Original Article

Emergency department in hospitals, a window of the world: A preliminary comparison between Australia and China

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BACKGROUND: This study aimed to make a preliminary comparison of emergency department (ED) presentations between Australia and China. The comparison could provide insights into the health systems and burden of diseases and potentially stimulate discussion about the development of acute health system in China.

METHODS: An observational study was performed to compare Australian ED presentations using data obtained from a single adult tertiary-referral teaching hospital in metropolitan Brisbane against Chinese ED presentations using public domain information published in existing Chinese and international medical journals.

RESULTS: There are major differences in ED presentations between Australia and China. In 2008, 1) 35.4% of patients arrived at a tertiary teaching hospital ED in Brisbane, Australia by ambulance; 2) 1.7% were treated for poisoning; 3) 1.4% for cerebral vascular disease; 4) 1.7% for cardiac disease; and 5) 42.6% for trauma. The top events diagnosed were mental health problems including general psychiatric examination, psychiatric review, alcohol abuse, and counselling for alcohol abuse, which accounted for 5.5% of all ED presentations. Among ED patients in China, 6.7% arrived at a tertiary teaching hospital by ambulance in Shenyang in 1997; 3.7% were treated for poisoning in Shanxi Zhouzhi County People's Hospital ED in 2006; 14.9% for cerebral vascular diseases at Qinghai People's Hospital ED in 1993-1995; 1.7% for cardiac diseases at the Second People's Hospital ED, Shenzhen Longgang in 1993; and 44.3% for trauma at Shanxi Zhouzhi County People's Hospital ED in 2006. The top events were trauma and poisoning among the young and cerebral infarction in the older population.

CONCLUSIONS: Compared with Australian, Chinese ED patients had 1) lower ambulance usage; 2) higher proportion of poisoning; 3) higher proportion of cerebral vascular diseases; 4) similar proportion of cardiac disease; 5) similar proportion of trauma; and 6) little reported mental health problems. Possible explanations for these differences in China include a pay for service pre-hospital care system, lack of public awareness about poisons, inadequate hypertension management, and lack of recognition of mental health problems.

KEY WORDS: Emergency department; Emergency presentations; Australia; China; Population health

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INTRODUCTION

Emergency departments (EDs) play a significant role in an acute healthcare system. Their services include emergency and disaster management.[1] The indispensable function gives them a high profile within the hospital and the community in which they serve. From the public health point of view, EDs also serve as a window of the world through which population health could be viewed. This view is becoming more revealing in the globalised world of emergency medicine.

In this paper we describe a preliminary comparison of the ED presentations between Australia and China. Such a comparison could provide insights into the health systems and burden of diseases and potentially stimulate discussion about the future development of the acute health system in China.

METHODS

An observational study was conducted to compare Australian ED presentations using data obtained from a single adult tertiary-referral teaching hospital in metropolitan Brisbane against Chinese ED presentations using public domain information published in existing Chinese and international medical journals. The Australian data were sourced from the hospital's electronic database called the Emergency Department Information System (EDIS). An information support officer ran regular reports for the ED managers using EDIS and the required information for this paper was readily available from these reports. The information obtained included International Classification of Disease (ICD-10) codes from January to December 2008. The Chinese data were collected through a comprehensive literature research. The databases used for this search included MEDLINE, PubMed, Science of Direct, and Web of Science. The key words used included China, Chinese, Emergency, Medicine, Ambulance, Acute Care, and Health. The journals searched included the *Chinese Journal of Emergency Medicine*, *Chinese Journal of Critical Care Medicine*, *Chinese Journal of General Practice*, *International Journal of Emergency and Critical Care Medicine*, *Journal of Emergency Medicine, Chinese Journal of Hospital Administration*, and *Chinese Journal of Nursing Care*.

DISCUSSION

There were major differences in ED presentations between the Australian study hospital in 2008 and comparable information from China. The proportion of patients arriving by ambulance in Australia was 35.4%. This was only 6.7% in a tertiary teaching hospital in Shenyang in 1997.[2] The proportion of patients treated for poisoning (ICD code T35-T65) in Australia was 1.7%. This was 3.7% among patients attending Shanxi Zhouzhi County People's Hospital ED in 2006.[3] Furthermore, poisoning was ranked the number one reason for ED attendances in the 14 to 39 year olds in Nantong Hospital ED from 1998 to 2001 and accounted for 42.2% of presentations.[4] The proportion of patients treated for cerebral vascular disease (ICD code I60-I69) in Australia was 1.4%. This was 14.9% among ED presentations at Qinghai People's Hospital from 1993 to 1995.[5] The proportion of patients treated for cardiac disease (ICD code I60-I69) in Australia was 1.7%. It was also 1.7% at the Second People's Hospital ED, Shenzhen Longgang in 1993.[6] The proportion of patients treated for injury or trauma (ICD code S00- T35) in Australia was 42.6%. This was 44.3% (65% of these from traffic trauma) at Shanxi Zhouzhi County People's Hospital ED in 2006.[3] In Australia, the frequently diagnosed events are mental health problems shown by general psychiatric examination and psychiatric review, alcohol abuse, and counselling for alcohol abuse, which contributed to 5.5% of all ED presentations. In China, the top problem diagnosed was trauma in youths with poisoning and cerebral infarction in the older population.

DISCUSSION

By the end of 2008, China had 60 000 hospitals, 3.69 million hospital beds, and 2.05 million doctors.[7] China has a large health workforce serving a population of 1.3 billion. The Chinese acute healthcare system is very different from that in Australia.[8] The basic introduction of emergency medicine in China has been reported before and will not be discussed in detail here.[1] However, it is again worth noting that the Chinese Association of Emergency Medicine was established in 1987.[9] By 1999, only approximately 37% of hospital EDs have emergency physicians.[10] So, compared with the emergency medicine in Australia, China is still in its development phase with a fast growth in its

workforce as well as its body of knowledge.

Our results show that compared with Australia, China had 1) a much lower rate of ambulance usage; 2) a higher proportion of patients with poisoning; 3) a higher proportion of patients with cerebral vascular disease; 4) a similar proportion of patients with cardiac disease; 5) a similar proportion of patients with trauma; and 6) little to no report on mental health presentations.

The much lower rate of ambulance use among Chinese ED patients could be explained, at least partly, by the pre-hospital care funding system.[11] It is a pay for service system for the majority of the population in China while it has mainly been a free service for the users in Australia.[12] In the 2005-2006 financial year, 22% of Australian patients arrived in the ED by road or air (helicopter and fixed wing) ambulance. The proportion of the patients was highest at 27% in the State of Queensland where our Australian study hospital was located.[13] Patients would be more likely to call for an ambulance when needed if there was no financial strain. In a free ambulance service system, people without health insurance and older people are more likely to use an ambulance,[14,15] but these findings have not been found in other research.[16] Therefore, the aging population and health equity could exert significant effect on ambulance use, which could be taken into account for future ambulance usage and development in China.

A Chinese government report has further demonstrated this financial strain concept. In 2007, hospital outpatient average cost was RMB ¥136.1 per day for an individual patient while the nations average income was RMB ¥68.3 per day.[17] Therefore, it would be a very significant financial challenge for an average family to send a member to the ED and they would not be able to afford the additional cost of an ambulance. In China, the peak presentation time is between 18:00–24:00 hours[18] and the peak mortality time is between 00:00–8:00 hours,[19,20] which are very different from those in Australia, where the peak presentation time is late morning. This may serve as evidence that Chinese patients only attend EDs when it is absolutely necessary.

Similarly, a study from the Houston, USA, reported that about 34% of the ED patients attended EDs for primary and not emergency care. These patients were usually without health insurance and were in the lower socio-economic group.[21] If everyone had universal health coverage for primary health care, ED presentations could theoretically be reduced by 34%. This might help with the current ED overcrowding problem although the main reason for the ED overcrowding in Australia is the shortage of in-patient bed for admitted patients from ED. Similar research findings support the close relationship between health insurance, affordability and ED attendances in 28 hospitals in USA.[22]

The higher proportion of poisoning among Chinese ED patients could be related to the limited public knowledge about poisoning especially among farmers. No research has been reported about the relationship between education and socio-economic status and the incidence of poisoning in China. However, the research conducted in State of Victoria in Australia has shown that Aboriginal and Torres Strait Islanders (178 per 1000) were two times more likely to present to EDs with injury or poisoning compared with non-Aboriginal people (91 per 1000).[23] Understanding the low socio-economic status of Aboriginal and Torres Strait Islanders in Australia, we consider that public education and initiatives to improve socio-economic conditions could be important strategies in preventing poisoning in this population in the future.

The higher proportion of cerebral vascular disease among Chinese ED patients could be related to the under treatment of hypertension in China. Hypertension is a known risk factor for cerebral vascular diseases. It has been reported that only 6.1% of hypertensive patients is under control in China.[24] This is even more significant considering the high prevalence of hypertension in China, at 18.8% among all Chinese and 49.1% among those over 60 years old.[25]

Hypertension management could be related to age and socio-economic status. In developed countries, hypertension and ischemic heart disease in people aged 60 years and over have been found to be predictors for ED presentations.[26] African Americans were more likely to have hypertension when attending EDs.[27] Therefore, heatlh education and improvement in socio-economic conditions in the vulnerable population could be an important step in better management of hypertension in China.

There is little published research about mental health in China. Our literature search found only one article, which reported mental health issues in 1.06% of patients attending a hospital ED.[6]

Since the proportion of trauma patients attending

EDs was similar between Australia and China, the scale of the problem is much more significant in China due to the population size. For example, data published by China Ministry of Health in 2005 showed that injury and trauma ranked the third (11.10%) in all hospital admissions in China, and it costed China about RMB ¥45.5 billion each year.[28] In addition, trauma or accidents are the leading cause of death among ED patients.[5,29]

While Australia has used high proportions of admitted patients staying longer than eight hours in the ED as an adverse performance indicator, Chinese EDs have reported shorter lengths of stay with only 7 per 100 000 of patients staying longer than four hours.[30] This could be related to the emergency medicine system in China[31] and the operating environment of financial funding issues with hospitals in China.[32]

The comparison between Australia and China is limited by the availability of comparable data and the differences in the age structures between the two countries. For example, the International Classification of Disease (ICD-10) codes has not been part of Chinese ED dataset. The use of ICD-10 code is in an early development among the Chinese EDs and Emergency Centres.[33] Future analytical research using ED data could further the knowledge and understanding of the acute health care system and population health in Australia and China.

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