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Factors influencing Chinese university students' willingness to performing bystander cardiopulmonary resuscitation

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ABSTRACT

Background and aim: Low rates of bystander-initiated CPR are a major obstacle to improved survival rates, and the aim of this study is to elucidate the factors associated with university students' attitudes toward performing bystander CPR.

Methods: Questionnaires were distributed to 18 universities across three metropolises in China. One question asking for respondents' attitudes toward performing bystander CPR was set as the dependent variable, and the logistic regression models were used to extract independent factors for respondents' attitudes toward performing bystander CPR.

Results: 2934 questionnaires were completed, with a response rate of 81.5%. Results suggested that predictors of willingness to perform bystander CPR were: previous experience of performing bystander CPR, higher self-perceived ability to perform bystander CPR properly after instruction, medicine and law discipline, male gender, not being the single child of their parents, higher participation in university societies, being used to taking decisive action immediately, less self-perceived life stress and higher self-perceived knowledge level of CPR.

Conclusions: Persons having previous experience of performing bystander CPR and those who thought they would have the ability to perform bystander CPR properly are predominantly associated with willingness to perform bystander CPR. Psychological and cultural factors need further study.

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1. Introduction

Sudden cardiac arrest results in millions of deaths worldwide each year and is a leading cause of premature death, with large disparities in survival between less privileged and more privileged groups (Berdowski et al., 2010). Every hour in the United States, 38 people have an out-of-hospital cardiac arrest (OHCA), and less than 1 in 10 survive (Mozaffarian et al., 2015). In China OHCA has become the most common reason for sudden death (Zhang et al., 2010) claiming an estimated 544,000 lives annually (Hua et al., 2009) and 80% of the people suffering OHCA have died before being treated by emergency medical service (EMS) personnel (Zhou et al., 2011).

There is a considerable body of research demonstrating bystander CPR improves survival rates for OHCA (Go et al., 2013; Iwami et al., 2012). However, less than half of persons with cardiac arrest in the United States receive bystander-initiated CPR (Mozaffarian et al., 2015) and the rate of bystander CPR in China is still only 4.48% (Zhang et al., 2010). Low rates of bystander-initiated CPR are a major obstacle to improved survival rates (Bradley and Rea, 2011), and there are significant disparities in its provision (Sasson et al., 2012).

The usual approach worldwide to increase rates of by-stander-initiated CPR has been to train as many members of the public as possible and introducing CPR training into schools and universities has been widely recommended as a long-term strategy to educate the wider community (American Heart Association, 2015; Sorets and Mateen, 2015; Stroobants et al., 2014). However, promoting the willingness of students to actually initiate bystander CPR

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may be harder than popularizing the knowledge and technique of CPR. Studies in Malaysia have shown that knowing how to perform CPR does not necessarily guarantee an efficient translation into willingness to perform it in practice (Chew et al., 2009). Studies in Asia (Chiang et al., 2014; Cho et al., 2010; Lu et al., 2015) have shown that individuals' attitudes toward bystander CPR are likely to be affected by complex factors, because initiating bystander CPR not only involves theory and technique, but also psychological willingness and participation at a social level (Chew and Yazid, 2008; Kanstad et al., 2011; Lu et al., 2015; Omi et al., 2008; Wen-Chu et al., 2014).

Therefore, the aims of this study were to assess university students' attitudes toward bystander CPR and identify the factors that may influence their willingness to perform CPR if required.

2. Methods

A questionnaire was used which consisted of two questions involving attitudes toward CPR and a demographic information survey. Two questions sought to determine attitude to performing bystander CPR. The first asked the question: Are you willing to perform bystander CPR? The other question asked: "Do you think you would have the ability to perform bystander CPR properly after instruction in CPR?" The demographic information survey includes gender, age, specialty, prior CPR-related course and experience of performing bystander CPR. The two questions involving attitudes toward CPR in this study were also included in the questionnaire previously used in Tianjin as that study (Lu et al., 2015) served as a pilot for the current study and this paper reports on the results of the logistical regression. The demographic information survey was based on the questionnaire previously used in Tianjin and adjusted as required (Lu et al., 2015). So this study was part of a bigger study and was the second phase of the bigger study.

The readability and content validity of the questionnaire was tested by one expert in clinical first aid, one expert in the emergency center and one university lecturer teaching first aid. The advice on the appropriateness of each question was discussed within the research team. Before the main study, we did a pilot study using 30 questionnaires administered to the same population twice within a two week interval to check reliability and to make sure the questionnaires were relevant and clear to the respondents. The test–retest reliability coefficient after two weeks was 0.73. The work presented above was done on the pilot study in Tianjin (Lu et al., 2015).

The sample was selected from three large cities having numerous universities serving many students from all over China. Seven disciplines were sampled because it was postulated that university students from different disciplines might have different levels of knowledge about CPR, ways of thinking and universal ethical principle orientations leading to different attitudes toward performing bystander CPR. Disciplines in Chinese universities can be generally classified into seven types: Medicine, Engineering, Science, Economics, Law, Arts, and Management. In China, vocational specialties, e.g. medicine and law, are taught in monotechnic universities and so are not (or very minimally) represented in the more general universities which deal with other disciplines. For this reason these types of universities, namely medical universities and universities of politics and law, were selected in addition to general universities. In this study, 450 copies of questionnaires were given to university medical students in each of the two cities because medical students in the third city were not accessible due to the impending winter vacation and we planned to distribute 150 to each of the other six types of disciplines in each of the three cities. Medical students were deliberately oversampled to ensure sufficient numbers to compare them with students from other dis-

ciplines. Eventually, the planned distribution of questionnaires had to be readjusted to accommodate different sized intakes on these courses. We modified our plan and distributed more questionnaires (600) to students of engineering and economics respectively and fewer questionnaires (300) to students of science and law students respectively. This actually means that the numbers recruited to some extent do reflect the distribution of these disciplines among the student population as a whole.

Three researchers were allocated one to each of the three cities and all used a previously agreed set of information and instructions. The researcher explained the nature and purpose of the study to the whole group of students in their classroom and requested volunteers to take part. Informed consent was gained before the printed copies of questionnaires were distributed. Willing subjects were required to independently finish the questionnaires within 15 min, and return them immediately to the researcher.

Descriptive statistics were used to summarize the data. Percentages were calculated for frequencies. Significant *p*-values were defined as <0.05. This study reports the results of logistic regression analysis which was performed to assess the factors affecting respondents' attitudes toward performing bystander CPR. The question: Are you willing to perform bystander CPR? was used as the dependent variable, and respondents' characteristics including gender, discipline, previous experience of performing bystander CPR, self-perceived knowledge level of CPR and self-perceived ability to perform bystander CPR and the question: "Do you think you would have the ability to perform bystander CPR properly after instruction in CPR?" were used as independent variables. The dependent variable was 'willing to perform bystander CPR' versus 'not willing to perform bystander CPR' and so logistic regression was used to predict the categorical dependent variable. A stepwise regression analysis model was used. The dependent variable is typically coded 1 to represent the event that the respondent was willing to perform bystander CPR, and 0 to represent the event that the respondent was not willing to perform bystander CPR. The predictive variables include categorical variables and ranked variables. Categorical variables were processed as dummy-coded variables and rank variables were transformed into continuous variables. For rank variables, such as self-perceived life stress: very little self-perceived life stress was coded 1, little self-perceived life stress was coded 2, moderate self-perceived life stress was coded 3, severe self-perceived life stress was coded 4, very severe self-perceived life stress was coded 5, so that we can process rank variable as continuous variables. When the categorical variables such as gender were the predictors, male was coded 1 and female was coded 0. For variables with more than two categories, a series of dummy variables is needed, for example in our results, discipline was a predictive variable in the logistic regression for predicting willingness to perform bystander CPR, bivariate logistic analysis provided estimates of the relative risk of different states of willingness. In such an analysis, one group would be the reference group, with an odds ratio (OR) of 1.0, and the other six groups would have ORs in relation to the reference group. The OR provides an estimate (around which confidence intervals can be built) of relative risk – the risk of an event occurring given a different condition. All statistical analyses were computed using Statistical Package for the Social Sciences Version 17.0. (SPSS, Inc., Chicago, IL, USA).

3. Results

3.1. Characteristics of the respondents (Table 1)

2934 questionnaires were completed, giving a response rate of 81.5%. Some questionnaires were not returned and some were so incomplete that they could not be counted, 2934 were considered

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