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The current workforce status of prehospital care in china

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Abstract

The Chinese Emergency Medicine System is primarily composed of three sectors; prehospital care, emergency department in a city hospital, and intensive care unit ward. While all sectors are integral to the system, the prehospital care system is less developed than the others. There are many possible contributors to the under-development of the prehospital care system, however, workforce issues may play a significant role. Firstly, there is no officially recognised paramedic profession in China. The staff members working in the prehospital care system are medical doctors, registered nurses, patient-carriers, and drivers. Secondly, these doctors and nurses are either over-qualified or under-qualified for practicing in the prehospital care system. Lastly, Chinese health professionals have taken actions to improve the current workforce status with initiatives such as short-term training workshops for doctors and nurses, implementation of a trial unit in a university, and development of a Major Degree of Emergency Medicine in a medical university. All of these actions are important steps toward improving the current workforce status in the prehospital care system. However, a long term workforce development plan is still essential for the Chinese system, and implementation of a professional paramedic education system in a medical university/college in China, may provide the solution.

Keywords: China; emergency medicine system; health services; prehospital care system; workforce; service delivery

Introduction

The past event of SARS outbreak in 2003 and the future event of Beijing 2008 Olympic Games mark China as an important country in terms of its emergency medicine system. China is a developing country whose emergency medicine system is also in its early development.

While prehospital emergency care is an important part of the emergency medicine system in China, it does not share the same high priority as other health professions. This is supported by results of a literature search in the leading national journal *Chinese Journal of Critical Care Medicine* in 2004, where only 11 of the 600 publications for that year covered the subject of prehospital care. The significance of the finding has prompted this review paper.

The Chinese Emergency Medicine System comprises of three parts: prehospital care, Emergency Department in a hospital, and the Intensive Care Unit ward.¹ There are four models of Emergency Medicine Service System (EMSS) in China²: Beijing model, Shanghai model, Chongqing model and Guangzhou model. Beijing model has its own emergency department, ambulance stations, and communication centre to dispatch vehicles and patients who are transferred to hospitals or its own emergency department. Shanghai model is primarily a prehospital emergency system, where communication centre dispatch vehicles and patients are transferred to the closest hospitals. Chongqing model is part of a hospital where the prehospital care and in-hospital care are combined as one care unit within one organisation. Guangzhou model has a communication centre only, while they dispatch vehicles from the closest hospital for patient rescue.²

Although the prehospital care system is the weakest part in the Chinese Emergency Medicine System,¹ its relatively low development is similar to other countries in the world. For example, Ambulance officers in New Zealand, until June 2004, whether paid or unpaid, had never been recognised by any legislation as a health profession or occupation in the same way as doctors, nurses, pharmacists, physiotherapists etc.³ Possible reasons for the slow development may be that the prehospital emergency care system is a relatively new emerging sub-health system, and as such has been slower to develop its professional research.⁴ Other possible contributors to the under-development of the prehospital care system in China may be identified in the lack of government policy and financial support,⁵ and non-existence of national standardisation in a range of performance indicators and workforce issues.^{6,7,8}

Dr O'Meara from Australia describes workforce as an important factor in the prehospital care system particularly in relation to the ambulance service being delivered by appropriately trained and educated staff in order to meet the needs and satisfaction of patients and families.⁹

The Current Workforce Issues

Considering that workforce issues may have a significant role in the Chinese prehospital care system, this article will review the current workforce issues relating to the system, in the following three parts:

Part 1: There is not a paramedic profession in China.

The staff members working in the prehospital care system are medical doctors, registered nurses, patient-carriers, and drivers. The medical doctors and registered nurses are either new graduates from medical/nursing schools or transferred from hospitals.¹⁰ Ambulance drivers occupy approximately 11% - 15% of the workforce in an average emergency centre in Zhejiang province.¹¹

The highway trauma rescue group consists of one surgeon, two experienced registered nurses, a patient carrier and a driver in Henan province.¹² A typical medical rescue team in a prehospital emergency system in Guangzhou, (the proportion of team members who hold Associate Professor or Professor title) absorb up to 66% of the workforce, and include specialists from internal medicine, surgery, anaesthetics, and emergency departments.¹³ Although it was recommended that prehospital emergency care staff members who undertake sea rescues should be senior doctors, anaesthetists and registered experienced nurses¹⁴, it has been recognised that doctors and nurses are not paramedics either in their training or in their practice.¹⁵ For example, due to a lack of training in emergency rescue time management, the highest standard for measuring best practice in medical emergency rescue is by “bravery” - a marker which is contradictory to the safety principles of paramedic practice.¹⁶

It is worth mentioning that in China, doctors and nurses prefer to practice in hospital clinics and wards and are reluctant to work in the prehospital care system.¹⁷ This may be feasible considering the differences in salary, medical skills challenge, and social recognition. As such, some areas in China are affected by a very severe shortage of staff in the prehospital care system, which has led to some unqualified people actively performing medical roles in the prehospital system. The results of this have impacted negatively on society's perception of medical care, and has led doctors and nurses away from the prehospital care system.¹⁷

Part 2: The doctors and nurses are over-qualified and under-qualified to practice in the prehospital care system.

It is easy to understand why doctors and nurses are over-qualified for practicing in the prehospital care system, as the education they receive is based on practice in a hospital as a clinician or a ward nurse. Qualification time normally takes 5-7 years of full time medical study to practice as a doctor in China, which is similar to the situation in Australia. Nurses are required to study full time for 3-5 years in China.

Some health organisations in China announced a regulation on the management of prehospital medical emergency care, stating that doctors and nurses who wish to practice in the prehospital care system must have a minimum of two to three years clinical practice experience.¹⁸ It was reported that in Zhejiang province, the proportion of professors and associate professors, or equivalent personnel in a city level medical emergency centre, was about 3%.¹¹

Doctors and nurses in China are generally under-qualified for practicing in the prehospital emergency care system, as the clinical education they receive does not focus on paramedic practice or the prehospital care system.

A survey of 370 students in a medical university¹⁹ showed that students who had not previously studied prehospital emergency care units, answered only 42% of the knowledge responses correctly, while those who had completed the prehospital emergency care units achieved 54% correct answers. There is a statistically significant difference between the students who had completed the units and the students who had not. However, in practice, neither group of students (although close to graduation and soon to be practicing as doctors), would be considered sufficiently qualified to practice as paramedics in a prehospital emergency care system due to their lack of knowledge in this area. Nursing students were also included in this survey. They scored 50% in the test, which is significantly higher than clinical medicine students (45%).¹⁹ A medical university students' survey showed that 99.2% of students believe that it is essential to establish some units in prehospital emergency care.¹⁹

These results do not indicate that paramedic professionals would necessarily achieve a 100% accuracy rate in any paramedic practice survey. For example, a survey of 2274 Australian ambulance service paramedics, (to test their knowledge of aetiology and transmission of infectious diseases) showed that of 25 infectious diseases, only three aetiological agents were correctly identified by at least 80% of the respondents.²⁰ Doctors and nurses practicing in Chinese hospitals may obtain a higher academic score due to their education and practice system, but no evidence has been found to support this expectation.

It is a common complaint globally that more doctors and nurses are needed in rural areas. However, the presence of a prehospital care system appears to be particularly lacking in rural areas of China. In Zhong-Jiang County of Sichuan province, the staff working in the Emergency Department of the county hospital are also responsible for the prehospital emergency care,²¹ which may reduce the quality and quantity of health service in both prehospital and hospital care. Some of the employed staff working in prehospital care are not qualified to practice as doctors or nurses but are there in some instances from unsuccessful attempts to meet the entry requirements for medical education.²² Considering the size of China's population, it is hard to believe that some ambulance vehicles perform transport roles without any health personnel involved in the process.²² This provides significant challenges to improving the survival outcomes in rural areas of China.

Part 3: Chinese health professionals and organisations have taken actions to improve the current workforce status which include the following:

Action 1: Running short-term training workshops for prehospital care staff

China's Ministry of Health established a National Medical Emergency Training Centre (NMETC) in Shanghai Medical Emergency Centre in 1993.²³ This NMETC also train staff members who work in the prehospital emergency care system all over China. The participants have included transport drivers, transport policemen, fire fighters, university students, and doctors and nurses working in the emergency department in hospitals or prehospital care. The short term training duration varies between different groups of participants, e.g. approximately 66 hours for doctors and nurses, and 40 hours for others. The NMETC has trained approximately 1800 personnel over the past six years.²³ Contributing factors to the success of training programs have included the involvement of eminent teaching professors, appropriate teaching materials, opportunities for participants to communicate with their peers, and a careful selection process for relevant participants.¹³

Health professionals in China are now talking about training volunteers as ambulance officers similar to the approach adopted by Tasmanian Ambulance Service.²⁴ Their research has found that as long as volunteer ambulance officers are protected from excessive and onerous bureaucratic processes, and provided with quality training, a competency-based training with national standards is not a disincentive. This is a good sign for the Chinese health professionals to further explore the area of volunteer training.

Similar to the rest of the world, the health system in rural areas of China, covering small size villages, is underdeveloped compared with urban areas in China. This however, is particularly dire in the prehospital care system. The only health workforce in China, with respect to small villages, are doctors (colloquially known as barefoot doctors) who have minimal training in medicine, and no formal training at medical school. Often, those village doctors are incapable of stopping acute bleeding from a trauma, or in other cases, where bleeding has been brought under control, the 'doctor' has neglected to remove the staunch tube, leaving the patient to die from blood loss or become disabled from loss of a limb.²⁵

It has been a priority of the China Ministry of Health to improve the rural health status due to a large proportion of the national population living in rural areas. However, it takes time to develop a good health team in the rural areas, which also includes a team working in the prehospital care system.²⁵ To establish such training, a community-volunteer model may have more success in rural parts of China. As demonstrated in Australia, advanced technology, rules, systems, procedures and policies are unable to sustain a rural ambulance service.²⁶

In helping China to update the knowledge and skills of the prehospital care staff, international health professionals and organisations have offered support. For example, Italy's government and its health training centre worked with Shanghai Medical Emergency Centre for the period of 11 months ("Italy Project" November 2002 to October 2003).²⁷ They conducted six workshops which included three in prehospital care management (a seven day course), and three in prehospital clinical performance (a 14 day course). The total participants from China reached over 200 which is a significant outcome for the workforce development in China.²⁷

The evaluation of the Italy Project showed a significantly higher score in the participants' satisfaction session compared with other training workshops run by the Ministry of Health in China. Possible reasons might include higher proportion of practice time, teaching method of stimulating thinking, and a higher proportion of "trained trainers as teachers".²⁷ The model of "train the trainers first" in the Italy Project could offer a practical approach to delivering overseas training programs due to the difference in language and teaching methods.

Italy is not the only country to provide assistance with China's prehospital emergency care system. In July 2004, Queensland Ambulance Service (QAS) and Queensland University of Technology (QUT) signed a Memorandum of Understanding (MoU) and a Letter of Intent (Photo 1) with the Emergency Branch of Chinese Hospital Association (EBCHA) to support the development of the prehospital care system by providing short term training programs in China or in Australia (Photos 2-4).

Other training centres in different parts of China have raised concerns over the standards of course content, teaching staff and a lack of standardisation throughout China.⁶ A leading expert in emergency medicine in China, Prof Wang Yi-Tang, suggests that it is crucial to develop China's own standard in short term training courses in relation to content, teaching or training methods and regulations of the courses, such as basic trauma life support and advanced trauma life support.²⁸

Action 2: Establishing a trial unit in a university

Shanghai Medical Emergency Rescue Centre and Tongji University have been working together since 1997 to develop a trial selective unit in counter disaster and emergency care for the university undergraduate student.^{29,30} The unit consists of 20 hours of lectures and 14 hours laboratory practice. The content of the unit includes: types and characteristics of disasters, epidemiology of national and international disasters, damage to human bodies in different disasters, triage in the disaster field, CPR, first aid in critical ill, first aid in toxic patients, and field visits.

The number of students taking this unit was only 72 in 1997, and increased to 648 in 2002, which suggests a need for this type of unit in a comprehensive university.³⁰ The evaluation of the unit showed that 5% of the students thought the unit should be a core unit for health students, while 34% of students indicated that more content should be added to the unit.²⁹ These research results showed a positive move towards establishing a trial unit in emergency care in universities in China. It is encouraging, although the trial unit is limited to emergency care, and not the prehospital emergency care system.

Action 3: Developing a Major Degree of Emergency Medicine in a medical university

It was the year of 2002 when the Major Degree of Emergency Medicine was first established in Nanjing Medical University⁸ in China. Considering that the Chinese Emergency Medicine Association was only established as recently as 15 years ago, the development of a Major in Emergency Medicine Service System (EMSS) in the award courses for medicine is a very significant achievement.

Prof Wang emphasised that workforce development is the most important part of developing a practice or career path, which has also been supported by other health professionals.⁷ The learning process that Chinese health professionals have experienced from the development of a Major Degree in Emergency Medicine in a medical university, and the related teaching experience, if it is reported, will benefit the development of emergency medicine for a long term.³¹

All of these actions are important factors, which contribute to the current workforce status in the prehospital care system. However, all of these actions together are not a long-term workforce development plan for the Chinese system. Action 1 of running short-term training workshops for prehospital care staff exists only for staff members who are already in the system. The workshops are not targeted for future staff members, which is more like a 'band-aid' way of solving the problem.

Action 2 of establishing a trial unit in a university, and Action 3 of developing the Major Degree in Emergency Medicine, would not solve the workforce issues in the prehospital care system because of reasons explained earlier in this article, that doctors and nurses who have graduated from medical school prefer to work in hospital clinics and wards, not in the prehospital care system. Even though they may work in the prehospital care system for a short period of time, it is usually a temporary measure before finding an ideal hospital to work in.

A long-term workforce development plan is therefore an essential consideration for the Chinese system, but has yet to be recognised by Chinese health professionals. For example, the President of the Emergency Branch of Chinese Hospital Association (EBCHA) proposed that a better future for medical emergency rescue centres in China could be achieved by strengthening the workforce development.⁵ He described a series of short term and long term training programs for the on-duty staff members but omitted to mention any university award courses in a paramedic profession as a pre-requisite or entry requirement.

The implementation of an education system in a medical university or college for paramedic professions in China may offer a possible long term solution,⁶ although the need for this development is not yet commonly recognised in China. In the Letter of Intent signed between QUT, QAS and China EBCHA, the main proposed activities are to support the development of an award course in paramedic training in a medical university/college. The three parties are working closely together to achieve this long-term goal.³¹

In summary, the workforce issue is an important factor to consider in developing the prehospital emergency care system in China. As there is currently no officially recognised paramedic profession in China, ambulance work is conducted by doctors and nurses who are both over-qualified and under-qualified to practice in the prehospital emergency care system. Chinese government officials and health professionals are working together to improve the current workforce issues by running short-term training courses and establishing a Major Degree in Emergency Medicine. A long-term solution may be achieved by the introduction of a professionally recognised paramedic degree course within a medical university or college in China.

Following the signing ceremony in Brisbane, April 2005, QUT & QAS hosted the Chinese delegation from EBCHA on a short study tour of simulated disaster scenarios to demonstrate paramedics at practice in relation to the theme of Disaster Management and Prehospital Emergency Care. The images below were taken during the visit.

Photo 1: The QLD Premier witnesses the signing ceremony of Letter of Intent between QUT, QAS and EBCHA in July 2004

Front row from left: The Hon QLD Premier Mr Peter Beattie, Commissioner of QAS Mr Jim Higgins, Vice President of EBCHA Prof Li Jin-Nian, Dean of Faculty of Health at QUT Prof Ken Bowman.

Back row from right: Mrs Heather Beattie, Health Project Manager at Faculty of Health of QU, Dr Cynthia Cliff, lecturer at Faculty of Health at QUT, Dr Xiang-Yu Hou (author) and Dr Alan Thomas the Ambassador of Australian Embassy in Beijing.

Photo 2: Demonstration of emergency services preparedness in a simulated disaster management scenario, “*Exercise City Bus Strike*” in the Brisbane CBD.

Photo 3: Paramedic dealing with a patient during simulation of disaster management scenario.

Photo 4: Paramedics performing systematic procedures at disaster management scenario to demonstrate the co-ordinated workforce in dealing with emergencies.

Author Disclosure

The authors have no financial, personal or honorary affiliations with any commercial organization directly involved or discussed in this study.

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References:

1. Ding, H., *A complete encyclopaedia on modern hospital management*. Prehospital emergency care. 1999, Hangzhou China: Hangzhou Publisher.
2. Zhao, W., *The emergency rescue role of emergency medical service system in disasters*. Chinese Journal of Critical Care Medicine, 2003. **23**(5): p. 314-315.
3. FitzGerald, G., *Research in prehospital care*. Journal of Emergency Primary Health Care, 2003. **1**(3-4).
4. Ambulance, N.Z., *Health Practitioners Competence Assurance (HPCA) Act: An issues paper on the implications for the ambulance sector June 2004*. Journal of Emergency Primary Health Care, 2003. **1**(3-4).
5. Zhao, Y., *The imagine of constructing the emergency rescue centre*. Chinese Journal of Emergency Medicine, 2004. **13**(8): p. 573-574.
6. Lu, C., *The standardisation issues in the pre-hospital emergency care in China*. Chinese Journal of Emergency Medicine, 2004. **13**(8): p. 571-572.
7. Xin, Y., *Thoughts on the development of pre-hospital emergency care*. Chinese Journal of Emergency Medicine, 2002. **11**(4): p. 270-271.
8. Wang, Y., *To strengthen the basic construction in emergency medicine teaching: Congratulations on the first Bachelor course in emergency medicine in China*. Chinese Journal of Emergency Medicine, 2002. **11**(4): p. 272-272.
9. O'Meara, P., *Ambulance satisfaction surveys: their utility in policy development, system change and professional practice*. Journal of Emergency Primary Health Care, 2003. **1**(3-4).
10. Lin, C., Z. Wei, and F. Chen, *The investigation of the dependent-model of emergency centre*. Chinese Journal of Critical Care Medicine, 2003. **12**(5): p. 355-356.
11. Gu, Y., J. Gan, and Z. Yang, *The current resource and its utilisation in Zhejiang Emergency Centre*. Chinese Journal of Critical Care Medicine, 2003. **12**(4): p. 269-270.
12. Zhang, Y., X. Zhang, and J. Yang, *The emergency medicine service system for highway trauma*. Chinese Journal of Critical Care Medicine, 2004. **24**(9): p. 677-678.
13. Xu, H., *The thinking and review of the training workshop in emergency medicine for medical staff in the last seven years*. Chinese Journal of Critical Care Medicine, 2002. **22**(1): p. 62-63.
14. Zhang, E., *The requirement and characteristics of pre-hospital emergency care and transport in seas*. Chinese Journal of Emergency Medicine, 2000. **9**(6): p. 416-417.
15. Chen, L., *The characteristics of organizing and management in pre-hospital emergency care*. Chinese Journal of Critical Care Medicine, 1999. **19**(8): p. 511.
16. Li, H., J. Jing, and Z. Sun, *The mistaken zone and strategies in disaster rescue*. Chinese Journal of Critical Care Medicine, 2000. **9**(5): p. 293-294.
17. Sun, Y., A. Ni, and G. Qian, *Comments on the role play of the emergency medicine function in pre-hospital emergency care*. Chinese Journal of Critical Care Medicine, 2004. **24**(7): p. 518-520.
18. Bureau, H.H., *Regulations on the Management of Pre-hospital Emergency Care in Henan Province*. 2002, Henan Health Bureau: Zhengzhou. p. 1-2.
19. Gui, L., Y. Zeng, and H. Tao, *A survey from medical unicersity students' on pre-hospital emergency knowledge and the investigation on the possible strategies*. Chinese Journal of Critical Care Medicine, 2003. **23**(5): p. 331-332.
20. Shaban, R.Z., D.K. Creedy, and M.J. Clark, *Paramedic knowledge of infectious disease aetiology and transmission in an Australian emergency system*. Journal of Emergency Primary Health Care, 2003. **1**(3-4).
21. Xu, Y., et al., *The current situation and strategies in pre-hospital emergency care in county level hospitals*. Chinese Journal of Critical Care Medicine, 2000. **9**(2): p. 118-119.
22. Li, J., *The imagine of the construction model for Tianjin Municipal Pre-hospital Emergency Care and Medical Rescue Network*. Chinese Journal of Critical Care Medicine, 2003. **12**(10): p. 710-711.
23. Fei, G., L. Gu, and W. Zhang, *Training and evaluation of medical emergency staff members*. Chinese Journal of Critical Care Medicine, 1999. **19**(12): p. 756-757.
24. Fahey, C., J. Walker, and G. Lennox, *Flexible, focused training: keeps volunteer ambulance officers*. Journal of Emergency Primary Health Care, 2003. **1**(1-2).
25. Ding, B., *The training of the village doctors in emergency medicine knowledge should be enhanced*. Chinese Journal of Critical Care Medicine, 2004. **24**(1): p. 50-50.
26. O'Meara, P., *The prehospital community-volunteer model has a place in rural Australia*. Journal of Emergency Primary Health Care, 2003. **1**(1-2).
27. Xu, H., et al., *Thoughts on increasing the training capacity in emergency medicine during the implementation of the training cooperation between China and Italy*. Chinese Journal of Critical Care Medicine, 2004. **24**(9): p. 672-674.
28. Wang, Y., *To energetically enhance the emergency rescue in severe trauma*. Chinese Journal of Emergency Medicine, 2001. **10**(2): p. 77-77.

29. Fei, G., X. Cai, and Y. Liu, *The experience summary in running selective units in self-rescue and rescue through the cooperation between emergency centres and universities*. Chinese Journal of Critical Care Medicine, 2001. **21**(11): p. 676-677.
30. Fei, G. and Y. Liu, *The present and future of developing counter disaster and emergency medicine selective units in universities through the cooperation between emergency centres and universities*. Chinese Journal of Critical Care Medicine, 2003. **23**(4): p. 258-259.
31. Zhang, J., et al., *The curricula investigation of emergency medicine CPCPR in university five-year education*. Chinese Journal of Critical Care Medicine, 2004. **24**(12): p. 896-897.