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B. M. PALASIUK, M. YA. KICHULA, M. V. YAREMA

PROBLEMS AND PROSPECTS OF IMPLEMENTING LOGISTICS MANAGEMENT IN MEDICINE

Ivan Horbachevsky Ternopil National Medical University of the Ministry of Health of Ukraine, Ternopil, Ukraine

Purpose: to study the problems and directions of implementation of logistics management in healthcare in Ukraine.

Materials and Methods. The paper investigates and analyses the main tasks, problems, areas of application of logistics management, characterises logistics technologies used to manage flow processes in the healthcare system. The research materials are based on scientific articles by Ukrainian and foreign scientists, in particular, the main logistics technologies used to manage flow processes in the healthcare system are studied and analysed. Methods of structuring, analysing and summarising information are also used.

Results. The benefits of logistics are increasingly being used to improve performance in healthcare. The use of logistics in the modern healthcare sector is driven by the emergence of a large number of barriers associated with supply chain activities, which is reflected in performance indicators. The effectiveness of logistics management is largely dependent on timely, fast and accurate information, which forms the basis for rational operations, coordinating material flow in such a way as to maximise the efficiency of medical services within existing budget constraints in healthcare today. Only comprehensive information ensures fast document flow and the formation of a single information space, which in turn contributes to the reliable and continuous operation of medical institutions and helps to improve the flow of medicines and medical equipment in the regions.

Conclusions. The main problem with implementing logistics approaches is that the healthcare industry requires very specific logistics solutions, as its priority is to optimise the effectiveness of treatment, quality and only then to minimise costs.

KEY WORDS: **logistics management; healthcare industry; logistics solutions; digital technologies; supply chain.**

In today's environment, there is a growing trend towards the use of modern management achievements in areas outside the business space. This trend also covers logistics, which from the beginning of its existence has been mainly related to military affairs, but has recently begun to be used more and more in the activities of enterprises. Indeed, in the management system the use of logistics approaches has a positive impact on the economic and financial performance of the organisation, in particular, on increasing labour productivity, saving tangible and intangible resources, increasing profits, etc. Thus, the ever-growing interest in the use of logistics has led to the emergence of a fundamentally new area of logistics in management not only in the military and enterprises, but also in non-profit organisations [1].

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Results. Healthcare institutions are a complex socio-economic system with material, financial and labour resources that require effective implementation of regulatory management and marketing functions. Without knowledge of modern management and marketing, it is impossible to draw the right conclusions and improve the healthcare system. The market, with its uncertainty and competitiveness, requires each specialist to be able to make scientifically based management decisions, primarily within their professional activities. Formation of not only a doctor, but also a manager of a qualitatively new type (professional manager) for the healthcare system requires a deep understanding of the origins of management as such, its critical assessment, knowledge of the history of formation and development of the national sectoral system, familiarity with the evolution of global management and the use of experience necessary for Ukraine [2].

The term 'logistics' comes from the Greek noun λογιστική and literally means 'the art of counting'. In the scientific literature, a large number of interpretations of the concept of 'logistics' is found, as each scholar puts their own vision of the term into this category. In this context, the work of R. Tsishchyk [3] is noteworthy, in which the interpretation of the term 'logistics' was combined into the following groups:

1) Logistics is a direction of economic activity in the field of management of material assets in production and circulation, the main purpose of which is timely supply of resources;

2) Logistics is a scientific field that cannot be attributed to a single discipline and is at the same time directly related to the search for new ways to improve the efficiency of material resource flows;

3) Logistics is a concept of entrepreneurship, a new way of thinking that directs the efforts of business owners towards its strategic orientation.

However, in recent decades, logistics has gone far beyond these boundaries. Highly skilled non-business executives have long been using its benefits to improve the efficiency of their organisations. The healthcare industry has not been spared from these trends. This is primarily due to the fact that the healthcare sector is one of the main indicators of the country's development level, and given its complex socio-economic system, the use of logistics management is essential. In addition, the use of logistics is due to the emergence of a large number of barriers associated with supply chain activities, which, in turn, is reflected in performance indicators in the modern healthcare sector. Thus, healthcare logistics includes planning, management, control of the efficiency of traffic flows, transportation and storage of pharmaceuticals, medical and surgical equipment, medical devices and equipment necessary to ensure the work of personnel in medical institutions, as well as sanatoriums and pharmacies.

The healthcare sector requires very specific logistics solutions, characterised by a high level of complexity and responsibility, a thorough knowledge and understanding of applicable regulations and extensive industry knowledge, the need to meet high health and safety standards, fast delivery deadlines and the management of specific products. Most healthcare logistics tasks require the use of systems and procedures that meet the requirements of international quality standards and good manufacturing, distribution, warehousing, pharmaceutical and other practices.

Healthcare has a variety of needs including medicines, medical devices, consumables, etc. Logistics service providers specialising in healthcare have to guarantee very precise delivery conditions within tight deadlines. The delivery of healthcare products, like any other goods, must take place in the right place, at the right time, but above all, in accordance with the conditions required by the nature of the products being transported.

Crucial aspects of healthcare logistics include the task of maintaining product integrity throughout the supply chain. These complex operations can be performed by competent healthcare logistics service providers who practice logistics solutions and digital technologies specifically designed to meet the constraints faced by industry professionals. Such logistics solutions and digital technologies are indispensable links in the logistics supply chain. Healthcare is one of those industries that operates in terms of networks and supply chains, rather than individual fulfilment needs for specific consumers.

The scientific literature [4] describes logistics technologies used to manage workflow processes in the healthcare system, in particular: operational management, which ensures the implementation of all workflows with minimal total costs such as the cost of purchasing material resources, sales and promotion of medical services; subordination of organisation, planning and management in all areas of activity to the principle of 'just-in-time'; increasing the speed and accuracy of medical services through the dispatching of workflows and the introduction of modern computer technologies; monitoring and evaluation of material resources flows, organisation of their regulation from the moment of entering the operational cycle to the provision of medical services to the end user; targeting healthcare institutions to the needs of individual patients, corporate clients, development of contractual relations with large and small customers of medical services; development of horizontal relationships between healthcare institutions when they compete with each other in the process of customer service, seeking to maximise the quality of their own medical services and at minimal cost, which helps to simplify (horizontalise) multi-level hierarchical management structures; continuous implementation of logistics innovations with an assessment of the consequences of the decisions made, their impact on functional costs, including logistics costs and revenues from the sale of medical services to achieve a competitive advantage for healthcare facilities, etc.

Supply chain management requires control over the movement of medicines, materials and medical equipment, as this directly affects both the efficiency of the participants involved and the health of patients. That is why medical logistics is unique in that its priority is to optimise the effectiveness of treatment, its quality, and only then to minimise costs. In this area the use of logistical approaches would optimise the process of service delivery in order to eliminate queues and reduce the number of staff required, which would allow the released funds to be used to improve the quality of service delivery. Some steps to optimise the healthcare sector have already been taken as

part of the healthcare reform: the process of providing healthcare services has been optimised through the use of electronic queues, electronic prescriptions, and the creation of an electronic healthcare system for doctors.

For management to deliver value, it must be fast. This is demanded by customers who dictate demand within the existing limitations of the organisational means available to firms. One of the trends that make this speed possible is the comprehensive automation of all human activities. It accelerates and standardises the exchange of information in every area of business. It includes, for example, elements such as identifying the stream of goods or the automatic exchange of data and documents. An example of such automation is the use of barcoding and RFID (Radio Frequency Identification Tag) technology: barcodes and radio tags that form the basis of a product's electronic code.

Effective tracking of the products in the supply chain improves inventory management and ensures that the right product is in the right place. This requires the implementation of detailed identification at the level of each product or batch of goods and the ability to manage this data. The main applications of barcoding are receiving and issuing goods in the warehouse by automated filling of documents through reading the barcode of the product in the system of wholesale trade and sale of medicines and medical products. The manufacturer uses a special printer to apply a unique barcode to the packaging, which contains information about the product, either directly during production or separately on the finished product.

Barcode technology is also the basis of GS1 standards, which are used as national standards in the healthcare industry in various countries, including Australia, Brazil, Japan, New Zealand and the UK. This system helps to create an efficient supply chain, ensure effective tracking of the movement and passage of products from the manufacturer to the patient, and thus better protect against possible errors or product falsification. The experience of using this system around the world indicates the benefits that can be gained from its use: reduced time and costs, reduced stocks and, ultimately, increased patient safety. In the near future, it is hoped that each medical product will have its own unique identification number, which will serve as a guarantee of its quality [5].

An illustrative example is the use of barcoding in the healthcare sector, which is essential for ensuring the circulation of medicines, and for hospitals – patients, materials and medical equipment. According to many European experts, the introduction of barcodes in the healthcare industry has a direct impact on reducing the risks inherent in this sector. In particular, studies conducted in the US, UK, New Zealand and Australia show that more than 19% of all medical errors are due to errors related to the administration of medicines to inappropriate patients, which can lead to a decrease in the effectiveness of therapy and may result in health deterioration and even death. Another threat to patient safety is the problem of counterfeit medicines and medical supplies. Very often, neither the pharmacist, nor the healthcare professional, nor the patient can identify a counterfeit.

RFID codes are very close to barcodes in terms of their functionality. Like bar coding, the use of RFID (Radio Frequency Identification Tag) technology and radio tags, which form the basis of the electronic product code, is designed to accelerate and standardise the circulation of information in any field of activity.

Ukrainian researchers emphasise the important role of RFID implementation in the healthcare sector, for example, in relation to the implementation of information contained, on the one hand, in existing patient data systems in primary care facilities, and, on the other hand, in the general system operating in a certain administrative territory (e.g. in Ukraine, the European Union, etc.). This would reduce the time (which in some cases is crucial for the patient's life and health) required to find the initial information and, in addition to general health information, it would allow the identification of the patient's eligibility for certain healthcare benefits or access to possible sources of funding for treatment. The system would be complemented by identification cards for staff, which would allow for the appointment of a single person responsible for taking action with patients. This, on the one hand, will help to improve the quality and, therefore, the safety of medical services for patients, and, on the other hand, to ensure unity of management of healthcare logistics.

Additionally, the use of RFID technology in the healthcare sector (for example, in combination with barcodes) allows for increased labour efficiency, improved customer service or detection of errors that occur due to negligence, not only at the patient identification points – reception, waiting room, doctor's office, operating room, laboratory, pharmacy (where code readers can be installed), but also throughout the entire territory of the medical facility. Coding of data and goods, detailed recording of information about their location in, for example, the point of delivery of goods, the point of selection of materials for analysis, laboratory, pharmacy, laundry, kitchen leads to a reduction in hospital costs and increased patient safety.

Only the holistic adoption of RFID technology and its full implementation in the information system of a healthcare organisation will guarantee synergistic effects, which are manifested in an increase in the speed and accuracy of information circulation regarding patient identification, control of prescribed tests, medical procedures and medications, and optimal management of currently available resources. In this way, the integration of certain data in a single place and time gives the doctor access to previous test

results and treatments. This greatly improves the standard of patient care and allows for quick, organised action. In addition, the analysis of historical data is useful in terms of finding the best solution for a particular case, based on the experience of its solution. This area of using logistics approaches in medicine is still in its infancy in Ukraine, so it will take some time before the benefits of its application are fully realised.

The problem of creating an efficient corporate logistics system is quite complex and multifaceted. It cannot be solved by individual measures. It must be a whole range of measures implemented in a coordinated manner within a single model. It is not only the integration of an organisation's internal logistics system that is becoming increasingly important, but also intersystem integration, which covers the links between the logistics systems of individual business entities, primarily the integration of logistics processes. Recently, the healthcare sector has been optimised by merging the activities of healthcare professionals, which has significantly reduced their number. This has freed up additional resources and improved the quality of medical services. At the same time, there is a negative aspect, which is expressed in the closure of hospitals in rural areas, which creates obstacles for patients to receive quality, and most importantly, timely medical services, and also contributes to the increase in the unemployment rate of medical workers.

Conclusions. To summarise, the benefits of logistics are increasingly being used to improve performance in healthcare. In addition, the use of logistics in the modern healthcare sector is driven by the emergence of a large number of barriers associated with supply chain activities, which, in turn, is reflected in performance indicators.

The effectiveness of healthcare logistics management today is largely dependent on timely, fast and accurate information, which forms the basis for rational operations, coordinating the flow of materials in such a way as to maximise the efficiency of medical services within existing budget constraints. Only comprehensive information ensures fast document flow and the formation of a single information space, which, in turn, contributes to the reliable and continuous operation of medical institutions and helps to improve the flow of medicines and medical equipment in the regions.

Prospects for further research are to study the application of logistics approaches to optimising the supply chain of medicines and equipment in order to ensure timely and complete satisfaction of consumer needs and eliminate all contradictions, taking into account the specifics of the industry.

Bibliography

1. Михальчук В. М. Проблематика логістики в медицині. В. М. Михальчук, А. В. Коломоєць, О. К. Толстанов, З. В. Гбур. *Український медичний часопис*. 2020. Т. 2, № 2 (136). Т. 2. С. 1–5.
2. Основи менеджменту і маркетингу в медицині : навчальний посібник. Т. В. Єрошкіна, О. П. Татаровський, Т. М. Полішко, С. С. Борисенко. Дніпропетровськ : РВВ ДНУ, 2012. 64 с.
3. Ціщик Р. В. Аналіз застосування інноваційних логістичних підходів до діяльності медичних установ. *Приазовський економічний вісник*. 2019. Вип. 4 (15). С. 168–172.
4. Лісна А. Г. Напрямки впровадження логістичних підходів в організацію охорони здоров'я. А. Г. Лісна, О. В. Посилкіна, О. В. Літвінова *Управління, економіка та забезпечення якості в фармації*. 2020. № 2 (62). С. 45–54.
5. Фармацевтична галузь України підбила підсумки і спрогнозувала плани на майбутнє В. Фазлєєва. *Кардіоревматологія*. № 1 (177). URL: www.health-medix.com/articles/liki_ukr/2014-02-28/ofits.pdf.

References

6. Mykhalchuk, V.M., Kolomoyets, A.V., Tolstanov, O.K., & Hbur, Z.V. (2020). Problematyka lohistyky v medytsyni [Problems of logistics in medicine]. *Ukrayinskyy medychnyy chasopys – Ukrainian Medical Journal,* 2 (136). 164–172 [in Ukrainian].
7. Yeroshkina, T.V., Tatarovskyy, O.P., Polishko, T.M., & Borysenko, S.S. (2012). Osnovy menedzhmentu i marketynhu v medytsyni: navchalnyi posibnyk [Basics of management and marketing in medicine: teaching. manual]. Dnipropetrovsk: RVV DNU. 64 p. [in Ukrainian].
8. Tsishchyk, R.V. (2019). Analiz zastosuvannya innovatsiynykh lohistychnykh pidkhodiv do diyalnosti medychnykh ustanov [Analysis of the application of innovative logistic approaches to the activity of medical institutions]. *Pryazovskyy ekonomichnyy visnyk – Pryazovsky Economic Bulletin, 4 (15)*, 168–172 [in Ukrainian].
9. Lisna, A.H., Posylkina, O.V., & Litvinova, O.V. (2020). Napryamky vprovadzhennya lohistychnykh pidkhodiv v orhanizatsiyu okhorony zdorovya [Directions for the implementation of logistic approaches in the organization of health care]. *Upravlinnya, ekonomika ta zabezpechennya yakosti v farmatsiyi – Management, economics and quality assurance in pharmacy,* 2 (62), 45–54 [in Ukrainian].
10. Fazlyeyeva, V. (2020). Farmatsevtychna haluz Ukrayiny pidbyla pidsumky i sprohnozuvala plany na maybutnye [The pharmaceutical industry of Ukraine summed up the results and predicted plans for the future]. *Kardiorevmatolohiya – Cardiorheumatology,* 1 (177). Retrieved from: www. health-medix.com/articles/liki_ukr/2014-02-28/ofits.pdf [in Ukrainian].

ПРОБЛЕМИ І ПЕРСПЕКТИВИ ВПРОВАДЖЕННЯ ЛОГІСТИЧНОГО МЕНЕДЖМЕНТУ В МЕДИЦИНІ

Б. М. Паласюк, М. Я. Кічула, М. В. Ярема
Тернопільський національний медичний університет імені І. Я. Горбачевського МОЗ України, м. Тернопіль, Україна

Мета: дослідити проблеми і напрями впровадження логістичного менеджменту в охороні здоров'я України.

Матеріали та методи. У роботі досліджено та проаналізовано основні завдання, проблеми, напрями застосування логістичного менеджменту, охарактеризовані логістичні технології, які використовуються для управління потоковими процесами в системі охорони здоров'я. Матеріалами для дослідження слугували наукові статті українських і закордонних вчених, зокрема, досліджено та проаналізовано основні логістичні технології, які використовуються для управління потоковими процесами в системі охорони здоров'я. Також застосовані методи структурування, аналізу й узагальнення інформації.

Результати. Переваги логістики все ширше застосовуються для підвищення ефективності діяльності в медицині. Застосування логістики в сучасній сфері охорони здоров'я зумовлено появою великої кількості бар'єрів, пов'язаних із діяльністю у ланцюгах постачання, що, зі свого боку, знаходить відображання у показниках ефективності функціонування. Ефективність управління логістикою у сфері охорони здоров'я сьогодні значною мірою залежить від своєчасної, швидкої і точної інформації, яка становить основу раціональної діяльності, координуючи матеріальний потік у такий спосіб, щоб максимізувати ефективність медичних послуг за наявних обмежень бюджету. Тільки комплексна інформація забезпечує швидкий документообіг і формування єдиного інформаційного простору, що, зі свого боку, сприяє надійній та безперервній роботі медичних закладів, допомагає вдосконалити потік вантажоперевезень лікарських засобів і медичного обладнання в регіонах.

Висновки. Основною проблемою впровадження логістичних підходів є те, що галузь охорони здоров'я потребує дуже специфічних логістичних рішень, оскільки її пріоритетом є оптимізація ефективності лікування, його якості та лише потім – мінімізація витрат.

КЛЮЧОВІ СЛОВА: **логістичний менеджмент; галузь охорони здоров'я; логістичні рішення; цифрові технології; логістичний ланцюг.**

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Відомості про авторів:
Паласюк Богдан Михайлович – кандидат економічних наук, доцент кафедри медичної фізики діагностичного та лікувального обладнання Тернопільського національного медичного університету імені І. Я. Горбачевського МОЗ України; ORCID https://orcid.org/0000-0002-7684-8214.
Кічула Марія Ярославівна – кандидатка педагогічних наук, доцентка кафедри іноземних мов Тернопільського національного медичного університету імені І. Я. Горбачевського МОЗ України; ORCID https://orcid.org/0000-0002-1781-2529.
Ярема Михайло Васильович – здобувач вищої освіти 3 року навчання за спеціальністю 222 «Медицина» медичного факультету Тернопільського національного медичного університету імені І. Я. Горбачевського МОЗ України.

Електронні адреси для листування: palasyukbm@tdmu.edu.ua, kishylamj@tdmu.edu.ua