergency Medical Trauma

Service (EMTS) and Pre-Hospital Care (PHC). This program will help raise the AMO profession to population ratio to 1:1000 by 2030.

Since 2018, institutions have ceased to offer the Diploma in Medical Assistant (DMA). The Diploma in Medical and Health Sciences (DMHS) is presently utilised by MAB after some major overhaul in its curriculum. This initiative will motivate AMOs to further their academic careers to a higher level (AMO Website, 2020). On top of it, there is active collaboration between MAB and local universities that aims to provide a degree program specifically for AMOs.

A delegate representing the Malaysian AMO Profession had attended the Global Association of Clinical Officers and Physician Associates (GACOPA), Conference in Rwanda, Africa funded by the MOH through an international collaboration program with GACOPA 2020 (Malaysian Association of Medical Assistants, 2020). An AMO Services Branch representative was then appointed as the GACOPA secretary. Collaboration with the Profession of Physician Assistants/Clinical Officers in the US, UK, Australia, Africa, and other countries through the American Association of Physician Assistants (AAPA) has led to the development of a similar scope of work, professional name and education at the global level. GACOPA has also succeeded in bringing together global members to improve welfare and healthcare. The association provides Health Professionals with the opportunity to consult and share as well as the power to negotiate. According to GACOPA (2021), their focus is to unite members of all cadres and qualifications to arrange collaboration among members and to express their collective views, opinions and decisions on concerns stirring the significance of health care and to actively engage all stakeholders on any policy issue regarding the commitment of healthcare services and to advocate the principles of meritocracy, equity, and professionalism.

This provides ample opportunities for improvement, especially in enhancing standards in medical controls, treatment protocols, PHC communication, system management, PHAM training or education, quality assurance policies as well as future carrier benefits for Malaysian AMOs especially in Perak.

1.7.1 Opportunity for PHC providers

PHAM is critical, especially as a basis for measuring levels of knowledge, attitude, confidence, and proficiency of PHC providers located in the Kinta Valley. However, this study has yet to obtain information about the knowledge, attitude, and confidence levels, especially regarding PHAM practiced by Perak PHC providers. Information about SAD practices in the ambulance service requires urgent attention to guide new PHC trainees and develop future PHC co-curricular activities.

The best clinical practices in PHAM in terms of knowledge, attitude, confidence levels among PHC providers can also assist in avoiding clinical errors and negligent practices while on-duty by allocating appropriate and competent personnel. Discursively, the issue of fatigue or burnout, stress, and negligence when on the job can be well addressed.

The yearly increase in emergency calls received by MECC MOH are related to medical illness, trauma, and disasters. The number of pre-hospital cases received shows the need for significant changes in knowledge, attitude, and confidence levels that affect Perak PHC providers in terms of socio-demographics, clinical science practices, co-curricular activities, training and simulation, qualification and credentials, policy and guidelines, and medical direction, especially when using the SAD during PHAM.

1.7.2 Opportunity for intervention in the PHC System

According to Mahmud, (2018), there exist a gap between theory and practice when implementing the PHC provider's curriculum in terms of theoretical content, procedures, and equipment. In this regard, the program's curriculum should be thoroughly assessed and updated periodically to indicate consistency with the needs and development of contemporary medical practices. This study could recommend planning opportunities in PHAM to improve the quality of education, human resources, best-career pathways, covenant policies and insurance, as well as commercial finance.

This study could probably recommend the Outcome Base Education (OBE) for PHC education based on the PHAM component in Basic Diploma, Advanced Diploma, bachelor's and Post-Graduate training. PHC provider education (academia), the field of PHC providers practice (experience) and PHC policy management (stakeholder) can make improvements, as well as help synchronize and synergise the contents, procedures, and equipment around PHAM. The tools and techniques applied in PHAM, such as Supraglottic Airway Device (SAD), endotracheal intubation (ETI) and surgical rescue techniques, are the result of continuous intervention during Clinical Risk Management and simulation module training in the future.

The follow-on study based on a literature review had focused on knowledge, attitude, and confidence levels when using the Supraglottic Airway Device, RSI, BVM as well as pre-hospital airway management by PHC providers in Perak. Consequently, this review represents an essential element of Clinical Science Care, Clinical PHC Education, Clinical PHC Best Practices, and Clinical Risk Management, PHC medicolegal cases among PHC providers as well as researchers' understanding

and identification of any gap in this current research, which underpins the proposed follow-up study.

1.8 Summary

The National PHC Act will be implemented with the aim of ensuring justice and welfare of local PHC providers, specifically, and the people in United States, United Kingdom, Europe, Australia, Canada PHC or EMS Act, generally. The government will receive surplus funds that are meant for paying compensation or summonses from recipients of PHC services when fewer PHC related medicolegal court cases related to any unprescribed SOPs implemented by PHC providers. In the future, the Malaysian PHC system can function systematically and effectively, while meeting the nation's expectations. Besides, future Malaysian PHC co-curriculum and the AMO profession can always be improved to satisfy students' needs and enhance the efficiency of patient management. This would automatically lead to a better career pathway, covenant policy and insurance, while achieving commercial financial targets.

This study has a significant impact on improving the community's quality-of-life by popularising knowledge about medical emergencies, first aid, and provision of early treatment for the target community, just like that provided by uniformed organizations and Non-Government Organizations (NGO) such as PDRM, APM, JBPM, ST JOHN Ambulance and PBSM. Consequently, the Malaysian community stands to receive professional health treatment, use of high-standard technology as well as PHC providers who are knowledgeable and competent based on updated emergency medicine procedures, knowledge on pre-hospital and disaster clinical medicine, factual or data-based evidence medicine, and sustainable assistance to the community.

As the PHC industry offers a return on investment, it must be alert about the health industry's needs, such as latest global developments as well as developments in the private and government sectors. They need highly clinically skilled, professionals and competent PHC personnel on shift duty and always looking for private or international hospital employers. The most important aspect in PHC training is competency, and a systematic curriculum for specific groups like trainees and providers, especially in areas like digital equipment, healthcare simulation, crisis management methodology (e.g., crisis such as the COVID-19 pandemic and high-risk medicolegal issues, like paediatric gynaecology patients).

Moreover, the novelty value of knowledge obtained from this study will increase the number of Emergency Medicine Science, PHC and Disaster Medicine researchers, new scientific materials and updated scientific study references in all local as well as foreign universities. Hopefully, this study can contribute new knowledge to be included in the international PHAM simulation module or guidelines in line with the successful development of PHC and Disaster Medicine in Malaysia.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Tintinalli (2014) had mentioned that only well trained and credentialed providers can establish emergency airway intervention especially in Pre-Hospital Airway Management (M. Rehn et al., 2016 & R.M. Ujevic et al., 2019). According to D. J. Lockey et al., (2017), PHAM is similar to a pre-hospital or hospital environment, whereby oxygenation and ventilation need to be maintained while mitigating complications. However, if oxygenation cannot be maintained via BVM and the patient is not fit for RSI, SAD or cricothyrotomy, then this indicates that PHAM intervention is unsuitable (Prekker et al., 2014; Boyce et al., 2005; Verschueren, Bell, Bagheri, Dierks, & Potter, 2006).

PHAM relies on the use of medical equipment and specialised training (Pejovic et al., 2019) (Tintinalli, 2014). It can be performed blind (Bielski, Smereka, Madziala, Golik, & Szarpak, 2019) or by using a laryngoscope to visualise the glottis (Tao et al., 2018; Klesmite et al., 2020). The medical equipment used are oropharyngeal, nasopharyngeal and Laryngeal Mask Airways (LMA), Repeat Sequence Intubation and finally, cricothyrotomy (surgical method).

At this moment, PHC practices in Malaysia are not standardised and varies among providers (Chew K.C.,2016). According to Crewdson K, and Lockey D. (2016), a highly efficient PHC provider must be competent, possess modern equipment and periodically monitor the system. Providers involved in the PHC system possess different levels of knowledge (Youngquist, Gausche-Hill, Squire, & Koenig, 2010),

attitude (Kwak et al., 2013), confidence (Agarwal et al., 2016), skills (David J Lockey, 2017) and competency (Han et al., 2018). This situation can cause inconsistent provision of care (Di Delupis, Mancini, di Nota, & Pisanelli, 2014), non-adherence to standard management protocol (Albrecht et al., 2006) and non-inter-facility transfer policy (Keng Sheng Chew & Hiang Chuan Chan, 2011).

The standardise PHAM knowledge, procedure, and training curriculum are comprehensive and adequate for training PHAM. National PHAM curriculum should teach to all PHC trainee and varies providers. Uniformity PHC practices in Malaysia can increase level of knowledge, attitude, and confidence among PHC provider especially in PHAM procedure.

2.2 Pre-Hospital Care (PHC)

Pre-Hospital Care (PHC) is defined as a system that organizes all aspects of medical care provided to patients out-of-hospital environment or in the pre-hospital (Mehmood, Rowther, Kobusingye, & Hyder, 2018). Furthermore, Keng Sheng Chew & Hiang Chuan Chan, (2011) and Cooper, (2007) mentioned that the PHC is the phase of patient care that starts from the point of injury or illness right up to the place of definitive treatment. Based on the above description, the concept of the right patient who must be transported to the right area of care within the right time frame via the correct mode of transportation by the right personnel, needs to be addressed.

2.2.1 PHC in Other Countries

In the United States National EMS Scope of Practice Model (2019), the paramedic is a professional whose primary focus is to provide advanced emergency medical care for emergency and critical patients who have access to Emergency

Medical Services (EMS). The paramedics possesses complex skills and knowledge necessary to provide patient transportation and care, such as CPR, nebulizer, ETT & PHAM medication, Intradermal, Intramuscular, Thrombolytics and others. Paramedics function as part of a comprehensive EMS response team under medical oversight. Paramedics perform interventions with both basic and advanced equipment that typically found in an ambulance. The paramedic is a link between the scene and the health care system. One of the eligibility requirements for state certification or licensure requires completing a nationally accredited paramedic program at the certificate or associate degree level. Other levels of PHC responders are Emergency Medical Technicians, Emergency Medical Responders and Advanced EMTs.

Most Canadian PHC providers who work in ambulances are identified as paramedics by the public (The Canadian National Occupational Competency Profile for Paramedics, 2011). In many cases however, the most prevalent emergency care in a PHC is provided by the Emergency Medical Responder (EMR). This is a level of practice recognized under the National Occupational Competency Profile involving Primary Care Paramedics (PCP), Advanced Care Paramedics (ACP), and Critical Care Paramedics (CCP). The scope of practice includes interpretation of 4-lead ECGs, performing semi-automated external defibrillation, performing trauma immobilization (including cervical immobilization), pre-hospital fibrinolytics and PHAM, administration of Symptom Relief Medications and prehospital medical research work, Besides that, there is also Medical Evacuation (MEDEVAC) using fixed and rotary wing aircraft when the weather permits and staff are available, but systems such as the Toronto EMS Critical Care Transport Program work in land ambulances. ORNGE Transport operates both land and aircraft ambulances in Ontario. According to the Emergency Health Services Act, the Emergency Medical Assistant Regulation