Journal of Education and Educational Research
ISSN: 2957-9465 | Vol. 9, No. 2, 2024

Human Resource Allocation Status and Countermeasure Analysis of a National Children's Regional Medical Center

Yanling Zhang, Qizhi Li, Guo Li, and Jie Tian *

Children's Hospital of Chongqing Medical University, 400014, China
*** Corresponding author:** Jie Tian (Email: jietian@cqmu.edu.cn)

Abstract: Objective: This study aims to conduct a longitudinal and cross-sectional comparative analysis of the human resource allocation at a national children's regional medical center in Chongqing. The goal is to optimize the human resource allocation at national regional pediatric hospitals and enhance overall hospital efficiency. Methods: Data was collected from the annual reports of the center, national children's medical centers, and national children's regional medical centers, as well as the "Health Statistics Yearbook" of the regions where these centers are located. The longitudinal analysis covers changes in absolute numbers, composition ratios, average annual growth, and annual growth rates of human resources at the center over the past ten years. The cross-sectional analysis compares human resource allocation and personnel structure differences between the center and other national children's medical centers, national children's regional medical centers, and pediatric hospitals in China. The workload differences of physicians between the center and pediatric hospitals in China were also compared. Results: Over the past ten years, the total amount of human resources at the center has shown an annual growth trend with reasonable overall allocation. However, there are still certain gaps in personnel structure and allocation compared to other national children's medical centers and national children's regional medical centers. The physician workload at the center is higher than that of pediatric hospitals in China. Conclusion: It is necessary to adjust the personnel structure reasonably, increase the training and introduction of high-level talents, accurately position the functions of the national children's regional medical center, and promote high-quality development of the national children's regional medical center.

Keywords: National Children's Regional Medical Center; Human Resource Allocation; Status; Countermeasures.

1. Introduction

Human resources are the core element of the operation of medical institutions and the provision of medical services. Their reasonable allocation directly affects the normal operation of hospitals and the smooth development of various services [1]. In 2016, the National Health and Family Planning Commission and other six departments jointly issued the "Plan for the Setting of National Children's Medical Centers and National Children's Regional Medical Centers," which clearly set up national children's medical centers nationwide and national children's regional medical centers in six administrative regions [2]. In 2020, the National Health Commission issued a notice on the setting of national children's regional medical centers, specifying the establishment of national children's regional medical centers in the northeast, east, central south, southwest, and northwest regions of China [3]. This study takes a national children's regional medical center in Chongqing (referred to as Center A) as an example to conduct a longitudinal analysis of its human resource status from 2011 to 2020, and a cross-sectional analysis with national children's medical centers, national children's regional medical centers, and pediatric hospitals in China during the same period. Suggestions for improvement are proposed to provide references for the formulation and optimization of human resource allocation in pediatric hospitals.

1.1. Data Sources

Data were obtained from the 2011-2020 annual statistical reports and human resource data management systems of Center A, annual reports of national children's medical centers, national children's regional medical centers, and the "Health Statistics Yearbook" of the regions where these centers are located.

1.2. Research Methods

A longitudinal analysis was conducted on the changes in absolute numbers, composition ratios, average annual growth, and annual growth rates of human resources at Center A from 2011 to 2020. A cross-sectional comparison was made of the allocation of personnel in various positions, the proportion of each type of personnel, and the bed-to-staff ratio differences between Center A and other national children's medical centers, national children's regional medical centers, and pediatric hospitals in China.

1.3. Statistical Analysis

Data were organized and statistically analyzed using Excel 2016 and SPSS 22.0 software. Statistical descriptions were made using n (%). Chi-square tests were performed, with $P < 0.05$ indicating statistically significant differences.

2. Results

2.1. Changes in Human Resources at Center A from 2011 to 2020

From 2011 to 2020, the total amount of human resources at Center A increased annually, with an average annual growth of 207 people and an average annual growth rate of 7.79%. In 2020, Center A had 3,793 employees, with the total number of personnel being 1.96 times that of 2011. The nurse-to-

physician ratio remained at 1:1.88-1:2.08 (Table 1).

2.2. Comparison of Overall Personnel Allocation between Center A and National Children's Medical Centers, National Children's Regional Medical Centers

In 2020, the proportion of health technicians at Center A was 76.03%, significantly lower than the 80.74%-90% at two national children's medical centers and three other national children's regional medical centers (referred to as the "five centers"). The proportion of doctors was 20.99%, much lower than the 24.96%-35.51% at the five centers. There were significant differences in the number of physicians, nurses, medical technicians, other technical personnel, management personnel, and service personnel among the six centers (χ^2: 823.40, $P < 0.01$). The proportion of each type of personnel and the bed-to-staff ratio also showed significant differences among the six centers (χ^2: 50.46, $P < 0.01$) (Table 2).

2.3. Comparison of Physician Workload between Center A and Pediatric Hospitals in China

From 2016 to 2019, the daily average number of outpatient visits per physician at Center A was 17.11-18.12, which was 1.22-1.32 times that of pediatric hospitals in China. The average annual number of discharges per physician was 121.21-130.88, which was 1.07-1.18 times that of pediatric hospitals in China. Due to the impact of the COVID-19 pandemic, both the daily average number of outpatient visits per physician and the average annual number of discharges per physician at Center A decreased in 2020, to 12.93 and 103.02, respectively. In 2021, these numbers recovered to pre-pandemic levels, at 17.63 and 123.31, respectively (Table 3).

Table 1. Distribution and Composition Ratio of Various Positions at Center A from 2011 to 2020, n (%)

Year	Physicians	Nurses	Medical Technicians	Other Technical Personnel	Management Personnel	Service Personnel	Total Number	Proportion of Health Technicians (%)	Proportion of Physicians among Health Technicians (%)	Proportion of Nurses among Health Technicians (%)	Nurse-to-Physician Ratio
2011	409(21.18)	788(40.81)	198(10.25)	140(7.25)	115(5.96)	281(14.55)	1931	72.24	29.32	56.49	1:1.93
2012	462(19.85)	960(41.24)	259(11.13)	162(6.96)	131(5.63)	354(15.21)	2328	72.21	27.48	57.11	1:2.08
2013	530(21.26)	1008(40.43)	266(10.67)	203(8.14)	149(5.98)	337(13.52)	2493	72.36	29.38	55.88	1:1.90
2014	585(22.05)	1099(41.42)	315(11.87)	223(8.41)	164(6.18)	267(10.06)	2653	75.35	29.26	54.98	1:1.88
2015	623(21.35)	1223(41.91)	384(13.16)	230(7.88)	194(6.65)	264(9.05)	2918	76.42	27.94	54.84	1:1.96
2016	627(21.20)	1256(42.46)	392(13.25)	221(7.47)	203(6.86)	259(8.76)	2958	76.91	27.56	55.21	1:2.00
2017	637(20.81)	1249(40.80)	424(13.85)	197(6.44)	205(6.70)	349(11.40)	3061	75.47	27.58	54.07	1:1.96
2018	680(20.67)	1360(41.34)	469(14.26)	213(6.47)	233(7.08)	335(10.18)	3290	76.26	27.10	54.20	1:2.00
2019	744(20.66)	1501(41.68)	506(14.05)	236(6.55)	264(7.33)	350(9.72)	3601	76.40	27.04	54.56	1:2.02
2020	796(20.99)	1554(40.97)	534(14.08)	249(6.56)	275(7.25)	385(10.15)	3793	76.03	27.60	53.88	1:1.95
Growth Multiple	0.95	0.97	1.70	0.78	1.39	0.37	0.96				
Average Annual Growth in Number of People	43	85	37	12	18	12	207				
Average Annual Growth Rate (%)	7.68	7.84	11.65	6.61	10.17	3.56	7.79				

3. Discussion

3.1. Overall Reasonable Personnel Allocation, Personnel Structure Needs Optimization

According to national standards, health technicians should account for at least 72% of the total staff, with physicians making up 25% of health technicians, pharmacists 8%, and nurses 50%, with a nurse-to-physician ratio of 1:2 [4]. This study shows that over the past ten years, the number of employees at Center A has increased annually. As of 2020, the center had 3,793 employees. The proportion of health technicians, physicians, and nurses all exceeded national standards, though the nurse-to-physician ratio was slightly below the national standard but better than the five centers. The proportion of health technicians and physicians at Center A was lower than that of the five centers, while the proportion of management and service personnel was higher. The human resources department should increase the proportion of health professional and technical personnel in recruitment.

3.2. Establish Human Capital Reserve Pool, Strengthen Talent Training and Recruitment Mechanism

Innovative talent mechanisms and talent training platforms should be established [6]. Implement an "internal training and external recruitment" combined strategy for discipline talent development, adhering to the principles of "layered classification, scientific evaluation, optimal selection [7-8], dynamic adjustment" for talent training. Actively explore the compilation filing system and the compilation turnover pool system to make full use of existing career compilation resources and improve the efficiency of compilation use, thereby attracting talent. Deepen salary system reform and performance evaluation reform policies to reflect the value of knowledge, technology, labor, and management, and tilt towards key positions, scarce positions, high-risk positions, and high-intensity positions [9].

Table 2. Comparison of Overall Personnel Allocation between Center A and National Children's Medical Centers, Other National Children's Regional Medical Centers in 2020

Distribution and Composition Ratio of Various Positions, n (%)								
Hospital Type	**National Children's Regional Medical Center (Center A)**	**National Children's Medical Center**		**National Children's Regional Medical Center**			χ^2	***P***
Region	**Southwest**	**Beijing**	**Shanghai**	**East China**	**Central South**	**Northwest**		
Approved Number of Beds	2480	970	689	1900	1400	1500	-	-
Personnel Position Types								
Physicians	796 (20.99%)	912 (29.71%)	470 (24.96%)	908 (30.57%)	1691 (35.51%)	687 (29.83%)	823.4	<0.01
Nurses	1554 (40.97%)	1266 (41.24%)	849 (45.09%)	1066 (35.89%)	1981 (41.6%)	1062 (46.11%)		
Other Technical Personnel	249 (6.56%)	104 (3.39%)	87(4.62%)	215 (7.24%)	275 (5.77%)	-		
Medical Technicians	534 (14.08%)	451(14.69%)	349 (18.53%)	424 (14.28%)	614 (12.89%)	279 (12.11%)		
Management and Service Personnel	660(17.4%)	337(10.98%)	128(6.8%)	357 (12.02%)	201(4.22%)	275 (11.94%)		
Total	3793	3070	1883	2970	4762	2303		
Proportion of Various Positions and Staff-to-Bed Ratio								
Proportion of Health Technicians	76.03%	85.64%	88.58%	80.74%	90.00%	88.06%	50.46	<0.01
Proportion of Management and Service Personnel	17.40%	10.98%	6.80%	12.02%	4.22%	11.94%		
Proportion of Physicians and Nurses	51.22%	72.04%	55.36%	85.18%	85.36%	64.69%		
Staff-to-Bed Ratio	65.38%	31.60%	36.59%	63.97%	29.40%	65.13%		
Note: 1. Health technicians include physicians, nurses, and medical technicians.								

Table 3. Comparison of Physician Workload between Center A and Pediatric Hospitals in China

Indicator	Institution Type	2016	2017	2018	2019	2020	2021
Average Daily Number of Outpatient Visits per Physician (persons)	Center A	17.25	18.12	17.11	17.99	12.93	17.63
	Pediatric Hospitals in China	14.10	14.00	13.10	13.60		
Average Annual Number of Discharges per Physician (persons)	Center A	121.21	125.59	130.88	127.69	103.02	123.31
	Pediatric Hospitals in China	112.9	113.4	111.1	112.50		

3.3. Clarify Center Function Positioning, Focus on Key Issues

The workload of physicians in pediatric hospitals in China is the heaviest among different types of hospitals and has always been higher than that of other types of hospitals, while the workload of physicians at Center A has always been higher than that of pediatric hospitals in China [10].

The functional positioning of national children's regional medical centers is to represent the top level in the region in terms of diagnosis and treatment of difficult and critical illnesses, medical talent training, clinical research, disease prevention and control, and hospital management, and to work with national medical centers to improve regional medical, prevention, and health service levels, striving to achieve homogenization of medical services across regions [11]. Establish pediatric alliances, medical consortia, two-way referral and other management mechanisms, optimize pediatric medical resources within the region, promote effective sinking of medical resources, and achieve a hierarchical diagnosis and treatment pattern [12]. Through medical quality control activities, training, technical promotion and other forms, promote the homogenization of regional medical quality. Center A will rely on the construction of three national-level platforms, namely, the National Clinical Medical Research Center, the National

Children's Regional Medical Center, and the National First-Class Undergraduate Construction Site [13], to actively explore the establishment of a collaborative working mechanism with the national regional children's medical center, clarify the positioning of the national children's regional medical center in serving the national development strategy, focus on solving key issues such as diagnosis and treatment of pediatric difficult diseases, training of advanced pediatric talents, and transformation of clinical research results [14], promote the high-quality development of the national children's regional medical center, and contribute to the improvement of pediatric medical, teaching, research, and preventive health services.

References

[1] Xinnan Zhang, Yanni Yin, Xiaohu Wu. Research on the Current Status and Efficiency of Human Resource Allocation in a Tertiary Specialized Hospital in Shanghai [J]. Medicine and Society, 2019, 32(07): 58-61. DOI: 10.13723/j.yxysh. 2019. 07. 014.

[2] Office of the National Health and Family Planning Commission. Notice on the issuance of the National Children's Medical Center and National Children's Regional Medical Center Setting Plan [J]. Gazette of the National Health and Family Planning Commission of the People's Republic of China, 2016(07): 28-54.

[3] Five National Children's Regional Medical Centers Set Up [J]. Rural Digest, 2021(01): 20.

[4] Lijuan He, Zhouzhong Yan, Lei Liu, Xiaoguang Huang. Survey on Human Resource Allocation in Tertiary General Hospitals in Jiangsu Province [J]. Medicine and Society, 2013, 26(11): 41-43.

[5] Yao Zhao, Shaoyan Liang, Qiu Li. The Development Path of Chongqing Medical University Affiliated Children's Hospital Guided by Innovation [J]. Journal of Chongqing Medical University, 2021, 46(09): 1135-1140. DOI: 10.13406/j.cnki. cyxb.002898.

[6] Yue Tong. Analysis of the Current Situation and Countermeasures of Hospital Human Resource Management [J]. China Health Industry, 2018, 15(12): 54-55. DOI: 10. 16659/ j.cnki.1672-5654.2018.12.054.

[7] Shaolan Dai, Jinling Xie, Hui Zeng, Jiangbin Liu, Ying Lu, Yanmei Chen, Yushan Jin. Human Resource Management Practices and Reflections in a High-Quality Development Pilot Public Hospital [J]. China Hospital, 2022, 26(05): 49-51. DOI: 10.19660/j.issn.1671-0592.2022.5.14.

[8] "14th Five-Year" Health Talent Development Plan [J]. Chinese Journal of Practical Rural Doctors, 2022, 29(09): 12-18.

[9] Dequan Fang. Vigorously Promote the Pilot Reform of Public Hospital Compensation [J]. China Health, 2017(07): 63-64. DOI: 10.15973/j.cnki.cn11-3708/d.2017.07.019.

[10] Xi Gao, Xiaodong Wang, Zhi Liu, Jiehua Zhou. Research on the Current Situation and Countermeasures of the Development of Children's Specialized Hospitals in China [J]. China Hospital, 2022, 26(11): 26-29. DOI: 10.19660/j.issn.1671-0592.2022. 11.08.

[11] National Health and Family Planning Commission. Notice on the issuance of the "13th Five-Year" National Medical Center and National Regional Medical Center Setting Plan [J]. Gazette of the National Health and Family Planning Commission of the People's Republic of China, 2017(01): 6-11.

[12] Shihan Lei, Yu Chen, Jianhua Zhou, Yan Hao, Liru Qiu, Zhixin Xiong, Lewei Song, Xiaoping Luo. Construction Practice and Development Thinking of Tongji Children's Specialty Alliance [J]. Modern Hospital, 2022, 22(03): 334-337+341.

[13] National Health Commission. Notice on the issuance of the Health Children Action Promotion Plan (2021-2025) [J]. Gazette of the National Health Commission of the People's Republic of China, 2021(10): 28-32.

[14] Miao Yang, Lin Yuan, Guoying Huang. Innovative Practices and Development Achievements of the National Children's Medical Center [J]. Modern Hospital Management, 2020, 18(04): 9-12.