

Emergency department enlargement in China: exciting or bothering

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Background: Emergency department (ED) enlargement became a trend with its development. However, there came some problems such as ED overcrowding and increasing medical disputes. Here we did a survey about the development tendency of EDs in 3A grade hospitals in China, analysed the problems we facing and rendered some solutions combining some special characteristics in China.

Methods: We randomly selected 17 3A grade general hospitals from 12 provinces from the 50 members of Chinese College of Emergency Physician. A questionnaire survey was conducted. The basic information and problems of EDs were collected and analysed.

Results: The gross area, the number of beds and the attention paid by the hospitals of EDs increased during the development, so did the patients admitted to EDs, also more doctors and nurses devoted into emergency medicine. But it had become more difficult for doctors to admit ED patients to inpatient wards. Besides the problem of increasing crowding degree, EDs faced more medical disputes and complains during the development.

Conclusions: ED expanding was the result of emergency medicine development, but the enlargement of ED should be more rational. We should improve our doctors' medical skills, optimize the health system, pay more attention to preventive medicine and push hard for health-care reform instead of forcing ED enlargement to satisfy the need for ED.

Keywords: Emergency department (ED); enlargement; overcrowding; access block

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Introduction

According to "Comprehensive hospital grading management standards", hospitals in China are divided into three degrees and each degree is classified into A and B grades in which 3A grade hospital is the top class. A survey conducted by National Health and Family Planning Commission of the

People's Republic of China in March 2014 showed that there were 1,475 3A grade hospitals which accounted for 15.2% of all hospitals in China. Emergency departments (EDs) in 3A hospitals are the main forces that drive the development of the emergency medicine in China. The ED in Peking Union Medicine College Hospital was established by Dr. Shao in 1983. At that time, ED was composed of

two doctors and 22 nurses, and the devices were limited, but the emergency room was not crowd. However, after 30 years of development, ED became larger and larger, but ED overcrowding which decreased the satisfaction of the patients, lowered the medical quality and generated a negative outcome for patients, just as what the literature said, had become a worldwide problem (1,2). Even though some authors suggested that ED enlargement could be a management strategy to deal with these crises, but the overwork doctors and nurses and the increasing waiting time saw the fact that ED expanding seemed cannot solve the problem properly. Namely, the development of ED could not meet the needs of the patients. In another word, EDs always seemed to need more space, more devices, more doctors and more nurses. Here we studied the development tendency of the EDs in several 3A grade hospitals in China, analysed the problems we were facing in the development of the EDs and rendered some solutions combining some special characteristics in China due to the regional influences and different health systems.

Methods

Data collection

This study was approved by the institutional review board committee of Peking Union Medical College Hospital. A questionnaire survey was conducted and the questionnaire was sent to ED directors. Seventeen 3A grade general hospitals from 12 provinces that were among the 50 members of Chinese College of Emergency Physician were enrolled in the study by random choice method. These hospitals and the ED establishment time were showed as follows: Peking Union Medical College Hospital (1983, Beijing), Peking University First Hospital (1989, Beijing), The General Hospital of Beijing Military Region (1978, Beijing), The Second Affiliated Hospital Zhejiang University School of Medicine (1984, Zhejiang province), The Second Hospital of Hebei Medical University (1996, Hebei province), Heilongjiang Provincial Hospital (1982, Heilongjiang province), The First Affiliated Hospital of Wenzhou Medical University (1982, Zhejiang province), Tianjin Medical University General Hospital (1984, Tianjin), Xinjiang Uygur Autonomous Region People's Hospital (1980, Xinjiang Uygur Autonomous Region), The First Affiliated Hospital of Xinjiang Medical University (1982, Xinjiang Uygur Autonomous Region), Hainan General Hospital (1988, Hainan province), Jiangsu Province Hospital (1987, Jiangsu province), Xinhua Hospital (1985,

Shanghai), Xiangya Hospital (1987, Hunan province), The First Affiliated Hospital of Anhui Medical University (1985, Anhui province), The First Affiliated Hospital of Kunming Medical University (1986, Yunnan province) and Sun Yat-sen Memorial Hospital (1984, Guangdong province). The staff composition, department composition, clinical amounts, the number of beds, the relationship with inpatient department and the medical disputes of EDs at the establishment time (the initial stage), 2000 and 2012 were collected and analysed respectively. The developing tendency of EDs in China was measured.

Statistics

Statistical analysis was finished by SPSS Statistics 17.0. The normality of the distribution was assessed using the Kolmogorov-Smirnov test. Group *t*-test was applied to the normal distribution data and Mann-Whitney U test was applied to the non-normal distribution data. Data are shown as means \pm SD or median (25–75%). Analyses were presented as two-sided comparisons. The P value less than 0.05 was considered to be significant.

Results

The gross area and the number of beds of EDs increased during last 30 years

The median gross area of the 17 EDs at the initial stage was 500 (range, 400–900) m², and at 2000 and 2012 it increased into 1,728.57 \pm 685.49 and 5,423.53 \pm 3,208.30 m² respectively (P=0.003 and <0.0001 respectively). The mean number of beds at the initial stage, 2000 and 2012 were 17.64 \pm 13.82, 43.45 \pm 32.78 and 81.71 \pm 34.23 respectively, which showed an increasing trend (P=0.026 and 0.007 respectively) (Table 1).

ED users increased during the last 30 years

The mean number of ED visits per year at 2012 (147.4 \pm 67.0 thousand) increased than that of 2000 (91.0 \pm 59.8 thousand) (P=0.038), so did the number of 2000 compared with that of the initial stage (46.4 \pm 40.4 thousand) (P=0.045) (Table 1).

ED got more attention and more doctors and nurses devoted to the emergency medicine

At the initial stage, only 13% hospitals paid high attention to the EDs, and the percent increased into 23% and 88% at 2000 and 2012 respectively (Figure 1).

Table 1 The developing tendency of EDs

Assessment indexes	The initial stage	2000	2012	P ₁	P ₂
The gross area (m ²)	500 [400–900]	1,728.57±685.49	5,423.53±3,208.30	0.003	<0.0001
The number of beds	17.64±13.82	43.45±32.78	81.71±34.23	0.026	0.007
The number of ED visits per year (thousand)	46.4±40.40	91.0±59.80	147.4±67.00	0.045	0.038
The number of ED doctors	6.00±4.87	17 [15–20]	39.94±11.88	0.004	0.002
The number of ED nurses	24.13±12.05	40 [40–80]	115.75±33.76	0.012	0.005

P₁, the P value between 2000 and the initial stage; P₂, the P value between 2012 and 2000. EDs, emergency departments.

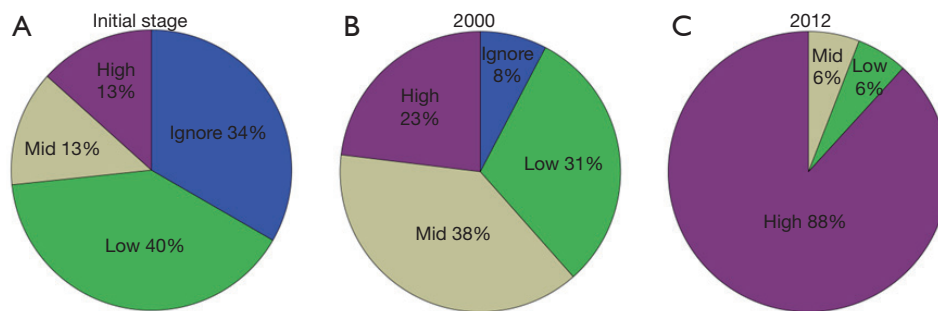


Figure 1 The attention paid by hospital to ED development. (A) At the initial stage, 13% hospitals paid high attention to ED development while 34% of EDs were ignored and 40% were paid little attention; (B) at 2000, 23% EDs were paid high attention and 8% and 31% were ignored and paid little attention respectively; (C) 88% hospitals paid high attention to ED development at 2012.

The mean number of ED doctors at the initial stage was 6.00±4.87, and the median number at 2000 increased into 17 (range, 15–20) (P=0.004), and at 2012, it increased into 39.94±11.88 (P=0.002). The number of ED nurses presented a similar trend, which was 24.13±12.05, 40 (range, 40–80) and 115.75±33.76 respectively (P=0.012 and 0.005 respectively) (Table 1).

ED doctors got into a dilemma between ED overcrowding and access block

We used the percentage of patients admitted to the inpatient ward who needed admitting to evaluate the level of access block. Here we divided it into four classes from easy to very hard (easy: more than 90%, mid: 50% to 90%, hard: 20% to 50%, very hard: less than 20%). From the very beginning of ED established to 2012, it had become harder for emergency patients to be admitted to the inpatient wards. Seventy-seven percent of EDs were hard or very hard to admit patients to the inpatient wards at 2012, while the percent at the initial stage was only 25% (Figure 2). To the year 2012, ED doctors of 53% hospitals had the priority to admit patients to the inpatient wards and all the

EDs had emergency intensive care units (EICUs).

The overcrowding degree of EDs was reflected by the average waiting time from registering to see the doctor. Six degrees from A (not crowd) to F (crowd to a very severe degree) were defined as follows according to the waiting time: A: less than 5 minutes, B: 5 to 10 minutes, C: 10 to 20 minutes, D: 20 to 30 minutes, E: 30 to 40 minutes, F: more than 40 minutes. At the initial stage, only 13% of EDs reported crowd to the degree E. The percentage increased into 25% at 2000. And in 2012, 59% of EDs were E or F degree crowd (Figure 3).

EDs faced more medical disputes and complains during the development

At the initial stage, all of the EDs faced less than five medical disputes per year, while at 2000 and 2012, 12.5% and 11.8% of EDs needed to manage more than five medical disputes per year. Similarly, the number of medical complains showed an increasing trend. A total of 11.1% of EDs got more than five medical complains per year at the initial stage and at 2000 and 2012, the percentage increased into 62.50% and 70.59% respectively.

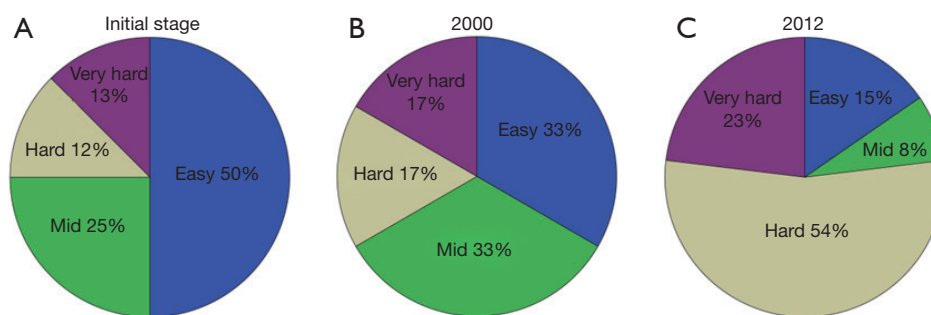


Figure 2 The difficulty degree for ED doctors to admit patients to inpatient ward. (A) Half of the EDs were easy to admit patients to inpatient wards at the initial stage and 13% were very hard; (B) the percentage of easy, hard and very hard were 33%, 17% and 17% respectively at 2000; (C) the percentage of hard and very hard degree increased to 54% and 23% respectively at 2012.

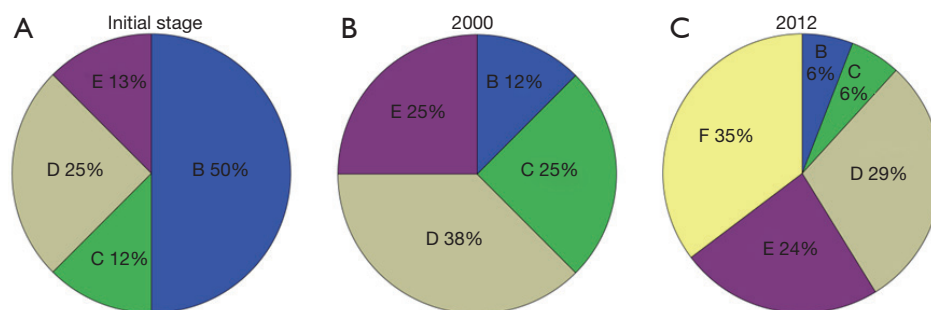


Figure 3 The crowd degree of EDs. (A) The percentages of the crowd degree of EDs from A to F at the initial stage were 0%, 50%, 12%, 25%, 13% and 0% respectively; (B) the percentages were 0%, 12%, 25%, 38%, 25% and 0% respectively at 2000; (C) the percentages were 0%, 6%, 6%, 29%, 24% and 35% respectively at 2012.

Discussion

Hospitals in China were classified into three degrees according to the scale of the hospital and the level of medical service, and each degree was graded into A and B classes (3). 3A hospitals were the top class hospitals in China. Emergency medicine had got great development since it was established. However, the increasing ED users broke the balance between the supply and demand of EDs. From the results of this survey, the gross area of EDs in 3A hospitals in China increased during last 30 years, so did the number of staffs. But these increases did not solve the problem of ED overcrowding. On the contrary, EDs seemed to be increasingly crowd. In this survey, 59% of EDs reported the problem of overcrowding to a sever degree at 2012 while only 13% and 25% of EDs faced this problem at the initial stage and 2000 respectively. In fact, the overcrowding was not only the problem of EDs, but also all departments of 3A hospitals in China. So far, Chinese doctors were not permitted to serve at more than

one hospital. And 3A hospitals possessed more medical resources and better medical teams. With the development of living standard, economic and traffic standard, medical service provided by the low grade hospitals could not meet the need of the patients and it had become more and more convenient for patients to get better medical service in a bigger city. As a result, the need for 3A hospitals increased. Then there came the problem of access block which worsen ED overcrowding. Even though ED doctors of 53% hospitals in this survey had the priority to send ED patients to the wards, the lack of beds limited this priority. Not to say those who did not have that priority.

Besides the lack of beds, the performance inspection systems of hospitals were responsible for the access block. The bed rotation rate, drug cost ratio, patient satisfaction and mortality were included in the performance inspection regardless of the disease severity and other circumstances of the patients. To improve the performance, the inpatient departments were likely to admit patients with less sever and less complicated diseases. As a result, some diseases

admitted previously were forced to be managed at ED now. To solve this problem and to make sure the security of the badly ill patients, EDs were forced to develop their own inpatient wards and EICUs were established which might be a unique compartment of the Chinese EDs. According to our survey, to the year 2012, all of the 17 hospitals included in the survey established EICUs. To some degree, EDs were forced to develop, both in the scale and in the medical services. Had the performance inspection systems of hospital been more flexible, the inpatient wards would have admitted serious patients with less unnecessary pressure. Also, with the increase of medical violence (4), inpatient wards were more circumspect when they picked patients. Besides the condition of the patient, the relatives' attitude and economic condition were taken into consideration. A survey conducted in a Chinese tertiary hospital also indicated that the most significant reason for prolonged lengths of stay was boarding block and shortage of inpatient beds and reluctance of the wards to admit these patients might be the primary reasons for extremely long boarding (5).

Aging population directly correlated with the increased utilization of emergency services (6). According to the Sixth National population census data Gazette, the total population increased by 5.84%, and population aged above 60 and 65 increased by 2.93% and 1.91% respectively compared with the fifth national census in 2000 (7). Even though more doctors and nurses devoted to emergency medicine, this seemed could not meet the need of the increasing population. Besides, the disease burden of China has changed from communicable disease to chronic disability such as cardiac-cerebral vascular disease and chronic obstructive pulmonary disease (8). However, the ignore of preventive care and the insufficient medical service provided by basic general hospitals aggravated the crowding problem of 3A hospitals and also augmented the burden of EDs.

EDs are required to insist on primary responsibility system and cannot deny any ED patients with any reason (9). According to our survey, most EDs did not have barriers to entry. The Beijing Times reported a research conducted in 42 general hospitals in Beijing recently which said that the non-urgent patients accounted for 32% of all ED users (10). These patients played an important role in the problem of ED overcrowding and enlargement. Accessibility to health care resources and the context in which the medical problem occurred were the reasons for non-urgent patients search help in ED (11). Improve the level of medical service provided by the basic general hospital, provide night-

time outpatient service and promote multi-sited license of doctors might be critical to solve this problem.

The forced enlargement of EDs brought many problems. Our survey saw increasing medical disputes and complains. We could not deny that the high expectation of patients for medical service might be a cause of this problem. But the relative lack of doctors and nurses and long waiting time caused by ED crowding played a critical role in it. Then the fate of the ED was worrying. Would the ED collapse someday if we let it continue to expand? Maybe we should stop and figure some solutions to optimize ED service.

There were some limitations in this survey. First, this was a questionnaire survey. The problems reflected by the responders might be subjective which could affect the result of the survey. Also, the conclusion might be restricted because of the limited number and information we studied. More researches should be done such as the EICU development in Chinese EDs.

Conclusions

ED expanding was the result of emergency medicine development, but the enlargement of ED should be more rational. We should improve our doctors' medical skills, optimize the health system, pay more attention to preventive medicine and push hard for health-care reform instead of forcing ED enlargement to satisfy the need for ED.

Acknowledgements

None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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