KNOWLEDGE, ATTITUDE AND CONFIDENCE LEVEL OF RESUSCITATION AMONG HOUSE OFFICER IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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AKU JANJI

Diperakui bahawa disertasi yang bertajuk **KNOWLEDGE, ATTITUDE AND CONFIDENCE LEVEL OF RESUSCITATION AMONG HOUSE OFFICER IN HOSPITAL UNIVERSITI SAINS MALAYSIA** merupakan kerja dan penyelidikan yang asli dari **LEE WUI PING**, No Kad Pengenalan 841110-01-5630, No Matrik P-UM 0327/16 dari tempoh 2016 hingga 2020 adalah di bawah penyeliaan kami. Disertasi ini merupakan sebahagian daripada syarat untuk penganugerahan Sarjana Perubatan Kecemasan, segala hasil penyelidikan dan data yang diperolehi adalah hak milik terpelihara Universiti Sains Malaysia.

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Author

Dr. Lee Wui Ping

TABLE OF CONTENTS **PAGES**

LIST OF TABLES Page

Chapter 2

Chapter 3

ABBREVIATIONS

ACLS- Advanced Cardiac Life Support

BLS-Basic Life Support

CPR- Cardiopulmonary Resuscitation

PLS- Pediatric Life Support

TLS- Trauma Life Support

ABSTRAK (BAHASA MELAYU)

Latar belakang: Pegawai perubatan siswazah seringkali merupakan orang pertama yang membantu semasa pesakit dalam keadaan kecemasan di dalam hospital. Kami mendapati sebahagian daripada mereka teragak-agak untuk memberikan resusitasi. Oleh itu, kami ingin menilai tahap pengetahuan, sikap dan keyakinan dalam resusitasi umum di keadaan kecemasan dan mengenal pasti faktor yang berkaitan. **Bahan dan kaedah**: Kajian keratan rentas telah dijalankan di kalangan pegawai perubatan siswazah dari 27 Mei 2018 hingga 31 Disember 2018 di Hospital Universiti Sains Malaysia, menggunakan soal selidik yang disahkan. Seramai seratus orang pegawai perubatan siswazah menyiapkan soal selidik dimasukkan dalam kajian ini. Empat belas borang soal selidik yang tidak lengkap telah dikecualikan. Analisis deskriptif, analisis regresi logistik ganda dilakukan melalui SPSS version24.0. P-value <0.05 dianggap signifikan secara statistik. **Keputusan:** Hanya 35% pegawai perubatan siswazah menunjukkan pengetahuan yang mencukupi, 24% yakin dalam melakukan resusitasi dan 97% mempunyai sikap positif terhadap pembelajaran resusitasi. Pegawai perubatan siswazah yang menerima latihan Trauma Life Support (TLS) semasa berkerja (nisbah odd diselaraskan: 10.9,95% CI: 1.197 hingga 99.240, p-nilai: 0.034) dan mempunyai ≥10 kali pendedahan klinikal kepada resuscitasi kardiopulmonari (CPR) (nisbah odd diselaraskan: 3.933, 95%CI: 1.249 hingga 12.385 ,p-nilai: 0.019) mempunyai kebarangkalian yang lebih tinggi untuk mempunyai pengetahuan yang mencukupi berbanding dengan pegawai perubatan siswazah yang tidak menerima latihan atau pendedahan klinikal. **Kesimpulan:** Secara keseluruhan, pegawai perubatan siswazah kurang mempunyai pengetahuan dan keyakinan terhadap resusitasi. Bagaimanapun, kebanyakan mereka mempunyai sikap positif terhadap pembelajaran resusitasi. Penilaian yang kerap, semakan, garis panduan dan teknik resusitasi yang

dikemaskini secara berkala adalah perlu untuk meningkatkan pengetahuan dan tahap keyakinan mereka dalam pemulihan.

Kata Kunci: resusitasi, pengetahuan, sikap, tahap keyakinan, pegawai perubatan siswazah.

ABSTRACT (ENGLISH)

Background: House officers are often the first responder involved in hospital management of emergency situations. We noticed some of them are hesitant in providing resuscitation. Therefore, we aim to evaluate knowledge in general resuscitation, attitude and confidence level in general resuscitation in emergency situations and identify its associated factors. **Materials and method:** A cross-sectional study was conduct among house officers from 27 May 2018 to 31 December 2018 in Hospital Universiti Sains Malaysia (HUSM), using a validated questionnaire. One-hundred house officers consented and completed the questionnaire were included. Fourteen incomplete questionnaires were excluded. Descriptive analysis, simple and multiple logistic regression analysis were performed via SPSS version24.0. P-value < 0.05 were considered to be statistically significant. **Result:** Only 35% house officers showed adequate knowledge, 24% were confident in performing resuscitation and 97% had positive attitude toward learning resuscitation. House officer received trauma life support training during housemanship (adjusted OR:10.9,95%CI : 1.197 to 99.240, p-value: 0.034)and had ≥10 times clinical exposure to CPR(adjusted OR: 3.933, CI95% : 1.249 to 12.385, p-value : 0.019) more likely to have adequate knowledge compared to those had not. **Conclusion:** Overall, house officers have lack of knowledge and confidence in resuscitation. However, most of them had positive attitude toward learning resuscitation. Frequent assessment, revision, refreshment of updated guideline and resuscitation technique at regular interval is necessary to improve their knowledge and confident level in resuscitation.

Key words: resuscitation, knowledge, attitude, confidence level, house officer

CHAPTER 1: INTRODUCTION

Overview of resuscitation

Resuscitation knowledge and skills are the utmost importance for every health care personnel including house officers as delayed in resuscitation may lead to death. Chance of survival increases if the resuscitation team has sufficient knowledge and skill in resuscitation in emergency situation (Pande et al., 2014; Finn et al., 2015).

In Malaysia, all medical students that graduated from medical college will go through two years of clinical training called "housemanship" before qualified as a medical officer. During housemanship, house officers will rotate through various departments to pick up knowledge in general resuscitation in emergency situations including trauma resuscitation and cardiac life support. Theoretically, they should have sufficient knowledge to recognize emergency conditions, call for help, and provide initiate resuscitation in emergency situation. However, we noticed some of house officers were hesitate to initiate resuscitation in emergency situation. We need to find out what reasons contribute to the hesitation in resuscitation whether it is due to lack of knowledge, unwillingness to perform, unwillingness to learn, or lack of confident. Study done in KL by Ismail et al in 2001 showed house officers had inadequate CPR knowledge and confident but study done in Kelantan by Chew et al (Chew et al., 2011) reported that CPR knowledge among house officers was adequate. A survey found 45% of college students in Malaysia had negative attitude toward resuscitation (Karuthan *et al.*, 2019). Huang et al reported that 88.4% of Chinese students in China had expressed willingness to learn resuscitation (positive attitude).

Due to scarce studies in our country to assess knowledge in general resuscitation in emergency situations, willingness to learn resuscitation (positive attitude), and confidence

level in performing resuscitation procedures among house officers after development of resuscitation guideline by our National Committee of resuscitation training (NCORT), Ministry of Health, in 2015. Therefore, this study was conducted to evaluate if our current house officers have adequate knowledge in general resuscitation in emergency situations, positive attitude toward learning resuscitation, and confidence to carry out effective resuscitation procedures in emergency situations, and its associated factors. The information collected during this study may be used as a guide for future planning on resuscitation training program among medical students and house officers.

1.1 Problem Statement and Study Justification

General resuscitation is important for every doctors. Health care workers also can learn general resuscitation knowledge and skills via the internet e.g. YouTube or self-reading the National Committee of Resuscitation Training Guideline. With all the current learning methods in place, we need to evaluate if our current house officers have adequate knowledge in general resuscitation in emergency, a positive attitude (willingness to learn resuscitation, and confidence in performing resuscitation procedures and its associated factors. The information collected during this study can be used as a guide for future planning on the resuscitation training program in HUSM.

CHAPTER 2: STUDY PROPOSAL

2.1 INTRODUCTION

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2.3 LITERATURE REVIEW

2.3.1 RESUSCITATION APPROACH FOR EMERGENCY CASES

Resuscitation is a series of life-saving actions that able to improve the chance of survival in cardiac arrest patients. According to AHA 2015 guideline, successful resuscitation following cardiac arrest requires an integrated set of coordinated actions which include immediate recognition of cardiac arrest and activation, early cardiopulmonary resuscitation (CPR), early defibrillation, effective advanced life support, and integrated post-cardiac arrest care.

According to the American Heart Association (AHA) 2015 guideline, if the patient appears unconscious, the basic life support (BLS) algorithm is used. Advanced cardiac life support (ACLS) algorithm is conducted after completing the BLS survey. If the patient appears conscious, the ACLS algorithm is used for the initial assessment. As in conscious patient (cardiac or respiratory problems), the ACLS algorithm help to identify and treat the underlying causes.

b. ABCDE approach in trauma patient

Resuscitation of critically ill trauma patients require different approach. According to American College of Surgeon Committee on trauma, initial step of managing multiple injured patient can be done by primary survey ABCDE approach to identify and treat the most life-threatening condition first followed by secondary survey. As certain injury kills in certain reproducible time frames. For example, the loss of airway kills more quickly than loss of ability to breath. The latter kills more quickly than loss of circulating blood volume. Thus, mnemonic ABCDE provide a simple and easily remembered and concise approach for all doctors including house officer for assessing and managing critically ill trauma patients.

Principles of initial trauma resuscitation include

1. Identify and treat life-threatening condition simultaneously using ABCDE approach
2. Reassess the effect of initial treatment
3. Recognise when you will need extra help. Call for appropriate help early
4. Use all members of the team. This enable interventions (e.g. Assessment, attaching monitor, intravenous access) to be undertaken simultaneously
5. Communicate effectively

ABCDE of initial trauma care and identifies life-threatening conditions follow the sequence as below:

1. Airway maintenance with cervical spine protection – Identify and treat upper airway obstruction and protect from cervical spine injury
2. Breathing and ventilation – Identify and treat massive, open or tension pneumothorax and flail chest to maintain adequate oxygenation and ventilation
3. Circulation and haemorrhage control- to identify and treat pericardiac tamponade, control external haemorrhage in order to maintain adequate perfusion to vital organ
4. Disability: neurological status – Quick assessment of GCS and effort is put to identify cause of depress consciousness which prompt provider to reassess oxygenation, ventilation, perfusion status and glucose status of patient.
5. Exposure and environment control – Undress patient to facilitate a thorough examination and assessment. Then, cover the patient with external warming device to prevent hypothermia.

The ABCDE approach can use in anywhere including in the street, in emergency rooms, in general wards or intensive care unit of hospital. The aim of this approach is to keep patient alive and achieve some clinical improvement. This will buy time for making final diagnosis and definitive treatment

2.3.2 RESUSCITATION TRAINING

Evidence showed that training not only improves knowledge and skill in resuscitation but also patient's survival (Ahmadi *et al.*, 2013; Cheng et al.,2018). A study by Yong et al also showed that advanced resuscitation training improves cardiopulmonary resuscitation quality, the return of spontaneous circulation, and survival to discharge. (Yong et al., 2020). Ahmadi et al reported that ATLS statistically significant increase in interns's clinical knowledge in emergency situation (Ahmadi et al., 2013;Wang et al., 2010).

Training health care personnel for the recognition and management of cardiac arrest patient increases confident and reduce concerns about being responsible for severely ill. Structural and standardized resuscitation training is proven to improved healthcare personnel‘s understanding of cardiac arrest resuscitation (Amaraegbulam and Nwankwo, 2013; Abu-Zidan, 2016).

2.3.3 ATTITUDE IN RESUSCITATION

Attitude is a tendency of individual behavior. Attitudes which cause individuals to always behave in the same way to people, objects, and events (Kara A., 2010). House officers' attitude on learning resuscitation may determine their ability and willingness to learn resuscitation. Majid A et al reported that their participants had a generally positive attitude toward resuscitation. They were eager to perform CPR in cardiac arrest despite having knowledge gaps (Majid A et al., 2019). This was consistent with the results of a study that has shown that despite the lack of knowledge, participants were willing to perform resuscitation (Roshana S et al., 2012). Hamas et al. reported that willingness to perform resuscitation increased after resuscitation training. There was a significant association between "anxiety for infection" and willingness to perform resuscitation. Factors associated with willingness to perform resuscitation for strangers were "anxiety for a bad outcome" and "knowing automated external defibrillator (AED)"before resuscitation training. Whereas willingness to perform resuscitation increased from 13% to 77% after resuscitation training (Hamasu et al., 2012).

2.3.4 CONFIDENCE IN PERFORMING RESUSCITATION

Newly qualified doctors lack competency in handling a cardiopulmonary resuscitation. Mohammed et al reported that the confidence level in performing resuscitation is poor among medical students (Mohammed et al., 2018). Studies conducted in Iran and the People's Republic of China also showed that only a small number of medical students

were confident in their ability to carry out resuscitation and felt that they can do it correctly (Li *et al.*, 2011; Ravari *et al.*, 2012a)

Sasaki et al reported that having carried out cardiopulmonary resuscitation, having received cardiopulmonary resuscitation training and awareness of the location of the external defibrillator were significantly associated with confidence in performing cardiopulmonary resuscitation. The study has shown confidence in performing chest compressions among participants was 2,667 (55%), confidence in performing rescue breathing by 2,498 (52%), and confidence in using an automated external defibrillator by 2,822 (58%)(Sasaki *et al.*, 2015).

2.3.5 RESUSCITATION KNOWLEDGE AMONG HEALTH CARE PERSONNEL

Despite various resuscitation training programs available to improve knowledge in general resuscitation including cardiac life support and trauma, many healthcare personnel worldwide do not have adequate knowledge about resuscitation. A multicentre cross-sectional study conducted in one of the states in India to evaluate the current knowledge and practice of resuscitation among health care professionals showed inadequate (Nambiar *et al.*, 2016). It is possible due to inadequate structural resuscitation training in India. In Greece, a descriptive, quantitative design study conducted in five hospitals among nurses and doctors showed Greece doctors and nurses' resuscitation knowledge was suboptimal (Passali *et al.*, 2011). Studies conducted in Iran(Ravari *et al.*, 2012b) and India (Avabratha *et al.*, 2012; Chandrasekaran *et al.*, 2010) showed that knowledge of medical interns about cardiopulmonary resuscitation was substandard. A study was done in China (Xi et al., 2014) showed that knowledge of advanced cardiac life support among fresh graduates was poor.

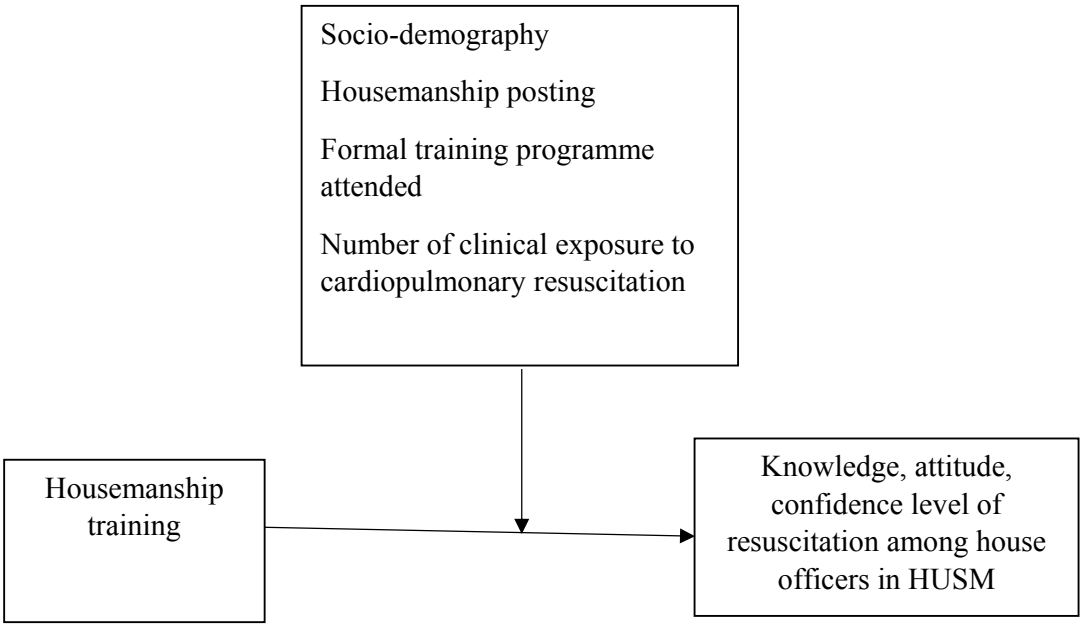
In contrast, Chew et al (Chew et al., 2011) reported that resuscitation knowledge among junior doctors in two hospitals in Kelantan was adequate but lack of confidence. Another

study done by Muhammad Faiz (Muhammad Faiz., 2016) showed that medical officers in health clinics in Kelantan had inadequate resuscitation knowledge and confident but good attitude.

2.4 BENEFIT FROM THE STUDY

1. We can determine whether our house officers have adequate knowledge in general resuscitation in emergency situations. We can determine their attitude toward resuscitation training and confidence level to carries out resuscitation procedure
2. We can determine the factors that may contribute to knowledge in resuscitation
3. The information collected during this study can be used as a guide for future planning on resuscitation training programme in HUSM

2.5 CONCEPTUAL FRAMEWORK



2.6 RESEARCH QUESTIONS

1. What is the knowledge, attitude and confidence levels of resuscitation among house officers in HUSM?
2. What are the factors that contribute to knowledge, attitude and Confidence level of resuscitation among house officers in HUSM?

2.7 OBJECTIVE

General:

1. To study on the knowledge, attitude and confidence levels of resuscitation among house officers in HUSM.

Specific:

1. To determine the levels of knowledge, attitude and confidence of resuscitation among house officers in HUSM
2. To determine the factors associated with knowledge, attitude and confidence level of resuscitation among house officers working in HUSM

2.8 METHODOLOGY

Study design

This is a cross sectional study that will be conducted from June 2018 to June 2019 in Hospital Universiti Sains Malaysia, Kubang Kerian, Kelantan.

Study area

The study will be carried out in Hospital University Sains Malaysia (HUSM), a tertiary teaching hospital located at Kubang Kerian Kelantan.

Study population

House officers who undergo housemanship in Hospital Universiti Sains Malaysia during the study period

Inclusion criteria

All house officers undergo internship in Hospital USM during the study period, who give written consent to participate.

Exclusion criteria

House officers who do not complete the questionnaire, or withdraw from the study and extended house officers.

Sampling method

Name list of house officers available during the study period will be obtained from the hospital administrative, simple random sampling is used. The number of house officer is chosen by random number generation via SPSS. The selected house officers will be contacted for the study.

Operational definition

Knowledge: Understanding of somethings such as facts, information, skills which is acquired through experience or education. In this study, knowledge is referring to theoretical understanding. No practical knowledge is assessed.

Attitude: Attitude is a tendency of individual behaviour which cause individuals to always behave in the same way to people, objects and events (Kara A., 2010).

Confidence: Feeling of trust, belief in one's ability.

House officer means a medical practitioner undergoing internship training under Malaysian Medical Art 1971.

Housemanship or internship is period of resident medical practice before full registration as stipulated under the Malaysian Medical Act 1971.

Sample Size Calculation

First objective: To estimate the proportion of knowledge, attitudes and confidence level on resuscitation among house officers in HUSM

a) **For knowledge**,

For estimation of proportion of knowledge, 1 proportion formula is used.

According Okonta and Okoh, 82.9% of house officer's knowledge scored <50%. (Okonta and Okoh, 2014). The sample size to determine the knowledge on resuscitation among house officer is 58 with 5% drop out rate.

1 proportion — Estimation	
Proportion (p)	82.90%
Precision (Δ)	10.00%
Significance level (α)	0.050
Drop-out	5%
Sample size	55
Corrected Sample size	58

b) Attitudes

According to Chew's study, 64.4% of junior doctors have positive attitude on cardiopulmonary resuscitation (Chew *et al.*, 2011). The sample size to determine attitudes on resuscitation among house officer is 94 with 5% drop out rate

1 proportion — Estimation	
Proportion (p)	64.00%
Precision (Δ)	10.00%
Significance level (α)	0.050
Drop-out	5%
Sample size	89
Corrected Sample size	94

c) Confidence level

According to Chew's study, 28% of junior doctors have poor confident on cardiopulmonary resuscitation (Chew *et al.*, 2011). The sample size to determine confidence level on resuscitation among house officer is 83 with 5% drop out rate.

1 proportion – Estimation	
Proportion (p)	28.00%
Precision (Δ)	10.00%
Significance level (α)	0.050
Drop-out	5%
Sample size	78
Corrected Sample size	83

The maximum calculated sample size was 94 with addition of 5% drop out rate will be used. For second specific objective: To determine factors associated with knowledge, attitude and confidence level on resuscitation among house officer in HUSM

a) Factors associated with knowledge

According to (Okonta and Okoh, 2014), female got higher knowledge score than male house officer (25% versus 6%, p<0.167). The sample size to determine association between gender and knowledge score is 75 with dropout rate 5%

2 proportions – Hypothesis Testing	
Proportion in control (p0)	25.00%
Proportion in case (p1)	6.00%
Significance level (α)	0.050
Power (1-β)	0.900
Drop-out	5%
Sample size	71
Corrected Sample size	75

b) Factor associated with attitude level of resuscitation

Based on Chew's study (Chew et al., 2011), sample size estimation for factors associated with attitude level are as below.

Variable	Standard deviation	Corrected sample size
1. Male	0.87	20
2. Female	1.22	40
3. ACLS	2.82	25
4. BLS	3.3	24
5. Number of attend CPR	1.07	22

*dropout rate: 5%, p<0.05, power 0.8, Chew et al, 2011

c) Factor associated with confidence level of resuscitation

Based on Chew's study (Chew et al., 2011), sample size estimation for factor associated with confidence level are as below.

Variable	Case, P1 (%)	Control, P0 (%)	Corrected sample size
1.Male	89.3	10.7	4
2.Female	83.3	16.7	11
3.Graduation from local	83.3	16.7	11
4.BLS	83.3	16.7	10
5.ACLS	62.5	37.5	87

*dropout rate: 5%, $p<0.05$, power 0.8, (Chew et al, 2011)

Sample size estimation were calculated using USM sample size calculator version 2.0 (Arifin, 2017). However, not all of the required data for sample size calculation for each of the independent variables were able to be obtained from the literature review. Based on the two objective sample size estimation as above, the maximum calculated sample size (94 with addition of 5% drop out rate) will be used.

2.9 ETHICAL CONSIDERATION

Ethical clearance will be obtained from the University Ethics and Research Committee of Hospital Universiti Sains Malaysia, before the commencement of this study.

During the study, all data involving the samples will be held confidential and will be only accessible to the investigator and my team. The investigator also declared no conflict of interest concerning this study.

Informed consent shall be obtained from all the participants who volunteer to participate in this study through an information sheet and written consent. The consent shall include the participation of this study, the use of gathered information for research purposes, and publication. The result from the assessment used in this study will not affect the house officer end-of-posting assessment in the respective department. Participation and non-participation shall not benefit or disadvantage the participants in any way.

2.10 RESEARCH TOOL

A self-administered questionnaire shall be used in this study.

The questionnaire consists of 4 parts include

1. Participant's sociodemographic data,
2. 9 questions to assess their attitudes on resuscitation

Attitude questions will be answered using 5 Likert scales:

1 - Strongly disagree

2 – Disagree

3 - Not sure

4 - Agree

5 - Strongly agree

A total of 5 questions consist of 5 positive attitude questions (item1, 2,3,5, and 6) and 4 negative attitude questions (item 4,7,8,9).

For positive questions, answer 1 or 2 will score 1 point. Answer 3, 4, 5 will score 0 points. In contrast, for negative questions, answer 4 or 5 will score 1 point, answer 1, 2, or 3 will score 0 points.

The total score ≥ of 5 points is considered a positive attitude. <5 points is considered a negative attitude.

3b.Six questions to assess Confidence using 5 Likert scales:

1. Strongly disagree

2 .Disagree

3. Not sure

4. Agree

5. Strongly agree

The confident level will be analyzed using the Likert scale

A total of 6 questions will be assessed. Answer 4 or 5 will get 1 point. Answers 1, 2, or 3 will get 0 points. A total confidence score of ≥ 4 points is to consider confidence. A total positive score <4 is considered not confident.

The questionnaire is adapted from Chew's study (Chew et al., 2011). Permission from the author was obtained (Appendix 4.3). The questionnaire content was validated by two emergency physicians in Hospital Universiti Sains Malaysia, Kelantan. After making necessary changes. The questionnaire was distributed to 30 house officers. Convenient sampling was used. Data entry and analysis was done using SPSS software version 24. Exploratory factor analysis was done. The result was shown in table 1 & table 2: Factor one (attitude toward learning and perform resuscitation) consisted of 5 items. The communalities ranging from 0.653 to 0.978 and factor loading ranges from 0.773 to 0.948. Cronbach's alpha was 0.925. Factor two (feeling in resuscitation) consisted of 3 items with communalities ranging from 0.303 to 0.547 and factor loading ranging from 0.452 to 0.700. The Cronbach alpha was 0.533. Factor 3 only had item 9 with communalities 0.440 and factor loading 0.642, so it was unable to be analyzed with a reliability test. Therefore, only factor one which contains 5 items were selected and used in this study to assess attitude toward learning resuscitation. For confidence questions, all 6 items were selected. The communalities were ranging from 0.344 to 0.693 and factor loading ranging from 0.5 to 0.7 except item 3 with factor loading 0.2. The Cronbach alpha was 0.807. 20 best of five questions to test on their knowledge on cardiac arrest resuscitation based on the latest advanced life support. The knowledge questions are taken from a validated question on resuscitation from a previous study (Mariam & Nor., 2017). Permission from obtained from the author (Appendix 4.3). The knowledge questions were developed after review various literature and guideline about resuscitation. The initial 80 questions were review

by a group of experts which consist of eight emergency physicians. A total of 60 questions were kept, and 20 questions were dropped after expert opinion.

A pilot study was done in medical students in HUSM. The result was shown in table 3. The knowledge questions were analyzed by 2 parameters logistic item response theory (2-PL LRT) analysis. The difficulty index (or facility value) is defined as the percentage of students who answer the item correctly. It can range from 0-1. Point measure <0.2 means that the question is difficult (only 20% participant get the correct answer) and point measure of >0.8 means that the questions are easy (80% participant get the correct answer). The discriminative index is a measure of how 'good' participants are doing versus 'poor' participants on a particular question. Questions with a difficulty index range 0.2- 0.8 and discriminative index >0.3 were considered good items to distinguish good from the poor student. 20 questions were chosen to measure the knowledge in resuscitation. Poor knowledge is considered if the total score < 50%. Adequate knowledge is considered if the total score of ≥50%. 50% was used as a cut-off point based on the previous study (Mariam & Nor, 2017).

Table I: Exploratory factor analysis of attitude scale (n=30)

Attitude item	Communalities	Factor 1	Factor 2	factor 3
1. I feel that my housemanship training is adequate for me to handle resuscitation	0.303	0.143	**0.469**	-0.250
2. In my opinion, resuscitation course should be taught before working as house officer	0.721	**0.842**	-0.081	-0.074
3. In my opinion, all junior doctors should have Advanced Life Support (ALS) course.	0.653	**0.800**	0.070	-0.094
4. In my opinion, house officer should wait for medical officer to initiate resuscitation.	0.547	0.153	**0.700**	0.184
5. Basic and advanced life support should be taught during undergraduate year	0.978	**0.948**	-0.281	0.001
6. Resuscitation knowledge of doctor can affect cardiac arrest patient's outcome	0.654	**0.773**	-0.239	0.014
7. In my opinion, in most resuscitation cases, the junior doctors just follow the orders from senior doctor/ team leader without actually understand the principles behind the intervention	0.304	0.158	**0.452**	-0.273
8. Most of the time I just pretend to do CPR instead of performing proper CPR as stipulated in appropriate guidelines.	0.857	**0.888**	0.230	0.127
9. Every time a patient collapse, I will ask permission from the family member before starting CPR	0.440	0.101	0.136	**0.642**
Cronbach alpha		**0.925**	0.533	**-**

Kaiser- Meyer- Olkin was 0.738, Bartlett's test sphericity was significant (p-value < 0.001), Principal axis factoring was applied.

Table II: Exploratory factor analysis of confident scale

	Confident Item	Communalities	Factor loading
1.	I am confident to be a team leader	0.66	0.813
2.	I am confident to perform tracheal intubation	0.21	0.453
3.	I am confident to perform CPR	0.40	0.635
4.	I am confident to perform defibrillation	0.57	0.754
5.	I am confident to use amiodarone	0.41	0.636
6.	I am confident to interpret electrocardiography (ECG) for cardiac arrhythmias.	0.45	0.667
	Cronbach alpha		**0.807**

Kaiser-Meyer-Olkin was 0.753 , Bartlett's test sphericity was significant (p value<0.001) principal axis factoring was applied.

Table 3: Knowledge in cardiac arrest resuscitation

Knowledge questions	Difficulty index	Discriminative index
Q1	0.80	0.33
Q2	0.52	0.44
Q3	0.72	0.56
Q4	0.56	0.67
Q5	0.44	0.67
Q6	0.84	0.56
Q7	0.32	0.22
Q8	0.44	0.56
Q9	0.72	0.22
Q10	0.64	0.22
Q11	0.80	0.33
Q12	0.44	0.67
Q13	0.48	0.78
Q14	0.44	0.44
Q15	0.76	0.44
Q16	0.56	0.56
Q17	0.20	0.44
Q18	0.52	0.67
Q19	0.88	0.22
Q20	0.84	0.22

2.11 DATA COLLECTION

The questionnaires will be distributed to the house officers during the houseman CME session in a meeting room in respective departments in Hospital Universiti Sains Malaysia. Data will be collected from the study participants after informed consent is obtained. To minimize any bias in answering the questionnaires, a 30 to 40 minutes' response time will be maintained during which discussions among participants are not encouraged. All the questionnaires will be collected back immediately after the participant finish their answer. They are not allowed to copy the questions from the questionnaire and bring back the questionnaire home in order to prevent leaking. The researcher will observe the participant answering the questions. An incomplete questionnaire will be excluded from the study.

2.12 DATA ENTRY AND ANALYSIS

Data will be entered and analyzed using SPSS version *24*.

For the first objective, knowledge, attitude, and confidence level of resuscitation among house officers will be analysed using descriptive statistics. The continuous variables will be described either in mean (standard deviation) or median (inter-quartile range). The categorical variable will be described in frequency and percentages.

For the second specific objective, simple and multiple logistic regression analysis were carried out to determine the associated factors (age, gender, place of graduation, duration of awaiting for housemanship, year of internship, number of clinical exposure to CPR, training program during undergraduate, training program during housemanship and posting) that influence the knowledge, attitude and confidence level in resuscitation among house officer in HUSM.

2.13 Dummy Tables

Table 1: Demographic distribution of study population

Variables	Categories	Number (%)
1. Age 2. Gender Male: Female 3. Place of graduation Local Oversea 4. Duration awaiting for housemanship (months) 5. Year of internship (years) 6. Numbers of clinical exposure to CPR a. <5 b. 5-10 c. >10 7. Training programme during undergraduate year BLS ACLS ATLS PALS/APLS Others 8. Training programme during internship year BLS ACLS ATLS PALS/APLS Others		

Table 2: Knowledge score distribution

Knowledge score %	Correct answer	n	Percentages (%)
Poor (<50%)	<10	65	65
Good (≥50%)	≥10	35	35

Table 3: Participant attitudes toward resuscitation

	Percentage of participant who answer 'agree' and 'strongly agree'(n)
Q1	
Q2	
Q3	
Q4	
Q5	
Q6	
Q7	
Q8	
Q9	

Table 4: Participant's confidence level to carries out resuscitation procedure

	Percentage of participant who answer 'agree' and 'strongly agree'(n)
Q1	
Q2	
Q3	
Q4	
Q5	
Q6	

Table 5: Factors associate with the knowledge in resuscitation (simple and multivariate logistic regression)

Demographic	Knowledge score Poor (<50%) Good (>50%) n %	β	P value	Adjusted Odd ratio	95% Confidence interval
1. Age 2. Gender Male: Female 3. Place of graduation Local Oversea 4. Duration awaiting for housemanship 5. Years of internship 6. Posting completed 7. Numbers of clinical exposure to CPR 8. Training programme attended during undergraduate year BLS ACLS TLS PLS 9. Training programme attended during internship year BLS ACLS TLS PLS					