

Practice and Exploration of Target Management Model for Clinical Pharmacists in Primary Hospitals

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Abstract: *Objective:* To explore the target management model for clinical pharmacists in primary hospitals facing current shortages of clinical pharmacists, in order to improve the work efficiency and service quality of clinical pharmacy, and promote the high-quality development of clinical pharmacy in primary hospitals. *Methods:* Developing a target management model, adopting a wide coverage work model of “1+1+N” (that is, 1 clinical pharmacist, 1 resident clinical department, and N contracted clinical departments). According to the SMART principle, various work assessment indicators were quantified. This involved setting clear work goals, diversifying work methods, personalizing work methods, standardizing workflows, and using numerical assessment indicators. Regular supervision, inspection, feedback, and improvement mechanisms were implemented. *Results:* The implementation of the target management model has made the work effectiveness of clinical pharmacists visualized. There were more than 200 annual consultations and multidisciplinary team (MDT) cases, with an opinion adoption rate of 90.2% and a patient improvement rate of 80.6%. More than 1500 rational drug use interventions were conducted, with a suggestion adoption rate of 83.5%. In terms of pharmaceutical indicators control. The intensity of antibacterial drug use in 2024 (without CMI adjustment) was 30.07 DDDs, significantly lower than the 2023 value of 33.54 DDDs, and also significantly lower than the provincial average (32.87 DDDs) and the average for hospitals of the same level (32.49 DDDs). The daily usage of intravenous infusion per bed for hospitalized patients was 2.09, a decrease from 2.15 in 2023, significantly lower than the provincial average of 2.71 and the average of 2.56 in hospitals of the same level. The amount of the second batch of national key monitoring drugs accounts for the value was 6.48%, significantly lower than the provincial average of 8.27% and the same level hospital average of 8.82%. In terms of chronic disease pharmaceutical management, taking the pharmaceutical management of patients with chronic heart failure as an example, the usage rates of renin-aldosterone-angiotensin-system inhibitors (RAAS inhibitors) and beta-blockers for heart failure in the management group were 87.88% and 80.81%, respectively, significantly higher than those in the control group (62.22% and 65.56%). Heart rate in the management group ($69.54 \pm 10.68 \text{ times} \cdot \text{min}^{-1}$) was significantly lower than in the control group ($80.04 \pm 17.68 \text{ times} \cdot \text{min}^{-1}$) ($P < 0.001$). The low-density lipoprotein cholesterol ($1.69 \pm 0.57 \text{ mmol} \cdot \text{L}^{-1}$) was significantly lower than the control group ($1.95 \pm 0.77 \text{ mmol} \cdot \text{L}^{-1}$) ($P < 0.001$), and the 1-year readmission rate was 47.47%, significantly lower than the control group 56.67%. The Minnesota Living with Heart Failure Questionnaire (MLHFQ) Score was (44.20 ± 10.78), significantly lower than the control group (55.89

± 11.48) ($P < 0.001$), indicating a significant improvement in the patient's quality of life. *Conclusions:* The targeted management model for clinical pharmacists can effectively enhance communication and collaboration between clinical pharmacists and clinicians, improve the work efficiency and service quality of clinical pharmacists in primary hospitals, promote the work of clinical pharmacy towards standardization and scientificization, boost the high-quality development of pharmacy in primary hospitals, and also provide new ideas and methods for the management of clinical pharmacists in other primary hospitals.

Keywords: Clinical pharmacist; Target management; “1+1+N” Management Model; Primary hospital; Pharmaceutical services

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1. Introduction

In recent years, with the deepening of national healthcare system reform, the role of clinical pharmacists in rational drug use and pharmaceutical services has become increasingly prominent. The state has issued important documents such as the “Notice on Strengthening Pharmaceutical Administration and Transforming Pharmaceutical Service Models” and the “Opinions on Accelerating the High-Quality Development of Pharmaceutical Services”, requiring medical institutions to accelerate the transformation of pharmaceutical service models, reasonably allocate the number of clinical pharmacists, and attach importance to the training of clinical pharmacists^[1,2].

Currently, clinical pharmacy work in China has made rapid progress, but there is still a large gap from clinical needs, especially in primary hospitals. The insufficient number of clinical pharmacists has led to uneven effectiveness of clinical pharmacy work, and even the work model of clinical pharmacists is still at the “superficial” stage^[3]. For example, the non-standardized work content of clinical pharmacists leads to incomplete clinical pharmacy services, the single work model brings incomplete clinical pharmacy services, and the lack of prominent work focus leads to inconspicuous effectiveness of clinical pharmacy work, which seriously restricts the improvement of the effectiveness and service quality of clinical pharmacy in primary hospitals. Therefore, it is of great practical significance to construct a targeted management model for clinical pharmacists suitable for primary hospitals.

2. Research content and methods

2.1. Simplifying management methods

The clinical pharmacy work content is divided into three aspects: rational drug use control, pharmaceutical index control, and chronic disease pharmaceutical management. Different work objectives are set according to different work content, and each objective is assigned a score. Different score values are assigned based on the importance, urgency, and clinical needs of the work content, and each objective can be achieved by reaching a certain score.

2.2. Clarification of management objectives

2.2.1. Implementing the “1+1+N” department responsibility system

Based on the specialized characteristics of each clinical pharmacist, implement the “1+1+N” broad-coverage work model, which refers to a management mode of 1 clinical pharmacist + 1 resident department + N contracted

departments. Develop standard operating procedures and evaluation criteria for various tasks. The contracted clinical pharmacists are responsible for managing all pharmaceutical-related work in the relevant departments, recording and analyzing monthly data, promptly analyzing and taking intervention measures in case of abnormalities, communicating and providing feedback to clinical departments in a timely manner, and reviewing the effectiveness of interventions in the following month.

2.2.2. Quantifying work evaluation indicators

Based on the SMART principle, analyze and decompose key management indicators to ensure that the target values of each indicator are specific, measurable, achievable, relevant to other indicators, and have a clear deadline. Focus on the performance evaluation indicators of public hospitals, hospital grade assessments, and requirements of pharmaceutical quality control centers at various levels to establish corresponding evaluation target values, such as the intensity of antimicrobial drug use, the proportion of inpatient bed days with intravenous infusions, etc. Additionally, set target values for auxiliary indicators such as the number of clinical rounds or independent pharmaceutical rounds, the number of pharmacist suggestions, the adoption rate of pharmacist suggestions, PDCA completion status, the number of patients managed by chronic disease pharmacology, and the number of effective interventions. Provide monthly feedback on the achievement of target values and annual feedback on overall achievement.

2.3. Streamlining management work

- (1) Introduce clinical pharmacist workstations by taking into account the actual situation of clinical pharmacy. Personalized modules are added to the workstations to enable online interaction between pharmacists' medication suggestions and doctors. Clinical rounds, medication interventions, patient education, and other work content can be recorded at any time, saving time on post-round documentation. The PDCA module for pharmaceutical indicators allows for the recording of intervention measures and effectiveness, automatically generating trend charts and reducing tedious manual tasks such as table creation.
- (2) Establish unified workflows and standardized operating templates for each task performed by clinical pharmacists to minimize time lost due to unfamiliarity with procedures.
- (3) Adjust the focus of pharmaceutical services provided by specialized clinical pharmacists, optimize time allocation, improve work efficiency, and highlight work effectiveness.

2.4. Personalized work approach

To achieve better management effectiveness, clinical pharmacists can adopt personalized work methods based on their own actual situations. For example, they can orient themselves around the hospital's key tasks, find entry points for their work, and actively participate in the management and control of rational drug use in DRGs and clinical pathways. They can also leverage the characteristics of chronic diseases in primary hospitals and their own professional advantages to develop specialized pharmaceutical services for chronic diseases.

2.5. Diversified work methods

- (1) Using rational drug use as a driving force, establish a standardized and effective feedback mechanism for clinical rational drug use supervision through various means such as workstations, hospital networks, and information networks.

- (2) Adopt the PDCA model for the management and control of rational drug use and pharmaceutical indicators, continuously analyzing, providing feedback, and making improvements.
- (3) Fully utilize team strength by collaborating with pharmacy clinics, conducting joint pharmacy rounds, and managing chronic diseases together. Different specialized clinical pharmacists can work together to more comprehensively and accurately address patients' medication issues. Cooperation among clinical pharmacists in the region can enhance the level of rational drug use and strengthen its management and control effects by viewing issues from different levels, perspectives, and expertise, achieving a synergistic effect where 1+1 is greater than 2. Integrate resources and complement each other's advantages by collaborating with departments such as clinical, nursing, rehabilitation, and information to leverage their respective professional strengths and improve work efficiency.

3. Results

3.1. Rational drug use

In 2024, over 200 cases of annual consultations and MDTs were conducted, with a 90.2% adoption rate of suggestions and an 80.6% improvement rate for patients. More than 1500 interventions for rational drug use were made during the year, with an 83.5% adoption rate of recommendations. Pharmaceutical care was implemented for 1388 patients, 664 drug consultation inquiries were answered, 75 cases of adverse drug reactions were monitored, and 1440 patients received education.

3.2. Effectiveness of pharmaceutical indicator management

The intensity of antimicrobial drug use (without CMI correction) in 2024 was 30.07 DDDs, showing a significant decrease compared to 33.54 DDDs in 2023. It was also notably lower than the average levels of 32.87 DDDs in Zhejiang Province and 32.49 DDDs in tertiary Grade III-B Hospitals (**Figure 1**).

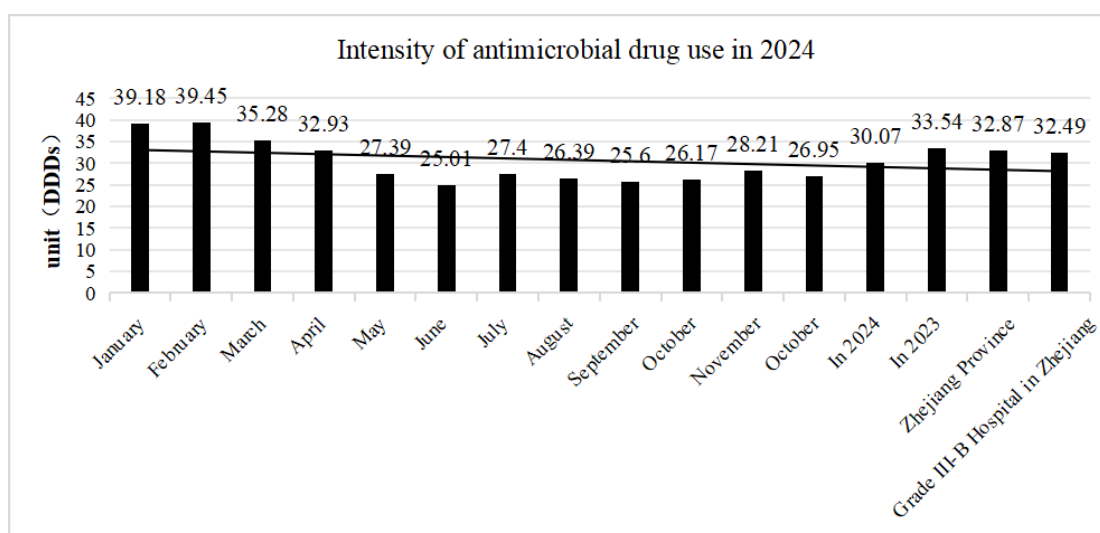


Figure 1. Intensity of antimicrobial drug use in 2024

The daily usage of intravenous infusions per bed for hospitalized patients in 2024 was 2.09, marking a clear decline from 2.15 in 2023. This figure was significantly below the average levels of 2.71 in Zhejiang Province and

2.56 in tertiary Grade III-B Hospitals (**Figure 2**).

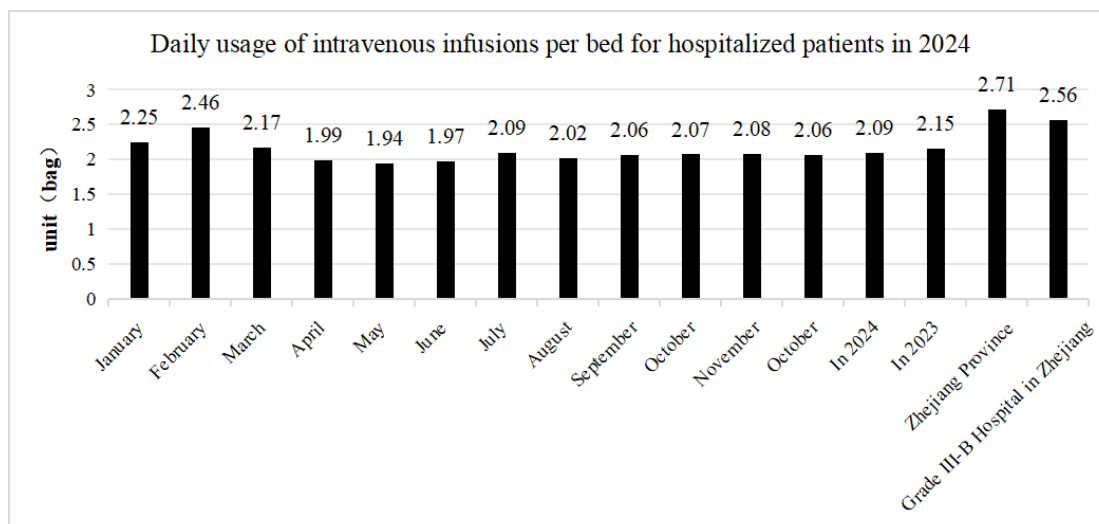


Figure 2. Daily usage of intravenous infusions per bed for hospitalized patients in 2024

The proportion of the second batch of national key monitored drug expenses in 2024 was 6.48%, which was significantly lower than the average levels of 8.27% in Zhejiang Province and 8.82% in tertiary Grade III-B Hospitals (**Figure 3**).

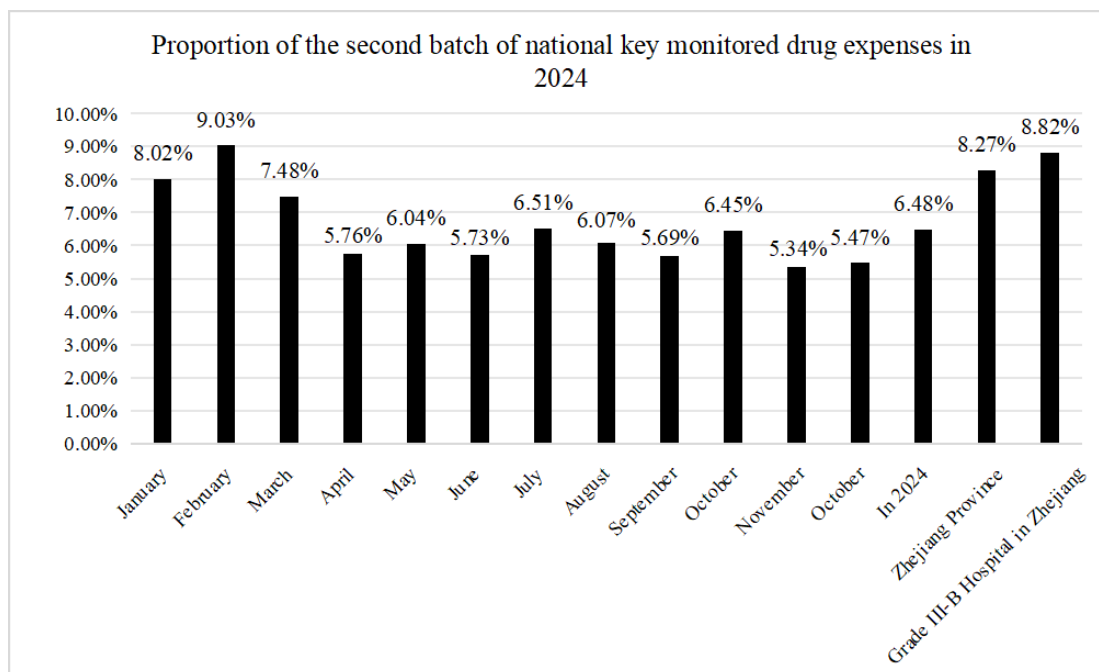


Figure 3. Proportion of the second batch of national key monitored drug expenses in 2024

The proportion of drug expenses in 2024 was 21.77%, indicating a notable decrease from 22.73% in 2023 (**Figure 4**).

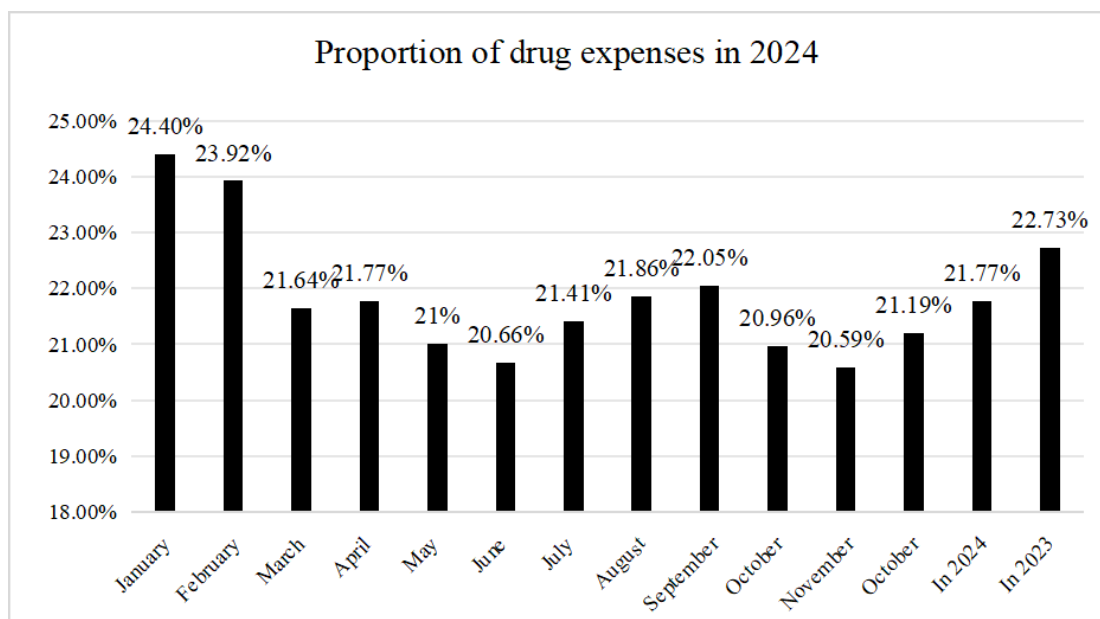


Figure 4. Proportion of drug expenses in 2024

3.3. Effectiveness of pharmaceutical management for chronic diseases

Pharmaceutical management of patients with chronic heart failure were taken as an example. The data were statistically analyzed using SPSS17.0 statistical software. Measurement data were represented by, and enumeration data were expressed as rates. Covariance analysis was used for comparison between groups, and paired sample t-tests were used for comparison before and after management. A *P*-value less than 0.05 was considered statistically significant.

3.3.1. Basic patient data

- (1) Management group: 103 cases (52 males, 51 females). Education level distribution: 33.01% illiterate, 43.69% primary school education, 23.30% junior high school education or above. Comorbidities distribution: 75.73% hypertension, 76.70% coronary heart disease, 22.33% diabetes, 55.34% arrhythmia.
- (2) Control group: 97 cases (51 males, 46 females). Education level distribution: 34.02% illiterate, 47.42% primary school education, 18.56% junior high school education or above. Comorbidities distribution: 70.10% hypertension, 71.13% coronary heart disease, 19.59% diabetes, 60.82% arrhythmia.

There were no significant differences in age and weight between the management and control groups (**Table 1**).

Table 1. Comparison of basic indicators between the control group and the management group

Indicator	Management group (n=103)	Control group (n=97)	<i>t</i> -value	<i>p</i> -value
Age (years)	73.69 ± 4.00	73.06 ± 4.54	1.06	0.293
Weight (kg)	60.19 ± 11.98	58.44 ± 9.99	1.11	0.265

3.3.2. Management effectiveness

In the management group, there were 4 deaths. The MLHFQ Score before and after management were (53.72 ± 11.80) and (44.20 ± 10.78), respectively, indicating a significant improvement in patients' quality of life after

management ($P < 0.01$). The utilization rate of RAAS inhibitors, a type of anti-heart failure medication, increased from 64.08% before management to 87.88% after management. The utilization rate of beta-blockers increased from 66.99% before management to 80.81% after management. The proportion of patients with moderate and good medication compliance increased from 76.70% before management to 95.95% after management. The 1-year rehospitalization rate was 47.47%, which was lower than that of the control group. Heart rate (beats/minute) before and after management were (76.82 ± 15.32) and (69.54 ± 10.68), respectively ($P < 0.01$). Low-density lipoprotein cholesterol (mmol/L) before and after management were (2.00 ± 0.78) and (1.69 ± 0.57), respectively ($P < 0.01$). Systolic blood pressure (mmHg, 1 mmHg=0.133 kPa) before and after management were (130.15 ± 20.58) and (123.94 ± 16.77), respectively ($P < 0.05$). Diastolic blood pressure (mmHg) before and after management were (76.30 ± 12.91) and (73.34 ± 10.43), respectively ($P < 0.05$).

In the control group, there were 7 deaths. The MLHFQ Score before and after the study period were (54.20 ± 13.80) and (55.89 ± 11.48), respectively ($P > 0.05$). The utilization rates of RAAS inhibitors before and after were 62.89% and 62.22%, respectively. The utilization rates of beta-blockers before and after were 67.01% and 65.56%, respectively. The proportion of patients with moderate and good medication compliance before and after were 72.16% and 84.44%, respectively. The 1-year rehospitalization rate was 56.67%. Heart rate (beats/minute) before and after were (78.76 ± 16.40) and (80.04 ± 17.68), respectively ($P > 0.05$). Low-density lipoprotein cholesterol (mmol/L) before and after were (1.99 ± 0.84) and (1.95 ± 0.77), respectively ($P > 0.05$). Systolic blood pressure (mmHg) before and after were (130.69 ± 20.77) and (128.14 ± 17.38), respectively ($P > 0.05$). Diastolic blood pressure (mmHg) before and after were (76.23 ± 12.24) and (75.29 ± 10.79), respectively ($P > 0.05$). NT-proBNP (pg/ml) before and after were (2644.80 ± 2542.56) and (2688.40 ± 3948.76), respectively ($P > 0.05$).

Compared with the control group, patients in the management group showed improved medication adherence, increased utilization of anti-heart failure drugs, reduced one-year rehospitalization rate, significantly improved quality of life, significantly reduced heart rate, significantly lowered low-density lipoprotein cholesterol levels, and a decrease in mean systolic blood pressure of approximately 4 mmHg (Table 2).

Table 2. Comparison of indicators before and after management in the control group and management group

Indicator	Control group (n=97)				Management group (n=103)				ANCOVA (F, P)	
	Pre-management	Post-management	<i>t</i>	<i>P</i>	Pre-management	Post-management	<i>t</i>	<i>P</i>		
Minnesota QoL score	54.20 ± 13.80	55.89 ± 11.48	-1.6	0.113	53.72 ± 11.80	44.20 ± 10.78	10.57	< 0.001	94.98	< 0.001
Heart rate (bpm)	78.76 ± 16.40	80.04 ± 17.68	-0.67	0.502	76.82 ± 15.32	69.54 ± 10.68	4.82	< 0.001	25.64	< 0.001
SBP (mmHg)	130.69 ± 20.77	128.14 ± 17.38	1.33	0.187	130.15 ± 20.58	123.94 ± 16.7	2.71	0.008	3.12	0.079
DBP (mmHg)	76.23 ± 12.24	75.29 ± 10.79	0.71	0.482	76.30 ± 12.91	73.34 ± 10.43	1.99	0.049	1.76	0.186
Serum Creatinine (μmol/L)	89.48 ± 31.06	92.03 ± 33.42	-1.22	0.226	89.76 ± 33.36	91.54 ± 40.12	0.85	0.396	0.07	0.797
Potassium (mmol/L)	4.03 ± 0.49	4.15 ± 0.45	-2.73	0.008	4.08 ± 0.40	4.21 ± 0.41	-2.85	0.005	0.46	0.496
LDL-C (mmol/L)	1.99 ± 0.84	1.95 ± 0.77	0.55	0.580	2.00 ± 0.78	1.69 ± 0.57	4.23	< 0.001	10.77	0.001
NT-proBNP (pg/mL)	2644.80 ± 2542.56	2688.40 ± 3948.76	-0.10	0.921	2696.63 ± 2930.04	2518.91 ± 3889.57	0.54	0.586	0.16	0.689

4. Discussion

In the context of the continuous deepening of national healthcare system reform, the importance of clinical pharmacy services in primary hospitals has become increasingly prominent, including rational drug use, pharmaceutical indicator management, and chronic disease management ^[4-6]. However, the current number and capabilities of clinical pharmacists in primary hospitals in China are far from meeting the urgent clinical needs, and there are still deficiencies in the “breadth” and “depth” of clinical pharmacy services. This study focuses on the development status of clinical pharmacists in primary hospitals, with the “1+1+N” work model as the core, and adopts a responsibility system and wide coverage model to compensate for the shortage of clinical pharmacists in primary hospitals.

At the same time, information technology is utilized to improve work efficiency, and the SMART principle is adopted to clarify the work objectives and responsibilities of clinical pharmacists, expand the “depth” of clinical pharmacist services, quantify assessment indicators, optimize work processes through various measures such as utilizing relevant software, and finally visualize the work effectiveness of clinical pharmacists. For example, clinical pharmacists have achieved a considerable number of annual consultations and MDTs, with high rates of opinion adoption and patient improvement, and a large number of rational drug use interventions with good adoption rates. This demonstrates that clinical pharmacists can deeply participate in the clinical diagnosis and treatment process and provide strong support for rational drug use.

The effectiveness of pharmaceutical indicator management and control is prominent, with effective management and control of antibacterial drug use intensity, intravenous infusion-related indicators for inpatients, etc., which are better than the provincial average and the level of hospitals at the same level. This fully reflects the positive promoting effect of this management model on pharmaceutical management. Taking patients with chronic heart failure as an example, the effectiveness of chronic disease management is significant. The utilization rate of anti-heart failure drugs has increased, key indicators such as heart rate and low-density lipoprotein have improved, the rehospitalization rate has decreased, and the quality of life has significantly improved. This strongly demonstrates the role and value of this management model in chronic disease management.

Due to the lack of a specific clinical pharmacist management model in primary hospitals, the professional value of clinical pharmacists in guiding rational drug use and pharmaceutical management cannot be fully utilized. This also seriously restricts the development of clinical pharmacy and the improvement of service quality in primary hospitals ^[7, 8]. Many large public hospitals in China have made many attempts and innovations in the management mode of clinical pharmacists, and have achieved good management results ^[9-12]. However, considering the shortage of clinical pharmacists in primary hospitals and the actual situation, the expansion and application of the above management mode in primary hospitals still have certain limitations. In this study, through diversifying the working methods of clinical pharmacists, personalizing work ideas, standardizing work content, and clarifying work goals, we solved the previous problems of a single work mode, irregular content, inconsistent standards, and unclear goals of clinical pharmacists. This significantly improved the efficiency and quality of clinical pharmacists’ work.

Currently, facing the growing demand for clinical pharmacy services in primary hospitals, the targeted management model of clinical pharmacists in primary hospitals constructed in this study provides useful and referential practical experience for the high-quality development of clinical pharmacy in primary hospitals. It also lays a solid practical foundation for the implementation of resident clinical pharmacists in primary hospitals in the future. With the further development of clinical pharmacy in primary hospitals, individualized and precise

drug use, such as genetic testing, will become the core issue of clinical rational drug use. We will further improve this management model and promote the standardization, normalization, precision, and scientification of clinical pharmacy work in primary hospitals.

5. Conclusion

The targeted management model for clinical pharmacists has proven effective in enhancing communication and collaboration between clinical pharmacists and healthcare teams. It significantly improves the work efficiency and service quality of clinical pharmacists in primary hospitals, promoting the standardization, normalization, and scientific advancement of clinical pharmacy practice. This approach further supports the high-quality development of pharmaceutical services in primary hospitals and offers a novel strategy and methodology for the management of clinical pharmacists in similar healthcare settings.

Disclosure statement

The authors declare no conflict of interest.

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