EQUITY AND SATISFACTION OF COMMUNITY HEALTH SERVICES IN TONGLIAO CITY, INNER MONGOLIA

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Abstract. We aimed to describe the human resources and apparatuses of community health service (CHS) in Tongliao City of China and investigate the differences between CHS centers and stations. Field investigations and questionnaire-based surveys were conducted in 120 CHS organizations of Tongliao City, which were selected by a stratified multistage random cluster sampling method. Data were collected on the human resources, medical apparatuses, and satisfaction of covered residents. We found that the total number, educational background, and professional titles of staff were lower at stations than at centers. Although the categories of providing health services were comparable between centers and stations, stations provided fewer health services than centers did. In addition, stations owned fewer apparatuses compared with centers. The percentages of satisfaction on many items were lower among residents covered by stations than among those covered by centers. Desired health services provided by CHS organizations have been partially accomplished in Tongliao City. Attracting more highly educated professionals and purchasing more valuable apparatuses may be helpful to improve the unbalanced distribution in human resources and apparatuses between centers and stations. Appropriate modifications of corresponding policies should be taken into consideration by the local government in the future.

Keywords: community health care, health equity, public health system, China

INTRODUCTION

China is a rapidly developing country facing several important public health problems. The first is continuously increasing prevalence of chronic diseases. According to the data published in 2008 and 2010, about 177 million Chinese adults suffer from hypertension (Yang *et al*, 2008b), while 92.4 million suffer from diabetes (Yang *et al*, 2010). The second problem is the uneven distribution of limited medical resources and professionals among different areas. A previous study showed that in China, uneven distribution of medical staff is higher in within-province than in between-province (Anand *et al*, 2008). The third problem is that China has entered the stage of an aging society. According to the National Bureau of Statistics of China in 2011, the number of people aged 60 years and older has risen to 185 million (Zhang *et al*, 2012).

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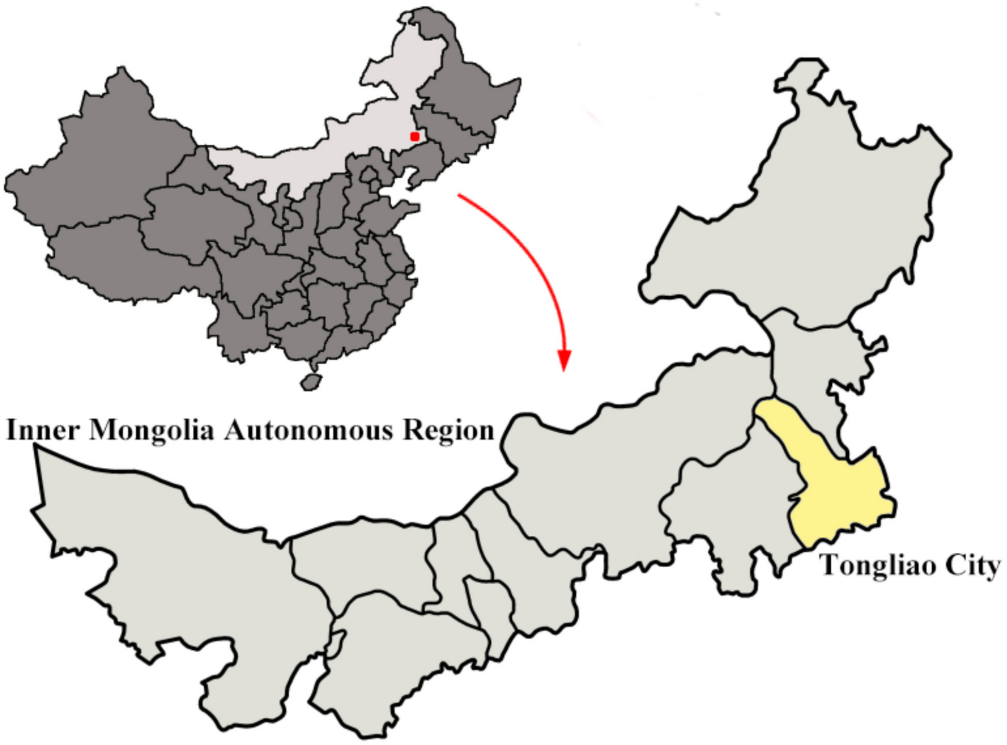

Fig 1–Map of the Inner Mongolia Autonomous Region showing the location of study site.

It is necessary for China to provide sufficient health care for this aged population.

China introduced a community health service (CHS) system in the 1990s to provide basic clinical and primary health care for the people. The composition of the CHS organization can be described as '1 body, 6 aspects' (Yang *et al,* 2008a). The 'body' refers to the CHS organization, while the '6 aspects' include basic clinical services, prevention, health education, women and children's care, elderly care, immunizations, and physical rehabilitation. As first designed, the CHS system consisted of centers and stations, both of which had similar functions but a little difference in target populations. A CHS center regulates 3-to-6 stations and provides services to a population of 30,000-100,000, while a station provides services to about 10,000 populations (Luo *et al,* 2010). Generally, the center collects and processes data from the stations, and then reports them to the local health administration department. Both CHS center and station are completely supported by an allocation from the government (Dib *et al,* 2010).

Tongliao is a typical large Mongolian city in the eastern Inner Mongolia Autonomous Region, in which the Mongol nationality forms the largest ethnic minority (Fig 1). Because the area of this city is wide and the population is unevenly distributed, there are limited accurate data on the CHS in this city. Therefore, the purpose of this study was to provide more information for modification and improvement of CHS in Tongliao City of Inner Mongolia.

MATERIALS AND METHODS

Respondents

Of all of the 1,243,215 people serviced by the 120 CHS organizations, 2,486 (0.2%) subjects were randomly selected, and finally, 2,139 subjects recruited for the satisfaction survey by using a standard CHS satisfaction questionnaire.

Ethical considerations

Design and all procedures of this study were in accordance with the Declaration of Helsinki. The Ethics Committee of the Inner Mongolia University for the Nationalities approved this study (Ref Nº IMUNEC032010031502; 2010 Mar 15), and all participants signed informed consent forms.

Sampling and survey

To ensure the sample representative, we adopted a stratified multistage random cluster sampling method. Briefly, all CHS organizations in this city were classified into three strata according to their capacity and financial situation, and then 120 CHS organizations (18 centers and 102 stations) were randomly selected from each stratum.

Data on human resources and apparatuses in 2010 were obtained from field investigations. We conducted this study from January 2011 to June 2012. Well-trained interviewers and investigators performed all surveys and investigations in our study.

Training and quality control

Three epidemiologists and two specialists of CHS organizations designed a standard satisfaction questionnaire, a training manual, and interview methods for the training program before this study. All interviewers and investigators evaluated the questionnaire and designed a pilot survey. We conducted the pilot survey on three CHS organizations randomly selected from each stratum respectively, and then confirmed the reliability and validity of our questionnaire. All questionnaire-based surveys were conducted by face-to-face interviews between interviewers and anonymous interviewees. All field investigations were confirmed again by telephone interviews. Two independent interviewers dually entered the data to ensure accuracy.

Data analysis

Data were presented as numbers or percentages as appropriate. Descriptive statistical analyses were performed with SPSS® (version 16.0; SPSS, Chicago, IL).

RESULTS

Human resource and apparatus

Compared with CHS centers, stations had fewer medical staff (Table 1). There were not only fewer doctors and nurses, but also other technicians such as laboratorians and imaging technicians. The doctor-nurse ratio was higher at CHS centers (ratio = 3.1) than at stations (ratio = 1.3). Staff at centers had higher professional titles (Table 2) and higher degrees (Table 3) than those at stations.

The categories of provided public health services were comparable between centers and stations. All centers and stations provided general clinical service and immunization; however, centers provided more health services than stations did in most other categories, such as home visits, and health education and information (Table 4). As summarized in Table 5, CHS centers also had a more adequate number of valuable apparatuses compared with stations. Obviously, CHS centers had greater average numbers of doctors and

Table 1
Average number and composition percentage of different staff positions.

Staff position	Center	Station
	n (%)	*n* (%)
Doctor	8.6 (47.3)	1.7 (38.6)
Assistant doctor	2.5 (13.7)	0.4 (9.1)
Nurse	2.8 (15.4)	1.3 (29.5)
Pharmacist	1.1 (6.0)	0.4 (9.1)
Laboratorian	0.7 (3.8)	0.1 (2.3)
Imaging technician	0.3 (1.6)	0.0 (0.0)
Others	2.2 (12.1)	0.5 (11.4)

Table 2
Average designation and composition percentage of professional status.

Professional status	Center	Station
	n (%)	*n* (%
Senior level	2.9 (15.9)	1.3 (29.5)
Middle level	5.4 (29.7)	1.1 (25.0)
Junior level	8.5 (46.7)	1.1 (25.0)
No title	1.4 (7.7)	0.9 (20.5)

Table 3
Average education levels and composition percentage.

Education level	Center	Station
	n (%)	*n* (%)
Master or higher	3.5 (19.2)	0.8 (18.2)
Bachelor	5.3 (29.1)	1.3 (29.5)
Lower than bachelor	9.4 (51.6)	2.3 (52.3)

of material resources per square kilometer and per thousand capita than stations did (Table 6).

Satisfaction of CHS organizations

Data derived from the satisfaction survey are summarized in Table 7. We found that most subjects knew the nearest CHS organizations and were satisfied with the cost of CHS. However, compared with those covered by centers, subjects covered by stations had lower satisfaction levels on several items, such as environment, service attitude, medical technology, and had fewer chronic disease related activities at CHS organizations.

Table 4
Public health services provided by CHS organizations.

Public health services	Center	Station
	n (%)	*n* (%
Child care	16 (88.9)	78 (76.5)
Chinese traditional medicine	16 (88.9)	84 (82.4)
Dental and oral care	17 (94.4)	83 (81.4)
Emergency rescue service	15 (83.3)	76 (74.5)
General clinic	18 (100.0)	102 (100.0)
Geriatric care	15 (83.3)	86 (84.3)
Health education and information	18 (100.0)	97 (95.1)
Home visit	17 (94.4)	70 (68.6)
Terminal care	15 (83.3)	78 (76.5)
Immunization	18 (100.0)	102 (100.0)
Maternal care	17 (94.4)	82 (80.4)
Psychological consult	14 (77.8)	75 (73.5)
Rehabilitative care	15 (83.3)	79 (77.5)

Table 5
Apparatus in CHS organizations of Tongliao.

Apparatus (CNY)	Center	Station
	n (%)	*n* (%)
10,000 - 500,000	77 (4.3)	43 (0.4)
500,001 - 1,000,000	47 (2.6)	30 (0.3)
1,000,001 - 1,500,000	0 (0)	0 (0)
1,500,001 - 2,000,000	1 (0.1)	0 (0)

CNY, Chinese yuan.

Table 6
Average number of medical staff and apparatus per km^2 and per thousand capita.

Medical staff and apparatus	Center		Station	
	Per km^2	Per thousand capita	Per km^2	Per thousand capita
Doctor	0.086	0.515	0.004	0.189
Assistant doctor	0.025	0.150	0.001	0.046
Nurse	0.028	0.166	0.003	0.138
Equipments (CNY)				
10,000 - 500,000	0.042	0.256	0.001	0.046
500,001 - 1,000,000	0.026	0.156	0.001	0.032
1,000,001 - 1,500,000	0.000	0.000	0.000	0.000
1,500,001 - 2,000,000	0.001	0.003	0.000	0.000

CNY, Chinese yuan.

Table 7
The results of perception and satisfaction survey of residents.

Items in questionnaire	Percentage	
	Center	Station
Knew the nearest CHS organization	99.5	95.9
Have been to CHS organization for disease treatment	95.4	81.3
The environment of CHS organization		
Satisfaction	88.9	74.2
Mild satisfaction	10.9	12.8
Dissatisfaction	0.2	13.0
The service attitude of staff at CHS organization		
Satisfaction	91.6	78.9
Mild satisfaction	8.2	6.2
Dissatisfaction	0.2	14.9
The medical technology of staff at CHS organization		
Satisfaction	86.6	61.3
Mild satisfaction	12.9	22.5
Dissatisfaction	0.5	16.2
The convenience in CHS organization		
Convenience	99.0	88.3
Inconvenience	1.0	11.7
The cost in CHS organization		
Satisfaction	98.6	96.3
Dissatisfaction	1.4	3.7
Have chronic disease records in CHS organization	92.4	68.0
Have attended the health lectures provided by CHS organization	88.6	76.2
Which one is the first choice for disease treatment		
Provincial hospital	14.5	13.7
Municipal hospital	12.3	15.6
District hospital	4.6	4.0
CHS center or station	56.2	55.4
Others	12.4	11.3
Usually received health promotion/ education documents	96.8	81.2
Aware of the limitation on daily salt intake	90.5	68.5
Usually received health knowledge from doctor	99.2	81.3
The responsibility of doctor at CHS organization		
Responsibility	99.5	73.4
Irresponsibility	0.5	0.4
The respect of staff on the privacy of patients		
Good	99.6	76.9
Bad	0.4	0.3

DISCUSSION

Undoubtedly, doctors and nurses play vital roles in the health services provided by CHS organizations. Our investigation found that doctor and nurse numbers were less at CHS stations than at centers. Moreover, the professional title and educational backgrounds of staff were also lower at stations than at centers. The reasons for professional differences between centers and stations might be that the average income, vocational development, and training opportunities are lower at stations than at centers (Eggleston *et al*, 2008). During the past decades, the Chinese government has made considerable effort to promote medical professionals with high professional titles and favorable educational backgrounds to work at CHS organizations (Zhou *et al*, 2013); however, our results indicated that, in Tongliao City, it is still necessary for government to attract more highly educated professionals to work at CHS stations.

As described above, both centers and stations provide several health services to the covered residents, but apparently many stations cannot provide full health services, which may be caused by lack of human resources and medical apparatus. Some directors or officers of CHS organizations in our field investigation indirectly confirmed this assumption. Most health services such as childcare and home visit are always considered useful health services to residents. The increased quality and quantity of these services in CHS organizations can partly reduce the number of patients in hospital and provide much convenience to patients. Therefore, how to maintain and further improve the medical services and increase the support funds in centers and stations should be given more attention.

The average numbers of doctors and apparatus were apparently less at stations than at centers. Our results were consistent with the above data on human resources distribution.

Questionnaire survey results suggested that most residents were satisfied with the CHS organizations. These results indicated that, to a certain degree, most CHS organizations function as intended by the government. However, differences in data between centers and stations should not be ignored. Due to great socioeconomic improvement and the arrival of an aging society, health care of chronic or non-communicable diseases has become particularly important in the Chinese community (Zhan, 2013).

Disease records at CHS organizations provide information for professionals to control diseases (Landon *et al*, 2007). However, in our study, the amount of information on disease was lower at stations than at centers. According to the information collected from officers of stations, some stations presently lack specialized staff to obtain and manage records. In the future, designing methods to attract more staff to manage records should be taken into consideration.

We also observed that many residents were unsatisfied with the medical technology at the stations. Up-to-date technologies are necessary for CHS organizations to improve diagnosis accuracy; therefore, this problem should be given more attentions in the future.

In conclusion, currently most CHS organizations in Tongliao City still lack medical professionals and apparatus, which may influence the quality of health service and medical care provided. Moreover, differential distribution of medical resources between centers and stations

probably affects the equity between various communities. To promote the development of CHS organizations, the way to attract more highly educated professionals and increase more funds on apparatuses should be taken into consideration in the future design of policies.

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