The application of information technology in the hospital pharmacy management based on HIS

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***Abstract*—[Purpose] In order to strengthen hospital pharmacy management and guide drugs rational use, we introduce rational use and analysis software and embed it in the hospital information system (HIS). [Method] Establish drugs basic information and set using rights limit in the HIS. Implement online monitoring of antimicrobial drugs in real time and prompt rational use of the narcotic drugs, psychotropic drugs, and medicare drugs. [Result] The introduction of information technology in hospital makes the management for drugs using in accordance with the permission more simple and reliable especially in the narcotic drugs, psychotropic drugs, and medicare drugs using. Meanwhile, online monitoring of antimicrobial drugs in real time ensures antibiotics reasonable use. [Conclusion] The information technology makes us master the whole hospital drug use situation and achieve the goal of effective monitoring and scientific supervision on the clinical medication.**

Keywords-HIS; information technology; hospital pharmacy management

I. INTRODUCTION

The introduction of the new pharmacy administration regulations in medical institutions puts forward a higher requirement for hospital pharmacy management and sets a much higher request of normalization and rationality (safety, efficacy, scientificity) in clinical medication. We take effective use of hospital information system platform and realize part or all informatization from getting drug usage rights and opening the prescription. Meanwhile, we further introduce rational application drug software (Da Tong medicine software) and hospital of clinical drug analysis software (HYGEYA). We effectively supervise rational drug use and dynamically monitor antimicrobial drugs using in real time. Thus we effectively strengthen hospital pharmacy management.

II. THE ESTABLISHMENT OF BASIC INFORMATION

A. Establish the basic information of drugs

Our hospital established drugs basic information database which includes Medicine Dictionary and Pharmacology Dictionary in HIS. Medicine Dictionary contains drugs generic name, trade name, price and supports fast inquiry and recognition of a medicine. Pharmacology Dictionary includes categories, types, specifications and packing. Doctors click on the generic names of drugs can know the hospital equipped with corresponding drugs.

III. SETTING THE USING PERMISSION OF DRUGS

A. Establish the using right of antimicrobial drugs

Basing on the antimicrobial drugs hierarchical management rulers established by the Hospital Pharmacy Administration Committee, we maintain drugs information of all the antimicrobial classification properties in the dictionary of the HIS. According to the physicians title rank list provided by the medical department, we also maintain the related physician authority information in the dictionary. Related information is shown in table 1.

TABLE 1 THE PHYSICIAN WHO HAS CORRESPONDING QUALIFICATION CAN OPEN THE APPROPRIATE LEVEL OF ANTIMICROBIAL DRUGS.

Antimicrobial usage level	**Physician**	**Attending doctor**	**Anti-infective expert or above deputy director**
No Restrictions on use	Yes	Yes	Yes
Restrictions on use	No	Yes	Yes
Special use	No	No	Yes

B. Establish permission of the narcotic drugs and psychotropic drugs

For all kinds of the narcotic drugs and psychotropic drugs, we maintain special drugs related fields in the HIS drug dictionary respectively and associate it with the list of physicians who have the right of obtaining narcotic drugs and open psychotropic drugs prescription. The system suggests that "You don't have the right of using narcotic drugs" to the physician who has no right opening prescription.

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C. *The limits of using drug for patients with medicare*

According to the medical insurance "a, b, and c" category requirements we strengthen restricting the medical insurance indication drugs used for patients with proprietary disease. Once drugs over the the patients with such disease the system prompts "such drugs can not be used for these patients".

IV. THE IMPLEMENTATION OF ONLINE MONITORING

A. *Online monitor used in antimicrobial drug classification*

According to antimicrobial use classification management regulation, we associate antimicrobial drug classification properties with the doctor titles. Banning primary title doctors open "Limiting use of the drugs" and "Special use of the drugs". Banning intermediate title doctors open "special use of the drugs". The system limiting is shown in Figure 1 below.

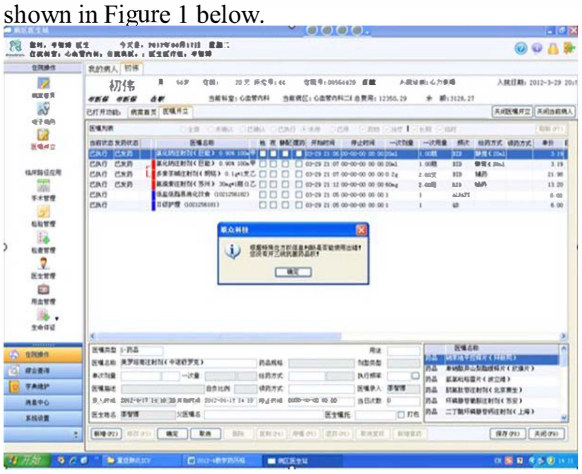

Fig. 1 Restrict physicians unauthorized using antimicrobial drugs

B. *Monitoring used in the narcotic drugs and psychotropic drugs unauthorized*

When physicians who have no appropriate permissions open the narcotic drugs and the first class psychotropic drugs, the HIS will make a mandatory prohibition program. The system prompt is shown in Figure 2.

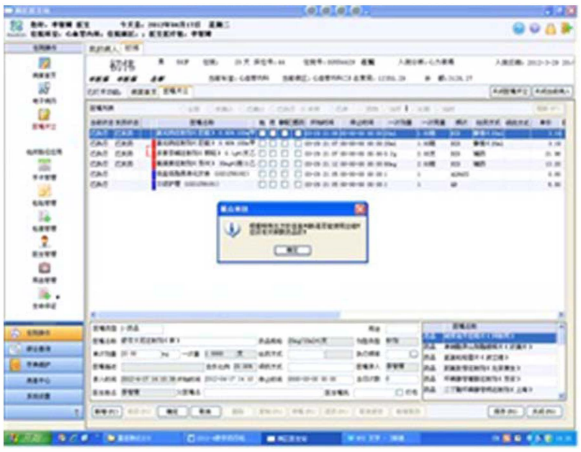

Fig. 2 The permissions hints of physicians without issued narcotic drugs

V. REASONABLE TIPS OF MEDICATION AND DYNAMIC MONITORING OF ANTIMICROBIAL DRUGS

A. *The establishment of the instructions between Da Tong medicine software and the hospital.*

We query on drug incompatibility by rational drug use software of Da Tong medicine. When the physician opens drugs of incompatibility system will display red lights blazing as warning. If the prescription drug appears physical, chemical or treatment issues there will be a red light tips. If the special pathological/physical state or route of administration is unreasonable the system will appear yellow lights tips. If drugs metabolism process in vivo influence each other the system will appear yellow lights tips. Da Tong medicine software prompts are shown in Figure 3.

Because information collected by Da Tong Medicine Drug is lack of legal effect, our hospital sets up our own package insert set and put it on the hospital OA(Office automation) net. So physicians have access to instructions with legal effect and ensure the correctness of usage, dosage, medicine given frequency, solvent species and dosage. Meanwhile, our hospital will update the instructions set provided to Da Tong medicine software timely so that they update data more conveniently. We ensure the safety and effectiveness for treating patients at the same time. The instruction set is shown in Figure 4.

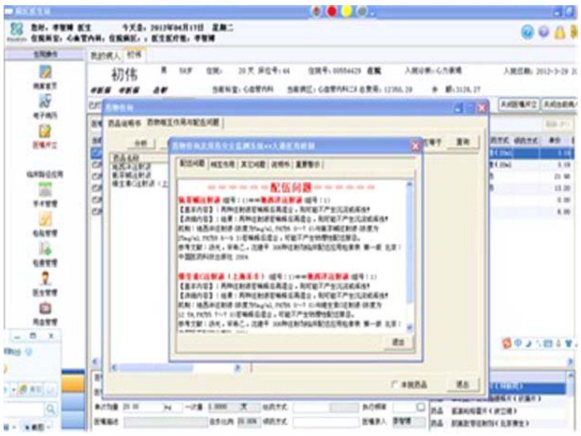

Fig. 3 Drug incompatibility tips

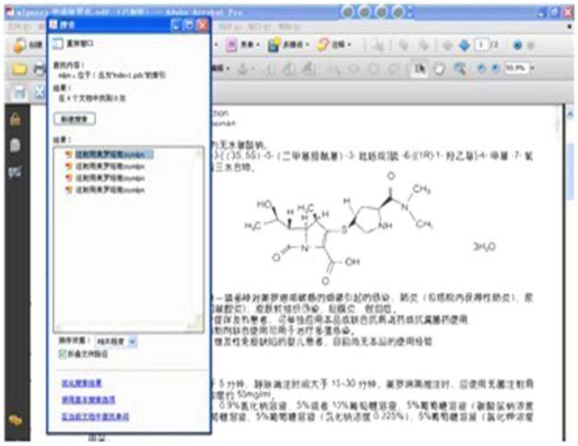

Fig. 4 Package insert query on hospital OA net

B. *Dynamic monitoring of antibacterial drugs in the HYGEYA system*

To seriously implement the "guiding principles for clinical application of antibacterial drugs" and the Ministry of health special punish activity in 2012, we monitor the use of antibacterial drugs in our hospital in real time. Our hospital introduced the HYGEYA and embed it into the HIS. We calculate hospital and departments related indicators in every month regularly which include antibacterial single-variety sales amount, sales volume ranking, daily drug number (DDDs) sort of antibacterial drugs within the same variety, average using variety of antibiotics per inpatients, inpatients using antibacterials percentage, the percentage of antibacterial drug cost accounts for the total cost. In this way we lay the foundation of antibacterial drugs corresponding management regulations. The amount of drug calculation of HYGEYA system is shown in figure 5.

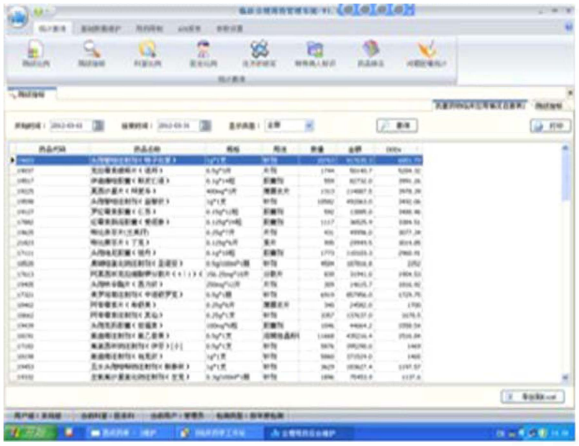

Fig. 5 Daily drug number (DDDs) sort of antibacterial drugs within the same variety

VI. EFFECT AND EXPERIENCE OF INFORMATION TECHNOLOGY AFTER THE IMPLEMENTATION.

Since our hospital applied HIS in 2007 we constantly monitor narcotic drugs, psychotropic drugs, and medicare drug. So that the management for drug used in accordance with the permission is more simple and reliable. In 2011, according to the requirements of the antimicrobial classification management we realize the antibacterial drugs classification management in HIS. The implementation of antimicrobial grading received significant management effect.

The implementation of Da Tong medicine software monitoring dosage, frequency of administration, solvent selection and drug interactions on the basis of HIS. It ensures patient medication safer and more effective. The implementation of HYGEYA software embedded in HIS ensures the dynamic monitoring of antimicrobial drugs indicators in our hospital. It provides data support for the rational use of antimicrobial drugs in our hospital.

The author believes that the information technology based on HIS in pharmacy administration is a kind of management mode in which the doctors can open prescriptions in workstation and they can be hinted using drugs reasonably. It can regulate the behavior of doctors opening drug prescription and enhance the consciousness of the execution of anesthesia, psychotropic drugs, and anti-bacterial drug classification management. Drug analysis software embedded in hospital clinical use can quickly master hospital-wide antimicrobial drug use so that we can implement effective checks and scientific supervision the clinical use of antimicrobial drugs.

VII. CONCLUSION

The information technology plays an increasingly important role in the medical and healthy services. Especially the application of information technology in the pharmacy management makes us carry out scientific management of the narcotic drugs, psychotropic drugs and medicare drug. And we realize the real-time monitoring of

antimicrobial drugs so that we avoid the abusing of antibiotics. The information technology maximum ensures the security and rationality of the patient's medication.

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