

How frequent is bystander cardiopulmonary resuscitation performed in the community of Kota Bharu, Malaysia?

Chew K S, Mohd Idzwan Z, Nik Hishamuddin N A R, Wan Aasim W A, Kamaruddin J

ABSTRACT

Introduction: Bystander cardiopulmonary resuscitation (CPR) serves as a vital link to improve the chance of survival among the out-of-hospital cardiac arrest (OHA) patients. The frequency of bystander CPR in Malaysia is largely unknown. The aim of this study was to find out how frequently bystander CPR was performed among OHA patients with CPR performed at the Emergency Department (ED), Hospital Universiti Sains Malaysia (HUSM), prior to their arrival to the department.

Methods: In this one-year observational study, data was collected from cases of CPR performed in ED, HUSM. In the OHA category, a subanalysis was further performed to look into the frequency and effects of bystander CPR on achieving return of spontaneous circulation and survival to hospital admission. The categorical data collected was analysed using chi-square test or Fisher-exact test.

Results: Out of a total of 23 OHA patients that had CPR performed on arrival at the ED, HUSM, from March 2005 to March 2006, only two cases (8.7 percent) had bystander CPR performed. None of these two cases achieved return of spontaneous circulation.

Conclusion: Although this study has many limitations, it does indicate that the frequency of bystander CPR is dismally low in our community and the mere fact that bystander CPR was reported to be done does not seem to translate into a higher chance of survival to admission. The quality and effectiveness of the technique is equally important.

Keywords: bystander cardiopulmonary resuscitation, cardiopulmonary resuscitation, out-of-hospital cardiac arrest, return of spontaneous circulation

Singapore Med J 2008;49(8):636-639

INTRODUCTION

Bystander cardiopulmonary resuscitation (CPR) is defined as CPR performed by any person who is not responding as part of an organised emergency response system approach to a cardiac arrest.⁽¹⁾ This implies that medical staff (including doctors) are considered to be performing bystander CPR if they are not part of the patient's resuscitation team in hospital. Early bystander CPR improves the chance of survival of out-of-hospital (OHA) cardiac arrest victims.⁽²⁾ It serves as a vital link, by temporarily perfusing the heart and brain with oxygen in order to preserve these vital organs while a waiting the arrival of the emergency medical services.⁽³⁾ In fact, according to the recent 2005 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care,⁽⁴⁾ two interventions are considered to be of utmost importance in improving the chances of survival of an OHA victim, namely: early bystander CPR and early defibrillation. For every minute without CPR after the onset of arrest, the chance of survival decreases approximately 7%–9%.⁽²⁾ This is especially so, as in most communities worldwide, the ambulance response time (from the time the ambulance is notified to the time of its arrival at site) is about 7–8 minutes or longer.⁽⁴⁾ In our local community, this situation is even much worse, as the ambulance response time in Kota Bharu is found to be an average of 15.2 minutes.⁽⁵⁾ This serves to illustrate the importance of bystander CPR while waiting for the arrival of the ambulance.

Internationally, bystander CPR is performed in only about one-third or fewer of cases of witnessed OHA.⁽⁴⁾ Furthermore, in many circumstances, even when bystander CPR was performed, it was not done effectively. Chest compressions are too shallow and too slow, there are frequent interruptions in the chest compression, and the ventilations are excessive.^(2,4) In Malaysia, the frequency of bystander CPR is largely unknown. In this study, we attempted to find out, among all cases of OHA with CPR performed in Emergency Department (ED), Hospital Universiti Sains Malaysia (HUSM), how many of them had received prior bystander CPR before arrival to the ED.

Emergency Medicine Department,
School of Medical Sciences,
Universiti Sains Malaysia,
Kubang Kerian 16150,
Malaysia

Chew KS, MD, MMed
Senior Lecturer and
Emergency Physician

Nik Hishamuddin
NAR, MBChB,
MMed
Senior Lecturer and
Head

Anaesthesiology
and Intensive Care
Department

Wan Aasim WA,
MBChB, MMed
Associate Professor
and Anaesthesiologist

Kamaruddin J,
MBBS, MD, PhD
Associate Professor
and Intensivist

Trauma and
Emergency Medicine
Academic Unit,
Universiti Malaya,
Kuala Lumpur
50603,
Malaysia

Mohd Idzwan Z,
MBChB, MMed
Senior Lecturer

Correspondence to:
Dr Chew Keng Sheng
Tel: (60) 9 766 3000
ext 3204
Fax: (60) 9 765 9360
Email: cksheng74@yahoo.com

We also attempted to determine whether prior bystander CPR performed before arrival to ED would influence the outcome of the patient.

METHODS

This study is a sub-analysis of a one-year observational study of outcomes of all CPR attempts performed in ED, HUSM from March 2005 to March 2006. This sub-analysis is focused only on OHA CPR with bystander CPR performed on them. All data with OHA cases and CPR performed in ED, HUSM were included in this sub-analysis. HUSM is a 723-bedded teaching hospital for Universiti Sains Malaysia. This university is one of the research universities in Malaysia. The ED of HUSM has an average patient load of about 150–200 patients per day.

The primary outcome is the achievement of return of spontaneous circulation (ROSC) in ED regardless of its duration. ROSC is defined as the restoration of a spontaneously-perfusing rhythm that results in more than just an occasional gasp, fleeting palpated pulse, or arterial waveform. This includes even a brief restoration of spontaneous circulation of approximately 30 seconds or more. “Witnessed cardiac arrest” is defined as one that is seen or heard by another person or an arrest that is monitored.⁽¹⁾ The secondary outcome is the achievement of ROSC until the patients are admitted to the respective wards, also known as “survival to admission”. Convenient sampling method was applied. The family members, friends or anyone who brought the patients to the ED or accompanied the patient in the ambulance were asked if any bystander CPR was performed.

For the purpose of this study, a patient is considered to have received bystander CPR prior to arrival to ED, HUSM when the patient received CPR either from a non-medical profession member of the public (with or without prior basic life support (BLS) knowledge and skill) or from a medical professional (which includes doctors, nurses, medical attendants, with or without prior BLS knowledge and skill). A medical professional is considered to be performing bystander CPR if he/she happens to see someone collapse, goes over to the incident site and voluntarily offers to perform bystander CPR. In other words, he is performing bystander CPR out of his own willingness and not as one bound by the law to perform. As such, ambulance service providers are excluded from this category of bystander CPR because they are responding as part of the emergency team.

All data collected was categorical data and analysed using the Statistical Package for Social Sciences version 12.0.1 (SPSS Inc, Chicago, IL, USA). Where applicable, chi-square test or Fisher exact test was employed for univariate analysis of categorical data and statistical

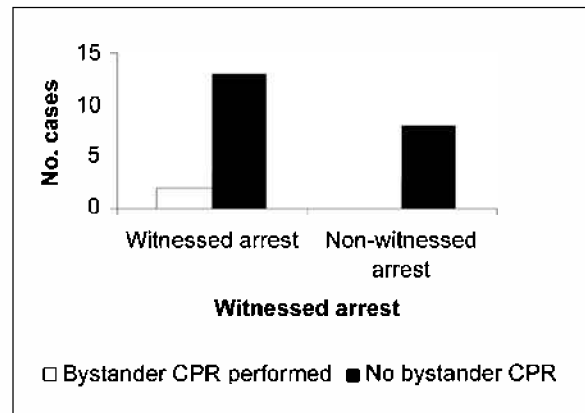


Fig. 1 Categories of out-of-hospital cardiac arrest (witnessed or non-witnessed).

significance is taken as p -value < 0.05 . All patients in cardiac arrest and CPR done in ED in the one-year stipulated period was included. Cases where resuscitation was deemed futile in the opinion of the attending doctors were excluded from the study. Patients with a “do not attempt resuscitation” (DNAR) order either from the patients’ own prior written wish or from the family members were also excluded.

RESULTS

During the study period, there were only 23 patients with OHA that had CPR performed on them. Out of these 23 patients with OHA, bystander CPR was initiated in only two of them (8.7%), although as many as 15 out of 23 (65.2%) of the OHA patients were witnessed arrests, either by family members or friends. Both of these patients who received bystander CPR did not achieve ROSC at all (Fig. 1).

Of the two patients who received bystander CPR, the first patient was a 45-year-old Malay man who was given bystander CPR (only chest compression) by an off-duty medical attendant, who lived within the community, and happened to be there when the patient collapsed. He offered to perform CPR until the arrival of the ambulance to transport the patient to ED, HUSM, where CPR was continued. The second patient was a 42-year-old Chinese man who was given bystander CPR (both chest compression and mouth-to-mouth breathing), by a family member. The family member reported that she had received some training in CPR at her workplace, but it was not entirely clear of how proficient her skill was in performing CPR, nor the quality of bystander CPR the patient received.

DISCUSSION

Though the sample size was small, the study reflects the low frequency of bystander CPR done in our community. The percentage of bystander CPR in this study was only 8.7%, compared to 33.3% worldwide.⁽⁴⁾ In the 15 cases

of witnessed OHA, only two had bystander CPR. In the other 12 cases of witnessed OHA, the family members did not give bystander CPR while waiting for the ambulance or driving to the ED. Even in the two cases where bystander CPR was performed, none had ROSC achieved. Bystander CPR does not necessarily translate into improving the patient's chances of survival. The quality and effectiveness of the CPR as well as the time interval between collapse and the start of bystander CPR are equally important determinants. Of the two cases, one of them was performed by a medically-trained member of the public, and the other was performed by a non-medically-trained family member.

The very dismal rate of bystander CPR in our community should serve as a reminder to all of us involved in the area of emergency care that more workshops, training sessions and courses should be conducted for our communities. Courses on BLS are often conducted to target groups such as security guards, teachers and policemen. Currently, there are few medical organisations that conduct courses such as BLS in Malaysia. These include the Malaysian Society of Trauma and Emergency Medicine (MASTEM), Malaysian Association of Emergency Medicine (MAEM), National Heart Institute Malaysia, Penang CPR Society, St John Ambulance of Malaysia, as well as many hospital-based bodies. Currently, there is no a single unifying resuscitation council that standardises the training programme. There is a great need for such a national resuscitation council, as every individual organisation that provides the BLS course now issues its own certificates of proficiency and competency.

Besides conducting BLS courses, there is also a need to create awareness among family members caring for their elderly and sick relatives, as most cardiac arrest cases that happen outside of the hospital happen at home or in private residences rather than in public places. In this respect, short documentary video clips concerning the importance of bystander CPR and the techniques of performing it may be helpful to target at a larger audience. Useful relevant websites should be set up. BLS courses should be held more frequently and the dates of the courses should be displayed in the relevant websites. We should also be targeting family members as previous studies have shown that up to 75% of OHA happens at home rather than in public places, and these are the places (the home and private residences) where no bystander CPR is performed.⁽⁶⁻⁸⁾

There are a number of limitations to this study that need to be mentioned. The sample size of this study is small and therefore, the true frequency and effectiveness of bystander CPR could be under-represented. In addition, convenient sampling was applied. There are probable

cases where CPR was performed by family members at residential areas for a period of time but the patient was not sent to the hospital for various reasons. Or more commonly, as we have often experienced, there were cases where CPR was initially performed by family members or office colleagues for a period of time, but when the patient arrived to ED, the medical officer or specialist in charge decided not to proceed further with resuscitation, either out of the family member's wishes, or at the discretion of the managing doctor, where any further resuscitation attempt would be deemed futile. Such cases were not taken into consideration in this study because this study only considered cases with CPR performed in ED, HUSM; all other cases were excluded. Another limitation was the study did not take into account the bystanders' theoretical BLS knowledge and the effectiveness of their skills in the two cases where bystander CPR was performed. This study involved only one centre. Finally, the homogeneity of the study's population may not reflect the heterogeneous, multicultural, multireligious Malaysian population.

This study provides the foundation for future work in this area of bystander CPR. It also paves the way for more comprehensive research in the field of bystander CPR in Malaysia. A multicentre observational study should be carried out in the future. Future work may also include comparison of the quality of bystander CPR performed by medical staff (which can be subcategorised further into different groups, like doctors, nurses and attendants) and non-medical staff. This study also poses the challenges to the emergency healthcare providers to educate and train our community, especially with the recent re-emphasis in the 2005 ILCOR Guidelines in a "back-to-basic" approach, with re-emphasis on the importance of early and effective chest compression.⁽⁴⁾

In conclusion, the frequency of bystander CPR in our community is dismally low. Nevertheless, the mere fact that bystander CPR is performed does not translate into higher chances of survival of cardiac arrest victims outside the hospital. Equally important is the quality and the effectiveness of the technique. Therefore, this serves as a reminder to the healthcare providers to intensify effort to create the awareness and to provide BLS training to our community.

REFERENCES

1. Jacobs I, Nadkarni V, Bahr J, et al. Cardiac arrest and cardiopulmonary resuscitation outcome reports: update and simplification of the Utstein templates for resuscitation registries. A statement for healthcare professionals from a task force of the international liaison committee on resuscitation (American Heart Association, European Resuscitation Council, Australian Resuscitation Council, New Zealand Resuscitation Council, Heart and Stroke Foundation of Canada, InterAmerican Heart Foundation, Resuscitation Council of Southern Africa). *Resuscitation* 2004; 63:233-49.

2. Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care—a consensus on Science. *Circulation* 2000; 102 (8 Suppl): I1-384.
3. Cummins RO, Ornato JP, Thies WH, Pepe PE. Improving survival from sudden cardiac arrest: the “chain of survival” concept. A statement for health professionals from the Advanced Cardiac Life Support Subcommittee and the Emergency Cardiac Care Committee, American Heart Association. *Circulation* 1991; 83:1832-47.
4. ECC Committee, Subcommittees and Task Forces of the American Heart Association. 2005 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation* 2005; 112 (24 Suppl):IV1-203.
5. Hisamuddin NA, Hamzah MS, Holliman CJ. Prehospital emergency medical services in Malaysia. *J Emerg Med* 2007; 32:415-21.
6. Herlitz J, Ekstrom L, Wennerblom B, et al. Effect of bystander initiated cardiopulmonary resuscitation on ventricular fibrillation and survival after witnessed cardiac arrest outside hospital. *Br Heart J* 1994; 72:408-12.
7. Bossaert L, Van Hoeyweghen R. Evaluation of cardiopulmonary resuscitation (CPR) techniques. The Cerebral Resuscitation Study Group. *Resuscitation* 1989; 17 Suppl:S99-109; discussion S199-206.
8. Iwami T, Hiraide A, Nakanishi N, et al. Outcome and characteristics of out-of-hospital cardiac arrest according to location of arrest: A report from a large-scale, population-based study in Osaka, Japan. *Resuscitation* 2006; 69:221-8.

*Can't decide where to publish
your next research journal?*

SCOPUS™

introduces a new exciting tool...

Scopus Journal Analyzer

Get
comparisons

Scopus has just added a new tool to measure performance -
The **Scopus Journal Analyzer** enables you to compare
up to 10 journals simultaneously, back to 1996.

The graphical overview delivers fast, field-specific, transparent
and objective results that are updated every two months.

You will be able to make clear and up-to-date comparisons,
which in turn help you decide on where to publish next.

Find out more from your institution's librarians on how to access Scopus.