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Development and validation of a questionnaire to assess knowledge, attitude and confidence regarding cardiopulmonary resuscitation among ambulance drivers in Malaysia

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ABSTRACT

Out of hospital cardiac arrest is a major cause of death worldwide. The outcome from out of hospital cardiac arrest remains poor, thus requiring immediate emergency medical intervention and high-quality cardiopulmonary resuscitation. Ambulance drivers are part of the prehospital care team and therefore play a critical role in providing cardiopulmonary resuscitation to cardiac arrest patient. As present, there is no study that has been developed to assess the knowledge, attitude and confidence regarding cardiopulmonary resuscitation among ambulance drivers. Thus, this study has developed a reliable and validated a questionnaire called AmKAC to evaluate their knowledge, attitude and confidence. The questionnaires are available in two languages, English and Bahasa Malaysia, in view of different educational background. The content validity was then assessed by content experts. Subsequently, the questionnaires underwent face validity which were pretested among 10 ambulance drivers to check for the understanding, language and readability. Afterwards, the refined questionnaires were administered to 108 ambulance drivers from the emergency trauma department of six different hospitals. The process was repeated one week after for the retest. This study reviewed reliable questionnaires in measuring knowledge, attitude and confidence among ambulance driver with Cronbach's alpha of 0.685, 0.703 and 0.905, respectively. In addition, the questionnaire also showed good test-retest reliability and correlation between the items, by using Spearman's rho and intraclass coefficient, respectively. In conclusion, the developed, validated AmKAC can be used in future to provide better insights of the ambulance drivers knowledge, attitude and confidence level regarding cardiopulmonary resuscitation permitting organization of courses and training.

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INTRODUCTION

Cardiac arrest is a cessation of cardiac activity that leads to circulatory arrest due to inadequate cardiac output. The causes of cardiac arrests can be cardiac or noncardiac, for instance, trauma, primary respiratory arrest, overdose and others. The cardiac etiology predominates and has been reported in 70-85% of cases (Ismail, 2016). Out of hospital cardiac arrest is a major cause of death worldwide (Holmberg *et al.*, 1999), including Malaysia. In Malaysia, there were 10-24 cases of out of hospital cardiac

arrest per month (Nurumal and Karim, 2015). Furthermore, a cardiac arrest has contributed to a large amount of cost of care as well as the loss of a number of productive years due to cardiac arrest death and disability (Graham *et al.*, 2015). The outcome from out of hospital cardiac arrest remains poor, with only 10.8% of adult patients that received resuscitations, survived to hospital discharge (Kleinman *et al.*, 2015). Asia has the lowest survival rates (Berdowski *et al.*, 2010). Thus, all out of hospital cardiac arrest patients require immediate emergency medical intervention and high-quality cardiopulmonary resuscitation as chances of survival rate reduces with each minute delay in initiating cardiopulmonary resuscitation (Ismail, 2016). Early cardiopulmonary resuscitation have a higher rate of return of spontaneous circulation compared to late cardiopulmonary resuscitation, 33% and 20% respectively (Ismail, 2016). In addition, Hasselqvist-Ax, Ingela, et al. found that there was a significant association between the time of cardiopulmonary resuscitation initiation and the 30 days survival rate. The survival rate reduced with increase time of cardiopulmonary resuscitation initiation (Hasselqvist-Ax *et al.*, 2015). As present, pre-hospital care in Malaysia usually consists of paramedics and ambulance drivers, and occasionally a medical doctor (Chew and Chan, 2011). Nowadays, pre-hospital services have become more develop in which ambulance drivers no longer serve as only drivers. They are considered as responder who will provide basic first aid in addition to being credentialed to drive ambulances. Hence, they play a crucial role in providing cardiopulmonary resuscitation to cardiac arrest victims. Thus, we developed a questionnaire to assess their knowledge, attitude and confidence as there was no study done before to evaluate the ambulance driver's knowledge, attitude and confidence. We believe that through the questionnaire, it may benefit in future to develop a well-planned and sustainable training program.

MATERIALS AND METHODS

Participants

Participants enrolled were ambulance drivers who are currently working at the Emergency and Trauma Department from six hospitals including Ampang Hospital, Putrajaya Hospital, Tengku Ampuan Rahimah Hospital, Banting Hospital, Kajang Hospital and Tuanku Ja'afar Hospital excluding those who are not willing to participate.

KAC Questionnaire

The questionnaire (AmKAC) was developed to assess three main domains, knowledge, attitude and confidence regarding cardiopulmonary resuscitation. The questions were designed based on extensive literature search and expert reviews. Furthermore, they were developed according to the American Heart Association Guidelines 2015 and European resuscitation Council Guidelines for Resuscitation 2015. In addition, local guidelines were also used as a reference, which was the Ministry of Health policies, Policy on Resuscitation Training and Emergency Medicine and Trauma Services.

There are four sections in the questionnaire. The first section is regarding demographic questions whilst the other three sections are regarding knowledge, attitude and confidence domains which comprised of 37 items that include both positively and negatively worded items.

The first domain is developed to test the knowledge about cardiopulmonary resuscitation that consists of 14 questions with true or false answer. A true answer will be scored one, and the false answer will be scored zero. On the other hand, the second domain which encompasses 13 items intended to evaluate the attitude of the ambulance drivers regarding cardiopulmonary resuscitation. Likert scale was used ranging from '1' for strongly disagree to '5' for strongly agree. The last domain assessed the confidence level of the drivers in providing cardiopulmonary resuscitation to a cardiac arrest patient. Confidence domain consists of 10 questions in total in Likert scale as well, '1' Not very confident to '5' very confident. Table 1 shows the domains and scoring for knowledge, attitude and confidence questionnaire.

Appendix A shows the questionnaires that had been developed to assess the knowledge, attitude and confidence regarding cardiopulmonary resuscitation among ambulance drivers in Malaysia. Appendix A comprises Figure 1 to Figure 2.

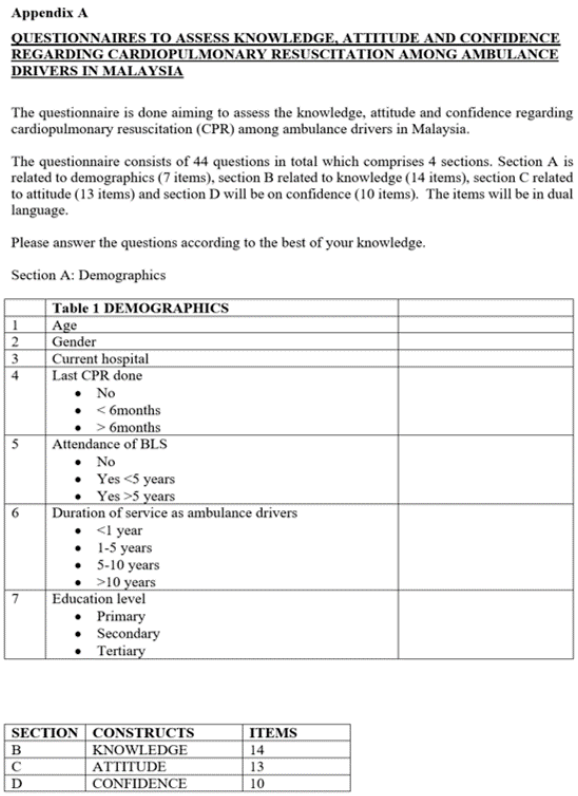
Figure 1 is regarding instructions on answering the questionnaires, demographics of the participants and the three sections of the questionnaires and their total items. On the other hand, Figure 2 displays the knowledge, attitude and confidence sections.

Translation Process

The knowledge, attitude and confidence items were translated into Malay language and back-translated by bilingual emergency physicians fluent in both the English and Malay languages. Any discrepancies were discussed and came to the consensus among the expert panel consists of experts fluent in both English and Malay languages from the disciplines of Emergency Medicine and Faculty of Medicine and

Table 1: Domain content and scoring for Knowledge, Attitude and Confidence (KAC) on the questionnaire

Domains	No of Items	Scoring
Knowledge	14	Dichotomous 1=True, 0=False
Attitude	13	5-point Likert scale 1=Strongly disagree, 5=Strongly agree
Confidence	10	5-point Likert scale 1=Not very confident, 5=Very confident



Appendix A

QUESTIONNAIRES TO ASSESS KNOWLEDGE, ATTITUDE AND CONFIDENCE REGARDING CARDIOPULMONARY RESUSCITATION AMONG AMBULANCE DRIVERS IN MALAYSIA

The questionnaire is done aiming to assess the knowledge, attitude and confidence regarding cardiopulmonary resuscitation (CPR) among ambulance drivers in Malaysia.

The questionnaire consists of 44 questions in total which comprises 4 sections. Section A is related to demographics (7 items), section B related to knowledge (14 items), section C related to attitude (13 items) and section D will be on confidence (10 items). The items will be in dual language.

Please answer the questions according to the best of your knowledge.

Section A: Demographics

	Table 1 DEMOGRAPHICS	
1	Age	
2	Gender	
3	Current hospital	
4	Last CPR done • No • < 6months • > 6months	
5	Attendance of BLS • No • Yes <5 years • Yes >5 years	
6	Duration of service as ambulance drivers • <1 year • 1-5 years • 5-10 years • >10 years	
7	Education level • Primary • Secondary • Tertiary	

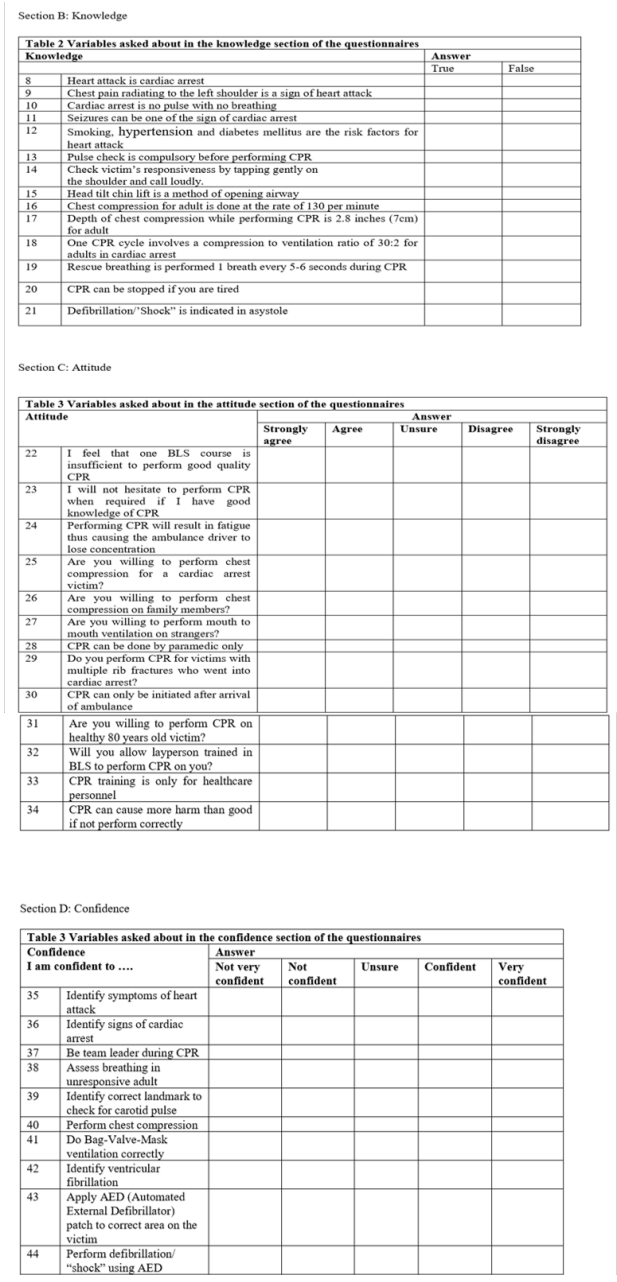
SECTION	CONSTRUCTS	ITEMS
B	KNOWLEDGE	14
C	ATTITUDE	13
D	CONFIDENCE	10

Figure 1: Instructions on answering the questionnaires, demographics of the participants and the three sections of the questionnaires and their total items

Health Sciences. The process was done according to the four stages described by Guillemin (Guillemin, 1995). The translation to Malay languages is done in view of ambulance drivers coming from a different educational background.

Content Validity

The questionnaires were sent to three experts to ascertain the content validity. Experts are defined as emergency physicians who graduated from an Emergency Medicine postgraduate specialist training program and are currently practicing. The items were assessed for the key aspects of content validity, which include clarity, relevance and representativeness in addition to appropriate grammar and



Section B: Knowledge

Table 2 Variables asked about in the knowledge section of the questionnaires			
Knowledge		Answer	
		True	False
8	Heart attack is cardiac arrest		
9	Chest pain radiating to the left shoulder is a sign of heart attack		
10	Cardiac arrest is no pulse with no breathing		
11	Seizures can be one of the sign of cardiac arrest		
12	Smoking, hypertension and diabetes mellitus are the risk factors for heart attack		
13	Pulse check is compulsory before performing CPR		
14	Check victim's responsiveness by tapping gently on the shoulder and call loudly.		
15	Head tilt chin lift is a method of opening airway		
16	Chest compression for adult is done at the rate of 130 per minute		
17	Depth of chest compression while performing CPR is 2.8 inches (7cm) for adult		
18	One CPR cycle involves a compression to ventilation ratio of 30:2 for adults in cardiac arrest		
19	Rescue breathing is performed 1 breath every 5-6 seconds during CPR		
20	CPR can be stopped if you are tired		
21	Defibrillation/"Shock" is indicated in asystole		

Section C: Attitude

Table 3 Variables asked about in the attitude section of the questionnaires						
Attitude		Answer				
		Strongly agree	Agree	Unsure	Disagree	Strongly disagree
22	I feel that one BLS course is insufficient to perform good quality CPR					
23	I will not hesitate to perform CPR when required if I have good knowledge of CPR					
24	Performing CPR will result in fatigue thus causing the ambulance driver to lose concentration					
25	Are you willing to perform chest compression for a cardiac arrest victim?					
26	Are you willing to perform chest compression on family members?					
27	Are you willing to perform mouth to mouth ventilation on strangers?					
28	CPR can be done by paramedic only					
29	Do you perform CPR for victims with multiple rib fractures who went into cardiac arrest?					
30	CPR can only be initiated after arrival of ambulance					
31	Are you willing to perform CPR on healthy 80 years old victim?					
32	Will you allow layperson trained in BLS to perform CPR on you?					
33	CPR training is only for healthcare personnel					
34	CPR can cause more harm than good if not perform correctly					

Section D: Confidence

Table 3 Variables asked about in the confidence section of the questionnaires						
Confidence I am confident to		Answer				
		Not very confident	Not confident	Unsure	Confident	Very confident
35	Identify symptoms of heart attack					
36	Identify signs of cardiac arrest					
37	Be team leader during CPR					
38	Assess breathing in unresponsive adult					
39	Identify correct landmark to check for carotid pulse					
40	Perform chest compression					
41	Do Bag-Valve-Mask ventilation correctly					
42	Identify ventricular fibrillation					
43	Apply AED (Automated External Defibrillator) patch to correct area on the victim					
44	Perform defibrillation/ "shock" using AED					

Figure 2: The knowledge, confidence and the attitude sections

language.

Face Validity

The questionnaires were administered to 10 ambulance drivers from the Emergency and Trauma Department to check for participant's understanding of items, as well as to check for language, clarity and readability. They were encouraged to ask questions and were interviewed upon completion of the questionnaires. This was performed to reduce the bias of the researcher and to ensure the domains defined by researchers matches the respondent's perspective.

Pilot test and test-retest reliability

The refined questionnaires were then distributed to the participants, and a total of 108 ambulance drivers were recruited. The questionnaires were re-administered to the same participants 1 week after the initial test. All participants completed the initial and subsequent questionnaires.

Statistical Analysis

The data were collected and analyzed using the IBM SPSS statistical package version 23. The collected questionnaires with two or more missing responses were eliminated in subsequent statistical analyses. Categorical data were demonstrated as frequencies with percentages in parenthesis.

The questionnaire consisted of 14 questions related to knowledge. A 2-scale will be used, ranging from {0} = '{False}' to {1} = '{True}'. Thus, a minimum sample size of 70 is required to produce good Cronbach's alpha and correct factor solution with a rule of thumb to calculate the sample size. With an additional 20% dropout rate, the sample size is 88 samples. (Bujang *et al.*, 2012).

The internal consistency of the knowledge, attitude and confidence were analyzed using Cronbach's alpha coefficients, inter-item correlations and item-total correlations. The item-total correlation was used to assess the homogeneity of the items in the domain. A correlation value of above 0.2 was taken as the rule of thumb as an item with a value below 0.20 should be discarded (Everitt, 1998). In addition, the first time completed questionnaire score (T1) and second time completed questionnaire score (T2) for all knowledge, attitude and confidence domains were evaluated for test-retest reliability using intraclass correlation coefficient. Value of between 0.75 and 0.9 based on the 95% confident interval of the intraclass correlation coefficient estimate means good reliability (Koo and Li, 2016). The scores for knowledge, attitude and confidence domains were summed up and were correlated using Spearman's correlation.

Ethics approval

This study has obtained approval from the Medical Research and Ethics Committee, Ministry of Health Malaysia. (Study ID: NMRR-18-918-40611).

RESULTS AND DISCUSSION

There were a total of 108 ambulance drivers with a mean age of 41 years (standard deviation 8.35) completed the knowledge, attitude and confidence questionnaires in Bahasa Malaysia language. There were no missing data. The ambulance driver population exclusively consists of the male gender, and the majority of them has been working as ambulance drivers for the past more than 10 years (n=56, 51.9%). Five of them have been working for less than 1 year (4.6%), while a total of those working for 1 to 5 years and 6 to 10 years are 21, 19.4% and 26, 24.1% respectively.

The hospitals that were recruited provide secondary and tertiary care with the majority of participants from Hospital Tengku Ampuan Rahimah, 28 in total, comprises 25.9% of total participants. The other participants in descending order are from Hospital Tuanku Ja'afar, 20 (18.5%), Hospital Putrajaya, 19 (17.6), Hospital Banting, 16 (14.8%), Hospital Kajang, 14 (13%) and lastly the least participants are from Hospital Ampang which are 11 in total, made up of 10.1% of the total participants. Almost all the participants had received only secondary education (n=97, 89.8%) while the remaining 2 participants, 1.9% received primary education and 9 participants, 8.3% received tertiary education. Furthermore, nearly half of the participants, 53, 49.1% had not performed cardiopulmonary resuscitation for the past 6 months. 63 (58.3%) of the participants had attended the course 5 or less than 5 years ago while 36 of them had participated in the course more than 5 years ago. All the demographic characteristics of the participants are described in Table 2.

Validation with AmKAC and test-retest reliability

A total of 108 individuals completed the AmKAC questionnaire. The AmKAC revealed good test-retest reliability with Spearman's rho of 0.709, 0.603 and 0.548 for knowledge, attitude and confidence, respectively. Moreover, the good reliability for all the domains were further demonstrated by intraclass coefficient T1-T2 of more than 0.75, which were 0.777, 0.754 and 0.751 for knowledge, attitude and confidence, respectively, (See Tables 3, 4 and 5).

Cronbach's Alpha for AmKAC

Table 7 and Table 8 show good internal consistency reliability for attitude (α=0703), and confidence

Table 2: Demographic characteristic of participants

Variables	N (%)
Age (mean (SD))	40.95 (8.35)
Gender	
Male	108 (100.0)
Current Hospital	
Hospital Ampang	11 (10.2)
Hospital Putrajaya	19 (17.6)
Hospital Tengku Ampuan Rahimah	28 (25.9)
Hospital Banting	16 (14.8)
Hospital Kajang	14 (13.0)
Hospital Tuanku Ja'afar	20 (18.5)
Education	
Primary	2 (1.9)
Secondary	97 (89.8)
Tertiary	9 (8.3)
Last CPR done	
No	13 (12.0)
Yes≤6 months	42 (38.9)
Yes>6 month	53 (49.1)
Previous BLS Attendance	
No	9 (8.3)
Yes≤5 years	63 (58.3)
Yes>5 years	36 (33.3)
Duration of service as ambulance drivers	
<1 year	5 (4.6)
1-5 years	21 (19.4)
6-10 years	26 (24.1)
>10 years	56 (51.9)

Table 3: Cronbach's alpha score for overall knowledge score

Knowledge	N=108
Mean score T1 (SD)	8.27 (1.53)
Mean score T2 (SD)	8.47 (1.58)
Cronbach Alpha T1	0.685
Mean inter-item correlation T1	0.113
Mean inter-item correlation T1-T2	0.638
Correlation T1-T2, Spearman's rho	0.709**
Intraclass coefficient T1-T2	0.777

T1 = first time completed questionnaire; T2 = second time questionnaire was completed by 108 participants

Table 4: Cronbach's alpha score for overall attitude score

Attitude	N=108
Mean score T1 (SD)	47.36 (5.62)
Mean score T2 (SD)	48.55 (5.32)
Cronbach Alpha T1	0.703
Mean inter-item correlation T1	0.151
Mean inter-item correlation T1-T2	0.618
Correlation T1-T2, Spearman's rho	0.630**
Intraclass coefficient T1-T2	0.754

T1 = first time completed questionnaire; T2 = second-time questionnaire was completed by 108 participants

Table 5: Cronbach's alpha score for the overall confidence score

Confidence	N=108
Mean score T1 (SD)	32.75 (6.36)
Mean score T2 (SD)	34.68 (6.27)
Cronbach Alpha T1	0.905
Mean inter-item correlation T1	0.491
Mean inter-item correlation T1-T2	0.594
Correlation T1-T2, Spearman's rho	0.548**
Intraclass coefficient T1-T2	0.751

T1 = first time completed questionnaire; T2 = second time questionnaire was completed by 108 participants

(α=0.905) as the Cronbach's alpha value is more than 0.70 (Tavakol and Dennick, 2011). The knowledge domain showed moderate Cronbach's alpha value of 0.685, (see Table 6).

Majority of the items in the three domains demonstrated acceptable item-total correlation apart from two items from the knowledge and one item from the attitude domain. The two items from knowledge domain, item K7 which asked regarding checking victim's responsiveness by tapping gently on the shoulder and call loudly (0.143) and item K14 which asked regarding defibrillation/shock is indicated in asystole (0.107). Whilst the item A10 item with the item-total correlation value of 0.068 (Are you willing to perform cardiopulmonary resuscitation on healthy 80 years old victim) displayed low inter-item correlation, (see Tables 6, 7 and 8).

AmKAC revealed good internal validity and test-retest reliability. Majority of the 37 original items of AmKAC demonstrated acceptable item-total correlation apart from two items from the knowledge and one item from attitude domains. The two items from knowledge domain, item K7 which asked regarding checking victim's responsiveness by tapping gently on the shoulder and call loudly and item K14 which asked regarding defibrillation/shock is indicated in asystole. Whilst the A10 item (Are you willing to perform cardiopulmonary resuscitation on healthy 80 years old victim) displayed low item-total correlation. The items that showed low item correlation may be discarded. In addition, the study demonstrated good intraclass coefficients.

Cardiac arrest is one of the leading causes of death worldwide. In the United states, nearly 90% of the out of hospital cardiac arrest are fatal, with more than 356,000 that occurred annually. The outcome of a cardiac arrest depends on critical intervention, including effective chest compressions and assisted ventilation. Survival to hospital discharge was 10.8% among adults (9% with good neurological function). Hence, in view of the importance of high-quality cardiopulmonary resuscitation, we developed and validated the AmKAC questionnaire to assess the knowledge, attitude and confidence regarding cardiopulmonary resuscitation among ambulance drivers in Malaysia as they are part of the pre-hospital care team in addition to being the first medical team to attend out of hospital cardiac arrest victim. The questionnaire will provide us with better insights into their understanding of cardiopulmonary resuscitation. The questionnaire was designed in such a way to be a user-friendly self-administered tool.

Our study was the first study to evaluate the knowledge, attitude and confidence regarding cardiopulmonary resuscitation among ambulance drivers. It revealed inadequate knowledge regarding cardiopulmonary resuscitation. Specifically, the ques-

Table 6: The overall mean score, standard deviation and Cronbach Alpha for each item in Knowledge domain of AmKAC

Question	Mean	Standard Deviation	Skewness	Standard Error	Kurtosis	Standard Error	Corrected Item-Total Correlation	Cronbach's Alpha if item deleted
K1	0.94	0.23	-3.585	0.233	11.058	0.461	0.211	0.688
K2	0.88	0.33	-2.366	0.233	3.667	0.461	0.350	0.664
K3	0.89	0.32	-2.510	0.233	4.380	0.461	0.215	0.679
K4	0.59	0.49	-0.382	0.233	-1.889	0.461	0.546	0.625
K5	0.92	0.28	-3.058	0.233	7.488	0.461	0.200	0.684
K6	0.59	0.49	-0.382	0.233	-1.889	0.461	0.557	0.623
K7	0.93	0.26	-3.299	0.233	9.049	0.461	0.143	0.702
K8	0.89	0.32	-2.510	0.233	4.380	0.461	0.242	0.676
K9	0.78	0.42	-1.355	0.233	-0.167	0.461	0.379	0.657
K10	0.69	0.47	-0.809	0.233	-1.372	0.461	0.367	0.659
K11	0.91	0.29	-2.851	0.233	6.242	0.461	0.202	0.680
K12	0.81	0.40	-1.566	0.233	0.460	0.461	0.290	0.671
K13	0.63	0.49	-0.544	0.233	-1.736	0.461	0.476	0.639
K14	0.89	0.32	-2.510	0.233	4.380	0.461	0.107	0.691

Table 7: The overall mean score, standard deviation and Cronbach Alpha for each item in Attitude domain of AmKAC

Question	Mean	Standard Deviation	Skewness	Standard Error	Kurtosis	Standard Error	Corrected Item-Total Correlation	Cronbach's Alpha if item deleted
A1	4.26	0.86	-2.068	0.233	5.967	0.461	0.505	0.610
A2	4.31	0.76	-1.785	0.233	5.734	0.461	0.613	0.600
A3	2.59	1.12	0.234	0.233	-1.334	0.461	0.200	0.678
A4	4.00	0.95	-0.908	0.233	0.642	0.461	0.600	0.590
A5	4.40	0.78	-1.600	0.233	3.591	0.461	0.633	0.596
A6	3.23	0.98	-0.121	0.233	-0.381	0.461	0.329	0.634
A7	3.42	1.02	-0.752	0.233	-0.473	0.461	0.249	0.648
A8	2.73	1.06	0.037	0.233	-0.705	0.461	0.235	0.662
A9	4.00	0.93	-1.397	0.233	2.202	0.461	0.280	0.648
A10	2.74	1.25	0.184	0.233	-0.981	0.461	0.068	0.703
A11	3.91	0.92	-1.234	0.233	1.496	0.461	0.406	0.623
A12	3.91	0.97	-1.367	0.233	1.832	0.461	0.210	0.653
A13	3.92	0.92	-1.086	0.233	1.218	0.461	0.256	0.660

Table 8: The overall mean score, standard deviation and Cronbach Alpha for each item in Confidence domain of AmKAC

Question	Mean	Standard Deviation	Skewness	Standard Error	Kurtosis	Standard Error	Corrected Item-Total Correlation	Cronbach's Alpha if item deleted
C1	3.50	0.88	-0.251	0.233	-0.281	0.461	0.697	0.893
C2	3.64	0.84	-0.792	0.233	1.393	0.461	0.730	0.891
C3	3.08	1.00	-0.632	0.233	-0.635	0.461	0.575	0.902
C4	3.24	0.86	-0.401	0.233	-0.523	0.461	0.707	0.892
C5	3.06	0.86	-0.197	0.233	-0.991	0.461	0.649	0.896
C6	3.87	0.88	-1.355	0.233	2.376	0.461	0.700	0.893
C7	3.56	0.92	-0.679	0.233	0.678	0.461	0.721	0.891
C8	2.87	0.70	-0.824	0.233	1.295	0.461	0.641	0.897
C9	3.06	0.88	-0.212	0.233	0.515	0.461	0.647	0.896
C10	2.87	0.83	-0.246	0.233	0.384	0.461	0.570	0.901

tions that were relating to the rate and depth of chest compression as well as regarding compulsory pulse check before performing cardiopulmonary resuscitation, less than 30 % of the participant answered correctly which was similar to a study conducted by Majid et al, in which nearly two thirds of the participants wrongly identified the correct rate. Likewise, Olajumoke et al. conducted a study to explore the knowledge and attitude regarding cardiopulmonary resuscitation among medical practitioners that demonstrated inadequate knowledge and incompetency in performing cardiopulmonary resuscitation with only 24 (36.9%) of the participants scored above average in answering questions related to cardiopulmonary resuscitation. Other studies also revealed insufficient knowledge among medical field related personnel. The insufficient knowledge could be due to lacking in structured training of Basic Life Support/cardiopulmonary resuscitation, lack of regular involvement in resuscitation or limited attendance in cardiopulmonary resuscitation training programmes.

Multiple efforts have been made to improve cardiopulmonary resuscitation skills and knowledge, and yet it showed little improvement in skills and knowledge retention. Interestingly, there is a theory of reasoned action that is used to explain human behavior Behaviour is usually under one's control and intention. Attitude is one of the behavioural intentions. In order to perform cardiopulmonary resuscitation on out of hospital cardiac arrest victims, firstly one must be trained. Secondly, the person who have underwent the training must be willing to use their skills in addition to able to recall correctly of what have been learnt to perform the cardiopulmonary resuscitation effectively. A positive attitude will affect CPR skill acquisition and retention. For instance, if one thinks that cardiopulmonary resuscitation will improve the patient's chance of survival, there is no hesitancy in initiating cardiopulmonary resuscitation thus resulting in the skill being performed in addition to being reinforced. In our case, the study has demonstrated a good attitude among the ambulance drivers, and therefore, it is a good start to allow planning of interventions to improve cardiopulmonary resuscitation skills. A similar finding was demonstrated in the studies conducted by Saquib et al. and Shrestha, Batajoo, Piryani, & Mw that showed positive results despite lacking in knowledge. Besides that, our study revealed insufficient confidence particularly in performing defibrillation, which was also displayed in a study conducted at a hospital in Southern Finland that was conducted to explore regarding attitudes of the nurses towards cardiopulmonary resuscitation with defibrillation.

A study conducted by Dyson et al. reported the patient survival will decrease when paramedics had not treated out of hospital cardiac arrest for more than 6 months. This period is concordant to the time of skill deterioration of Advanced Life Support skills (6-12months) after training. Nearly half of the participants in our study, 53, 49.1% had not performed cardiopulmonary resuscitation for the past 6 months. Unfortunately, resuscitation skills will reduce as time passes. Hence, the out of hospital cardiac arrest treatment will fall below the recommended standard. Thus, it is critical to organize more regular refresher course sustain optimum resuscitation skills in order to maximize cardiac

arrest victim survival rate.

Attitude and confidence items have displayed good reliability. Cronbach's alpha coefficient value of 0.7 or greater is considered acceptable to measure the reliability of the knowledge items. However, there are multiple studies that were conducted regarding knowledge showed Cronbach's alpha value ranging from 0.50 to 0.80 (Deniz and Alsaffar, 2013). The study revealed Cronbach's alpha value of 0.685, which is acceptable in view of ambulance drivers come from various educational backgrounds from secondary to tertiary level. Furthermore, the questionnaires were translated to the Malay language due to a similar reason.

There were two items from knowledge domain, item K7 which asked regarding checking victim's responsiveness by tapping gently on the shoulder and call loudly and item K14 which asked regarding defibrillation/shock is indicated in asystole and one item from attitude domain the A10 item (Are you willing to perform cardiopulmonary resuscitation on healthy 80 years old victim) displayed low item-total correlation, Therefore the items can be discarded to improve the internal consistency of the scale.

There is a limited number of ambulance drivers in each of the hospitals. However, they are managed under the same standard of the procedure, and thus, the sampling taken can represent the other drivers in other states. Besides that, the duration between the test and retest was quite short, which might cause bias due to learning effect attributable to time constraint. To the best of our knowledge, this is the first study that was conducted to assess knowledge, attitude and confidence regarding cardiopulmonary resuscitation among ambulance drivers. Future study may be recommended to be conducted involving larger sample population to further evaluate and explore our current findings.

CONCLUSION

AmKAC questionnaire has now been proven to be valid and reliable and is available in both English and Malay Language. Future studies can be done involving a larger population of ambulance drivers from all over the states in Malaysia. It is hoped that the questionnaire may benefit in future in order to develop a well-planned and sustainable training program with periodical reinforcements and refresher courses as early quality cardiopulmonary resuscitation will improve the survival rate in cardiac arrest victims.

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