



Improving Outcomes from Pre-hospital and Emergency Care across the Asia-Pacific

STUDY PROPOSAL REQUEST FORM

Please complete the form and email to PAROS secretariat at patricia.tay@scri.cris.sg by the stipulated date. You will be notified in due time on whether your study has been accepted for presentation.

Reminder: Please check the list of existing proposals and publications from <http://www.scri.edu.sg/crn/pan-asian-resuscitation-outcomes-study-paros-clinical-research-network-crn/paros-publications/> to avoid duplications of proposals. Abstract and manuscript must be sent to PAROS chairs for approval before submission for presentation/publication.

1. BASIC INFORMATION		
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2. TYPE OF REQUEST (Please select one)		
<input type="checkbox"/> New Study Proposal (initial)	<input checked="" type="checkbox"/> Secondary Analyses	<input type="checkbox"/> Explanatory Analyses
3. STUDY TITLE		
THE PROVISION OF BYSTANDER CARDIOPULMONARY RESUSCITATION FOR OUT-OF-HOSPITAL CARDIAC ARREST IN VIETNAM: IMPACT ON OUTCOMES		
4. ABSTRACT OF STUDY PROPOSAL		
<p>In no more than 350 words, describe the study under the given headings below.</p> <p>Out-of-hospital cardiac arrest (OHCA) is a prominent cause of death and disability worldwide,(1-4) accounting for up to 10% of overall mortality in low- and middle-income countries (LMICs).(5-7) Outside of a medical context, OHCA is characterized as a loss of functional heart mechanical activity in association with a lack of systemic circulation.(8, 9) The precise worldwide impact of OHCA on public health is unknown since a significant percentage of patients are not addressed by emergency medical services (EMS), and substantial disparities in both reporting systems and survival rates exist across various areas, countries, and continents.(5, 10-13) Asia-Pacific countries have underdeveloped and widely varying EMS systems.(14) Survival rates for OHCA differ enormously across Asia, and these variations may be a consequence of modifications in the EMS system and patients.(12) These differences suggest that survival outcomes for OHCA can be improved in many countries by interventions to enhance EMS systems,(15) such as increasing bystander cardiopulmonary resuscitation (CPR) through community-based CPR training programs,(16) increasing availability of public access defibrillators,(17) and improving post-resuscitation care.(18) Patients with OHCA in low- and middle-income countries (LMICs) are considerably less likely to obtain bystander CPR than those in high-income nations (HICs).(12) Furthermore, in areas with underdeveloped EMS infrastructures, extremely ill or injured patients are frequently transported to hospitals by non-EMS vehicles.(19-22) Vietnam is an LMIC, with a population of 96.462 million people; ranking 15th in the world and third in Southeast Asia, and still struggles with a lack of development in prehospital services.(19, 20, 23, 24) The Vietnamese government implemented a countrywide strategy for the EMS system in 2008; nonetheless, only a few localities, such as urban areas, have a working EMS system. In addition, the availability of ambulances, qualified and authorized medical personnel, and life-saving equipment is restricted. Medical control and frequent monitoring of quality indicators are also uncommon.(23) Prehospital treatment is typically left to bystanders, and the injured or sick individual is usually taken immediately to the next vehicle large enough to handle him or her; bystander CPR is also frequently not performed.(19-21) As a result, patients with</p>		

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life-threatening diseases or injuries are frequently denied basic life support (BLS) and advanced life support (ALS) services until they arrive at the hospital.(19-21, 25) Understanding the present state of bystander CPR and how it affects the outcomes of patients with OHCA locally is critical for increasing survival in Vietnam and other countries where clinical practice is hampered by inadequate medical resources.

OBJECTIVES

To investigate the factors associated with survival after OHCA and to compare the survival rates of non-matched and matched OHCA cohorts who received bystander CPR and those who did not receive bystander CPR in Vietnam.

METHODOLOGY *(To include sample size, settings, inclusion & exclusion criteria, etc. For secondary & explanatory Study design and setting*

This multicenter prospective observational study is part of the Pan-Asian Resuscitation Outcomes Study (PAROS), Clinical Research Network, which collects data on patients with OHCA admitted to hospital emergency departments (EDs) in countries across Asia.(19, 20, 26, 27) In this study, we used only data for Vietnam. The hospitals in Vietnam participating in the PAROS study are three public sector tertiary hospitals in the three largest cities of the country: Hanoi (northern Vietnam) which serves an estimated 10 million people; Hue (central Vietnam) which serves 1.154 million people; and Ho Chi Minh City (southern Vietnam) which serves 13 million people. The hospitals receive patients from all parts of each city.

Several ambulance services are available in Vietnam, but only one emergency service has an emergency number (i.e., telephone number 115), trained and accredited medical staff, life-saving equipment, medical oversight, and quality indicators that are regularly monitored.(23, 28) Several other private organizations provide so-called emergency transportation but with limited medical interventions at the scene or during transportation.(29) For this study, we categorized the type of pre-hospital transportation into two groups: EMS, which refers to ambulances dispatched by an EMS dispatch center; and non-EMS, which refers to private ambulances, own or private transport, or public transport. We defined a private ambulance as an ambulance that was not dispatched by an EMS dispatch center. Own or private transport includes transport in vehicles of family members, relatives, neighbors, or passers-by. Public transport includes taxis, buses, or other types of public transport.

Participants

This study included all patients (older than 18 years) presenting with OHCA to the EDs of the three hospitals. Patients with OHCA caused by traumatic injury were excluded. We defined a case of OHCA as a person who was unresponsive, not breathing, and without a pulse outside the hospital setting.(30-32) A physician confirmed the diagnosis either in the ambulance or in the ED. We excluded patients for whom resuscitation was not attempted by the staff of the EMS or private ambulance at the scene or on the way to the hospital and who were immediately pronounced dead (because of rigor mortis, lividity, or do not resuscitate orders) at the ED. However, we included patients on whom resuscitation was attempted but who were later pronounced dead before they reached the hospital.

Data collection

We used a standardized classification and case record form to collect data on common variables. The data dictionary of the PAROS study is available as an online supplement to previously published papers.(12, 19) We extracted data from emergency dispatch records, ambulance patient case notes, ED, and in-hospital records. Data was entered into the database of the PAROS study by an electronic data capture system. Patient identifiers were not entered into the database to protect patient confidentiality. We then merged the data sets for the three hospitals. Each hospital contributed 5 years of data from February 2014 to December 2018.

Variables

We included variables based on Utstein recommendations,(33, 34) such as information on (i) bystander CPR; (ii) availability of public access defibrillators; (iii) response times; (iv) provision of ALS (e.g. intravenous drugs,



advanced airway management including endotracheal intubation, or alternative airway devices); (v) cause of the arrest (a cardiac arrest was presumed unless it was known or likely that the arrest had a non-cardiac cause (e.g. asthma, terminal illness, cerebrovascular accident, drug overdose, suicide, drowning or trauma)); and (vi) specialized post-resuscitation care (hypothermia or extracorporeal membrane oxygenation (ECMO)). We also collected data on the location of the OHCA (e.g. home, public area). We collected data on system variables, and the list of variables is available as an online supplement to previously published papers.(12, 19)(12, 19)

Outcomes

The primary outcome will be survival with good neurological function, defined as a Cerebral Performance Category (CPC) score of 1 or 2(35, 36), for all patients with OHCA on hospital discharge or at 30th-day post-arrest. We will also examine the following secondary outcomes: the proportions of patients in whom spontaneous circulation returned at the scene or on the way to the hospital, patients who survived upon admission to the hospital, and patients who were discharged alive from the hospital.

Statistical analyses

Description and comparison of cohorts

We will report data as numbers (nos.) and percentages (%) for categorical variables and medians and interquartile ranges (IQRs: 25%–75%) or means and standard deviations (SDs) for continuous variables. Comparisons will be made between patients with OHCA who received bystander CPR and who did not receive bystander CPR, between patients with OHCA who died before reaching the hospital or in the ED and who survived to hospital admission, and between patients with OHCA who died in the hospital and who survived to discharge from the hospital, and between patients with OHCA who died or survived with poor neurological function and who survived with good neurological function, for each variable, using the Chi-squared test or Fisher exact test for categorical variables and the Independent Samples T-test, Mann-Whitney U test, or one-way analysis of variance for continuous variables.

Matching method

We will carry out pairwise 1:1 propensity score matching, using the nearest neighbor matching method, for reducing the effect of bias by unbalanced covariates and potential confounding.(37, 38) The propensity score will be estimated using multiple logistic regression analysis that includes the independent variables of age, sex, past medical history, and etiology of OHCA: with bystander CPR and without bystander CPR.

Assessing factors associated with survivability

Upon admission, we will assess factors associated with survival with good neurological function on discharge from the hospital using logistic regression analysis. To reduce the number of predictors, multi-collinearity, and overfitting, we will use different ways to select variables as follows: First, we will start variable selection with a univariable logistic regression analysis of each variable that include independent variables related to participating hospitals, patient-related factors, cardiac arrest event-related factors, EMS system-related and therapy-related factors. We will include variables for consideration in the multivariable logistic regression analysis if the P-value is <0.05 in the univariable logistic regression analysis, as well as factors that are clinically important (including age, past medical history, presence of a witness, etiology of OHCA, type of pre-hospital transportation and bystander CPR). Second, we will use a stepwise backward elimination method to select variables for multivariable logistic regression analysis. Similarly, we will use these methods of variable selection and analysis to assess factors associated with survival to hospital admission and survival to discharge from the hospital. We present odds ratios (ORs) and 95% confidence intervals (CIs).

We will use IBM® SPSS® Statistics 25.0 (IBM Corp., Armonk, United States of America) for data analysis. For all statistical analyses, significance levels are two-tailed, and we consider $p < 0.05$ as statistically significant.

Significance of the study (e.g. provide brief description on how the study can improve current

What is already known on this topic?

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- Survival outcomes for OHCA worldwide differ considerably, and these variations may be related to differences in patients and the EMS systems.
- There has been increasing understanding that prompt CPR and defibrillation is crucial for improving survival from OHCA, irrespective of who performs it.

What will this study add?

- This study will show that patients with OHCA presented to the ED with a low rate of EMS or private ambulance utilization and a low survival rate.
- A low proportion of patients with OHCA received bystander CPR, which may contribute significantly to a low rate of good neurological survival. Moreover, bystander CPR may be an independent predictor of good neurological survival at hospital discharge.

How might this study affect research, practice or policy?

- The EMS system in Vietnam, as well as in other countries that face challenges in clinical practice owing to limited medical resources, needs to be enhanced through, for example: increasing bystander CPR performance, increasing the number of EMS ambulances, and the utilization of private ambulances, and developing a standard emergency first-aid program for healthcare personnel and the community.

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1	2	3	4	5	6	7	8	9	10
<i>Unfavourable</i>								<i>Favourable</i>	
(B) Comments (free text):									

GUIDELINES FOR PREPARING NEW PROPOSAL PRESENTATION

If your study proposal has been accepted for presentation, you will be notified by the Secretariat. Please prepare your presentation slides in accordance to the following instructions. Each presenter is given 10 minutes to present (8min presentation + 2min Q&A).

General Instructions

1. Presentation must include the following sections:
 - a. Introduction
 - b. Objectives/Hypotheses
 - c. Methodology
 - d. Significance

2. Limit total number of slides to not more than 12. The following are the recommended number of slides for each section.
 - a. Introduction – maximum of 2 slides
 - b. Objectives/Hypotheses – maximum of 2 slides
 - c. Methodology – maximum of 6 slides
 - d. Significance – maximum of 2 slides

3. Try to use big fonts and contrasting colours to increase readability e.g.
 - a. Black/dark blue font against white background
 - b. White/yellow font against black background
 - c. Black font against blue background

For any enquiries, please contact PAROS secretariat at patricia.tay@scri.cris.sg

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