Study on the Storage Strategy of Safe Inventory under the Joint Inventory Model of Drugs in Public Hospitals: A Case Study of Jiangxi Public Hospitals

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Abstract: With the development of China's medical industry and the gradual advancement of medical reform, the separation of pharmaceuticals has put forward new requirements for the storage of drug inventory system in public hospitals. Therefore, the author takes public hospitals in Jiangxi Province as the research sample to study the storage strategy of safe stock under the mode of joint drug inventory in public hospitals. This paper introduces the content and effect of the medical reform in Jiangxi Province, enumerates the common problems in drug inventory management in public hospitals under the background of medical reform, and demonstrates the necessity of optimizing the internal control of drug inventory management in public hospitals. Research shows that at this stage, the public medical drug inventory is large, and the drug library management cost occupies a large amount of funds in the hospital, affecting the normal operation of the hospital and increasing the operating cost of the hospital. The drug inventory should be reasonably controlled, the procurement process should be optimized, and the problem of inventory backlog should be improved. Under the premise of ensuring the supply of drugs, the drug turnover rate in the warehouse should be gradually improved.

1. Introduction

The reform of the drug supply and procurement model has continued to become a hot spot, and the provincial-level centralized drug bidding procurement has been launched nationwide [1]. The main goal of the reform is to reduce or even eliminate the power rent-seeking phenomenon of the previous independent procurement of public hospitals, thus effectively reducing the price of drugs [2]. The reform of the medical and health system nationwide officially began. A variety of medical reform pilots have been set up across the country. In order to change the traditional phenomenon of medicine and medicine [3]. The implementation of the "medical separation" policy will inevitably lead to a decline in hospital income, and the situation of income and expenditure is not matched [4]. These studies can be summarized as follows: ordering strategy and allocation strategy. The current ordering strategy is based on a regular ordering strategy [5]. Jiangxi public hospital is a provincial third-level first-class hospital, which has two drug storehouses: traditional Chinese medicine storehouse and Western medicine storehouse. It has eight second-level pharmacies, such as outpatient, inpatient Tablets, inpatient injections and anesthesia. The amount of drugs circulated annually amounts to hundreds of millions of yuan, involving more than 1800 kinds of drugs [6]. However, there are many choices of allocation strategies according to different situations. This paper makes a comparative study of various possible allocation strategies, and explores the differences of these strategies and their impact on safe inventory and transportation. Many new systems and concepts arise from in-depth research and Reflection on the basic concept of inventory.

In recent years, it has become an important responsibility for drug purchasing to control hospital drug stocks reasonably, improve drug turnover rate in stock, and reduce and improve the backlog of stocks in accordance with the relevant requirements of evaluation of public hospitals in Jiangxi Province [7]. In many pilot medical reform projects, Jiangxi Province has always been in the vanguard position. It has implemented and implemented the drug government centralized procurement and drug "zero plus" policy, and vigorously implemented the performance appraisal mechanism in public hospitals in Jiangxi Province [8]. It further highlights the sociality and public welfare of public hospitals in Jiangxi Province [9]. Therefore, through the optimization of the drug

inventory management system of public hospitals in Jiangxi Province, the cost of drug library management is reduced, and the normal operation of public hospitals in Jiangxi Province is guaranteed. We have conducted a certain degree of research on the reloading strategy in the inventory system. In these studies, the retransmission time and cost are actually compared with the central warehouse retention inventory strategy [10]. Due to the variety of stocks required for modern business activities and the large amount of liquidity required, market competition is becoming increasingly fierce. Therefore, it is becoming more and more important for any economic unit to make a trade-off between various inventory costs and benefits to achieve the best combination of the two.

2. Analysis on the Problems Existing in the Internal Control of Drug Inventory Management in Public Hospitals in Jiangxi Province

2.1 The development of drug management control measures is not scientific

According to the questionnaire survey and the entity visit investigation, the public hospitals in Jiangxi Province have relatively perfect regulations on drug inventory management, but they lack scientific guidance for the process design and specific operation of the business. The drugs are not classified according to economic benefits, but the drugs are managed uniformly, which reduces the efficiency and efficiency of inventory management in public hospitals in Jiangxi Province, wastes resources for drug library management, increases the cost of drug inventory management, and restricts Jiangxi Province. The development of public hospitals. Since the safety stock of the secondary inventory system can be stored in the central warehouse or distributed in each sub-repository, the re-transfer strategy can be implemented between the sub-warehouses in a single order cycle or not. Among them, the deterministic inventory model generally assumes that all economic factors are determined, expressed by real constants or real variables. However, there are still a lot of manual operations in actual distribution acceptance, warehousing invoice entry, drug claim and warehouse inventory links, which are prone to errors and lead to inefficiency. The total stock of drugs is too large, the turnover rate of stocks is low, and the degree of refinement is not high. It can not effectively combine the characteristics of clinical drug use to formulate a reasonable procurement plan, so that there are deviations in the procurement plan. It is easy to coexist the phenomenon of backlog and shortage of drug stocks. Therefore, from the perspective of supply chain, optimizing and adjusting drug supply mode to suit drug purchase mode is the key factor to improve the reform and ensure the effectiveness and sustainability of drug reform.

According to the division of inventory period and the setting of inventory, it can be divided into four kinds of inventory strategies (see Table 1).

Table 1 Classification of Basic Strategies

Project	Reprint	No reprint
Central Storage Inventory	TR&CW strategy	CW Strategy
Center does not store stock	TR&RW Strategy	RW Strategy

Different strategies have different methods of setting up safe inventory. The demand belonging to two lead periods or different locations can be regarded as different demand aggregates to set different safe inventory. Different demand aggregates need to choose appropriate transportation strategies to ensure the same level of service (see Table 2).

Table 2 Inventory Setting and Transportation of Various Strategies

Strategy	Safety stock		Transport	
	Central Warehouse	Sub-warehouse	Preemptive period P	Preemptive period T
TR&RW	Overall Safety Inventory in P+T	Nothing	Reprint	Reprint
TR&CW	Overall Safety Inventory in P	Overall Safety Inventory in T	Reprint	Central Transportation
CW	Overall Safety Inventory in P	Safety Inventory in T	Central Transportation	Nothing
RW	Nothing	Safety Inventory in P+T	Nothing	Nothing

2.2 The risk assessment ability of Jiangxi public hospitals for drug inventory management is weak.

In the link of drug storage and procurement, through questionnaire analysis, we found that the risk assessment in the two links is not very good. After the drug manufacturer leaves the factory, it advances all the outstanding payments in the goods, including the liquidity corresponding to the three parts of the inventory, namely, transit, distribution center and hospital. With the rapid development of the logistics industry, it is more conducive to help build a reasonable management model for pharmaceutical inventory management. To realize dynamic management of drugs, so that drugs are in a state of turnover. The central warehouse stores and reproduces the safe stock; the central warehouse does not store and reproduce the safe stock. At this time, it often relies on the judgement, intuition and experience of managers to estimate the business environment, so it needs to be described by the theory of fuzzy sets. The distribution of drug suppliers needs to be coordinated with the upgrade of the public hospital system in Jiangxi Province. The drug list of the distribution company is in one-to-one correspondence with the HIS drug list of the hospital and is updated at any time to make a good foundation for the system implementation. Drug procurement in public hospitals in Jiangxi Province needs to adjust the drug inventory in a timely manner according to changes in drug consumption, and try to combine the zero inventory management model with the ABC classification inventory management model. Manage the hospital's drug inventory and formulate procurement plans based on the existing drug consumption characteristics of the hospital. The latter is defined as the number of drug shortages in a simulation cycle, which can be divided into the number of hospital shortages and the shortage of supply chain drugs.

3. Optimization Measures for Internal Control of Drug Stock in Public Hospitals in Jiangxi Province

3.1 Improving Drug Management and Control Measures

Among the various kinds of drugs in hospitals, there must be some drugs which have a small proportion of all kinds of drugs, but their sales amount accounts for a large part of the total sales amount of drugs. In order to manage these drugs more effectively, we use Pareto classification to divide the drugs into three levels of ABC. On the one hand, to ensure the clinical use of medicines while reducing the stock of medicines. On the other hand, drug use should be reasonably estimated, and the upper and lower limits of drug inventory should be revised at any time according to drug use, so as to adjust drug inventory for emergencies. The central warehouse orders the suppliers, and after the goods arrive, the goods are directly distributed to the respective warehouses. In the real environment, there are many reasons for the ambiguity, such as the lack or insufficiency of information, the contradiction between the information obtained, the ambiguity of the language describing the information itself, the measurement technology and the subjective beliefs and preferences of the individual. . Or convert the invoice information into a QR code and print it on the delivery slip. When the warehouse is in stock, scan the QR code directly to generate the invoice content. Zero inventory is a special form under the premise of full social storage guarantee. The specific method is that the hospital drug store directly delivers certain drugs directly to each pharmacy. In addition, it should be noted that due to the special nature of drugs, emergency drug use and anesthetic drugs will directly affect the quality of medical services in public hospitals in Jiangxi Province. Therefore, the safety stocks for such drugs need to be separately classified.

It can be seen from Figure 1 that although the safety stock quantity in the system is positively correlated with the lead time, the safety stock quantity required under the common parts strategy is increased faster than the non-general parts strategy.
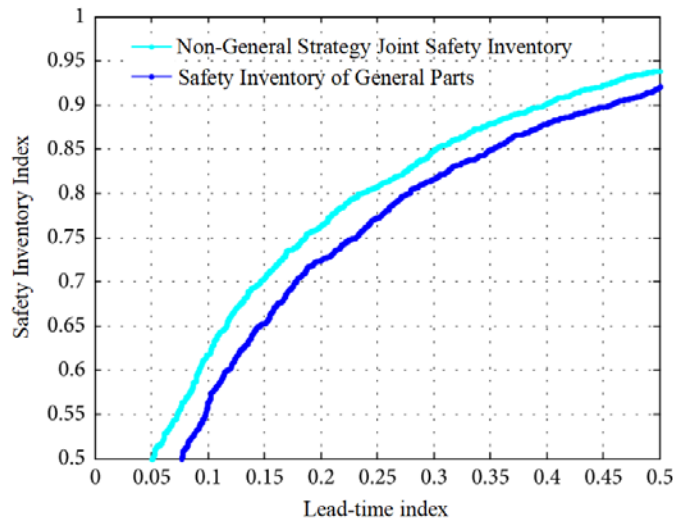
Fig.1. Data analysis result

3.2 Regulating drug use system

At present, the drug usage system of public hospitals in Jiangxi Province is not standardized, which leads to the fact that the drug accounts of public hospitals in Jiangxi Province can not match the actual quantity. At the same time, the supervision of the quality of drugs in and out of storage should not be relaxed. On the other hand, according to the characteristics of clinical medication in our hospital, such as the medication needs of patients in otolaryngology and pediatrics, the dosage of medication depends on the particularity of patients and the factors of seasonal climate change. The main reason is that the lead time is shortened, and the level of safe inventory calculated according to lead time will also be reduced. Once the random demand of supply chain terminals fluctuates greatly or exceeds expectations, there will be outages. At present, the drug usage system of public hospitals in Jiangxi Province is not standardized, which leads to the fact that the drug accounts of public hospitals in Jiangxi Province can not match the actual quantity. At the same time, the supervision of the quality of drugs in and out of storage should not be relaxed. On the other hand, according to the characteristics of clinical medication in our hospital, such as the medication needs of patients in otolaryngology and pediatrics, the dosage of medication depends on the particularity of patients and the factors of seasonal climate change. The main reason is that the lead time is shortened, and the level of safe inventory calculated according to lead time will also be reduced. Once the random demand of supply chain terminals fluctuates greatly or exceeds expectations, there will be outages.

4. Conclusion

The inventory strategy in the general inventory system always plays a game between inventory costs, transportation costs, and service levels. Public hospitals in Jiangxi Province should first improve from their own internal, comprehensively consider the impact of the external environment, then learn the enterprise inventory management model, and upgrade the drug inventory management mode and method. According to the fuzzy credibility theory and the definition of fuzzy expectation value, the credibility distribution function and the expression of the expected value of the normal fuzzy variable are derived as the basis of the later research. Furthermore, the safe inventory strategy of node enterprises and collaborative supply chain under fuzzy environment is discussed. Drug inventory management is a very arduous management work. With the improvement of information management system of public hospitals in Jiangxi Province, as long as unremitting efforts, continuous exploration, strengthening communication and learning, drug inventory management of public hospitals in Jiangxi Province will gradually become more reasonable and scientific. After the implementation of the policy of drug bidding and purchasing by government-led medical institutions, the number of drug suppliers with sales qualification has

decreased relatively, the supply of single supplier has increased, and the demand for liquidity has increased substantially. It can significantly improve the efficiency and accuracy of drug management in public hospital pharmacy of Jiangxi Province, and reduce drug inventory. It is worth popularizing and applying in drug management in public hospital pharmacy of Jiangxi Province.

Acknowledgement

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