Health Biotechnology and Biopharma (2017), 1(3): 1-4

Opinion

Pharmacy informatics: A reform at drug consumption management in healthcare

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Received: October 2, 2017; **Accepted:** October 30, 2017

In recent decades, since the pharmacy has a key role in patient care, advancement in information technology has created many opportunities for pharmacists and pharmacies to leverage informatics to support their practice and improve care [1].

Pharmacy informatics (PI) is an umbrella term that describes the use and integration of data, information, knowledge, and technology involved with medication use processes to improve outcomes. The use of informatics has ranged from improving pharmaceutical care in oncology to providing clinical decision support for antimicrobial stewardship and pharmacokinetics to containing costs in managed care [2].

Generally, PI has two important applications including developments electronic prescribing systems and pharmacy information management systems. The first systems allow direct recording medication and treatment data in a computer system by physicians. The latter system collects, stores and manages the information related to the medications and their use in the patient care process [3, 4].

Application areas of PI are based on compliance with seven principles: "right patient", "right dose", "right route", "right drug", “right time", "right information” and "proper documentation". Accordingly, these areas can be divided into four categories:

1. Prescribing management: Includes analysis of medication orders, control of drug-drug interactions by monitoring drug-drug, drug-food, and drug laboratory values incompatible, drug allergies and dosage according to age, weight, and other factors affecting patient which provide alert reminders for inconsistencies.
2. Drug distribution management: Includes demographic data, pharmaceutical therapeutic classification, drug identification number, generic and brand name, strength and dosage, drug manufacturer, date of distribution, and the amount of drug distribution.
3. Inventory Management: Includes maintenance integral index of inventories and pharmaceutical barcode to control previous and current medications, expiration date of drugs, control drug inventory by type, date and distributors, report income depot, and control of monetary statistics on purchased and delivered drugs as well as control of delivered drugs to patients with specific diseases.
4. Document Management: Includes the provision of alerts about the absence of any element of the documentation such as date, signature, and the name of receiving and delivering clerk [5-8].

For transition from traditional systems in the hospitals to the pharmaceutical informatics, it is necessary that these systems interact with other information systems in the hospital to support the pharmacy workflows. These support systems are as follows:

- Patient management systems that can provide patient's demographic information for the pharmacy information system (PIS).
- Electronic prescribing systems that feed and control the process of medication orders for PIS electronically in different parts of the hospital.
- Pathology information systems that can provide PIS to receive and display the results of laboratory tests related to certain drugs (for example: determining the plasma level for gentamicin or level of serum potassium for diuretics).
- Specific prescribing systems that can provide PIS to receive specific prescription such as chemotherapy.
- Pharmacy robots that can be considered by means of labeling.
- Electronic cabinet in this way, the pharmacy computers are connected directly to the physicians and the pharmacists can remotely control drug cabinets in doctor office and after receiving the prescription; they can send signals to drug cabinets in remote to open a specific

part of it. These cabinets contain barcoded drugs. The software sends the prescription to the patient database to monitor the drug interactions and allergies, and then in the absence of danger for patient, it can confirm the medication administration. Additionally, patients can consult with pharmacist remotely [4, 9-11].

Using PI requires the infrastructures which support it effectively. These infrastructures can name the hardware that several users can simultaneously use it and change the locations. Another is wide bandwidth network to provide uninterrupted service at countrywide. Also, the data exchange based software to exchange the data easily between the different nodes or systems. The features of mobility and interoperability will also allow increased access to Telepharmacy.

On the other hand, both hardware and software systems need to be highly secured and protected against damage or loss of data. Data access levels can also determine who can access the information? How can this information be used? And finally, since healthcare services are based on social justice, access to medications and pharmacy in remote area is critical. To achieve this goal, the pharmacy information management system must be equipped with geographic information system [1-3, 5].

Using of PI reduces medication errors due to monitoring medication interactions, adverse effects, and allergies which can eliminate errors related to prescription handwriting. Interoperability and data exchange between different systems such as patient management systems, pathology information systems, and specialized clinical applications may improve quality of care and patient safety in the organization and also can integrate healthcare services as well. Moreover, optimal management of resource consumption leads to cost saving and reduce healthcare costs too. Accordingly, it can be said that the use of PI in the health system is a revolution in drug consumption management [1, 7-9].

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