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INFORMATION SYSTEMS IN PHARMACEUTICAL SERVICE MANAGEMENT

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Abstract: This article discusses the importance of information systems in pharmaceutical service management and the possibilities of digitalizing the processes of accounting, storage, distribution, and sale of medicines. In pharmaceutical organizations, working with large volumes of data directly affects the speed and accuracy of management decisions. The use of information systems makes it possible to control medicine inventories, monitor expiration dates, forecast demand, generate orders, and automate reporting processes. Along with the advantages of digitalizing pharmaceutical services, the article also analyzes problems related to information security, technical infrastructure, and the digital skills of employees. In addition, practical recommendations for the effective use of information systems in pharmaceutical organizations are provided.

Keywords: pharmaceutical service, information system, digitalization, medicines, electronic database, inventory, logistics, electronic prescription, information security, management.

Today, digital technologies are penetrating all areas of the economy and social life. As an important component of the healthcare system, the pharmaceutical sector is also increasingly in need of information technologies. Pharmaceutical organizations work with a large amount of information every day, including the names, quantities, prices, manufacturers, batches, expiration dates, sales volumes, and other characteristics of medicines. The rapid and accurate management of this information directly affects the efficiency of an organization's operations. In traditional paper-based accounting systems, searching for, updating, and analyzing information requires more time. Information systems, however, make it possible to automate these processes, store data in a unified database, and quickly obtain the information necessary for management.

The World Health Organization also emphasizes the importance of linking forecasting, procurement, warehousing, ordering, and distribution processes within the health product supply chain through effective information management [1]. Therefore, studying the capabilities of information systems in pharmaceutical service management and implementing them effectively in practice is one of the pressing issues of today.

An information system in pharmaceutical services is a set of digital tools designed to collect, store, process, and use information related to medicines and pharmaceutical activities for the purpose of making management decisions.

One of the main functions of such a system is to monitor the movement of medicines. From the moment a product is received by an organization until it is placed in a warehouse and delivered to the consumer, the entire process can be recorded electronically. This helps maintain accurate records of products.With the help of an information system, it is possible to obtain up-to-date information about the medicines available in a warehouse. For example, when the stock of a particular medicine falls below a specified level, the system can notify the responsible employee. As a result, the necessary product can be ordered in advance.

Another important area is monitoring expiration dates. When working with medicines, preventing expired products from entering circulation is an important requirement. An electronic

system helps identify products approaching their expiration dates and place them under special control.An information system also makes it possible to analyze sales data. Information about which medicines are in high demand, which products have experienced a decline in sales, and how demand has changed during a certain period is important for determining future procurement and inventory policies.

Effective management in a pharmaceutical organization depends on receiving accurate and timely information. If a manager knows how much of each product is available, which products are experiencing increased demand, and which products are approaching their expiration dates, more informed decisions can be made.In this regard, it is not sufficient to consider an information system merely as an accounting program. It should function as a tool that supports management decision-making. The data collected in the system can be analyzed to identify problems within the organization and plan future activities.

For example, if sales data from previous years indicate that demand for certain medicines increases during specific seasons, the organization can create sufficient inventory before the beginning of that period. This not only helps meet consumers' needs in a timely manner but also contributes to preventing unnecessary expenses.

The introduction of electronic reporting also increases management efficiency. The time spent preparing reports manually is reduced, the need to enter the same data repeatedly decreases, and some errors caused by human factors can be prevented.The movement of medicines from manufacturers to consumers forms a complex supply chain. Manufacturers, distributors, wholesalers, pharmacies, and other entities may participate in this process. Accurate exchange of information at each stage is important.An information system helps control medicine inventories, orders, deliveries, and warehouse conditions within logistics processes. The use of a unified electronic system accelerates information exchange between different departments.

The World Health Organization notes that the use of logistics data within a digital supply chain approach is important for ensuring the availability of medicines and other medical products [1; 2]. As a result of digitalizing pharmaceutical logistics, the ability to track product movement, reduce excessive inventories, and deliver the necessary products at the right time is increased.

Another important direction in the digitalization of pharmaceutical services is the electronic prescription system. An electronic prescription makes it possible to transmit and record information about medicines prescribed by a physician in digital form. This process facilitates the storage of prescription information and the rapid retrieval of necessary data.However, special attention must be paid to data security in pharmaceutical information systems. In addition to information about medicines, such systems may contain information related to patients and healthcare professionals. Therefore, access rights to information should be determined according to employees' responsibilities, and appropriate data protection measures should be implemented.

It is advisable to record who entered or modified information in the system, create regular backup copies, and establish appropriate security requirements for users.There are several challenges associated with implementing information systems in pharmaceutical organizations. One of them is insufficient digital skills among employees. Along with introducing a new system, it is necessary to train employees to use it effectively.

The second problem is insufficiently developed technical infrastructure. Stable internet connectivity, computers, servers, and software are important for ensuring the continuous operation of the system.

The third problem is the incompatibility of software used by different organizations. In such cases, data exchange becomes difficult. Therefore, when developing new systems, their ability to

integrate with other information systems should also be taken into account.In the author's opinion, a gradual approach to digitalizing pharmaceutical services is the most appropriate way forward. Initially, medicine accounting can be automated, followed by the integration of warehouse management, procurement, logistics, sales, and analytical management modules into a unified system.In addition, introducing an "early warning" function into the system would be useful. For example, automatically notifying responsible employees when product inventory decreases, an expiration date approaches, or demand increases sharply can improve management efficiency.

The use of information systems in pharmaceutical service management is of great importance in today's digital economy. Such systems make it possible to account for medicines, control inventories, monitor expiration dates, forecast demand, manage logistics processes, and generate reports.The greatest advantage of an information system is not simply storing data, but using it effectively to make management decisions. A properly organized digital system can help save time and resources in pharmaceutical organizations, reduce excessive inventories, and improve control over the availability of medicines.

At the same time, during the digitalization process, special attention should be paid to improving employees' qualifications, developing technical infrastructure, and ensuring information security. A pharmaceutical information system should be developed not only as a technical tool but also as a management mechanism aimed at improving the quality of services.

In the future, the development of artificial intelligence, data analysis, and automated forecasting technologies may further expand the capabilities of pharmaceutical service management. As a result, it will become possible to assess the demand for medicines more accurately, reduce interruptions in supply, and increase the ability to provide high-quality pharmaceutical services to the population.

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