DEVELOPMENT AND VALIDATION OF QUESTIONNAIRE FOR KNOWLEDGE, ATTITUDES AND SELF-EFFICACY ON ADULT CARDIOPULMONARY RESUSCITATION AMONG HEALTHCARE PROVIDERS

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Abstract

Cardiac arrest was Malaysia's highest cause of death for over two decades. All healthcare providers should be prepared to perform resuscitation, especially in an out-of-hospital setting. This research aimed to develop and validate a questionnaire to assess knowledge, attitudes, and self-efficacy on adult cardiopulmonary resuscitation (CPR), known as the KAECPR questionnaire among healthcare providers, focusing on Assistant Medical Officers (AMOs), nurses, and midwives in an out-of-hospital setting. Sixty-one items were initially developed according to the latest Basic Life Support (BLS) guidelines and experts' consensus involving four sections: demographic data and three domains on knowledge, attitudes, and self-efficacy towards adult CPR. This questionnaire was assessed regarding content validity, face validity, and internal consistency reliability. The average of content validity index at scale level (S-CVI/Ave) and universal agreement of content validity index at scale level (S-CVI/UA) showed over 0.80 for all domains. For average index of face validity (S-FVI/Ave) and universal agreement index of face validity at scale level (S-FVI/UA) also showed more than 0.80, indicating that the items scale was clear, relevant, and understandable. All three domains showed Cronbach's alpha values of over 0.70, indicating it was a reliable instrument. This study demonstrated that the newly developed questionnaire had achieved acceptable content validity, face validity, and internal consistency reliability. Therefore, this instrument can be used to evaluate the knowledge, attitudes, and self-efficacy of AMOs, nurses, and midwives in Malaysia regarding out-of-hospital adult CPR. The questionnaire is recommended to be used with existing life support courses in Malaysia to enhance learning and concept-grasping among healthcare providers.

Keywords: Attitudes, Cardiopulmonary Resuscitation, Knowledge, Questionnaire, Self-Efficacy, Validation

Introduction

In 2020, 18 515 Malaysian deaths were caused by ischaemic heart disease among the population over 41. It is the top cause of death in 92 administrative districts in Malaysia (1). The prevalence of ischaemic heart disease increases yearly in Malaysia's urban and rural areas, with 15.2% cases in 2020, 17.2% in 2021 in urban areas and 14.5% in the year 2020 to 16.5% in 2021 in rural areas (1). Most cardiac arrest events are caused by ischaemic heart diseases, causing death if not treated immediately (2).

An earlier study from the Pan Asian Resuscitation Outcomes Study at three regions in Malaysia, namely the

Klang Valley (comprised of the state of Kuala Lumpur and various cities of Selangor), Kota Bharu in Kelantan and Penang, found a total of 389 out-of-hospital cardiac arrests (OHCA) from which only 22.6% CPR started by a bystander, only 8% survived hospital admission, and 0.5% survived to discharge (3). Meanwhile, in another study, out of 285 cardiac arrest cases recorded by the Kuala Lumpur Medical Emergency Coordinating Centre in 2011, the survival rate was 16.8% (4). In another study in Hospital Tuanku Mukhriz, out of 82 OHCA cases, 52% received bystander CPR, 12.2% survived admission, and only one patient survived to discharge (5).

In lieu of the increased prevalence of cardiac arrest each year in Malaysia, healthcare providers must always be ready to perform adequate resuscitation, especially those who work in out-of-hospital settings. Early chest compression, optimising ventilation and early defibrillation, as necessary, are the latest management for cardiac arrest in adults (6). Adequate knowledge, training, and experience in CPR increase awareness and self-efficacy in learning and performing CPR (7-10). Unfortunately, CPR skills easily deteriorate if it is not performed regularly. A study showed that CPR skills decline three months after certification (11, 12). Healthcare providers not often exposed to situations that necessitate them to perform CPR, especially those who work for a long time in remote facilities, will affect their adult CPR performance (7, 13).

Therefore, it is crucial to assess knowledge, attitudes, and self-efficacy regarding adult CPR among healthcare providers using a specific, valid, and reliable questionnaire. This study focuses on developing knowledge of adult CPR, attitudes towards CPR training and practices, and self-efficacy on adult CPR steps and procedures targeting AMOs, nurses, and midwives working in public health facilities. This instrument is known as KAECPR.

To the best of our knowledge, local research or a validated tool has yet to be established to investigate the knowledge, attitudes, and self-efficacy of adult CPR in the Malaysian population, specifically healthcare providers. The present study objectives to develop and determine the psychometric properties of the questionnaire on knowledge, attitudes, and self-efficacy toward adult CPR. This validated survey tool may be incorporated into future adult cardiac resuscitation training, enhancing provider training and hopefully producing better and longer-lasting knowledge in adult CPR.

Materials and Methods

Setting and procedure

This study consisted of two phases; Phase I: Development, content and face validation of KAECPR, and Phase II: Pilot study of KAECPR. Phase 1 of this study was conducted between early November 2022 till mid-December 2022. The content validation process involved ten experts panel to review the content of the items. Later, face validity was assessed by ten raters who were purposively selected from the target population to justify the clarity and comprehension of the constructed questionnaire. Data collection for the Phase 2 study was implemented from mid-December 2022 to the end of December 2022. This pilot test was carried out to evaluate the internal consistency of finalised items.

Ethical clearance

Ethical approval was acquired by the Medical Research Ethics Committee of the Ministry of Health, Malaysia and registered through the National Medical Research Registry (NMRR ID-22-02022-KGV (IIR)). This study also was approved by Sabah Health Department (JKN(SB)100-6/1/61(113)) and UiTM Research Ethics Committee (REC/03/2023 (PG/MR/103)).

Phase I: Development, content validation, and face validation of the KAECPR

The KAECPR was developed to assess three main domains: knowledge, attitudes, and self-efficacy regarding adult CPR. This questionnaire was developed based on the extensive literature search and experts' review. Furthermore, they were also developed by referring to the latest guidelines for adult CPR from the Advanced Life Support Guidelines, 2020 and Basic Life Support Training Manual for Healthcare Workers (14, 15). The questionnaire was designed using the Malay language for better understanding and outcomes from the respondents involved in this study.

There are four sections in the questionnaire. The first section consists of demographic questions. The other three sections regard knowledge of the latest adult CPR guidelines, attitudes on CPR training and practices, and self-efficacy on adult CPR steps and procedures. The questionnaire initially comprised 61 items: ten items for demographic data and 51 items representing the three domains of knowledge, attitudes, and self-efficacy.

The first domain was developed to test the knowledge about the latest CPR guidelines, consisting of 15 true or false questions. A true answer will be scored one, and a wrong answer will be scored zero. On the other hand, the second domain encompasses ten items intended to evaluate the respondents' attitudes toward adult CPR training and practices among healthcare providers. The items in this domain are rated on a 5-point Likert scale which ranged from '1' for strongly disagree to '5' for strongly agree. Meanwhile, the third domain assessing respondents' self-efficacy on CPR steps and procedures. Self-efficacy domain consists of 26 items using a 10-point Likert Scale ranging from '0' for unable to perform to '10' for very confident of performing.

Ten experts revised the questionnaire to ascertain the content validity. Experts are defined as healthcare providers with the postgraduate specialist training program such as emergency physicians, family medicine specialists, BLS instructors, and lecturers. The items were assessed for the key content validity aspects, including clarity, relevance, representation, appropriate language, and grammar.

Subsequently, the questionnaire was administered to ten AMOs, nurses, and midwives from various departments in public health settings, including the health clinic, rural clinic, and community clinic, to check respondents' understanding of items, appropriateness of grammar and language, clarity, and readability.

This study's minimum number of experts and raters is sufficient (16, 17). They were encouraged to suggest their opinion in the suggestion section in the content and face validity study form. This was performed to reduce the researchers' bias and ensure the domains defined by researchers match the respondent's perspectives.

Phase II: Pilot study

A cross-sectional study was applied after considering the experts' and raters' suggestions and corrections on the questionnaire. The KAECPR questionnaire was administered to 42 respondents among AMOs, nurses, and midwives recruited for a pilot test. The number of respondents who participated in the pilot study was calculated using Sample Size Calculator to estimate Cronbach's alpha coefficient (18). The questionnaire was distributed to all potential respondents using Google Forms via the researcher's self-approach through e-mail and social media. The inclusion criteria for the selection of the respondents were: (i) Must be AMOs, nurses, and midwives from out-of-hospital settings, (ii) Have attended BLS, (iii) Understand the Malay language. The exclusion criterion was for respondents who were unwilling to involve in the pilot test.

Data analysis

For Phase I, the content validity and face validity indexes were computed based on the guidelines of Yusoff (16) and Yusoff (17). There are four relevancy and clarity scales for content and face validity study. In the content validity study, all experts must respond to a scale of '1' for 'the item needs to be more relevant and clearer' and a scale of '4' for 'the item is highly relevant and clear'. Meanwhile, for the face validity study, each rater was required to rate the item on a 4-point scale (1 = for the item is not clear and not understandable, 4 = the item is very clear and very understandable). Each response was recorded as 1 (for responses 3 and 4) and 0 (for responses 1 and 2) for the calculation of item validity and scale validity indexes. All remarks given by the expert panel and the raters were highlighted and taken into deliberation to produce the finalised version of the KAECPR.

In content and face validity study, there are two forms of validity index, for content validity index (CVI) and face validity index (FVI), which are item validity index or I-CVI and I-FVI and scale validity (S-CVI and S-FVI). The calculation method for these two forms of validity index was similar. To calculate I-CVI or I-FVI, the number of experts or raters that have re-categorised their rating with "1" must be divided by the total number of experts or raters. There are two methods to calculate the validity index at scale level (S-CVI and S-FVI). First, the average of I-CVI or I-FVI scores for all items on the domain will determine the scale validity averaging index (S-CVI/Ave or S-FVI/Ave). Second, the universal agreement index (S-CVI/UA or S-FVI/UA) is calculated as the proportion of items on the domain that attain a scale of 3 or 4 (recorded as 1) by all experts or raters.

The value of at least 0.78 is considered an acceptable cut-off score of CVI with at least nine experts. Meanwhile, the value of 0.83 has been considered as an acceptable value for FVI (16, 19). In Phase II of this study, the data obtained were computed using IBM Statistical Package for Social Science (SPSS) version 28.0 software to run a reliability analysis. The Cronbach's alpha value was computed for three domains, and a value exceeding 0.70 was considered to indicate acceptable internal consistency reliability for medical study (20).

Results

Content validity

Out of 51 items in the knowledge, attitudes, and self-efficacy domains, only 44 items showed I-CVI value of 1. Findings from content validation of this study showed scale-level CVI of more than 0.80, with the average index (S-CVI/Ave) of 0.99 for the knowledge domain, and 0.98 for the attitudes and self-efficacy domains respectively. The average universal agreement (S-CVI/UA) for the knowledge domain was 0.93, the attitudes domain was 0.80, and the self-efficacy domain was 0.85. Therefore, all the values in I-CVI and S-CVI exceeded the acceptable content validity value. Hence, the questionnaire is sufficient given experts to clarify the item's relevance.

Most experts commented on phrase structure and suggested adjustments to the facts to avoid confusion among the respondents. The experts were also suggesting to void 1 item from the knowledge domain and six items in the self-efficacy domain due to its relevance to be put in the CPR-only assessment. The relevance and clarity rating on all items by ten experts and a summary of CVI are revealed in Table 1.

Face validity

After considering the suggestion to remove seven items and to restructure phrases in some items from the content validity study, there were 44 items involved in the face validity study. Face validation on the KAECPR questionnaire has resulted in 39 items achieving the I-FVI value of 1. For S-FVI/Ave, the average of I-FVI for the knowledge and self-efficacy domains was 0.99 respectively, and for the attitude's domain was 0.98. Meanwhile, the universal agreement index (S-FVI/UA) of 0.80 was achieved for the three domains. The KAECPR tool has attained an acceptable level of face validity. The raters suggested minor adjustments, but no item was removed. Table 2 shows the summary of the calculation of I-FVI and S-FVI.

Table 1: Rating on the item scale by ten experts and content validity index

Domain	Item	Expert										Experts in agreement (n=10)	I-CVI	UA
		1	2	3	4	5	6	7	8	9	10			
Knowledge	K1	1	1	1	1	1	1	1	1	1	1	10	1	1
	K2	1	1	1	1	1	1	1	1	1	1	10	1	1
	K3	1	1	1	1	1	1	1	1	1	1	10	1	1
	K4	1	1	1	1	1	1	1	1	1	1	10	1	1
	K5	1	1	1	1	1	1	1	1	1	1	10	1	1
	K6	1	1	1	1	1	1	1	1	1	1	10	1	1
	K7	1	1	1	1	1	1	1	1	1	1	10	1	1
	K8	1	1	1	1	1	1	1	1	1	1	10	1	1
	K9	1	1	1	1	1	1	1	1	1	1	10	1	1
	K10	1	1	1	1	1	1	1	1	1	1	10	1	1
	K11	1	1	1	1	1	1	1	1	1	1	10	1	1
	K12*	1	1	1	1	1	1	1	1	1	0	9	0.9	0
	K13	1	1	1	1	1	1	1	1	1	1	10	1	1
	K14	1	1	1	1	1	1	1	1	1	1	10	1	1
	K15	1	1	1	1	1	1	1	1	1	1	10	1	1
Proportion clarity and relevance		1	1	1	1	1	1	1	1	1	0.93		S-CVI/Ave = 0.99	S-CVI/UA = 0.93
Attitudes	A1	1	1	1	1	1	1	1	1	1	1	10	1	1
	A2	1	1	1	1	1	1	1	1	1	1	10	1	1
	A3	1	1	1	1	1	1	1	1	1	1	10	1	1
	A4	1	1	1	1	1	1	1	1	1	1	10	1	1
	A5	1	1	1	1	1	1	1	1	1	1	10	1	1
	A6	1	1	1	1	1	1	1	1	1	1	10	1	1
	A7	1	1	1	1	1	1	1	1	1	1	10	1	1
	A8	1	1	1	1	1	1	1	0	1	1	9	0.9	0
	A9	1	1	1	1	1	1	1	0	1	1	9	0.9	0
	A10	1	1	1	1	1	1	1	1	1	1	10	1	1
Proportion clarity and relevance		1	1	1	1	1	1	1	0.8	1	1		S-CVI/Ave = 0.98	S-CVI/UA = 0.80
Self-efficacy	S1	1	1	1	1	1	1	1	1	1	1	10	1	1
	S2	1	1	1	1	1	1	1	1	1	1	10	1	1
	S3	1	1	1	1	1	1	1	1	1	1	10	1	1
	S4*	1	1	1	1	1	0	0	1	1	1	8	0.8	0
	S5	1	1	1	1	1	1	1	1	1	1	10	1	1
	S6*	1	1	1	1	1	1	1	1	1	1	10	1	1
	S7	1	1	1	1	1	1	1	1	1	1	10	1	1
	S8	1	1	1	1	1	1	1	1	1	1	10	1	1
	S9	1	1	1	1	1	1	1	1	1	1	10	1	1
	S10	1	1	1	1	1	1	1	1	1	1	10	1	1
	S11	1	1	1	1	1	1	1	1	1	1	10	1	1
	S12	1	1	1	1	1	1	1	1	1	1	10	1	1
	S13*	1	1	1	1	1	1	0	1	1	1	9	0.9	0
	S14	1	1	1	1	1	1	1	1	1	1	10	1	1
	S15	1	1	1	1	1	1	1	1	1	1	10	1	1
	S16	1	1	1	1	1	1	1	1	1	1	10	1	1
	S17*	1	1	1	1	1	1	1	1	1	1	10	1	1
	S18	1	1	1	1	1	1	1	1	1	1	10	1	1
	S19	1	1	1	1	1	1	1	1	1	1	10	1	1
	S20	1	1	1	1	1	1	1	1	1	1	10	1	1
	S21	1	1	1	1	1	1	1	1	1	1	10	1	1
	S22	1	1	1	1	1	1	1	1	1	1	10	1	1
	S23	1	1	1	1	1	1	1	1	1	1	10	1	1
	S24*	1	1	1	1	1	1	0	1	1	1	9	0.9	0
	S25*	1	1	1	1	1	1	0	1	1	1	9	0.9	0
	S26	1	1	1	1	1	1	1	1	1	1	10	1	1
Proportion clarity and relevance		1	1	1	1	1	0.96	0.85	1	1	1		S-CVI/Ave = 0.98	S-CVI/UA = 0.85

*Items K12, S4, S6, S13, S17, S24 and S25 were removed after content validation

Table 2: Rating on the item scale by ten raters and face validity index

Domain	Item	Rater										Raters in agreement (n=10)	I-FVI	UA
		1	2	3	4	5	6	7	8	9	10			
Knowledge	K1	1	1	1	1	1	1	1	1	1	1	10	1	1
	K2	1	1	1	1	1	1	1	1	1	1	10	1	1
	K3	1	1	1	1	1	1	1	1	1	1	10	1	1
	K4	1	1	1	1	1	1	1	1	1	1	10	1	1
	K5	1	1	1	1	1	1	1	1	1	1	10	1	1
	K6	1	1	1	1	1	1	1	1	1	1	10	1	1
	K7	1	1	1	0	1	1	1	1	1	1	9	0.9	0
	K8	1	1	1	1	1	1	1	1	1	1	10	1	1
	K9	1	1	1	1	1	1	1	1	1	1	10	1	1
	K10	1	1	1	0	1	1	1	1	1	1	10	1	1
	K11	1	1	1	1	1	1	1	1	1	1	10	1	1
	K12	1	1	1	1	1	1	1	1	1	1	10	1	1
	K13	1	1	1	1	1	1	1	1	1	1	10	1	1
	K14	1	1	1	1	0	1	1	1	1	1	9	0.9	0
Proportion clarity and comprehension		1	1	1	0.86	0.93	1	1	1	1	1		S-FVI/Ave = 0.99	S-FVI/UA = 0.86
Attitudes	A1	1	1	1	1	1	1	1	1	1	1	10	1	1
	A2	1	1	1	1	1	1	1	1	1	1	10	1	1
	A3	1	1	1	1	1	1	1	1	1	1	10	1	1
	A4	1	1	1	1	1	1	1	1	1	1	10	1	1
	A5	1	1	1	1	1	1	1	1	1	1	10	1	1
	A6	1	1	1	1	1	1	1	1	1	1	10	1	1
	A7	1	1	1	1	1	1	0	0	1	1	8	0.8	0
	A8	1	1	1	1	1	1	1	1	1	1	10	1	1
	A9	1	1	1	1	1	1	1	1	1	1	10	1	1
	A10	1	1	1	1	1	1	1	1	1	1	10	1	1
Proportion clarity and comprehension		1	1	1	1	1	1	0.9	0.9	1	1		S-FVI/Ave = 0.98	S-FVI/UA = 0.90
Self-efficacy	S1	1	1	1	1	1	1	0	1	1	1	9	0.9	0
	S2	1	1	1	1	1	1	0	1	1	1	9	0.9	0
	S3	1	1	1	1	1	1	0	1	1	1	9	0.9	0
	S4	1	1	1	1	1	1	1	1	1	1	10	1	1
	S5	1	1	1	1	1	1	1	1	1	1	10	1	1
	S6	1	1	1	1	1	1	1	1	1	1	10	1	1
	S7	1	1	1	1	1	1	1	1	1	1	10	1	1
	S8	1	1	1	1	1	1	1	1	1	1	10	1	1
	S9	1	1	1	1	1	1	1	1	1	1	10	1	1
	S10	1	1	1	1	1	1	1	1	1	1	10	1	1
	S11	1	1	1	1	1	1	1	1	1	1	10	1	1
	S12	1	1	1	1	1	1	1	1	1	1	10	1	1
	S13	1	1	1	1	1	1	1	1	1	1	10	1	1
	S14	1	1	1	1	1	1	1	1	1	1	10	1	1
	S15	1	1	1	1	1	1	1	1	1	1	10	1	1
	S16	1	1	1	1	1	1	1	1	1	1	10	1	1
	S17	1	1	1	1	1	1	1	1	1	1	10	1	1
	S18	1	1	1	1	1	1	1	1	1	1	10	1	1
	S19	1	1	1	1	1	1	1	1	1	1	10	1	1
	S20	1	1	1	1	1	1	1	1	1	1	10	1	1
Proportion clarity and comprehension		1	1	1	1	1	1	0.85	1	1	1		S-FVI/Ave = 0.99	S-FVI/UA = 0.85

Pilot study

After the face validity study and considering the suggestion from the raters, a total of 44 items comprised of 14 items from the knowledge domain, ten items from the attitude's domain, and 20 items from the self-efficacy domain were tested among 42 healthcare providers. Table 3 presents the demographic profile of the respondents involved in the pilot test. The Cronbach's alpha coefficients showed values of 0.806, 0.809, and 0.969 for knowledge, attitudes, and self-efficacy respectively. A summary of Cronbach's alpha values is demonstrated in Table 4.

Table 3: Demographic characteristics of pilot study respondents (n = 42)

Variables	n (%)
Age (years), mean (SD)	32.29 (6.51)
Gender	
Male	24 (57.1)
Female	18 (42.9)
Year of services	
1-10 years	29 (69.0)
11-20 years	10 (23.8)
21-30 years	3 (7.1)
Occupation	
Assistant Medical Officer	31 (73.8)
Nurse	7 (16.7)
Midwife	4 (9.5)
Place of work	
Health Clinic	28 (66.7)
Health Office	3 (7.1)
Rural clinic	1 (2.4)
Community clinic	1 (2.4)
Others	9 (21.4)
Education	
Certificate	3 (7.1)
Diploma/advanced diploma	27 (64.3)
Bachelor degree	11 (26.2)
Masters/PhD	1 (2.4)
Total of cardiac arrest events attended in the past 12 months	
No case	15 (35.7)
1-4 cases	18 (42.9)
5-10 cases	5 (11.9)
11-14 cases	0 (0)
15-19 cases	1 (2.4)
More than 20 cases	0 (0)
Attending BLS	
Yes	40 (95.2)
No	2 (4.8)
Years of attending BLS	
Never attended	2 (4.8)
Before 2020	16 (38.1)
After 2020	24 (57.1)
Numbers of BLS attended upon years of services	
Never attended	2 (4.8)
1-5 times	38 (90.5)
6-10 times	2 (4.8)

Table 3: Demographic characteristics of pilot study respondents (n = 42) (continued)

Variables	n (%)
Have you performed CPR for the past 12 months?	21 (50)
Yes	21 (50)
No	
Experience in the Emergency and Trauma Department or Intensive Care Unit?	31 (73.8)
Yes	11 (26.2)
No	

Table 4: Cronbach's alpha value for each domain

Domain	Number of item	Cronbach's alpha
Knowledge	14	0.806
Attitudes	10	0.809
Self-efficacy	20	0.969

Discussion

This research is a pioneer project to develop and validate the questionnaire related to the knowledge, attitudes, and self-efficacy of adult CPR among healthcare providers, namely the KAECPR questionnaire. This present work demonstrates the initial creation, validity, and reliability of the KAECPR questionnaire for measuring the level of knowledge, attitudes, and self-efficacy regarding adult CPR in the Malay-speaking population. This questionnaire will provide better insights into healthcare providers' understanding of the latest adult CPR guidelines, attitudes toward CPR practice and training, and concerns about the level of self-efficacy toward steps and procedures in adult CPR.

The questionnaire covers three constructs: knowledge (cognitive), attitudes, and self-efficacy according to the latest guidelines of adult CPR and literature review (14, 15). This questionnaire's development was also guided by the self-efficacy theory introduced by Bandura, A (21). elf-efficacy theory best describes the healthcare providers' ability to perform adult CPR on patients experiencing cardiac arrest. Self-efficacy could be improved by previous successful attempts and witnessing role models or peers' successful performance in a safe and encouraging learning environment (22). In the beginning, 15 items of knowledge on the latest adult CPR guidelines, ten items on attitudes toward CPR practice and training, and 26 items on self-efficacy steps and procedures are formed. To make sure the validity and reliability of the instrument, the questionnaire items were developed through two phases: content and face validation, followed by a pilot test.

Ten experts were involved in the content validity study, assessing the developed item's accuracy, appropriateness, and quality (23). The number of experts in this study is based on a previous study that stated that ten experts

are ideal (16). The experts provided recommendations on each item for relevance, representativeness, and clarity. The questionnaire's item content has been improved to ensure it is free from potential ambiguities. Some experts recommended excluding one item from the knowledge domain and six items in the self-efficacy domain due to the non-relevance of the items. The questionnaire developed supposedly assessed only the adult CPR steps and procedures instead of advanced intervention in resuscitation. Based on this study's findings, the CVI values for knowledge, attitudes, and self-efficacy domains exceeded the acceptable cut-off value of 0.78 (16), indicating that the contents of the KAECPR questionnaire were relevant and clear to reflect knowledge, attitudes, and self-efficacy on adult CPR.

In the next step, the face validity study was done among ten raters from the target population to assess respondents' comprehension of the questionnaire. The responses collected from the respondents will help to improve the appropriateness of grammar and language, clarity, and readability of the questionnaire. An average FVI over 0.90 was obtained for the three domains, which exceeded the acceptable value of 0.83 (19). During the face validity, none of the items was removed from the questionnaire because all items received more than 0.80 values of I-FVI. However, some items were rephrased for better understanding among respondents. This result indicated the appropriateness of the questionnaire utilisation among the AMOs, nurses, and midwives.

The present study demonstrated that the knowledge, attitudes, and self-efficacy scales had attained an acceptable level of internal consistency reliability with Cronbach's alpha values of greater than 0.70 (20). It is suggested that the Cronbach's alpha coefficient of equal or more than 0.80 is considered to be moderately high and high internal consistency reliability (24). The findings of this study suggested that knowledge, attitudes, and self-efficacy constructs had high internal structural stability. Were validated and reliable to be applied. Therefore, the questionnaire is reliable in assessing the knowledge, attitudes, and self-efficacy regarding adult CPR among healthcare providers in out-of-hospital settings.

A major limitation of this study was that there is no other study related to developing knowledge, attitudes, and self-efficacy in adult CPR for healthcare providers. Hence, there is no reference to the knowledge, attitudes, and self-efficacy baseline, specifically among AMOs, nurses, and midwives in Malaysia. In addition, this study was only focusing on assessing the knowledge, attitudes, and self-efficacy regarding adult CPR steps and procedures. The outcomes might differ if other cardiac arrest interventions involve other populations, such as children, infants, and neonates. We are optimistic that there will be an assessment tool to assess children, infants, and neonatal resuscitation knowledge, attitudes, and self-efficacy in cardiac arrest events, specifically involving healthcare providers in out-of-hospital settings in Malaysia.

Conclusion

The current study concluded that the newly developed KAECPR questionnaire with 44 items and three domains had achieved acceptable content validity, face validity, and high internal consistency reliability. Therefore, it is a valid and reliable instrument to evaluate knowledge, attitudes, and self-efficacy on adult CPR among healthcare providers in out-of-hospital settings, especially for the Malay-speaking population in ASEAN countries.

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Competing Interests

We declared that we had no competing interests while conducting this study.

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