Community-based rehabilitation service in Chengdu: a cross-sectional general survey

CURRENT STATUS: UNDER REVIEW

Siliang Chen
West China School of Medicine, Sichuan University

Yi Lei leiyi111@scu.edu.cn
Sichuan University
Corresponding Author
ORCiD: 0000-0003-3197-5620

Hua Dai
International medical center/center of general practice, West China Hospital, Sichuan University

Jia Wu
International medical center/center of general practice, West China Hospital, Sichuan University

Ziyu Yang
International medical center/center of general practice, West China Hospital, Sichuan University

Xiaoyang Liao
International medical center/center of general practice, West China Hospital, Sichuan University

DOI: 10.21203/rs.2.19044/v1

SUBJECT AREAS
Health Economics & Outcomes Research Health Policy

KEYWORDS
community-based rehabilitation, basic health services, general survey, primary health center
Abstract

Background

Community-based rehabilitation (CBR) was initiated by World Health Organization in 1984, and by then it has been an essential process of medical services in the worldwide. China had strengthened primary health care via constructing more than 35 thousand community health centers (CHCs) in cities, and more than 35 thousand township health centers (THCs) in rural area. Nevertheless, it remains unclear that if these basic health center could provide optional rehabilitation services for disabilities. And this study aims at evaluating supply capacity of rehabilitation service in basic health centers of Chengdu, a regional center city of southwest China.

Method

We conducted a general investigation of primary health centers in Chengdu, a city located in south west China with more than 15 million population. Totally, our investigation covered 115 CHCs and 264 THCs from October to November 2016. We investigated these primary health center on basic rehabilitation services, disease spectrum and rehabilitation equipment quantity and quality, and traditional Chinese medicine (TCM) physiotherapy

Result

Rehabilitation therapy is available in 88.9% (337 of 379) of all community health centers, meanwhile, urban community health centers slightly surpass rural community with available rate of 92.2% (106 of 115) and 87.5% (231 of 264), respectively. Traditional Chinese Medicine (TCM) physiotherapy is available in 97.1% (368 of 379) of all community health centers, 97.3% (112 of 115) of urban
community health centers and 97.0% (256 of 264) of rural community health centers. Quantitively analysis indicated that substantial factors which could make impact on number of patients per year contain: species of rehabilitation disease \( (P<0.001, \text{95\% confidence interval (CI)} \ [-1.571, -0.702]) \), the service population \( (P=0.03, \text{95\%CI} \ [-1.198,-0.057]) \), number of rehabilitation bed \( (P<0.001, \text{95\%CI} \ [-1.249,-0.290]) \)

Conclusion

Community-based rehabilitation and TCM physiotherapy have become accessible for disabilities in neighbor community health centers of Chengdu City. Whereas, available rate of CBR in rural CHCs is lesser than in urban CHCs, which indicates imbalance in basic health service development between rural and urban area. A bit of baseline of CHCs makes significant impact on number of patients per year, including species of rehabilitation diseases, service population and number of rehabilitation bed.

Background

Community-based rehabilitation (CBR) has been a widely-accepted pattern for individuals to get access to convenient, flexible and economical rehabilitation services since it was introduced in the 1970s\(^1\). In 1978, in an attempt to decrease the burden of disability in low- and middle-income countries, the World Health Organization launched a strategy called community-based rehabilitation (CBR). CBR is now implemented in more than 90 countries and is defined as an inclusive community development strategy, which aims at the equalization of opportunities, rehabilitation, poverty reduction, and social inclusion of the population living with a disability. Statistics show that more than 2 million disabilities are under the
condition of inconvenient rehabilitation medical service assessment. The World
Health Organization (WHO) set CBR as a critical development direction for
disabilities, according to the Global Disability Action Plan(2)
The development of rehabilitation services in China has been evoking since the 1980s when it was introduced into China. In the early years, volunteers recruited by the government were main providers of CBR, however, due to lack of systematic training for volunteers, CBR service remains in a low quality for many years. With support from the central and provincial governments and organizations, grassroots rehabilitation communities have mobilized and integrated local resources to meet the rehabilitation needs of people with disabilities(3). However, insufficient financial resources and personnel in rural communities, compounded by a lack of awareness from local authorities and the traditional hierarchical administrative system, have hampered the growth of CBR services in China(4).

Nevertheless, there are rare data about how widely the community health centers could cover disabilities who are in sore need of convenient and economical rehabilitation services. Because so many challenges during the process of CBR evaluation would hamper investigators to get real and effective data. For instance, community health centers in the Chinese vast rural area are difficult to be evaluated because of the low literacy and the large variety of dialects. Additionally, using Likert scaled in Chinese culture is difficult because participants tend to select the midpoint(5) and probably skip some items(6). This is because of the deeply held collectivist values within Chinese culture affect the self-reporting behavior of Chinese people: Chinese people are expected to modestly rate their performance and refrain from exaggerating their achievements(7). They are relatively conservative and encouraged not to openly discuss or comment on a person’s family
or organization(8). The reluctance in China to evaluate service systems, programs or a family can result in the underrating of performance when using self-reporting scales(7).

Methods

Subjects

In order to effectively evaluate CBR in CHCs, we selected Chengdu, with a 13.5 thousand dollars general domestic production (GDP) per capita(9) as the target place. Chengdu city is located at Sichuan province in southwest China, which has a land area of 12390km² and a population of 14.17 million. The city is the economic and cultural center in the western part of China, and about 34.49% of the population dwell in rural areas. In this middle-class developed city with a relatively better economic scenario, we could reduce bias evoked by the low literacy and education level of the citizens to a minimum.

And we conducted a cross-sectional general survey of primary care facilities in Chengdu covering a totally of 115 CHCs and 264 THCs. To reduce the uncertainty caused by the large variety of education levels of patients, the survey questionnaire was undertaken by lead physicians in these community health facilities from October 2016 to November 2016. At the same time, data about these community health facilities was obtained from the Health Commission of the Sichuan Province to corroborate survey results.

Development of the questionnaire

The questionnaire was self-developed. The questionnaire(10) items were designed according to the policy of <Service quality evaluation guideline for primary care facilities>, made by National health and family planning commission of the people's
republic of China in 2016, then modified after consideration of specific applicability as well as an expert discussion. We focus on evaluating the basic capabilities of primary care facilities in providing services, thus we mainly collected the following variables:

1. Total number of rehabilitation patients of each primary health facilities in 2015
2. Total number of disabilities in the area under the administration of each primary health facilities in 2015
3. Species of rehabilitation diseases
4. Basic conditions: the service population, area of the structure, the total number of rehabilitation physicians, physical therapy equipment, cervical and lumbar traction equipment, infrared therapy apparatus, ultrasound therapy apparatus, number of rehabilitation bed, number of rehabilitation therapeutic room,
5. Rehabilitation training: rehabilitation lecture, rehabilitation counseling.
6. Rehabilitation management measures: rehabilitation training plan, rehabilitation-related system, rehabilitation self-examination.

**Administration of the questionnaire**

An instruction for data quality control was developed. Questionnaires were distributed by local health bureaus to the leaders of every single basic health center. 390 leader physicians received questionnaires, completed independently and handed them over to the investigation team in 2 weeks after they received the questionnaires. Then the investigation team staff rechecked the collected questionnaires, and complementary filled the missing data by telephone review for leaders of basic health centers. At last, we randomly sent staff to 5% of the CHC facilities to examine the authenticity and validity of the returned questionnaires.
Data analysis

Data were entered into Epidata by dual investigators and analyzed with SPSS 22.0 (SPSS Inc., Chicago, IL, USA). Normally, distributed continuous variables were reported as mean ± standard deviation (SD), while undistributed continuous variables used median ± interquartile range. Categorical variables are reported as frequency and proportions.

In order to determine which specific characteristics—among the number of diseases, rehabilitation diseases, area of the structure, rehabilitation equipment, rehabilitation management measures, etc.—were independently associated with the number of patients per year in urban and rural CHCs, we performed multivariate linear regression analysis. As the average number of patients per day was huge, thereby using the square root of the average number of patients per day as the dependent variable. The assumptions of the regression model—normality of residuals, homoscedasticity, and multicollinearity—were checked by a scatterplot of residuals vs predicted (fitted) values (quantile-quantile plots), Breusch-Pagan/Cook-Weisberg tests, and a variance inflation factor, respectively. We used the R2 value to assess the model's goodness of fit. All significant tests were 2-tailed, and those with a P-value <.05 were considered statistically significant.

Results

Of all the 390 CHCs this survey covered, 379 primary health facilities responded to this survey under the help of municipal government, which came out with a response rate of 97.2%. After inspecting the validity of all received survey feedbacks, all 379 feedbacks entered into the analysis.
The first part is the basic status of community rehabilitation and TCM physiotherapy (Table 1.). Rehabilitation service is available in 88.9% (337 of 379) of all community health centers, meanwhile, urban community health centers slightly surpass rural communities with an available rate of 92.2% (106 of 115) and 87.5% (231 of 264), respectively. Traditional Chinese Medicine (TCM) physiotherapy is available in 97.1% (368 of 379) of all community health centers, 97.3% (112 of 115) of urban community health centers and 97.0% (256 of 264) of rural community health centers. And the top 5 diseases of community rehabilitation in descending order are the cervical vertebral disease, lumbar vertebral disease, osteoarthritis, adhesive capsulitis, and stroke sequelae.

|                        | urban community N=115 | rural community N=264 |
|------------------------|-----------------------|-----------------------|
| Rehabilitation (KF)    | yes 106 no 9          | yes 231 no 33         |
| TCM physiotherapy      | yes 112 no 3          | yes 256 no 8          |
| both(zyfw04)           | yes 106 no 9          | yes 231 no 33         |

Statistics about the basic condition of CHCs read that total number of rehabilitation patients in 2015 is more than 2 million person-time (Table 2.)
| Table 2. The basic condition of community health centers |
|--------------------------------------------------------|
| primary health care institution                        |
|                                                        |
| **urban community**                                    |
| N=115                                                  |
|                                                        |
| **rural community**                                    |
| N=264                                                  |
|                                                        |
| **Total**                                              |
| N=379                                                  |
|                                                        |
| **Number of patients person-time/year**KF01            |
| 857544                                                 |
|                                                        |
| **Number of disabilities**KF05                         |
| 69037                                                  |
|                                                        |
| **Number of disabilities with health record**KF06      |
| 47007                                                  |
|                                                        |
| **Basic condition**                                    |
|                                                        |
| **Area of structure**RY02) square meter                |
| 376090.85                                              |
|                                                        |
| **Number of rehabilitation physicians**RY08**          |
| 215                                                    |
|                                                        |
| **Rehabilitation equipment**                            |
|                                                        |
| **Cervical and lumbar traction equipment**KF09         |
| 107                                                    |
|                                                        |
| **Infra-red ray therapy apparatus**                    |
| 93                                                     |
|                                                        |
| **Ultrasound therapy equipment**                       |
| 60                                                     |
|                                                        |
| **Rehabilitation beds**KF02                            |
| 1274                                                   |
|                                                        |
| **Number of rehabilitation therapeutic room**          |
| 290                                                    |
|                                                        |
| **Rehabilitation training**                            |
|                                                        |
| **Rehabilitation lecture**KF07                         |
| 847                                                    |
|                                                        |
| **Rehabilitation counseling**KF08                       |
| 21748                                                  |
|                                                        |
| **Rehabilitation management measures**                  |
|                                                        |
| **rehabilitation training plan**KF12                    |
| 95                                                     |
|                                                        |
| **Rehabilitation related system**KF13                   |
| 104                                                    |
|                                                        |
| **Rehabilitation self-examination**KF14                 |
| 86                                                     |
|                                                        |
In order to quantitively analysis potential factors that could influence the capacity of CHCs rehabilitation service, we covert the dependent variable, the number of rehabilitation patients to level varies according to quartile. (Table 3.)

Table 3. Conversion of the number of rehabilitation patients

| Variable | Classification criteria |
|----------|-------------------------|
| Number of patients(person-time/year) | 1\:<378\]  
| | 2\]>=378 AND < 2375\]  
| | 3\]>=2375 AND < 7255\]  
| | 4\]>=7255\] |

Quantitively analysis indicated that substantial factors which could make impact on number of patients per year contain: species of rehabilitation disease (P<0.001, 95% confidence interval (CI) [-1.571, -0.702]), the service population (P=0.03, 95%CI [-1.198,-0.057]), number of rehabilitation bed (P<0.001, 95%CI [-1.249,-0.290]) (Table 4.)
|                                | β   | Wald | P   | 95% Confidence Interval | Lower limit | Higher limit |
|--------------------------------|-----|------|-----|-------------------------|-------------|--------------|
| Number of disabilities KF05    |     |      |     |                         |             |              |
| <248                           | -0.032 | 0.011 | 0.92 |                         | -0.630      | 0.565        |
| >=248 AND < 486                | 0.174 | 0.300 | 0.58 |                         | -0.447      | 0.751        |
| >=486 AND < 840                | 0.144 | 0.219 | 0.64 |                         | -0.460      | 0.744        |
| >=840                          | reference |      |      |                         |             |              |
| Rehabilitation diseases KF03   |     |      |     |                         |             |              |
| < 9                            | -1.136 | 26.242 | 0.00 |                         | -1.571      | -0.732       |
| >=9                            | reference |      |      |                         |             |              |
| The service population (RY 01)(10 thousand) |     |      |     |                         |             |              |
| < 1.8                          | 0.561 | 28.727 | 0.09 |                         | -1.216      | 0.098        |
| >=1.8 AND < 3                  | -0.628 | 4.646 | 0.03 |                         | -1.198      | -0.021       |
| >=3 AND < 5.94                 | -0.194 | 0.468 | 0.49 |                         | -0.750      | 0.351        |
| >=5.94                         | reference |      |      |                         |             |              |
| Area of structure RY02) square meter |     |      |     |                         |             |              |
| <1600                          | -0.687 | 3.316 | 0.05 |                         | -1.376      | 0.001        |
| >=1600 AND < 2628.4            | 0.157 | 0.276 | 0.60 |                         | -0.428      | 0.741        |
| >=2628.4 AND 4296              | -0.297 | 1.091 | 0.30 |                         | -0.855      | 0.259        |
| >=4296                         | reference |      |      |                         |             |              |
| Number of rehabilitation physicians (RY08) |     |      |     |                         |             |              |
| <=1                            | -0.438 | 3.761 | 0.05 |                         | -0.882      | 0.000        |
| >1                             | reference |      |      |                         |             |              |
| Cervical and lumbar traction equipment KF09 |     |      |     |                         |             |              |
| Yes                            | -1.047 | 1.352 | 0.25 |                         | -2.811      | 0.710        |
| No                             | reference |      |      |                         |             |              |
| Infra-red ray therapy apparatus |     |      |     |                         |             |              |
| No                             | -0.016 | 0.004 | 0.95 |                         | -0.507      | 0.548        |
| Yes                            | reference |      |      |                         |             |              |
| Ultrasound therapy equipment KF11 |     |      |     |                         |             |              |
| No                             | -0.196 | 0.758 | 0.38 |                         | -0.638      | 0.235        |
| Yes                            | reference |      |      |                         |             |              |
| Rehabilitation bed KF02        |     |      |     |                         |             |              |
| <=7                            | -0.770 | 9.908 | 0.00 |                         | -1.249      | -0.293       |
| >7                             | reference |      |      |                         |             |              |
| Number of rehabilitation therapeutic room K50301 |     |      |     |                         |             |              |
| <=2                            | -0.148 | 0.389 | 0.53 |                         | -0.614      | 0.312        |
| >2                             | reference |      |      |                         |             |              |
| Rehabilitation training plan KF12 |     |      |     |                         |             |              |
| No                             | -0.289 | 0.848 | 0.36 |                         | -0.905      | 0.321        |
| Yes                            | reference |      |      |                         |             |              |
| Rehabilitation self-examination KF14 |     |      |     |                         |             |              |
| No                             | 0.390 | 1.943 | 0.16 |                         | -0.158      | 0.938        |
| Yes                            | reference |      |      |                         |             |              |
Discussion

By Sep 2019, this survey is the ever first general survey of rehabilitation capacity of primary health care in Chinese cities from published works of literature, as well as the first analysis of factors that influence rehabilitation service capacity in the primary health system. In the general survey, we found more than 88% of CHCs and THC involved in this survey have been well equipped to provide convenient, economical and high-quality rehabilitation services. But, the imbalance between urban and rural community health centers remains obvious, even though the THCs make efforts to shorten the gap. Compared to rural community health centers, urban community health centers obviously carry out higher-quality equipment, more rehabilitation doctors and wider-cover of rehabilitation diseases. Reasons that make this kind of gap between urban and rural may be various, such as economic level, physician attraction, transport construction, and citizens’ health sense.

Consequently, this phenomenon of the urban-rural imbalance inspires the government and community to pay more financial support and health education to the rural area in order to improve the rehabilitation capacity of rural basic health centers.

Since 2009, the Chinese government has been carrying out strategies and investing lots of money to improve its primary health care system. For example, in 2014, the expenditure on primary care reached ¥110 billion(11). In less than 10 years, the infrastructures and facilities of the CHCs and THC were greatly enhanced(12). In our study, we found majority (90%) of involved CHCs and THC were well equipped of basic diagnostic tests, such as blood routine, biochemical test, ultrasound, X-ray as well as electrocardiogram, which were essential auxiliary examinations for
dealing with common diseases in the primary care settings.

Along with the giant leap in medical service in the primary health care system under a powerful and effective push from China government, rehabilitation capacity of these basic health centers also carried out a splendid progression in both hardware and software. But in the southwest region of China, there are still dozens of district troubling in short of appropriate medical service, and inevitable lack of affordable and convenient rehabilitation medical services, because of poverty, poor transportation and lack of health senses. Chengdu, as a regional center city, shows off its powerful and comprehensive influence on regional development in every aspect, including economic, education, culture, technology and medicine, which may lead to radiate our survey’s outcome to entire southwest China rather than a city.

Due to weak education and training systems on general practitioners, rehabilitation services could not be well delivered to disabilities, even though CHCs are rapidly equipped with the newest equipment and technology. Hence, completing an optimal general practitioner training system would be another driving force to further rehabilitation service capacity in the primary health system.

Conclusion

Rehabilitation service capacity of primary health facilities in Chengdu has a giant leap in the past 20 years to reach a relatively high-level quantity and quality. However, there are still many aspects of flaws and shorts during the rapid development of the primary health system and rehabilitation service. To furtherly improve the rehabilitation capacity of CHCs, the government needs to take measures: to increase species of rehabilitation diseases; to train more rehabilitation
physicians; to augment the number of rehabilitation beds, which are proved directly correlated with rehabilitation service capacity.

Abbreviations

CBR: community-based rehabilitation
CHC: community health center
THC: town health center
TCM: traditional Chinese medicine
CI: confidence interval

Declarations

Ethics approval and consent to participate
This survey was authorized by the Chengdu Municipal Health Commission (CMHC). And CMHC signed a consent document to authorize us to use the information of the survey and information in the database.

Consent for publication
Not applicable

Availability of data and materials
The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests
The authors declare that they have no competing interests

Funding
This study was supported by a fund of Chengdu Municipal Commission of Health and Family Planning (project no. 0040205502002)
Chengdu Municipal Commission of Health and Family Planning authorized this survey and provided financial support for this research.

Authors’ contributions

SC analyzed and interpreted survey data and was a major contributor in writing the manuscript. YL and XL design of the work. HD and ZY collected data and contributed to the analysis. JW contributed to writing the manuscript. All authors have read and approved the manuscript.

Acknowledgments

We would like to thank all the CHCs and THCs who participated in the survey. We would also like to thank the generous support of the Chengdu health and family planning commission.

references

1. Lightfoot E. Community-based rehabilitation:A rapidly growing method for supporting people with disabilities. International Social Work. 2004;47(4):455-68.

2. WHO global disability action plan 2014-2021:better health for all people with disability. Geneva: World Health Organization; 2014.

3. Ran C, Wen S, Yonghe W, Honglu M. A glimpse of community-based rehabilitation in China. Disability and rehabilitation. 1992;14(2):103-7.

4. Hampton N. An evolving rehabilitation service delivery system in the People's Republic of China. J Rehabil. 2001;67(3):20.

5. Chen C, Lee S, Stevenson HW. Response Style and Cross-Cultural Comparisons of Rating Scales Among East Asian and North American Students. Psychological Science. 1995;6(3):170-5.
6. Lee JW, Jones PS, Mineyama Y, Zhang XE. Cultural differences in responses to a likert scale. Research in Nursing & Health. 2002;25(4):295-306.

7. Farh J, Dobbins GH, Cheng B. Cultural Relativity in Action: A Comparison of Self-Ratings Made by Chinese and U.S. Workers. Personnel Psychology. 1991;44(1):129-47.

8. Shek DTL. The Chinese Version of the Self-Report Family Inventory: Does Culture Make a Difference? Research on Social Work Practice. 1998;8(3):315-29.

9. Annual statistics of Chengdu: National Bureau of Statistics of China; 2017 [Available from: http://data.stats.gov.cn/easyquery.htm?cn=E0105&zb=A01&reg=510100&sj=2017.

10. Self-evaluation form of basic medical service capacity of primary medical institutions in Chengdu.

11. China Health and Family Planning Statistics Yearbook 2015 [press release]. Beijing: Peking Union Medical College Press2015.

12. Wang HH, Wang JJ, Wong SY, Wong MC, Mercer SW, Griffiths SM. The development of urban community health centres for strengthening primary care in China: a systematic literature review. British medical bulletin. 2015;116:139-53.

Additional Files

Additional File 1

*Self-evaluation form of basic medical service capacity of primary medical institutions in Chengdu*

English copy of questionnaire.
Additional File 2

Strobe_checklist

Supplementary Files

This is a list of supplementary files associated with the primary manuscript. Click to download.

Questionnaire.docx
STROBE_checklist.docx