Translating Knowledge to Attitude: A Survey on the Perception of Bystander Cardiopulmonary Resuscitation Among Dental Students in Universiti Sains Malaysia and School Teachers in Kota Bharu, Kelantan

K S Chew, MMed, M N A Yazid, MMed, B A Kamarul, MMed, A Rashidi, MMed

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

SUMMARY

This voluntary, anonymous questionnaire survey was performed to assess the willingness of Basic Life Support (BLS) participants to perform bystander cardiopulmonary resuscitation (CPR). A total of 55 dental students and 73 school teachers were assessed on their willingness to perform bystander CPR after completion of their BLS training. In general, only 29.0% of the total 128 participants said that they would offer to perform CPR under any cardiac arrest condition and 69.0% said that they would just offer to call the ambulance but they would not offer to perform CPR. When analyzed separately, only 16.4% of school teachers said that they would perform CPR as compared to 45.5% of dental students (p<0.001). Knowing how to perform CPR does not necessarily translate into willingness to perform CPR.

KEY WORDS:
Bystander cardiopulmonary resuscitation, Mouth-to-mouth resuscitation

INTRODUCTION

Defined as cardiopulmonary resuscitation (CPR) performed by any person who is not responding as part of an organized emergency response system[1], bystander CPR has been documented to significantly improve the chance of survival of a sudden cardiac arrest victim[2-8]. This is especially so if immediate CPR and defibrillation can be delivered within 3 – 5 minutes of the onset of cardiac arrest[9]. Unfortunately, in many communities, the time between activation of the ambulance and its arrival is seven to eight minutes or longer[8]. In Malaysia, it is about 15 to 20 minutes[10]. Therefore, bystanders play an extremely important role during the first five minutes prior to the arrival of the ambulance.

Various medical agencies and organizations like the National Heart Institute, Malaysian Association of Trauma and Emergency Medicine (MASTEM), as well as various universities like Universiti Sains Malaysia and Universiti Kebangsaan Malaysia are organizing basic life support courses for the public as well as healthcare providers.

The vital question is, how much of what is learned during the practical skills training of basic life support actually translate into a positive and willing attitude towards performing CPR in real situations? One should remember that during basic life support training, manikins are used. Practising on these manikins is very different from the actual unpleasant situations especially so when the collapsed person is a totally unknown stranger to the bystander. There may be vomitus and oral secretions coming out from the victim's mouth or the victim may be bleeding from the accident injuries. In such a situation, would one still be willing to perform bystander CPR?

We conducted a voluntary and anonymous questionnaire survey involving final year dental students for the academic year 2007-2008 in Universiti Sains Malaysia (USM) to unravel their attitude towards performing bystander CPR. Approval was obtained from our institutional ethical and research committee.

MATERIALS AND METHODS

A total of 60 dental students (in three batches of 20 students each) completed their emergency medicine rotation by the end of 2007. During their emergency medicine rotation, students were exposed to a two-hour lecture on Basic Life Support (BLS) another two-hour lecture on Advanced Life Support (ALS) and airway management practical sessions.

At the end of their rotation, each student was given a survey form to assess his/her willingness to perform bystander CPR under eight hypothetical scenarios. Realizing the potential vulnerability of the students as study subjects, we emphasized to them that this was an anonymous as well as voluntary survey. The students filled the survey in an unmonitored environment because we did not want them to feel that they were doing it under duress. We chose to obtain the opinions of the final year dental students because they represent the immediate next batch of future healthcare professionals in Malaysia. In the cover letter, we made clear to the participants that should they choose to fill the form, they are implying that they have consented to participate as well as giving permission to the investigators to use the data for any subsequent publication. Participants who chose not to

This article was accepted: 11 August 2009
Corresponding Author: K S Chew, Lecturer/Emergency Medicine Specialist, School of Medical Sciemces, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia Email: cksheng74@yahoo.com

respond were told that they can simply return the blank form into the box provided.

The scenarios posed to the participants are listed in Table I. For each scenario, the respondents were asked to rate their willingness to perform bystander CPR on a four-point Likert Scale of 'definitely yes', 'probably yes', 'probably no' and 'definitely no'. For selected analysis, re-coding of responses were done with 'Definitely yes' and 'probably yes' re-coded as a positive response whereas a negative response means either 'probably no' or 'definitely no'.

This survey was repeated in a group of 120 school teachers after a three-day first aid and basic life support workshop training. During the workshop, the teachers were exposed to lectures as well as practical sessions on performing CPR.

In a sense, as the dental students represent the future healthcare professionals, the school teachers that we have selected represent the non-medically trained professionals. But the common denominator that both groups share is that they do not respond to emergency medical situations as part of their daily routine job.

Forms returned blank or inappropriately filled were excluded from the analysis. Comparison between the students' responses of willingness under different scenarios was computed using Pearson's Chi-squre or Fisher-exact tests for categorical data analysis computed with SPSS® version 12.0.1.

RESULTS

A total of 128 out of 180 (71%) responses were included in the analysis. Out of the 60 dental students in that year, 55 (92%) responded. Five were excluded (four were returned blank and one inappropriately filled). Out of these 55 respondents, seven (12.7%) were male students, 48 (87.3%) were female students. In terms of ethnic groups, 47 students (85.5%) were Malays, five (9.0%) were Chinese, three (5.5%) were from the indigenous groups from Sabah and Sarawak.

For the school teachers, 73 out of the 120 (60.8%) participants responded. Fifteen of these participants were male, 56 were female, and two did not specify their gender in their forms. In terms of ethnic groups, 69 out of 73 (94.5%) were Malays, three were Chinese (4.1%), and one did not specify his or her ethnic group.

When asked the general question *"In general, what would* you *do if you witness someone having cardiopulmonary arrest*?", only 37 out of a total of 128 (29.0%) participants said they would offer to perform CPR at any time when they witness a cardiac arrest. The majority (89 responses or 69.5%) gave the answer that they would just offer to call the ambulance but they would not offer to perform CPR. Two participants (1.5%) said they would just quietly walk away in any cardiac arrest situations. When analyzed separately, we found that 25 out of the 55 dental students (45.5%) said that they would perform CPR, as compared to only 12 out of 73 school teachers (16.4%) said that they would do so ($p<0.001$) (Table II).

Table III shows the number and percentage of positive responses in the two groups analyzed separately under different hypothetical situations. Both groups show a similar trend where if the victim is their own family member or a friend, most demonstrated a positive attitude towards willingness to respond to the cardiac arrest.

Interestingly, when the participant's gender is female, the number of positive response for a victim who is of male gender is lower as compared to a male participant responding to a female victim. This difference is significantly different in the school teachers group (Table IV).

DISCUSSION

Except for two categories (victim who is a family member and victim who is a close friend), the positive response rate among both dental students and school teachers is below 90%. This happens despite the fact that all participants in this survey have just completed their basic life support training. Such reluctance to perform bystander CPR has also been documented in other countries[11, 12 ,13,14,15].

The American Heart Association (AHA) Guidelines 2005 on cardiopulmonary resuscitation and emergency cardiac care states that the overall bystander CPR rate is only about one in three cases[7]. Factors contributing to the hesitancy among bystanders to perform CPR include fear (often unfounded) of transmission of diseases, a lack of confidence as well as the distasteful nature of the resuscitation process itself[7,11,12,13,14,15].

In addition, as shown in this study, responding to a victim who is of a different gender is possibly a deterrence as well. This is especially so if the potential responder is a female responding to a male victim. In this regard, the different response rate between a male and female responder can be seen in both groups especially in the school teachers group where the difference is statistically significant ($p<0.001$). (Table IV). This barrier, which may possibly be due to socio-cultural influence in Malaysia, is not acknowledged in many of the similar studies conducted in other countries.

Arguably, if the positive response rate in the immediate period of post BLS training is only 29%, how much then, can we expect our bystanders to respond, in months or years ahead, when one really witness a victim having a cardiac arrest? The participants may have well forgotten the algorithmic steps they learned in the BLS workshop months or years ago; especially so, during the spur of that potentially panicky moment. Coupled with the distasteful sight of seeing the stranger collapsed with cyanosed, sweaty face and oral secretions coming from the mouth, would one still be full of zeal and willing to spring to action to perform bystander CPR?

Traditionally, CPR has been taught as a series of sequential steps with the giving of two rescue breaths followed by pulse check and chest compressions as necessary at a ratio of 15 compressions to two rescue breaths in earlier guidelines[14] and 30 compressions to two rescue breaths in the most recent guidelines[7]. However, giving rescue breaths through mouth-to-mouth resuscitation has ironically been documented to be a barrier to performing CPR[15,16,17].

Table I: Questions Asked in the Survey Form

Section A: General Question

In general, what would you do if you witness someone having cardiopulmonary arrest? (Assume there is no scene danger and help has already been summoned)

A. Pretend you do not see it and walk away.
B. Offer to call ambulance, but afraid to offer CPR (while you silently hope that someone else would do the CPR or the ambulance would have arrived quickly).
C. Tell the crowd that you have the skills and offer to do CPR.
D. Other response (please specify):

Section B

"You are walking alone. You witnessed victim A having cardiopulmonary arrest (no breathing, no pulse) right in front of you. You have no pocket mask with you. Assuming no scene danger and help has already been summoned, would you perform CPR (both mouth-to-mouth and chest compression) if victim A were:
Scenario 1: Your own family member?
Scenario 2: Your close friend?
Scenario 3: A stranger of different gender from you?
Scenario 4: A stranger involved in a motor vehicle accident (MVA) with some amount of blood on the face?
Scenario 5: A stranger who is a child?
Scenario 6: A stranger who is an elderly man/woman from old folks home?
Scenario 7: An unkempt stranger (appeared probably a beggar/street wanderer/drug addict to you)?
Scenario 8: In personal dispute with you or someone whom you don't like?

For each scenario, rate your response with only one of the four options below:
A. 'Definitely yes'
B. 'Probably yes'
C. 'Probably no'
D. 'Definitely no'

Table II: Number and Percentage of Responses to the General Question of Performing Cardiopulmonary Resuscitation Under any Condition

	Dental students	School teachers
Will Perform CPR	25 (45.5%)	12 (16.4%)
Will Not Perform CPR	30 (54.5%)	61 (83.6%)

p<0.001
Note:
1. "Will Not Perform CPR" is recoded from participants who gave the response of "Walk Away" and "Will Just Offer to Call Ambulance But Not Perform CPR".
2. Pearson's Chi Square test was used in this analysis.

Table III: Number and Percentage of Positive Responses in Different Scenarios for Both Dental Students and School Teachers

If Victim A is	Dental students	School teachers
A family member	54 (98.2%)	71 (97.3%)
A close friend	51 (92.7%)	69 (94.5%)
Of different gender	21 (38.2%)	25 (34.3%)
Involved in MVA	9 (16.4%)	13 (17.8%)
A child	39 (70.9%)	54 (74.0%)
An elderly	28 (50.9%)	38 (52.1%)
An unkempt stranger	1 (1.8%)	6 (8.2%)
In personal dispute	30 (54.5%)	31 (42.4%)

Note: "Positive Response" is a recoded variable of both "Definitely Yes" and "Probably Yes".

Table IV: Number and Percentage of Positive Response When the Victim is a Stranger of Different Gender as Analyzed According to Participants' Gender

		Victim of Different Gender		
		Positive Response	Negative Response	
Dental Students	Male	5 (71.4%)	2 (28.6%)	p = 0.09
	Female	16 (33.3%)	32 (66.7%)	
School Teachers	Male	12 (80.0%)	3 (20.0%)	p < 0.001
	Female	12 (21.4%)	44 (78.6%)	

Note:
Fisher's Exact test was used in the analysis for the dental students due to the small sample size with 2 cells having expected count of less than 5.
Pearson's Chi Square test was used in the analysis for the school teachers.

Performing both mouth-to-mouth resuscitation with chest compression has been shown to paradoxically result in much interruption of the more important chest compressions[26]. Furthermore, studies have shown that the occasional gaspings during the pre-arrest period together with the dissolved oxygen in the blood itself are sufficient to maintain the ventilation/perfusion relationship due to the much lower cardiac output generated during chest compressions without additional rescue breaths[16]. As the effectiveness of compression-only CPR is becoming more convincing and simpler to learn, the AHA in April 2008 issued a statement to advocate for compression-only CPR as an alternative method for public members responding to adult victims with out-of-hospital sudden cardiac arrest[27].

Therefore, perhaps the technique that we should be emphasising more for our Malaysian public to practise is chest compression-only CPR. Chest compression-only CPR without rescue breaths has been advocated for healthcare providers as well as lay rescuers who are reluctant to perform mouth-to-mouth breathing[17,18]. According to the AHA, compression-only CPR is better than no CPR at all[19,20]. In fact, at least five important human studies on compression-only CPR have been published recently that shows that there is no significant difference in terms of survival and neurological status in patients who received compression-only CPR versus conventional CPR[21,22,23,24,25].

Several limitations in this study are inevitable, as these are limitations inherent to the design of the study itself. Responses in hypothetical situations may not necessarily mirror an actual clinical behaviour should one really encounter a cardiac arrest. Several other factors may influence a bystander's choice whether to respond promptly to an actual cardiac arrest. The emotional make up at that spur of the moment, the perceived ability and confidence of the bystander at that time as well as the ability to speedily recognise a cardiac arrest has actually occurred are some of these confounding factors. Nevertheless, although intention or willingness to perform may not be the ideal indicators of future behaviour, they are still the best available pragmatic behavioural predictors; and such survey tools have been used in many other health contexts including assessing addictive behaviour, eating habits, exercise habits, oral hygiene, risk behaviours, etc. Furthermore, we employed convenience sampling in this survey. The number of subjects available on each arm would be dependent on the number of participants in the training program which is a confounding factor beyond our control. Therefore, the results in this study may not truly reflect the attitude of our population in general. Lastly, the fact that we allow the students and the teachers to complete the survey form in an unmonitored environment may actually be a disadvantage as it may encourage them to discuss with one another rather than revealing their own true intentions.

Nevertheless, we hope more Malaysian researchers will conduct studies in the critical field of CPR, which are dismally lacking in our Malaysian context. For example, similar surveys like this could be repeated within a larger context, with multi-centre participation and encompassing other groups of personnel like the armed forces personnel and factory workers. Another study that could be conducted in the near future is to scientifically unravel the reasons behind the unwillingness of our bystanders to respond promptly and appropriately.

CONCLUSION

In conclusion, what matters most in basic life support training is for all bystanders, not just in knowing, but also in willing to perform bystander CPR. Attitude is as important as aptitude. Knowing does not necessarily means willing. Technique should be simple enough to learn, recall and practise. Compression-only CPR is not a new technique. The AHA has already endorsed compression-only CPR in their resuscitation guidelines back in 2000[16]. This has gained more importance in their revised guidelines in 2005[7] as well as their most recent scientific statement in April 2008[27]. As such, we recommend that during basic life support courses, our Malaysian public as well as healthcare providers should be at least told that compression-only CPR is an alternative as effective as[16,27] or even more effective[23,27] than the conventional CPR.

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. Cummins RO, Eisenberg MS, Hallstrom AP, Litwin PE. Survival of out-of-hospital cardiac arrest with early initiation of cardiopulmonary resuscitation. Am J Emerg Med. 1985; 3: 114-9.
3. Cummins RO, Eisenberg MS. Prehospital cardiopulmonary resuscitation. Is it effective? JAMA. 1985; 253: 2408-12.
4. Larsen MP, Eisenberg MS, Cummins RO *et al.* Predicting survival from out-of-hospital cardiac arrest: a graphic model. Ann Emerg Med 1993; 22: 1652-8.
5. 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.
6. Herlitz J, Svensson L, Holmberg S *et al.* Efficacy of bystander CPR: Intervention by lay people and by health care professionals. Resuscitation 2005; 66: 291-5.
7. American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation 2005; 112 (24 Suppl): IV1-203.
8. Eisenberg MS, Horwood BT, Cummins RO, Reynolds-Haertle R, Hearne TR. Cardiac arrest and resuscitation: a tale of 29 cities. Ann Emerg Med. 1990; 19: 179-86.
9. Stiell IG, Wells GA, Field BJ *et al.* Improved out-of-hospital cardiac arrest survival through the inexpensive optimization of an existing defibrillation program: OPALS study phase II. Ontario Prehospital Advanced Life Support. JAMA. 1999; 281: 1175-81.
10. Hisamuddin NA, Hamzah MS, Holliman CJ. Prehospital emergency medical services in Malaysia. J Emerg Med. 2007; 32: 415-21.
11. Brenner BE, Van DC, Cheng D *et al.* Determinants of reluctance to perform CPR among residents and applicants: the impact of experience on helping behavior. Resuscitation 1997; 35: 203-11.
12. Shibata K, Taniguchi T, Yoshida M *et al.* Obstacles to bystander cardiopulmonary resuscitation in Japan. Resuscitation 2000; 44: 187-93.
13. Riegel B, Mosesso VN, Birnbaum A *et al.* Stress reactions and perceived difficulties of lay responders to a medical emergency. Resuscitation 2006; 70: 98-106.
14. Locke CJ, Berg RA, Sanders AB *et al.* Bystander cardiopulmonary resuscitation. Concerns about mouth-to-mouth contact. Arch Intern Med 1995; 155: 938-43.
15. Swor R, Khan I, Domeier R *et al.* CPR training and CPR performance: do CPR-trained bystanders perform CPR? Acad Emerg Med 2006; 13: 596-601.

16. American Heart Association (AHA). International Guidelines 2000 for Cardiopulmonary resuscitation and Emergency Cardiovascular Care—a consensus on Science. Supplement to Circulation 2000; 102: I-1-I-384.
17. Brenner BE, Kauffman J. Reluctance of internists and medical nurses to perform mouth-to-mouth resuscitation. Arch Intern Med 1993; 153: 1763-9.
18. Hew P, Brenner B, Kaufman J. Reluctance of paramedics and emergency medical technicians to perform mouth-to-mouth resuscitation. J Emerg Med 1997; 15: 279-84.
19. Berg RA, Kern KB, Sanders AB *et al*. Bystander cardiopulmonary resuscitation. Is ventilation necessary? Circulation 1993; 88: 1907-15.
20. Becker LB, Berg RA, Pepe PE *et al.* A reappraisal of mouth-to-mouth ventilation during bystander-initiated cardiopulmonary resuscitation. A statement for healthcare professionals from the Ventilation Working Group of the Basic Life Support and Pediatric Life Support Subcommittees, American Heart Association. Circulation 1997; 96: 2102-12.
21. Hallstrom A, Cobb L, Johnson E *et al.* Cardiopulmonary resuscitation by chest compression alone or with mouth-to-mouth ventilation. N Engl J Med 2000; 342: 1546-53.
22. Waalewijn RA, Tijssen JG, Koster RW. Bystander initiated actions in out-of-hospital cardiopulmonary resuscitation: results from the Amsterdam Resuscitation Study (ARRESUST). Resuscitation 2001; 50: 273-9.
23. Cardiopulmonary resuscitation by bystanders with chest compression only (SOS-KANTO): an observational study. Lancet 2007; 369: 920-6.
24. Iwami T, Kawamura T, Hiraide A *et al.* Effectiveness of bystander-initiated cardiac-only resuscitation for patients with out-of-hospital cardiac arrest. Circulation 2007; 116: 2900-7.
25. Bohm K, Rosenqvist M, Herlitz J *et al.* Survival is similar after standard treatment and chest compression only in out-of-hospital bystander cardiopulmonary resuscitation. Circulation 2007; 116: 2908-12.
26. Assar D, Chamberlain D, Colquhoun M *et al.* Randomised controlled trials of staged teaching for basic life support. 1. Skill acquisition at bronze stage. Resuscitation 2000; 45: 7-15.
27. Sayre MR, Berg RA, Cave DM *et al.* Hands-only (compression-only) cardiopulmonary resuscitation: a call to action for bystander response to adults who experience out-of-hospital sudden cardiac arrest: a science advisory for the public from the American Heart Association Emergency Cardiovascular Care Committee. Circulation 2008; 117: 2162-7.