

Emergency staffers could guide local health-care providers constructing a team of mass CPR instructors: a survey report of knowledge and attitudes from Shenzhen City, China.

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**Emergency staffers could guide local health-care providers
constructing a team of mass CPR instructors: a survey
report of knowledge and attitudes from Shenzhen City,
China.**

Running head: A survey from resuscitation instructors in China

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Abstract

Background: Few investigations concerns about why the local health-care providers participate in mass Cardiopulmonary Resuscitation (CPR) training in developing countries. This study aimed to survey knowledge and attitudes of local health-care providers who candidate to be mass CPR instructors in China.

Method: This was a retrospective survey study. Data were obtained from candidates being mass CPR instructors ($n=496$) between March 2018 and December 2018. Whether they belonged to the emergency group or non-emergency group was based on their service department. The outcome was passed in the final examination. Binary logistic regression was performed to analysis.

Result: Passed rate in emergency group is higher than non-emergency groups (90.7%, 175/194 vs. 83.8%, 253/302, $P=0.042$). Consisting with higher frequency on receiving CPR training, emergency staffers were richer in dealing emergency situation such as out-of-hospital cardiac arrest (58.2%), In-of-hospital cardiac arrest (95.4%), use of an automatic external defibrillator (AED) (96.4%), traumatic hemorrhage (83.5%), suffocation (74.2%), syncope (53.1%) and epilepsy (79.4%). In despite, younger group ($OR: 0.957$, 95% $CI [0.925-0.990]$), previous training on AED ($OR: 2.698$, 95% $CI [1.441-5.050]$) and pecuniary motivation ($OR: 3.176$, 95% $CI [1.231-8.191]$) independently affects being mass CPR instructors among health-care provider.

Conclusion: Because of better knowledge and skill, emergency staffers have ability to lead local health-care providers to build a team of mass CPR instructors. Our findings can be used to conduct public emergency education for health policy design in China.

Key words: Cardiopulmonary Resuscitation; instructors; Knowledge; Attitude; Health-care provider; Survey; China.

Background

Survival rate of out-of-hospital cardiac arrest (OHCA) decreased by 10% with every minute of delay and the golden time of treatment is about 3-5 minutes [1]. An initial application of bystander, such as cardiopulmonary resuscitation (CPR) and the use of an automatic external defibrillator (AED), could significantly control mortality of OHCA[2]. Although almost 544000 incidences of OHCA per years happened in China[3], most of them suffer from cardiac arrest die before the arrival of ambulances[4], which means time of ambulances arriving is at 13-20 minutes in China[5]. In further aspects, several "sudden death" induced by OHCA had brought widespread discussion on how to increase the survival rate in China [6]. When compare to developed countries, mass CPR training is not widely spread across in developing countries including China and India[7]. However, numerous measurements of mass training in bystanders-CPR and AED was trying to perform, one is building a team of mass CPR instructors from local health-care providers.

But few investigations concerned about why the local health-care providers participate in mass CPR training in developing countries. In fact, Chinese emergency medicine needs to motivate mass education on bystander-CPR and use of AED as the reason that little achievement was gained on improving public emergency education even after 30 years developments[8]. Furthermore, no a team of formal mass CPR instructors was built while we have 11 billionaire health-care providers with excellent medical education background[9]. However, given mass CPR training is newborn in China, a program on how to pick mass CPR instructors among health-care providers needs to be created. Moreover, we had recommended the priority of local emergency staffers is leading this selection in a new era[10].

In this present study, we survey health-care providers' knowledge and attitudes during their candidate to be mass CPR instructors. Consequently numerous variables in survey linked with being formal instructors are objective reported as follows.

Methods

Study population

During March 2018 and December 2018, we held three events on selecting mass CPR instructors, which are consisting of a 120-minute theory lessons and 60-minute hands-on practice of bystander-CPR and AED. Every individuals need fit the following inclusion criteria:(1)they had enthusiasm on teaching bystander-CPR and

AED in public; (2)they was still working in clinical institution; (3)The completion of 180-minute training programs was essential required; They needed to accomplish the survey within 20 minutes at begging of our course. If they declined to finish surveying or their questionnaire was incomplete was excluded in further analysis. The Institutional Human Ethics Committee of Affiliated Baoan Hospital of Shenzhen, Southern Medical University approved the study.

Questionnaire

A paper survey of structured questionnaire developed by five experts on resuscitation medicine was to assess knowledge and attitude of participants. It consists of 15-item questions across three sections to collect data. Questions 1-4 in Section 1 collected participants' basic characteristics (i.e. age, gender, serves department and CPR training frequency within past one year). Questions 5-12 in Section 2 evaluated participants' knowledge on bystander-CPR, AED and other emergency situations. Questions 13-15 in Section 3 revealed participants' attitudes on being mass CPR instructors.

Authentication

After their skill being tested in the end of course, passed candidates were authored as formal mass CPR instructors by two advanced experts. Every case in passed group or non-passed group base on whether passed or didn't pass the final examination was objectively recorded.

Subgroup division principles

Every case was divided into two subgroups based on their services departments: If they were working in emergency system (i.e. pre-hospital care, intern-hospital emergency and intensive care unit), they belonged to emergency groups; In contrast, If they were not working in above-mentioned department, they belonged to non-emergency group.

Statistical analysis

Data was expressed as the mean \pm standard deviation or percentage of case numbers. Student's t test or Mann-Whitney *U* test was used to establish comparisons of quantitative variables based on whether their distribution is normal. χ^2 was used to determine comparisons of categorical variables. Binary logistic regression analysis was carried out to identify independent factors being mass CPR instructors. *P* value <0.05 was regarded as statistically significant. All of statistical analyses were conducted by using the SPSS software package (version 20.0; SPSS Inc., Chicago, IL,

USA).

Results

Baseline characteristic

During three events, 428 cases passed the final test and received certification to be mass CPR instructors (86.49% in 496 candidates). Pass-rate in emergency group exceeded those in non-emergency group (90.7%, 175/194 vs. 83.8%, 253/302, $P=0.042$). Although physicians and nurse are still the main source of instructors (99.5% vs. 76.8%, $P<0.001$), higher proportion as nurse but lower female rate in emergency group may be linked with increasing Chinese male nurse. Moreover, higher frequency on receiving CPR training within one past year in emergency group indicated better educational background on CPR (Table 1).

Knowledge on dealing with emergency situation

When surveyed on resuscitation experience both in OHCA and In-of-hospital cardiac arrest (IHCA), emergency group achieved higher proportion than Non-emergency group (58.2% vs. 14.0% and 95.4% vs. 65.3%, $P<0.001$). Additionally, Table 2 also shows most of them also were rich in dealing with other emergency situation, such as traumatic hemorrhage (83.5%), suffocation (74.2%), syncope (53.1%) and epilepsy (79.4%).

96.4% instructors in emergency group had expertise in use of AED, however, only 79.1% instructors in non-emergency group had received previous training of AED before our course (187/194 vs. 239/302, $P<0.001$).

An update of resuscitation process from *A-B-C* to *C-B-A* in 2015 American Heart Association (AHA) Guidelines was emphasized the importance of continuous compression[11], however, either 35(18.85%) instructors in emergency group or 70(23.2%)instructors in non-emergency group had not yet updated their Knowledge in our survey.

The attitude of being mass CPR instructor

Table 3 showed widespread awareness on lack of mass CPR training; in addition, a similar attitude why to be mass CPR instructors was presented on social responsibility, hobby, advertising health knowledge and assigned tasks. However, more candidates in emergency group choose part-time fee as reason why they participate in public CPR training (24.7% vs. 14.5%, $P=0.004$). Actually, substantial parts of them (38.1%) were more likely to choose 1 time each week but 1 time each month in non-emergency group (38.1%).

Independent factors being resuscitation instructor

After setting passing the final test as golden standard, 15 variables were enrolled in binary logistical regression analysis between survey questions and final passed rate. Younger (*OR*: 0.957, 95% *CI* [0.925-0.990]), previous training on AED (*OR*: 2.698, 95% *CI* [1.441-5.050]) and pecuniary motivation on part-time fee (*OR*: 3.176, 95% *CI* [1.231-8.191]) were independently affected on being mass CPR instructors (Table 4).

Discussion

Our study firstly reported how to pick mass CPR instructors from local health-provider in China. As they pass rate yielding at most 90%, we observed that physicians and nurse are still the main resource of instructors[12]. Especially from the emergency department, because they have better educational background linking with richer knowledge and experience on resuscitation skills when compared to non-emergency groups. In other side, since routine CPR training had been mandatory for every individual in Chinese hospital, we confirm instructors from non-emergency department could become supplementary instructors. However, it should be noticed from our survey that primary instructors need enhanced course on AED and latest CPR guidelines for updating their current knowledge[13].

Of interest, there could be three explanations on why our surveys revealed a younger group, previous training on AED and pecuniary motivation independently affects being a mass CPR instructor.

Firstly, older age is related to a higher resuscitation knowledge decay and poorer reaction time in the final test. Indeed, a similar report from the UK had demonstrated that brief time course may be difficult for learning as the candidate age increases. So we need a long time course for enhancing resuscitation memory processing and updating the new knowledge and skills from latest guidelines[14]. Depending on this hypothesis, we had conducted a 1-day enhance course to consolidate knowledge concepts among primary mass CPR instructors.

Secondly, AED had no meat popular in China[15]. Part of health-providers fear to initiate defibrillation in cardiac arrest out-of-hospital, while all of them had already seen trained in use of immediate electrical defibrillation. It is may induce that previous training on AED was independently related to our course outcomes. So we recommend a reeducation program, which aims at promoting use of AED in the medical staff in public, must have been a right for retraining at regular intervals[16].

Thirdly, as the largest developing country, Chinese medical system needs lots of improvements such as low income[17]. So it is the causes that positive attitude induced by pecuniary motivation is associated with passing the final evaluation. Furthermore, regardless of the fact that without an organized nationwide system for bystander-CPR and AED training in public, a local institution of organizing mass CPR training need been recommended. It is fortunate that our local government fiscal support our efforts. Number of authorized first responder increased from 0 to 144845 as proportion of 2.58% population in Baoan district after our nonprofit education in mass CPR training had spread across[18].

This study is further presented several limitations. Firstly, the number of instructors grew at 1325 until December, 2019, which this survey may reflect part of status due to this primary enrollment. Secondly, a further comprehensive assessment should be carried their change before and after our course. Thirdly, several conclusions based on our local health-care providers might not present other areas in China.

Conclusion

Local health-care providers are optimal for being mass CPR instructors. Among them, emergency staffers could guide this progress because of better knowledge and skill on CPR. Furthermore, young group, primary training on AED and pecuniary motivation influence the selection among local health-care provider, which needs to be considered for health policy design in China.

Declarations

Abbreviations

Out of hospital cardiac arrest, OHCA; automatic external defibrillator, AED; cardiopulmonary resuscitation, CPR; in of hospital cardiac arrest, IHCA; confidence interval, CI; odds ratio, OR.

Ethics approval and consent to participate

The Institutional Human Ethics Committee of Affiliated Baoan Hospital of Shenzhen, Southern Medical University approved the study (No. 201810). A written informed agreement on collecting their information was necessity for every subject.

Consent for publication

Not applicable.

Availability of data and material

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare no conflict of interest relevant to these papers.

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Authors' contributions

J L and C W participated in the study conception and drafting the manuscript; Y L, W T and J W abstracted the data collection and formal analysis; W Z and O D guided the data analysis and critically revised the manuscript. All authors read and approved the final manuscript.

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