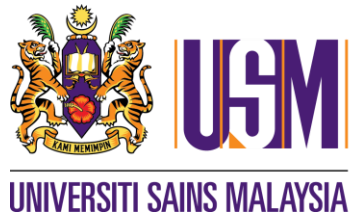


**KNOWLEDGE AND ATTITUDE TOWARDS
CARDIOPULMONARY
RESUSCITATION AND DEFIBRILLATION AMONG
MEDICAL OFFICERS IN
GOVERNMENT PRIMARY CARE CLINICS IN
KELANTAN, MALAYSIA**

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LISTS OF SYMBOLS, ABBREVIATIONS OR NONMENCLATURE

CPR	CARDIOPULMONARY RESUSCITATION
CCR	CHEST COMPRESSION ONLY RESUSCITATION
BCLS	BASIC CARDIAC LIFE SUPPORT
ACLS	ADVANCE CARDIAC LIFE SUPPORT
AUC	AREA UNDER CURVE
SCA	SUDDEN CARDIAC ARREST
OHCA	OUT OF HOSPITAL CARDIAC ARREST
VF	VENTRICULAR FIBRILLATION
AED	AUTOMATED EXTERNAL DEFIBRILLATOR
NCORT	NATIONAL COMMITTEE OF RESUSCITATION TRAINING
AHA	AMERICAN HEART ASSOCIATION
EMS	EMERGENCY MEDICAL SERVICES
PAROS	PAN ASIA RESUSCITATION OUTCOME STUDY
HUSM	HOSPITAL UNIVERSITI SAINS MALAYSIA
MOH	MINISTRY OF HEALTH
SD	STANDARD DEVIATION
CI	CONFIDENCE INTERVAL
SPSS	STATISTICAL PRODUCT AND SERVICE SOLUTIONS
FMS	FAMILY MEDICINE SPECIALIST
NMRR	NATIONAL MEDICAL RESEARCH REGISTRY
ECG	ELECTROCARDIOGRAPHY
BVM	BAG VALVE MASK
HMEF	HEAT MOISURE EXCHANGER FILTER
TOT	TRAINERS OF TRAINER

ABSTRAK

Pengenalan

Serangan jantung secara mendadak merupakan salah satu penyebab utama yang menyebabkan kematian di seluruh dunia dan khususnya di Malaysia. Dalam kajian ini, kami ingin menilai pengetahuan, sikap, menentukan kaedah resusitasi yang berkesan dan menetapkan faktor-faktor yang berkaitan antara demografi dan latihan dengan pengetahuan serta sikap terhadap CPR dan defibrilasi dalam kalangan pegawai perubatan klinik penjagaan primer kerajaan.

Kaedah Kajian

Satu kajian keratan rentas telah dijalankan ke atas 192 doktor penjagaan primer kerajaan yang berpusat di lebih sepuluh buah daerah di Kelantan menggunakan soal selidik yang dikendalikan sendiri. Pensampelan rawak berstrata digunakan dalam menentukan jumlah sampel. Kajian ini dianalisis menggunakan statistik deskriptif dan Regresi Logistik Multivariat.

Keputusan

192 responden dianalisa dan kami mendapati bahawa 68.8% pegawai perubatan klinik penjagaan primer kerajaan di Kelantan mempunyai pengetahuan yang baik mengenai CPR dan defibrilasi. 90.6% pegawai perubatan klinik penjagaan primer kerajaan di Kelantan mempunyai sikap yang baik terhadap CPR dan defibrilasi. Sebilangan besar pegawai perubatan tidak akan melakukan ventilasi mulut ke mulut semasa CPR yang menyumbang kepada 59.9% pegawai perubatan. Di antara 192 pegawai perubatan, majoriti memilih pengudaraan dan pemampatan (CPR) yang merangkumi 77.6% pegawai perubatan. Tiada perkaitan antara pemboleh ubah berkenaan dengan pengetahuan terhadap Resusitasi dan Defibrilasi Kardiopulmonari. Klinik yang ada defibrillator

(p-value = 0.048) signifikan secara statistik dengan sikap terhadap Resusitasi dan Defibrilasi Kardiopulmonari dengan Nisbah ganjil 3.70.

Kesimpulan

Secara keseluruhan, pegawai perubatan klinik penjagaan primer kerajaan di Kelantan, Malaysia mempunyai pengetahuan yang baik dan sikap positif terhadap CPR dan defibrilasi walaupun bagaimanapun ini tidak dapat digunakan sebagai ramalan tunggal kerana sesi praktikal tidak dikaji dalam penyelidikan ini.

Kata Kekunci

Serangan Jantung, Kajian Keratan Rentas, Statistik descriptive, Regresi Logistik Multivariat

ABSTRACT

INTRODUCTION

Sudden cardiac arrest has been one of the leading causes of out-of-hospital mortality worldwide, particularly in Malaysia. In this study, we want to assess the knowledge, attitude, determine the preferred method of resuscitation, and establish the associated factors between demographic and training exposure with knowledge and attitude towards CPR and defibrillation among government primary care clinic medical officers.

Methods

A cross-sectional study was conducted on 192 government primary care physicians based over ten districts in Kelantan using a self-administered questionnaire. Stratified random sampling was applied in determining the sample size. This study was analysed using descriptive statistics and Multivariate Logistics Regression.

Results

One hundred ninety-two respondents were analysed. We found out that 68.8% of government primary care clinic medical officers in Kelantan have good knowledge towards CPR and defibrillation. 90.6% of government primary care clinic medical officers in Kelantan have a good attitude towards CPR and defibrillation. 59.9% of medical officers would not perform mouth-to-mouth ventilation during CPR. Among 192 medical officers, the majority preferred both ventilation and compression (CPR), 77.6% of medical officers. There were no significant association between related variables towards knowledge of Cardiopulmonary Resuscitation and Defibrillation. Clinics having defibrillator (p-value = 0.048) was statistically significant with the attitude towards

Cardiopulmonary Resuscitation and Defibrillation with the Odds Ratio of 3.70 when adjusted for other variables.

Conclusion

Overall, government primary care clinic medical officers in Kelantan, Malaysia, possess good knowledge and positive attitude towards CPR and defibrillation, but this cannot be used as a sole predictor because the practice was not studied in this research.

Keywords

Cardiac arrest, cross-sectional study, descriptive statistics, Multivariate Logistics Regression

CHAPTER 1.0 INTRODUCTION

1.1 OVERVIEW OF CARDIAC ARREST AND RESUSCITATION

Sudden cardiac arrest has been one of the leading causes of out of hospital mortality around the globe and particularly in Malaysia¹. It has been known to be increasing with a lack of awareness of one's health status to cardiovascular illness. But on the contrary, the outcome can be brought favorable by the emergent of efficient medical emergency services and resuscitation protocol. Clinicians and scientists are always on their toes to create protocols to reduce the mortality of these patients.

Primary care clinic doctors remain as primary resuscitators and of very much paramount importance in the resuscitation of out of hospital cardiac arrests. Some patients who experience early symptoms of cardiac arrest may seek primary care doctors help if the hospital is not within their reach at that moment².

Immediate recognition and delivery of high-quality basic life support are some of the most crucial factors in neurologically intact survival in a cardiac arrest patient². Besides chest compression, early defibrillation remains as a critical step in the chain of survival of a patient³. This is said due to the most common rhythm in a witnessed cardiac arrest patient is ventricular fibrillation(VF). Basic CPR alone is unlikely to terminate VF; hence early defibrillation is advocated. VF tends to deteriorate to asystole over time if the initial treatment step is delayed or not given (MOH/P.PAK/347.17 GU ADVANCED LIFE SUPPORT Training Manual 2017).

Adequate knowledge on BCLS, ACLS, and an optimistic attitude among medical health care personnel, especially doctors at primary care clinics, contributes reduction of mortality following sudden cardiac arrest. On top of that, primary care clinic doctors must keep abreast of the knowledge with the rapidly changing protocols⁴.

Determining the level of knowledge and attitude towards CPR and defibrillation in a particular target population is a vital component. Maintenance of clinical skills and competence will improve the survival outcome in sudden cardiac arrest cases. No study was done into determining of level of knowledge and attitude towards CPR and defibrillation among medical officers in government primary care clinics; hence this study would be a good platform.

1.2 LITERATURE REVIEW

CPR (Cardiopulmonary Resuscitation), which is practiced now, has a huge historical development behind it. . In the 1960s, it marks the historic year where closed cardiac massage was started to be performed, whereby 86 years ago, in 1874, open cardiac massage was the only method to help the heart pump out its blood in a resuscitation. Meanwhile, for artificial respiration, mouth to mouth breathing was rampantly performed when Vesallus introduced it in the 16th century. After which it evolved to the positive pressure ventilation in 1958, which proved to be better than the former. Delivery of electrical current internally to the animal heart had begun in 1775 but was not proven successful. The technique was successful when applied to humans externally in 1956⁵.

The act of return of spontaneous circulation is the result of successful CPR. There are two components in CPR: chest compression to maintain adequate circulatory flow to vital organs and appropriate artificial ventilation to maintain tissues' oxygenation. Adhering strictly to the resuscitation protocols promptly, which involves early defibrillation and proper post-cardiac arrest care implementation, survival, and the neurological outcome can be improved.

For every minute of delay in initiating CPR, the chance of survival decreases according to the American Heart Association in collaboration with the International Liaison Committee on Resuscitation 2004⁶.

In the United States, sudden cardiac arrest treatment by Emergency Medical Service (EMS) was approximately 55 per 100 000 person-years for all rhythm arrests. It was 21 per 100 000 person-years for arrest due to ventricular fibrillation, with survival rate estimates of 8% for all rhythm arrests and 17% among ventricular fibrillation arrests.

A clinical research network called Pan Asia Resuscitation Outcome Study (PAROS) had been performed in 2015 to report the OHCA trend hence providing a better understanding of OHCA in Asia. Malaysia is one of the seven countries that participated in this four-year (2009-2012) study duration, which provides data of 1.5 to 2.5 years of reported OHCA captured by their EMS in each country⁷.

A total of 66780 OHCA cases have been submitted to PAROS. About 65.4% of OHCA cases occur at home; meanwhile, 35.5% of cardiac arrests were witnessed by bystanders ⁷. With the increased number of cardiac arrests occurring, primary care clinicians must be vigilant.

A local study in Peru found that participants did not possess adequate knowledge of CPR. Hence, they postulated that the lack of regular training was the cause of that. Another factor to be addressed was the lack of encounter with sudden cardiac arrest (SCA) patients. Therefore emergency service rotation respondents had better knowledge and attitude towards CPR and defibrillation⁸.

In another study conducted in three medical institutes in India, it was noted that intern doctors' knowledge is at below par level.

About 41.11% of respondents had a poor knowledge with regards to defibrillation and CPR. The main reason postulated was the inadequacy of the undergraduate resuscitation training and teaching for the students⁹.

Two factors have been related to a better attitude and confidence in practicing ACLS skills in an emergency, such as increased years of working experience and elder age category, reflecting the knowledge and exposure to cardiac arrest cases.

Many medical officers felt that they are more confident about CPR and defibrillation than being equipped with knowledge. The reason is that they lack frequent updates and theoretical revisions related to resuscitation, where 94.5% of the study population agreed that ACLS certification is re-evaluated from time to time. This mentioned factor denotes the associated factors required to improve knowledge and attitude towards CPR and defibrillation¹⁰.

Regarding positive attitude towards defibrillation, about 50 % of nurses in a medium-sized secondary hospital in Finland were afraid to defibrillate patients mentioning that they would injure the patient and patient may succumb. Hence, it had been postulated that these nurses lack interprofessional education, which improved drastically after the education program was conducted¹¹.

CPR remains the sole treatment option for cardiac arrest, while defibrillation is the integral and crucial portion of cardiac arrest victims' resuscitation. In a survey conducted upon junior doctors in Hospital Universiti Sains Malaysia (HUSM) in Kelantan in Malaysia in 2008, 85.8% claimed that they were not confident of the resuscitation process. The formerly mentioned figure contrasts with the level of knowledge they possess, where 70% of the respondents answered the knowledge section correctly. This does not imply the practice with the knowledge they possess¹².

In 2017, a study had mentioned that primary care physicians in Israel were underprepared to provide effective CPR. There were three factors considered in retaining resuscitation skills, timely training of the physician, physician's confidence in defibrillation, and defibrillator availability. The majority of the Israeli primary care physicians lack in one of these factors leading to a break in the chain of survival².

Primary care clinics are the bedrocks of the community health care system. Hence, the physicians' response towards a cardiac arrest patient's resuscitation must be swift and appropriate, ensuring spontaneous circulation return. Kelantan, the state concerning our study, is that approximately 1.83 million people occupy the north-eastern state in Malaysia as per the 2017 census. Kelantan has 82 primary care clinics, with 370 primary care medical officers practicing there.

Despite having various literature reviews on the response of OHCA by nurses, medical students, paramedics, and general practitioners, there is a lack of literature to reveal any study related to the knowledge and attitude of primary care clinic physicians in Kelantan on CPR and defibrillation. This study will fill in the research gap regarding knowledge and attitude towards cardiopulmonary resuscitation and defibrillation among primary care clinic medical officers in Kelantan, Malaysia.

CHAPTER 2.0 STUDY PROTOCOL

2.1 PROBLEM STATEMENT

Medical officers working in and out of hospitals have to keep themselves abreast of updated resuscitation protocols on cardiac arrest. This will improve the survival outcome in and out of hospital cardiac arrest cases. We can objectify the knowledge and attitude parameters among medical officers in government primary care clinics in Kelantan by doing this research. So far, there is no data about this group of medical personnel in Kelantan; hence this research will help to fill in the research gap and may reduce mortality due to cardiac arrest in this state.

2.2 STUDY JUSTIFICATION AND BENEFIT OF THIS STUDY

Despite multiple studies performed on various healthcare groups, minimal research on this topic related to the study group targeted. Thus, we are inquisitive to know the knowledge and attitude of CPR and defibrillation among government primary care doctors in Kelantan, Malaysia.

This study's findings can contribute to the improvement of resuscitation knowledge, and awareness thus reduces mortality of OHCA.

2.3 RESEARCH QUESTIONS

- a) Do government primary care clinic medical officers in Kelantan have good knowledge towards CPR and defibrillation?
- b) Do government primary care clinic medical officers in Kelantan have a positive attitude towards CPR and defibrillation?
- c) What are the factors associated with good knowledge and a positive attitude towards CPR and defibrillation?
- d) Which method of resuscitation is preferred by government primary care medical officers; Chest compression-only CPR versus CPR?

2.4 OBJECTIVE

2.4.1 General objective

To assess the knowledge and attitudes towards CPR and defibrillation among government primary care clinic medical officers.

2.4.2 Specific objectives

- To determine level knowledge and attitude of CPR and defibrillation among government primary care clinic medical officers in Kelantan
- To determine the demographics and training exposure factors among government primary care medical officers.
- To determine the preferred method of resuscitation (CPR vs. CCR) among government primary care clinic medical officers.
- To determine the associated factors between demographic and training exposure with good knowledge and attitude among government primary care clinic medical officers.

2.5 METHODOLOGY

2.5.1 STUDY DESIGN

- This is a cross-sectional study

2.5.2 STUDY DURATION

- Study is going to be performed from 1st January 2019 till 31stDecember 2019.

2.5.3 STUDY LOCATION

- Government primary care clinics, Kelantan, Malaysia

2.5.4 STUDY POPULATION

Reference Population

- Medical Officers in Kelantan, Malaysia.

Source Population

- All Government medical officers in Kelantan, Malaysia acquired from each District Health Offices in Kelantan, Malaysia.

Sampling Frame

- All government primary care clinics medical officers in Kelantan, Malaysia acquired from each District Health Offices in the state of Kelantan, Malaysia who fulfill the inclusion criteria.

2.5.5 SUBJECT CRITERIA

Inclusion Criteria

- All consented permanent government primary care clinic medical officers in Kelantan, Malaysia under Ministry of Health (MOH) during the study period.

Exclusion Criteria

- Medical officers not available during the study period

2.5.6 SAMPLE SIZE CALCULATION

One proportion formula:

The formula:

$$n = \left(\frac{Z_{\alpha}}{\Delta} \right)^2 * P (1 - P)$$

P = The population proportion from literatures

Δ or d = Precision or detectable deviation. Absolute precision is usually taken between 1% (0.01) – 10% (0.10). Can also be relative precision.

Z_α = normal deviates that reflects Type I error; usually taken as 1.96 for α = 0.05 (95%CI).

P : 0.06

Z: 1.96

Delta: 0.07

We will be considering a 10% dropout of samples in all the factors mentioned.

OBJECTIVES	P	N	Reference
1) Knowledge	0.06	24	13
Attitude	0.28	85	14
2) Training exposure factors	0.38	184	15

Objective 3

There is no sample size calculated for this objective in view of it being descriptive analysis.

Objective 4

The sample size was calculated using PS software for prior CPR course and associated factors.

Associated factor	p_0	OR	n	2n	Study
Prior CPR course	0.43	3.4	52	104	16

Prior data indicate that the probability of exposure among controls is 0.43. If the true odds ratio for disease in exposed subjects relative to unexposed subjects is 3.4, we will need to study 52 case patients and 52 control patients to be able to reject the null hypothesis that this odds ratio equals 1 with probability (power) 0.8. The Type 1 error probability associated with this test of this null hypothesis is 0.05. We will use a continuity- corrected chi squared statistic or Fisher's exact test to evaluate this null.

Conclusion

The highest sample size calculated is 184. Therefore, sample size taken for this study will be 184. After 10% dropout, sample size would be 202.

2.5.7 SAMPLING METHOD

STRATIFIED RANDOM SAMPLING

$$n_i = \frac{N_i \times n}{N}$$

Where,

N = number of medical officers sampled from population

n_i = number of medical officers sampled from population for each district

N_i = Number of Medical officers in each district

N = Total number of medical officers in government primary care clinic in Kelantan

District	Number of Medical officers	Calculation	Sample
Bachok	32	$\frac{32 \times 202}{347} = 18.6$	19
Gua Musang	24	$\frac{24 \times 202}{347} = 13.9$	14
Jeli	13	$\frac{13 \times 202}{347} = 7.56$	8
Kota Bharu	93	$\frac{93 \times 202}{347} = 54.13$	54
Kuala Krai	22	$\frac{22 \times 202}{347} = 12.8$	13
Machang	25	$\frac{25 \times 202}{347} = 14.5$	14
Pasir Mas	47	$\frac{47 \times 202}{347} = 27.3$	27
Pasir Puteh	22	$\frac{22 \times 202}{347} = 12.8$	13
Tanah Merah	25	$\frac{25 \times 202}{347} = 14.5$	14

Tumpat	44	$\frac{44 \times 202}{347} = 25.6$	26
Total	347	-	202

- For each district, equal proportion of respondent will be divided to two categories that is whether the clinic has a residing family medicine specialist or not.
- Medical officers' name will be arranged in alphabetical order for both the categories and principal investigator will select the eligible respondent by systematic random sampling at a proportionate interval.

2.6 DATA COLLECTION METHOD

- Data collection is the systematic process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes.
- Number of medical officers was obtained from the state health office of Kelantan. The number of respondents in each primary care clinic has been ascertained. The investigator will personally visit the respective selected clinics during lunch hours to avoid clinical duties and service interference.
- Respondents will be briefed regarding the study details for about 5 minutes and given the written consent form.
- A self-administered questionnaire method will be handed to them if they consented to participate in the study.
- The written consent form and questionnaire will be handled in the English language as all eligible participants have good English proficiency skills as part of their academic requirements and training.

- Participants may answer the questionnaire at the same time.
- Duration of answering questionnaire will be 10 minutes.

2.6.1 DATA ENTRY

- Data entry and data analysis using SPSS version 26
- The data will be analyzed for descriptive statistics with frequency and percentage for categorical data and mean and SD for numerical data.
- The associated factors will be tested by using simple and multiple logistic regression.

2.6.2 RESEARCH TOOL

- Data collection will be done using a questionnaire from a validated survey adapted from Ong et al. (2009) on the Knowledge and attitudes towards cardiopulmonary resuscitation and defibrillation among Asian primary health care physicians. Open Access Emergency Medicine, 1, 11-20. The questionnaire comprises of 27 questions, and they are divided into four sections, namely demographic, Knowledge, attitude and CCR-only resuscitation vs. CPR
- There are 27 questions in the questionnaire. Five questions are for knowledge assessment. Each question will contribute to 1 mark, making a total of 5 marks for knowledge assessment. Respondents are considered to have good Knowledge if they score ≥ 3 out of 5. There are 11 questions in the attitude section. Each question will contribute to 1 mark, making a total of 11 marks for attitude assessment. Respondents who answered eight questions correctly are considered to have a positive attitude.
- Two questions are to know the preferred method of resuscitation among respondents. It could be either chest compression-only resuscitation or cardiopulmonary resuscitation.

2.6.3 STATISTICAL ANALYSIS

- Data entry and data analysis using SPSS version 24
- The data will be analysed for descriptive statistics with frequency and percentage for categorical data and mean and SD for numerical data.
- The associated factors will be tested by using simple and multiple logistic regression.

2.6.4 DUMMY TABLES

OBJECTIVE 1

1) RESPONDENTS KNOWLEDGE IN DEFIBRILLATION

RESPONDENTS KNOWLEDGE IN DEFIBRILLATION AND CPR	
VARIABLES	Mean SD

Obtained correct answers for the following

Q1. What does the abbreviation “A” in AED represent?

Q2. What does the abbreviation “E” in AED represent?

Q3. What does the abbreviation “D” in AED represent?

Q4. AED operator is not required to interpret

Q5. Defibrillation is the most important step in cardiac arrest

Q6. Compression : ventilation ratio in two rescuers for adult CPR is 30:2

Q7. Compression : ventilation ratio in two rescuers for pediatric CPR is 15:2

Q8. The effective chest compression is one with 100 compressions in 1 minute, allows for complete chest recoil and minimizes interruptions in chest compression.

Q9. Rescuers need to provide about 5 cycles (or about 2 minutes) of CPR between rhythm check during treatment of pulseless arrest.

Q10. Defibrillation is recommended for asystole patient

Total score (full score = ten questions answered correctly):

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.
Know how to operate AED/defibrillator
Attended AED/defibrillator training

Abbreviation: AED - automated external defibrillator

<u>KNOWLEDGE</u>	<u>n(%)</u>
- <u>Good</u>	
- <u>Poor</u>	

2) Attitude of government primary care clinic doctors towards CPR and defibrillation

Variables	n (%)
Willing to use AED to attend to cardiac arrest patient if it is available	
Reasons for not using AED	
Don't know what an AED is	
Don't know how to use AED	
Fear of legal liability	
Not confident	
Willing to purchase AED	
Willing to pay	
RM4000	
RM4000-RM12000	
RM12000–RM 20000	
> RM20000	

Not willing to purchase AED because

Expensive

Not useful

Difficult to maintain

Unsure how to use

Others

Would be encouraged to purchase AED if:

Reasonable price

Easy to use

Easy to maintain

Others

Willing to attend AED course at own expense**Agreed that all clinics should have AED****Would support legislation to make AED compulsory equipment in all clinics****Would support/participate in community CPR/AED project**

Abbreviations: AED, automated external defibrillator; CPR, standard cardiopulmonary resuscitation.

<u>ATTITUDE</u>	<u>n(%)</u>
- <u>Good</u>	
- <u>Poor</u>	

OBJECTIVE 2

3) CHARACTERISTICS OF RESPONDENTS

VARIABLES	n%)	Mean(SD)
1) Trained in BCLS		
- Valid BCLS certificate		
2) Trained in ACLS		
- Valid ACLS certificate		
3) Ever attended patients with cardiac arrest		
4) No. of cardiac arrest cases attended		
1		
2		
3		
4		
5		
≥ 10		
Unknown		
5) Uses clinic's AED/defibrillator on cardiac arrest		

OBJECTIVE 3

- 4) Comparison between chest compression only resuscitation and standard cardiopulmonary resuscitation (CPR) among government primary care clinic medical officers in Kelantan (n = xx)

Variables	n (%)
CCR vs CPR	
Would perform mouth to mouth ventilation during CPR	
Preferred method of resuscitation	
- CCR	
- CPR	
Preferred CCR because:	
- As effective as CPR	
- Easier to learn	
- Unwilling to do mouth to mouth	
Preferred CPR because:	
- More effective	
- Confident of CPR technique	
- Recommended by National Resuscitation Council	
Confident of CPR techniques	
Recommended by National	
Resuscitation Council	
Abbreviations CCR- chest compression only, CPR- cardiopulmonary resuscitation	

OBJECTIVE 4

5) Factors associated with knowledge and attitude of CPR and defibrillation

Logistic regression analysis of factors associated between demographics and training with good knowledge towards CPR and defibrillation among government primary care clinic medical officers in Kelantan, Malaysia (n = xx)

Variables	Univariate analysis			Multivariate analysis		
	Crude OR	95% CI	P value	Crude OR	95% CI	P value

1) Age

2) Gender

- Male
- Female

3) Graduation

- Local
- Overseas

4) Years of service

- < 3 years
- > 3years

Training

5) BLS trained with valid certification

6) ALS trained with valid certification

7) Primary care clinic

- With FMS
- Without FMS

8) Attended cardiac arrest cases before?

9) Have used AED/defibrillator for the cardiac

arrest cases
attended

Abbreviations: BLS -Basic Life Support, ALS – Advance Life Support, FMS- Family Medicine Specialist, AED- Automated External Defibrillator

Logistic regression analysis of factors associated between demographics and training with good attitude towards CPR and defibrillation among government primary care clinic medical officers in Kelantan, Malaysia (n = xx)

Variables	Univariate analysis			Multivariate analysis		
	Crude OR	95% CI	P value	Crude OR	95% CI	P value

1) Age

2) Gender

- Male
- Female

3) Graduation

- Local
- Overseas

4) Years of service

- < 3 years
- > 3years

Training

5) BLS trained with valid certification

6) ALS trained with valid certification

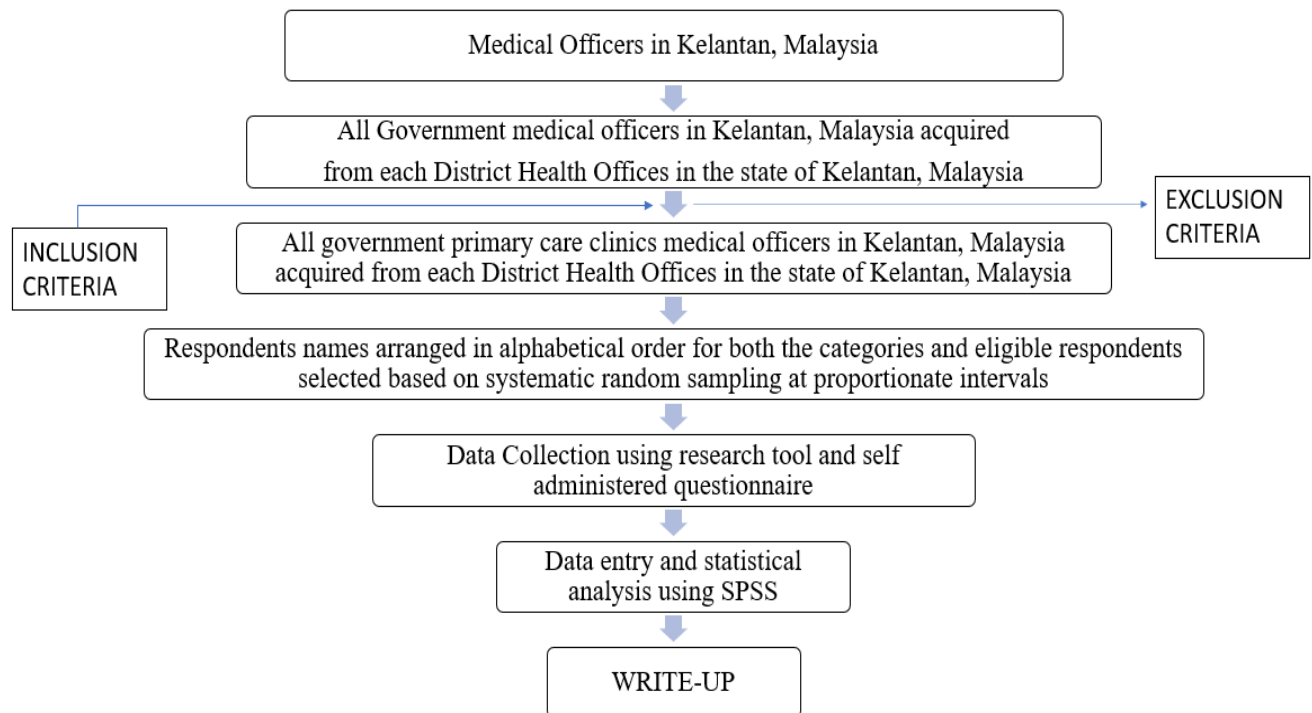
7) Primary care clinic

- With FMS
- Without FMS

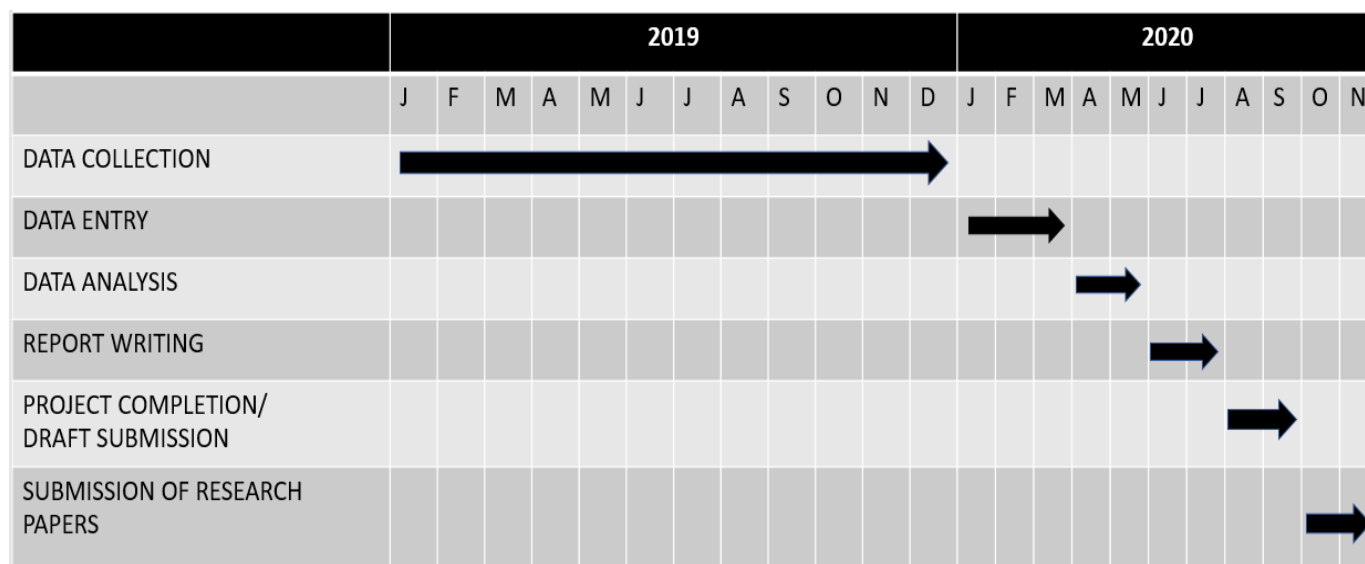
- 8) Attended cardiac arrest cases before?
- 9) Have used AED/defibrillator for the cardiac arrest cases attended

Abbreviations: BLS -Basic Life Support, ALS – Advance Life Support, FMS- Family Medicine Specialist, AED- Automated External Defibrillator

2.7 STUDY FLOWCHART



2.8 GANTT CHART & MILESTONE



No	Milestones	Date	Semester
1.	Draft research proposal to supervisor	July 2018	Semester 1 2018/2019
2.	Present research proposal to department	August 2018	
3.	Submit proposal to ethics committee	September 2018	
4.	Anticipated date for ethics approval	November 2019	Semester 2 2018/2019
5.	Data collection commencement	January 2019	
6.	Data collection complete	December 2019	Semester 2 2019/2020
7.	Data entry & analysis commencement	January 2020	
8.	Data entry & analysis complete	May 2020	Semester 1 2020/2021
9.	Review findings with supervisor	July 2020	
10.	Dissertation report write up	August 2020	
11.	Review draft final report with supervisor & corrections	October 2020	
12.	Submit final report	November 2020	

2.9 ETHICS OF STUDY

The quality and integrity of the research will be ensured. The study will be conducted in compliance with the ethical principles outlined in the Declaration of Helsinki and Malaysian Good Clinical Practice Guideline. Approval to conduct the study will be obtained from the institutional ethics committee, Human Research Ethics Committee USM (HREC/ JePEM), National Medical Research Registry (NMRR), and hospital management. The participants will take part voluntarily. Any harm to the participants will be avoided.

2.10 PRIVACY AND CONFIDENTIALITY

- Participants' information will be kept confidential by the researchers and will not be made publicly available unless disclosure is required by law.
- Data obtained from this study that does not identify the participant individually will be published for knowledge purposes.
- The original records may be reviewed by the researcher, the Ethical Review Board for this study, and regulatory authorities to verify the study procedures and data.
- Participants have the right to refuse future storage and use of collected specimens/data.
- Data will be kept for three years in a compact disc and will be archived at the mentioned period. The answered questionnaire and consent form will be shredded as well.
- Participant information may be held and processed on a computer. Only research team members are authorized to access the participant's information.
- By signing this consent form, participants authorize the record review, information storage, and data process described above.