

## Survey of knowledge of cardiopulmonary resuscitation in nurses of community-based health services in Hainan province

CHEN Xiu-zhen, ZHANG Rui-lian, FU Yan-mei, WANG Tao

Department of Nursing, Hainan Medical College, Haikou-570102, P.R.China

**Abstract:** To assess the knowledge of cardiopulmonary resuscitation (CPR) among the nurses (n= 302) of community-based health services in Hainan province of China, a survey was made by randomized stratified cluster sampling using self-designed questionnaires. The passing rate for qualification of the knowledge of CPR was found to be very low in Hainan province (23.18 %). A significant difference of regions and different educational level among the nurses were also noticed (P<0.01). It may be concluded from the study that nurses of community-based health services in Hainan province lack the basic knowledge of CPR, especially in rural region.

**Keywords:** Nursing care of community-based health services; Nurse; Cardiopulmonary resuscitation (CPR); Data collection.

### Introduction

Cardiopulmonary resuscitation (CPR) is the foundational technique for the emergency treatment of cardiac arrest (CA). The standardized training of CPR has been emphasized more than ever. Common people in developed countries and regions have received popular education of CPR program of basic life support (BLS) training which was launched jointly by Universal Medical Assistance International Center, Ministry of Health, P.R.China and American Heart Association (AHA) in 2004 [1]. Nurses of community-based health services who have received professional education and training should be able to practice CPR accurately and offer basic life support to the patient who suffered an attack of cardiac arrest. This is considered as the basic requirement and qualification of licensed nurses. With the aim to have the knowledge, awareness and demand of CPR in nurses of community-based health services in Hainan province and to implement targeted training, a survey was done from June to August in 2007. The observations are presented in the following report..

### Materials and Methods:

1.1 *Object of survey* Stratified sampling was adopted to classify the survey level in Hainan province into four strata as provincial level- (i) city, (ii) county level city, (iii) Han ethnic county and (iv) minority autonomous county. Six cities and counties, namely Haikou City, Wenchang City, Danzhou City, Ledong, Qiongzong Li and Miao ethnic autonomous county were selected randomly in a proportion of 1:3 from their subjected cities or counties. 16 community-based health service centers and their related stations which were selected by random-cluster sampling method in a

proportion of 1:6 from communities have been numbered according to their subjected cities and counties. 312 nurses in these selected centers and stations were surveyed.

1.2 *Investigation methods:*The survey was conducted mainly by questionnaires, supplemented with site visits and individual interview. The questionnaires of CPR was self-designed and revised repeatedly, which was reviewed and checked by peer experts and tested through preview survey. The content of the questionnaires include:

- 1 The general personal: units, ethnic, age, education and title;
- 2 Idea and awareness of first aid: "survival chain", concept of "first time" and so on;
- 3 CPR knowledge: judgement of CA, airway opening, artificial breath (mouth to mouth breathing), chest cardiac massage, application of automatic external defibrillators (AED) and
- 4 Status and request of CPR knowledge. The survey was conducted by teachers who were in charge of the research project in the Department of Nursing and students who were members of social practice in summer vacation through distributing questionnaires and on spot explanation. Questionnaires were answered anonymously and independently in 20 minutes. The questionnaires were collected immediately after completion.

1.3 *Statistical methods:* The data of questionnaires were processed using chi-square test, considering  $P < 0.05$  as the level of significance.

### **Results:**

2.1 *General:* 302 copies of valid questionnaires were collected from the distributed 312 copies of questionnaires, accounting for 96.79%. It comprises of the ethnic group: 239 from Han ethnic group and 63 from minority ethnic group. From the age distribution: 117 persons were 18 ~ 39-year-old and 185 persons were aged 40 years and above. From the education: Tertiary College and over-28, vocational school-203 and senior high school and following (didn't receive professional train)-71. From the title of profession: No one with deputy high title or above, 29 with intermediate title, 273 with primary title and below (including 51 untrained nursing staff). The overall situation of nurses of community-based health service stations in Hainan province reveals a greater number of middle aged persons with lower in titles and educational background, especially in rural regions and the Miao and Li minority ethnic groups. The staff belongs to Miao and Li minority ethnic group who had not gone through formal training were accounted for 39.31% and 70.83% respectively whereas primary and the titles of profession were accounted for 76.39% and 84.39% respectively.

2.2 *Results of CPR knowledge* Knowledge of CPR among the nurses of community-based health services in Hainan province was poor in general, especially those who are from rural and town background. They also have lower academic qualifications with lower passing rate. Among the 302 nurses only 70 were declared as pass (23.18 %). There were significant differences between different regions and different educational levels ( $P < 0.01$ ) [Table 1].

Table 1: Comparison of the results of CPR knowledge test in nurses of different community-based health services

Groups	Number	Pass	Pass rate(%)	X <sup>2</sup>	P
City Group	129	38	29.46		
Township Group	173	32	18.50	23.92	<0.01
College and above	28	9	32.14		
Vocational school	203	53	25.62		
Senior high school and following	71	8	11.27	93.84	<0.01
Total	302	70	23.18		

2.3 *Idea of first aid and knowledge of CPR*: Majority of nurses of community-based health services (59.93%) were lacking idea and awareness of CPR and first aid. From the answers of their understanding to CPR, the indications of CPR (51.32%) were found to be the best. The lowest score was of early AED of "survival chain" concept (13.26%). Other followed by the use of AED (13.58 %), unarmed open airway (23.84%), chest cardiac massage (27.15%) respectively. There were highly significant differences between different groups(P <0.01) were noticed [ Table 2].

Table 2: Comparison of the test of idea of first aid and knowledge of CPR in nurses of different groups of community-based health services (n = 302)

Items	Regions			Education		
	Qualified	City (n=129)	Town and rural (n=173)	College and above (n=28)	Vocational school (n=203)	High school and following (n=71)
Idea of first aid	121(40.07)	67(51.94)	54(31.21)	27(96.43)	90(44.33)	4(05.63)
Judgement of CA	96(32.79)	55(42.64)	41(23.70)	25(89.29)	65(32.02)	6(08.45)
Survival chain	40(13.26)	28(21.71)	12(06.94)	12(42.86)	28(13.79)	0(00.00)
Airway opening	72(23.84)	37(28.68)	35(20.23)	23(82.14)	41(20.20)	8(11.27)
Artificial breath	98(32.45)	62(68.06)	36(20.81)	23(82.14)	67(33.00)	8(11.27)
chest cardiac massage	82(27.15)	52(40.31)	30(17.34)	23(82.14)	52(25.62)	7(09.86)
Use of AED	41(13.58)	32(24.81)	9(05.20)	15(53.57)	26(12.81)	0(00.00)
Indications of effect	155(51.32)	88(68.22)	67(38.73)	28(100.00)	102(50.25)	25(35.21)
Mean pass rate	29.31	40.05	20.40	78.57	29.00	10.21

Note: Compared with city group and town and rural group, also different educations, there were significant differences between them, P <0.01.

2.4 *Status and request of CPR knowledge of the nurses of community-based health services*:66.56% of the nurses of community-based health services CPR knowledge through various channels, like textbooks, network, television programmes etc.. The attitude of acquiring CPR knowledge was high in nurses of community-based health services. The overwhelming majority of them (93.38%) wished to participate special targeted training [Table 3].

Table 3: Status and requirement of CPR knowledge in nurses of community-based health services (n=302)

Items	Number	%
Had learned CPR	201	66.56
Channels of learning CPR(may use multiple-choice) Schools, textbooks	166	54.97
Media: network, TV, etc	113	37.42
Saw in hospital	83	27.48
Special training	42	13.91
Wish to learn CPR	283	93.71
Channels of hopes to learn (multiple-choice)School	95	31.46
Hospital study	123	40.73
Special training	282	93.38

## Discussion

### 3.1 Analysis of the status :

3.1.1 Idea of first aid and CPR was found to be weak and poor among nurses of community-based health services. They lack basic knowledge of CPR. According to the survey, the pass rate of knowledge of CPR in nurses of community-based health services was 23.18 %. As airway opening is the first step in CPR, it was found that 76.16 % of the nurses in this study had not mastered the method of unarmed airway opening. Chest cardiac massage is an important procedure in CPR and the correct answer rate of it was 27.15 % only. AED is known as a best approach for first aid in cardiac arrest, however, 86.42% of the nurses in this study had never heard of it; none of them had commanded the use of AED technique. Most of the nurses (59.93 %) didn't have the idea and awareness of first aid. 40.50% of 121 nurses in this study had the idea and awareness of first aid but were unable to practice first aid in the investigation because of "no technique". The rest of the nurses either got panic and chaotic to treat the patients or followed incorrect procedure resulting in failure of CPR when confronted with a patient of CA.

3.1.2 Associated causes related to poor knowledge of CPR in nurses of community-based health services: Firstly, some of the nurses did not receive standardized education. Among the 302 investigated nurses, 101 had not learned of CPR, accounting for 33.44 %. Some knew CPR through radio, TV etc. 21.53 % among 231 nurses with nursing diploma also reported that they have never learned CPR. Secondly, continuing education of nurses of community-based health services hadn't been put into practice fully. Despite plans of continuing education had been made by department-in-charge, it hadn't been carried out effectively. Thirdly, the government in charge of the community-based health services did not manage well on the quality admission of staff, resulting in decrease in quality of nursing. Results of questionnaires caused people to worry & the actual situation was even worse. By investigating, the investigators knew those who didn't hand over questionnaires were untrained persons. In some investigating stations subjected to 16 villages, there were only two nurses who hadn't received professional training and didn't belong to the registered "roster" of nurses.

### 3.2 Measures :

3.2.1 Changing views, raising awareness & clarifying responsibilities of the nurses of community-based health services in CPR are required. According to some data[2], 88% of CA taking place in community, may survive the attack on being properly treated with resuscitation in 4 ~ 6 minutes. Thus, if people waste time by thoughts of asking help and waiting, the optimal time to save lives will be missed. New emergency system proposed "community emergency, first aid on spot, popularization of knowledge of first aid"[3]. In some developed countries and regions, social emergency of first aid has achieved. A study confirmed that there were more than 100 people survived from death every day with the community first aid which had realized community emergency in some countries like Europe and United States. Nurses of community-based health services, as professionals, need to practice CPR in the first aid to save life with full responsibility and obligation.

3.2.2 To increase and enforce the nurses of community-based health services, require leader emphasis, strengthening management. WHO proposed that principles of health services must be of "community" [4]. Nursing of community-based health services in USA are committed mainly by college-level or higher qualifications of registered nurses. At present, it is gradually moving to a master degree. In 2000, there were more than 11.60% of nurses of community-based health services in the United States who had master degree. The survey revealed that the education levels of nurses of community-based health services in Hainan province lacking number of graduates, a small part with tertiary college diploma, a fairly large part of them without formal training. To change this situation, the access to nurses of community-based health services to be given only for those who had received a formal standardized training and passed an examination especially with CPR knowledge, will be admitted to this profession. Professionals should shoulder the missions of first aid and popularization of CPR knowledge to public. It should be mandated as the basic qualification of practice [1], Secondly, emergency nursing courses should be set up for nursing major, and it should be compulsory. Thirdly, the government needs emphasis and should provide policy support. In the survey, the investigators learned that some nursing undergraduates of medical college would rather do drugs salesperson in the city than engage in nursing of community-based health services. Poor working environment or low financial condition may be the reason for it. Government should take measures to enforce community-based health services through policy guidance and financial support.

3.2.3 Administrative intervention and community support are required to build long-term mechanism for continuing education of nurses of community-based health services. Nurses of community-based health services belong to an important constituent of pre-hospital emergency team. Accurate and effective CPR at the time of need is essential for the patients of CA, and it depends dominantly on those qualified nurses. According to the results of the survey, the status of CPR was unsatisfactory & its urgent to take measures for targeted standardized training of the knowledge of CPR. Continuing education of nurses of community-based health

services must improve. Because of the weak foundation of the nurses of community-based health services, the training tasks will be hard and arduous; it can not be accomplished overnight. Long-term mechanism for continuing education should be established and increase the intensity of training. According to the professional characteristics of nurses of community-based health services, different phases at different levels of training programs may be more suitable for them. In response to the wish of 93.38 % nurses of community-based health services, a plan of multi-channel study, carrying out special training mainly supplemented by hospital study will be practical and effective. Basic theory and skills of CPR, especially the main steps and methods of BLS are key points and highlight of the train. Training organizers must strengthen supervision and evaluation, awarding qualified trainees accreditation of the state health administration, which will serve as the necessary condition of employment. To realize the goal and to guarantee the stability and continuous running of a standardized training mode, administrative intervention should be conducted by functional departments of the government, strong support from the medical schools and social organizations, as well as the long-term efforts of nurses of community-based health services. Qualified skilled nurses of community-based health services are the prerequisites for pre-hospital emergencies successfully.

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\*All correspondences to: CHEN Xiu-zhen<sup>1</sup>,*Department of Nursing, Hainan Medical College, Haikou-570102, China*